Operating Instructions

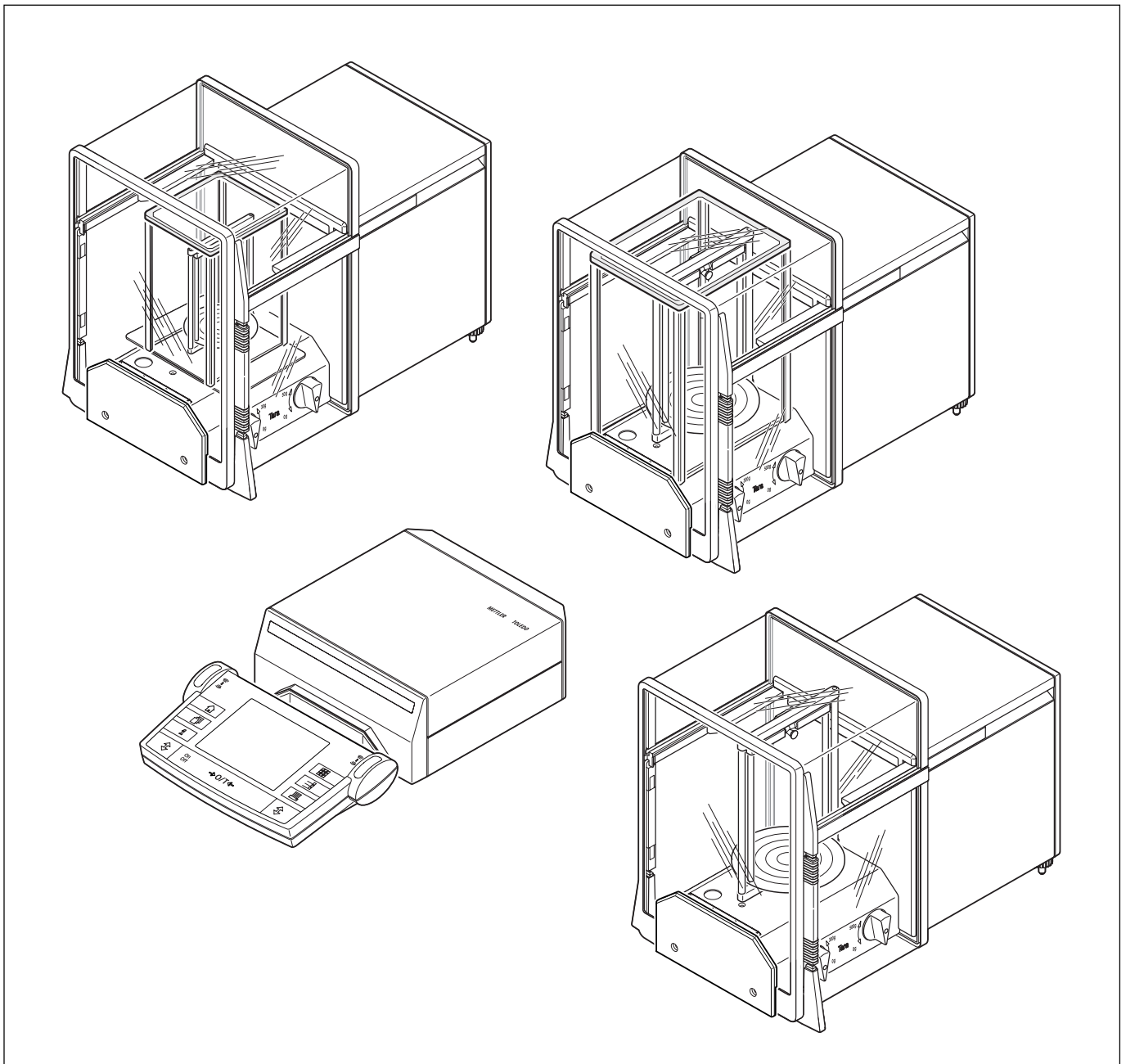# METTLER TOLEDO
AX106 Comparator, AX206 Comparator
AX1005 Comparator, AX2005 Comparator
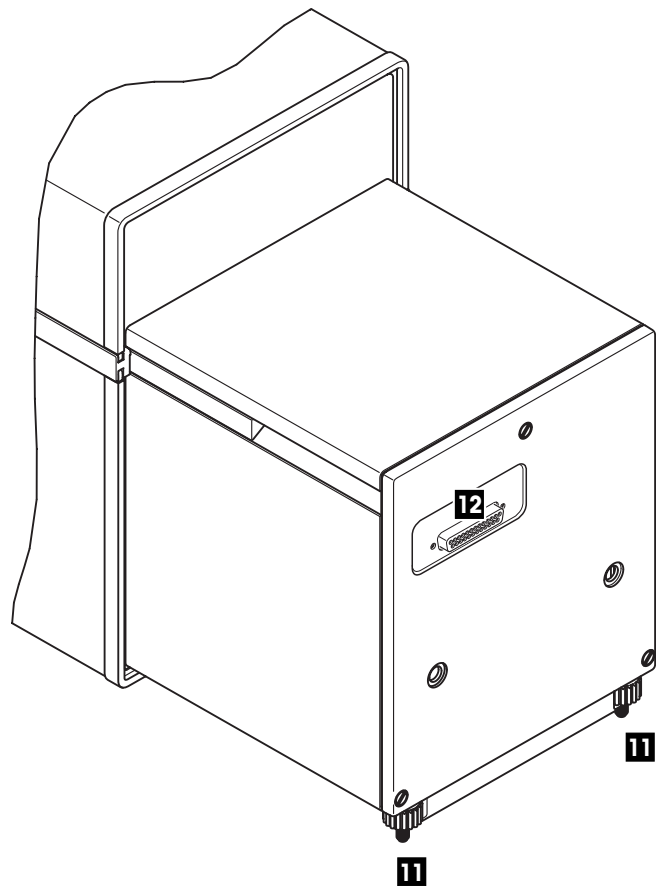# AX1004 Comparator

METTLER TOLEDO

Overview of your AX106/206 mass comparator
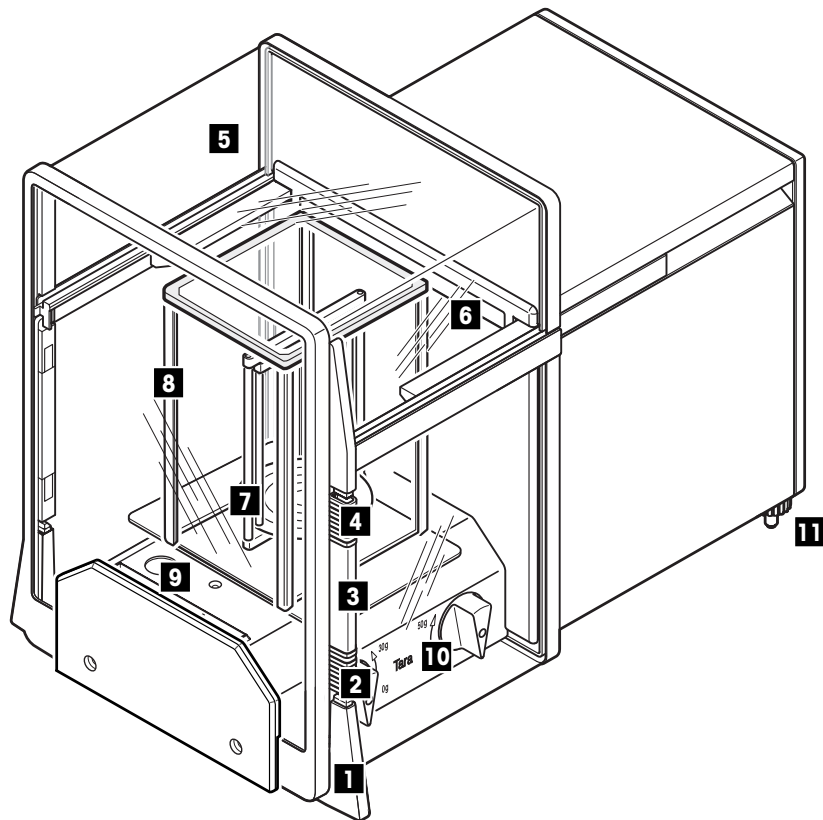
1 Door follower handle
2 Lower door coupling element
3 Door handle
4 Upper door coupling element
5 Glass draft shield
6 Typename
7 Weighing pan
8 Inner draft shield
9 Level indicator
10 Control knobs for dial weights
11 Leveling screw
12 Socket for control unit

Overview of your AX1005/2005 and AX1004 mass comparator

AX1005/2005

AX1004
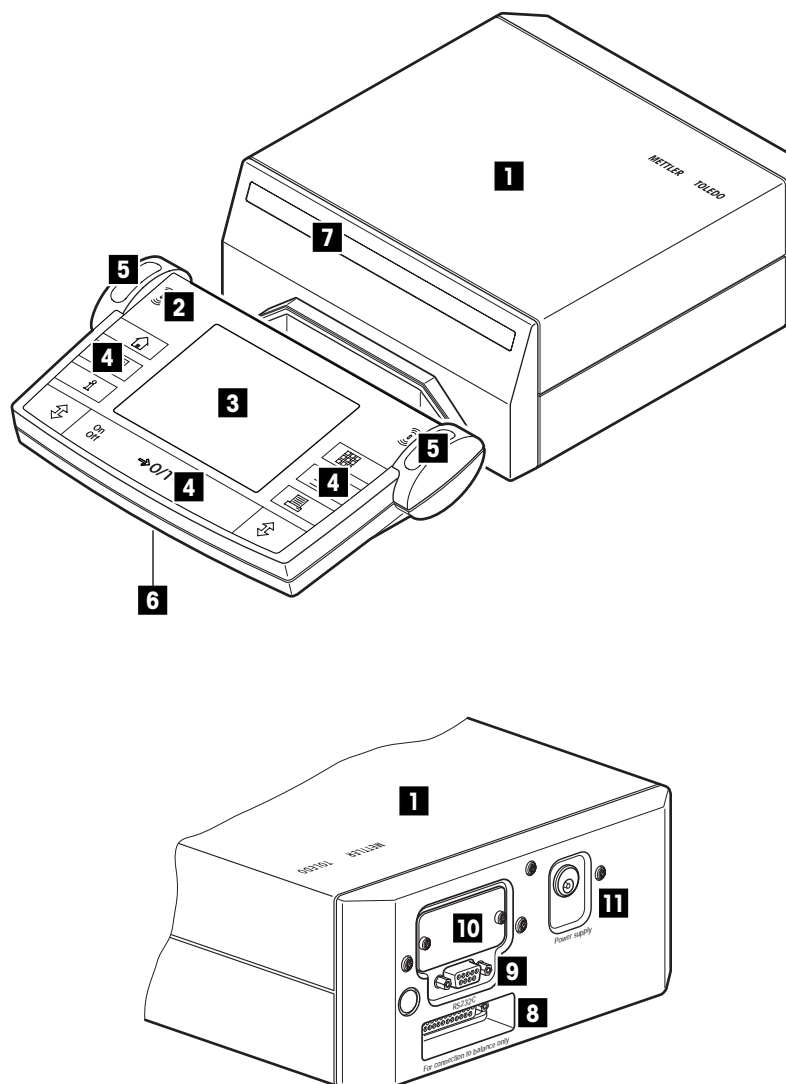
1   Door follower handle
2   Lower door coupling element
3   Door handle
4   Upper door coupling element
5   Glass draft shield
6   Typename
7   Weighing pan
8   Inner draft shield (AX1005/2005)
9   Level indicator
10 Control knobs for dial weights
11 Leveling screw
12 Socket for control unit
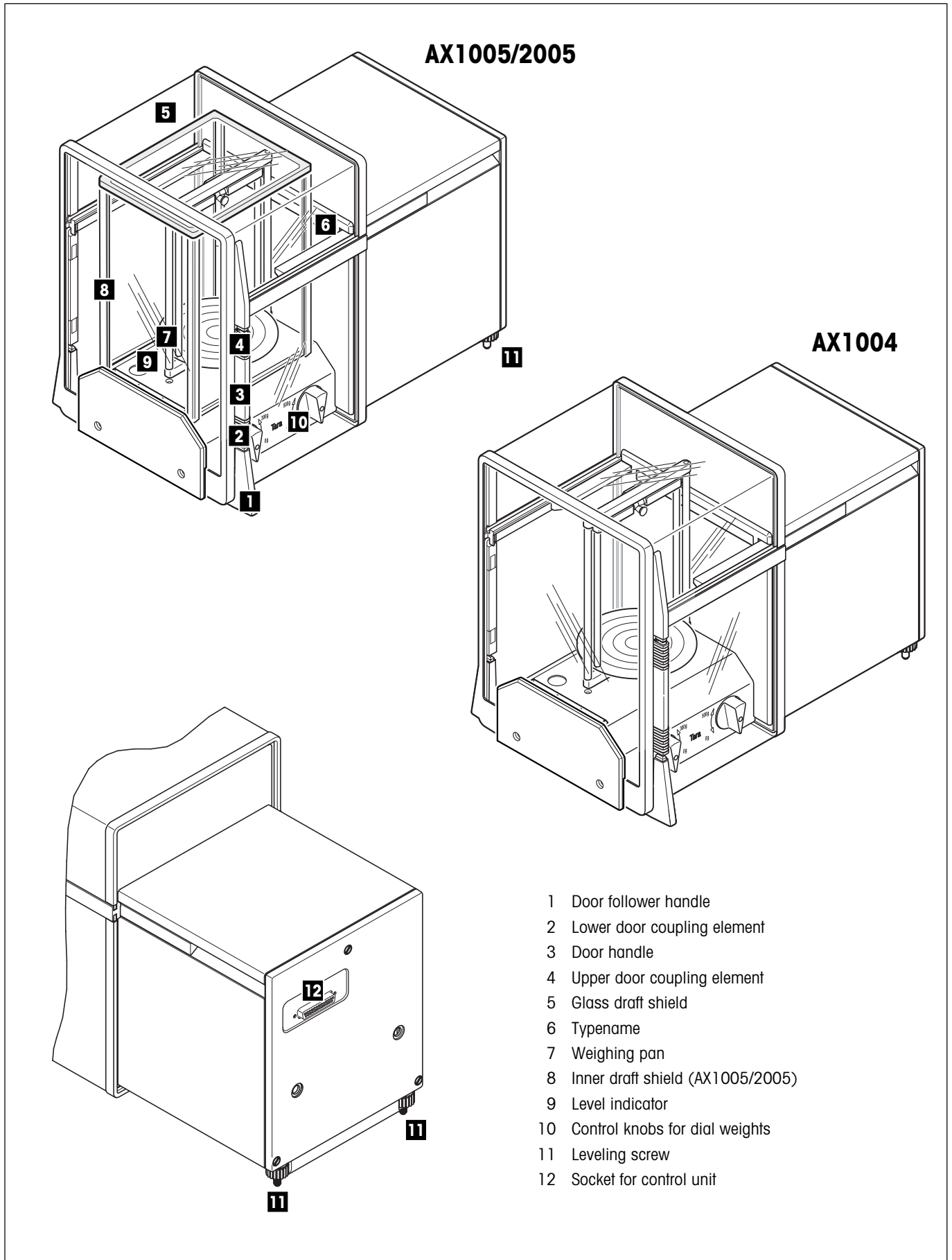
Overview of your control unit

1   Control unit
2   Terminal (for details see Chapter 4)
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   RS232C serial interface
10 Slot for second interface (optional)
11 Socket for AC adapter

Contents

6

8

1   Getting to know your mass comparator

In this chapter you will be given basic information about your balance. Please read right through this chapter 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 mass comparator.

The mass comparators of the AX line combine a large number of weighing and adjustment possibilities with exceptionally convenient operation. With these new-generation balances additional applications and software updates can be downloaded from the Internet and loaded into the balance.

Please read right through these operating instructions carefully so that you can fully utilize all the possibilities your mass comparator offers.

These operating instructions apply to all AX106, AX206, AX1005, AX2005 and AX1004 mass comparators.
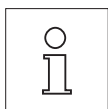
Note: You receive separate operating instructions for working with the "WeighCom" application for comparing masses included in the delivery.

1.2   Introducing the AX106, AX206, AX1005, AX2005 and AX1004 mass comparators

The following features are common to the AX106, AX206, AX1005, AX2005 and AX1004 mass comparators:

– Glass draft shield with motorized opening for precise weighing even in unstable environments.
– Adjustment (calibration and linearization) using internal weight at a keystroke.
– Integrated applications for normal weighings and WeighCom (guided mass comparison). If required, further applications can be downloaded from the Internet onto your computer and from there onto your 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 AX mass comparators.**
– Key designations are indicated by double angular parentheses (e.g. «**On/Off**» or «🖰»).
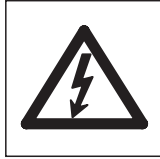
These symbols indicate safety notes and hazard warnings which, if ignored, can cause personal danger to the user, damage to the balance or other equipment, or malfunctioning of the balance.
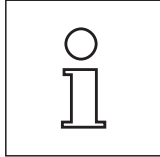
This symbol indicates additional information and notes which make using your mass comparator easier, and help you to use it correctly and efficiently.

1.4   Safety first

To ensure safe and trouble-free operation of your mass comparator, 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 mass comparator only in accordance with the instructions contained in this manual.

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

The mass comparator may only be used in enclosed interior rooms. It is not permitted to use the balance in hazardous environments.
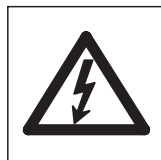
Use only the AC adapter delivered with your balance, and check that the voltage printed on it is the same as your local power supply voltage. Only plug the adapter into a socket which is grounded.

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

Although mass comparator 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 und das Auswertegerät: it does not contain any parts which can be maintained, repaired, or replaced by the user. If you ever have problems with your mass comparator, contact your METTLER TOLEDO dealer.

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

2 Setting up the mass comparator

This chapter explains how to unpack your new mass comparator, and how to set it up and prepare it for operation. When you have carried out the steps described in this chapter, your mass comparator is ready for operation.

2.1 Unpacking and checking the delivered items

When you receive the mass comparator, please check that all parts have been delivered.

Open the packaging and carefully remove all the parts. The standard delivery comprises the following items:

– Weighing cell and control unit with terminal installed

– Weighing pan and draft cover, internal draft shield, external draft shield AX106/AX206

– AC adapter with country-specific power cable

– Connection cable for connecting the weighing cell to the control unit

– Protective cover for the terminal

– Cleaning brush

– Weighing tweezers

– Production certificate

– Operating instructions (this document)

– Operating instructions "WeighCom" Application

– Booklet "Weighing the right way with METTLER TOLEDO"

– Instructions for the "METTLER TOLEDO Standard Interface Command Set" (MT-SICS), in English
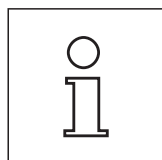
Please keep all parts of the packaging. This packaging provides the best guarantee of protection when transporting your balance (Chapter 2.7).

2.2 Preparatory tasks

The AX mass comparators have different weighing pans and draft covers. Please observe the following instructions for installing these parts:

Use the cable delivered with the mass comparator to connect the balance to the control unit and the weighing cell. It does not matter which end of the cable you connect to the control unit or 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 and leveling the mass comparator

Your balance is a precision instrument. Its accuracy and reliability depend on its being placed in an optimal location:
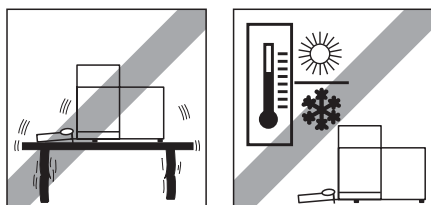
Choose a position which is stable, free from vibration, and as nearly horizontal as possible. The supporting surface must be able to bear the weight of the fully loaded balance safely. A stone table is recommended for mass comparator.

Pay attention to the environmental conditions (see technical data).

Avoid:

– Direct sunlight

– Strong drafts (e.g. from fans or air conditioning)

– Excessive fluctuations in temperature.

Level the balance: Turn the two leveling screws at the back of the balance housing until the air bubble of the level indicator is in the inner circle.

2.4 Power supply
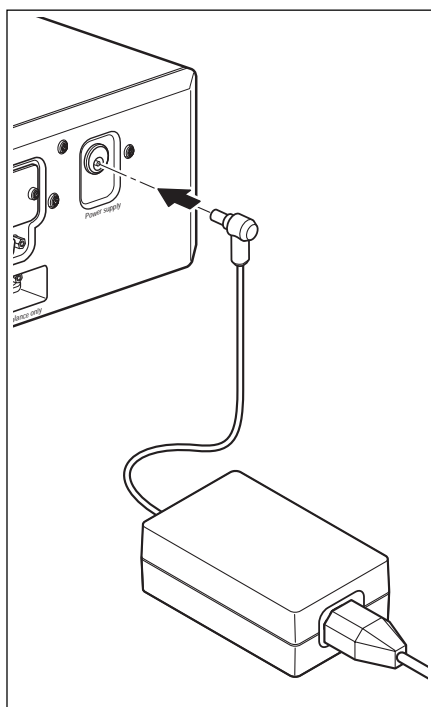
Your balance is delivered complete with an AC adapter and a country-specific power supply cable. The AC adapter is suitable for all power supply voltages in the range:
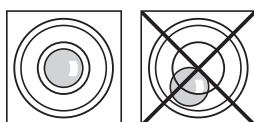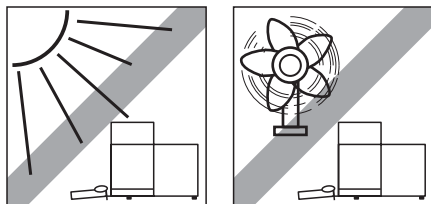
$100 - 250\,VAC$, $-10/+15\%$, $50 - 60\,Hz$.

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.

AX mass comparator:

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.

2.5   Glass draft shield

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

Draft shield on AX mass comparator

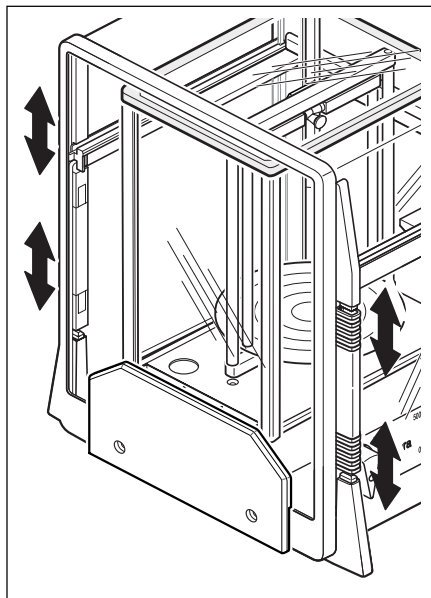The position of the coupling elements determines which parts (left-hand, right-hand, and upper door) of the glass draft shield can be opened.

Try out various different combinations by moving the 4 coupling elements up and down. We recommend arranging the glass draft shield in such a way that only those parts are opened that are necessary for loading. Your mass comparator then works faster, because the disruptive air currents are weaker than when the glass draft shield is completely open.

The doors of the glass draft shield can be opened and closed either by means of the «↕» key, the "SmartSens" sensors, or by hand (this will be described in detail later in these operating instructions).

Note: To open the doors by hand, the two lower coupling elements must always be uncoupled (upper position)!

2.6   Adjusting the reading angle and positioning the terminal

So that you can work without fatigue, the reading angle of the terminal can be adjusted. For delivery, the terminal is fastened to the control unit. So that you can arrange your workplace optimally, the terminal can be disconnected from the control unit and positioned separately.

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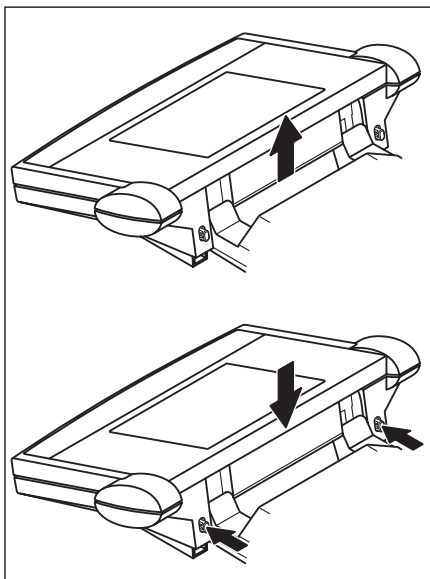
If you wish to have a flatter reading angle, press the two stop buttons on the back of the terminal and press the terminal downward. Release the two stop buttons and the terminal will then click into the desired position.

Removing the terminal from the control unit

Switch off the mass comparator.

Fold the terminal upward.

Note: to do this, the terminal must be in the lowest setting position (flattest reading angle).
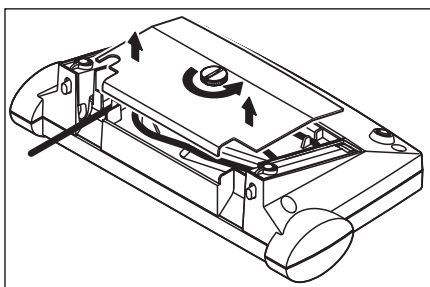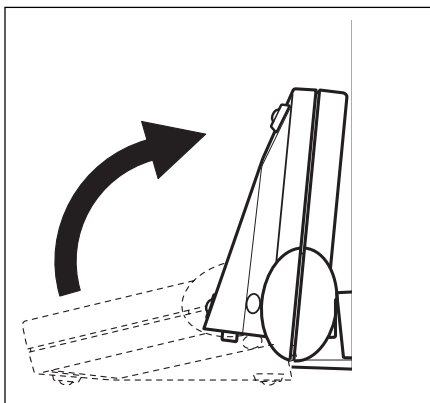
Unscrew the knurled screw underneath the terminal and remove the cover.

Pull the connecting cable gently out of the tension relievers. Unwind the cable. Replace the cover and fasten it with the knurled screw.

Fold the terminal forward again into its normal position.

Grasp the back of the terminal and pull it slowly upward until it clicks into the top position (steepest reading angle).
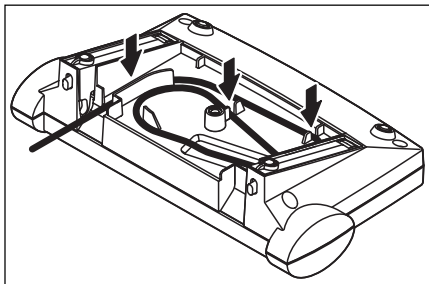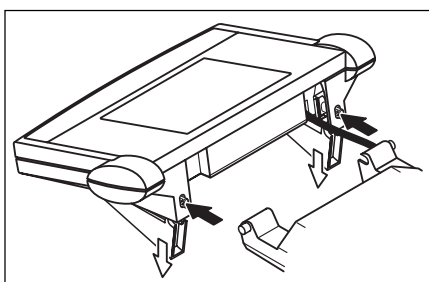
Press the two stop buttons on the back of the terminal and pull the terminal further upward. By doing this you release the two feet of the terminal from their mountings. Place the terminal in the desired location. Press the two stop buttons and lower the feet back into the terminal.
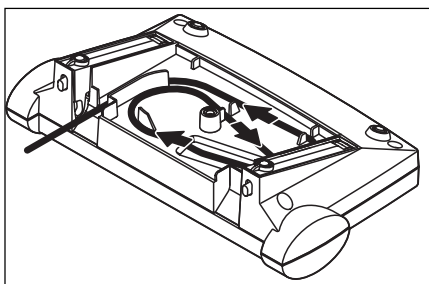
To fasten the terminal onto the control unit again, carry out the procedure in the reverse order. Please refer to the illustration on the left: it shows how to place the cable correctly in the terminal housing.

2.7   Location change

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

2.8   Below-the-balance weighing

So that weighings can be carried out below the working surface (below-the-balance weighing), your balance is provided with a special hanger.
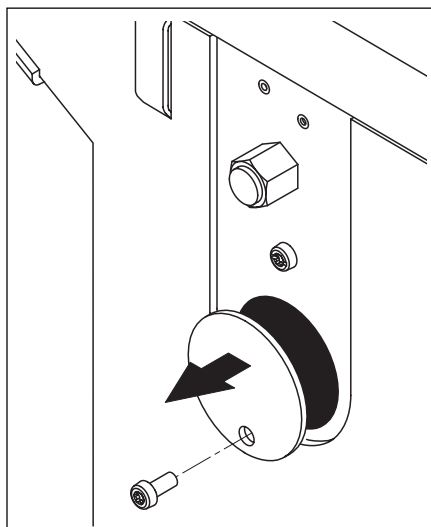
Switch off the mass comparator and unplug the cable of the AC adapter from the back of the control unit. Also remove any interface cables. Open the glass draft shield and remove the weighing pan.

Pull the balance carefuly over the edge of the table until the cover of the hanger for weighing below the balance is accessible.

Unscrew the screw of the cover of the hanger and remove the cover.

The balance is now ready for installing the feedthrough for below-the-balance weighing.

3   Your first weighing

In this chapter you will get to know the operating and display elements of your mass comparator which are necessary to carry out simple weighings. This chapter provides a first introduction to operating your mass comparator.

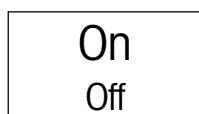## 3.1   Switching the mass comparator on and off

Note: – Turn control knobs of dial weights to "**0g**"

– Place supplied weight on the weighing pan (with tweezers or weight fork):
AX106: 100 g; AX206: 200 g; AX1005/1004: 1 kg AX2005: 2 kg

– Plug in power connector

<table>
<tr><td>On
Off</td><td>**To switch the balance on:** Briefly touch the **«On/Off»** key. After the balance has been switched on, it carries out a short test and is then ready for weighing.</td></tr>
</table>

⚖ Weighing Home	14.Apr 2000	9:18
	0.0000 g	
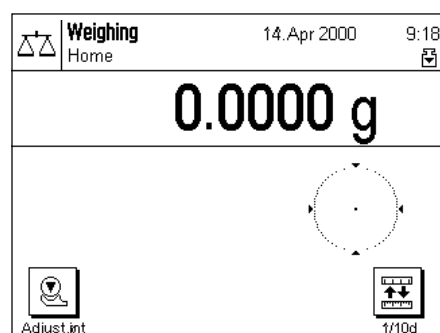
When the balance is **switched on for the first time**, the indicator shown at the side appears.
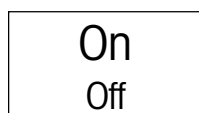
<table>
<tr><td>On
Off</td><td>**To switch the balance off**: Touch the **«On/Off»** key and press it until "OFF" appears in the display. The display then goes off, and the balance is switched off.</td></tr>
</table>

3.2   Large electrical range

Schematic representation of substitution principle

Item being weighed

Dial weights

Electrical compensation system
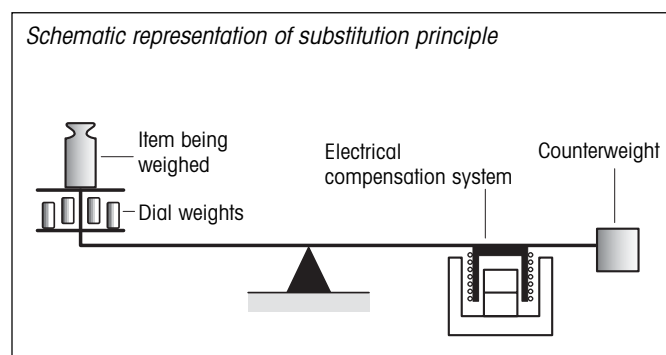
Counterweight

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.

Weighing range

Complete weighing range

Dial weights (internal)   Electrical weighing range
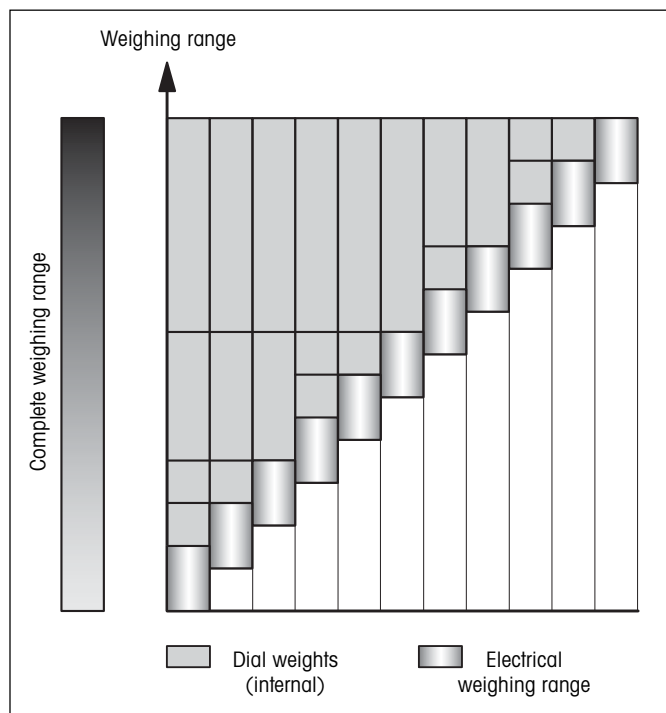
In contrast to the mechanical dial weight balances, handling of the AX mass comparator is practically as simple as that of the standard AX balance!

Thanks to the enormous electrical range, 109 g with the AX1005/AX2005/AX1004 or 11 g with the AX106/AX206, the AT mass comparator needs only 4 dial weights.

- Two are manually switchable.
- Two by pressing the «☺☺» key under the "WeighCom" application.

3.3   Settings for work with the mass comparators

Weight range		Setting of the dial weights		
		50 g / 500 g	30 g / 300 g	10 g / 100 g
AX106	AX1005	Knob setting		Display (Application "WeighCom")
	AX1004	**Manually switchable**		**Keypad operation: key«☺☺»**
0 - 10 g	0 - 100 g	◖	◖	☺☺
10 - 20 g	100 - 200 g	◖	◖	☺☺
20 - 30 g	200 - 300 g	◖	◖	☺☺
30 - 40 g	300 - 400 g	◖	◗	☺☺
40 - 50 g	400 - 500 g	◖	◗	☺☺
50 - 60 g	500 - 600 g	◖	◗	☺☺
60 - 70 g	600 - 700 g	◗	◖	☺☺
70 - 80 g	700 - 800 g	◗	◖	☺☺
80 - 90 g	800 - 900 g	◗	◗	☺☺
90 - 100 g	900 - 1000 g	◗	◗	☺☺
100 - 111 g	1000 - 1109 g	◗	◗	☺☺

| Weight range AX206 | Setting of the dial weights | | | Disc weight |
	50 g | 30 g Knob setting Manually switchable		10 g Display (Application "WeighCom") Keypad operation: key «⊙⊙»	on the weighing pan load ◢ release ◥
0 - 10 g	◐	◐	⊙⊙	◢
10 - 20 g	◐	◐	⊙⊙	◢
20 - 30 g	◐	◐	⊙⊙	◢
30 - 40 g	◐	◐	⊙⊙	◢
40 - 50 g	◐	◐	⊙⊙	◢
50 - 60 g	◐	◐	⊙⊙	◢
60 - 70 g	◐	◐	⊙⊙	◢
70 - 80 g	◐	◐	⊙⊙	◢
80 - 90 g	◐	◐	⊙⊙	◢
90 - 100 g	◐	◐	⊙⊙	◢
100 - 110 g	◐	◐	⊙⊙	◢
110 - 120 g	◐	◐	⊙⊙	◥
120 - 130 g	◐	◐	⊙⊙	◥
130 - 140 g	◐	◐	⊙⊙	◥
140 - 150 g	◐	◐	⊙⊙	◥
150 - 160 g	◐	◐	⊙⊙	◥
160 - 170 g	◐	◐	⊙⊙	◥
170 - 180 g	◐	◐	⊙⊙	◥
180 - 190 g	◐	◐	⊙⊙	◥
190 - 200 g	◐	◐	⊙⊙	◥
200 - 211 g	◐	◐	⊙⊙	◥

Weigh range	Setting of dial weights		
AX2005	500 g | 300 g Knob setting Manually switchable		100 g Display (Application "WeighCom") Keypad operation: key « 🙂 »
998 - 1100 g	◗	◗	🙂
1100 - 1200 g	◗	◗	🙂
1200 - 1300 g	◗	◗	🙂
1300 - 1400 g	◗	◗	🙂
1400 - 1500 g	◗	◗	🙂
1500 - 1600 g	◗	◗	🙂
1600 - 1700 g	◗	◗	🙂
1700 - 1800 g	◗	◗	🙂
1800 - 1900 g	◗	◗	🙂
1900 - 2000 g	◗	◗	🙂
2000 - 2109 g	◗	◗	🙂

3.4   Carrying out a simple comparative weighing

To carry out a simple comparative weighing, you need only use the keys in the lower, dark part of the terminal.

Comparative weighing is as simple as this:

– Remove all weights from the weighing pan

– Preset the dial weight s according to the weight range.

– Open the glass draft shield either by hand or by touching one of the two «↕» keys.

– Place the reference weight on the weighing pan.

– Touch the «→0/T←» key and close the draft shield (manually or with the «↕» key.)
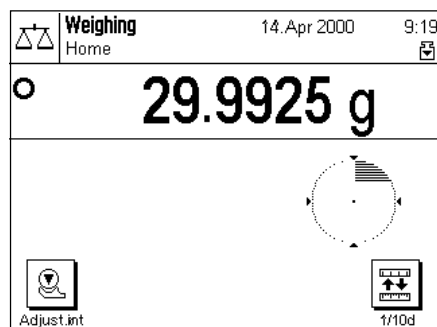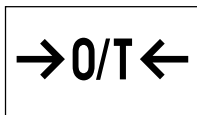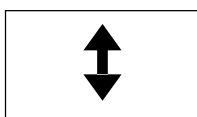
– As soon as the stability detector symbol (the small ring to the left of the weight display) goes out, the display is stable and you can read the weighing result. In the illustration at the side, the stability detector symbol is still visible, and the weighing result is therefore not yet stable.

– Remove the reference weight and the load the test weight.

– 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 "Weigh-Com" application).

4   Basic operating concepts for the terminal and software

This chapter describes the operating and display elements on your terminal and explains the concept for operating the software on your balance. Please read right through this chapter carefully: it is the basis for all the operating steps described in subsequent chapters.

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.
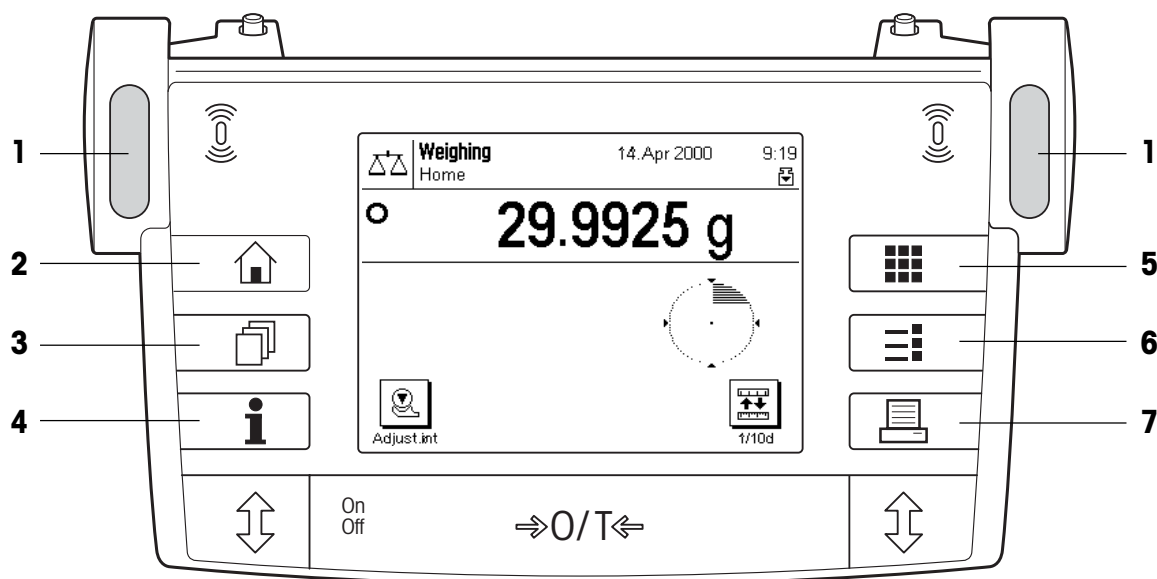
1 SmartSens

Each of these two hands-off sensors can be given a specific function (opening and closing the glass draft shield, or zeroing the balance). 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 to open and close the glass draft shield.

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.
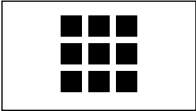
5 «▦» key

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.
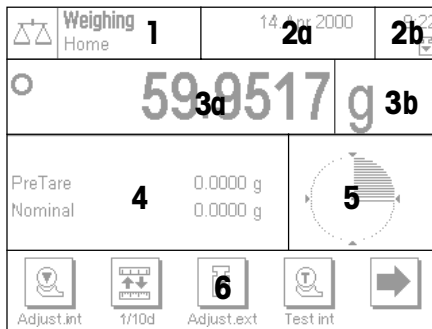
The display is divided into a number of zones:

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.
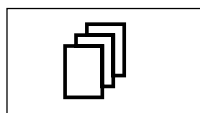
As well as the "Home" profile, 8 other user profiles are available in which you can change the settings at will. (Two of the user profiles have been programmed at the factory for very fast and very accurate weighings and have been given the corresponding names "Fast" and "Accurate"). You can use the «⬚» 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
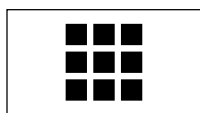
Applications are software modules for carrying out specific weighing tasks. 2 applications are loaded onto the balance before it leaves the factory (for normal weighing and comparative weighing "WeighCom"). When the balance is switched on, it starts the application for normal weighing. The other applications can be accessed with the «6» key. You will find instructions for working with the standard applications in Chapter 6 and subsequent chapters. You can also download additional applications from the Internet if required (see Chapter 7).

Settings
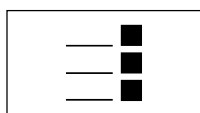
The software differentiates between two sorts of settings:

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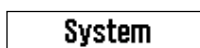
– **System settings** which are not application-dependent (e.g. the dialog language setting): The range of available settings of this type is the same in all applications. To call up the system settings touch the «⬚» or «⬚» key and then the "System" button. You will find information about the individual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

Example

1. Select user profile

"Home"   or   Fast   Accurate   User 3   ....   User 8
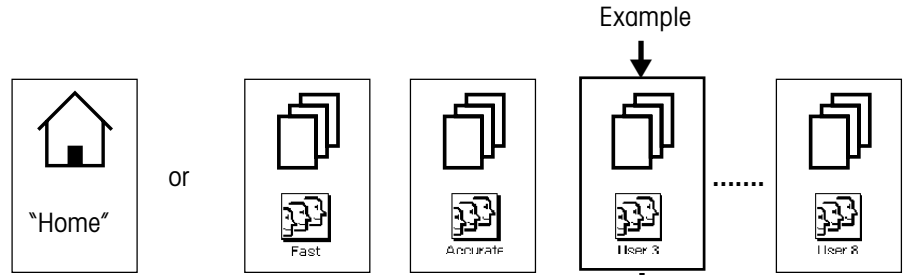
2. Select application
For information about the
"WeighCom" application,
refer to the separate operating
instructions.

Weighing   or   WeighCom
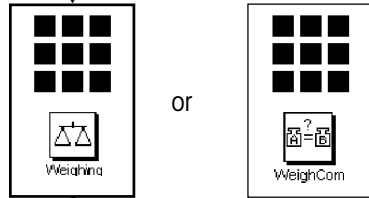
3. Work

4. If desired:
Change the settings for the se-
lected application (application-
dependent settings)
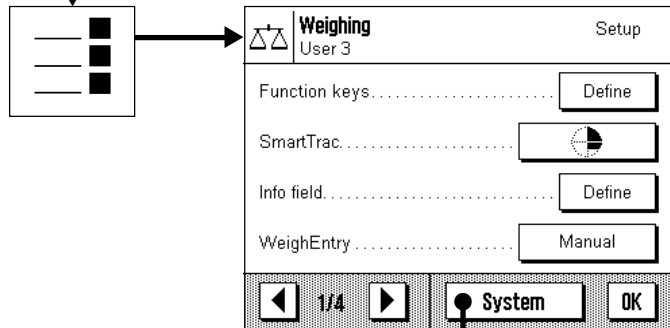
Settings for the se-
lected application
(the example
shows "Weighing")
are stored in the
active user profile
(in the example,
"User 3").

5. If desired:
Change the system settings
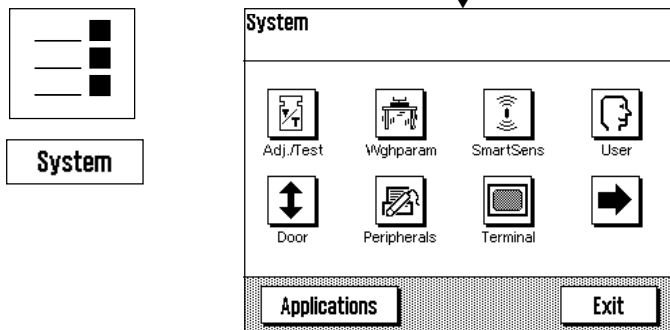
Settings are stored
in the active user
profile (in the ex-
ample, "User 3").

4.4 Typical working procedure

Following below is a brief description of the typical working procedure, leaving out details which depend on specific applications.
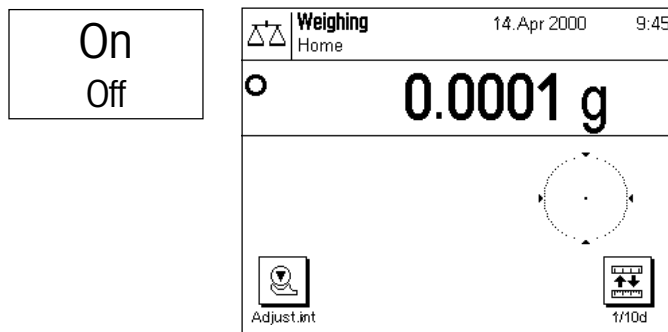
On Off	⚖ **Weighing** 14.Apr 2000 9:45 Home ○ **0.0001 g** ⚖ Adjust.int 1/10d	**Switch on the balance:** Switch on the balance by briefly pressing the «**On/Off**» key. After the balance has been switched on, it is in the "Home" profile of the "Weighing" application. **Important:** While you are working, you can return to the "Home" profile at any time by touching the «⌂» key. **Note:** Depending on the settings you have selected, the display on your balance may differ from the example shown.
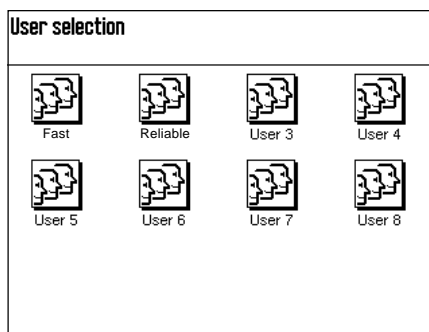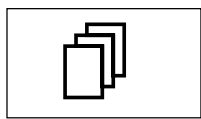
🗐	**User selection** Fast Reliable User 3 User 4 User 5 User 6 User 7 User 8	**Select user profile:** If you wish to use one of the 8 other user profiles instead of the "Home" profile, use the «🗐» key to call up the profile menu and then select the desired user profile by touching the corresponding symbol. By doing this you activate the settings stored in the selected profile for the applications and for the system. **Note:** When the balance leaves the factory, the first two user profiles contain settings for very fast and very accurate weighings and are given corresponding names ("Fast" and "Accurate").
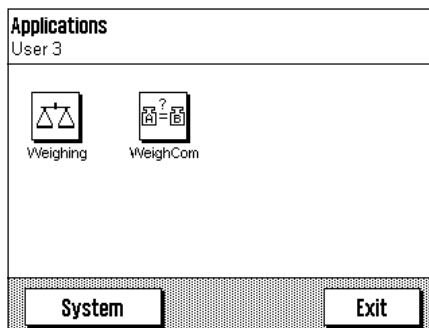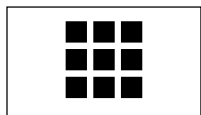
▦	**Applications** User 3 ⚖ 📱 Weighing WeighCom System Exit	**Select application:** If you do not wish to work with the weighing application, use the «▦» key to select the applications menu. (Alternatively, you can touch the corresponding zone in the top left-hand corner of the display). Touch the symbol for the desired application and the software will load the application.
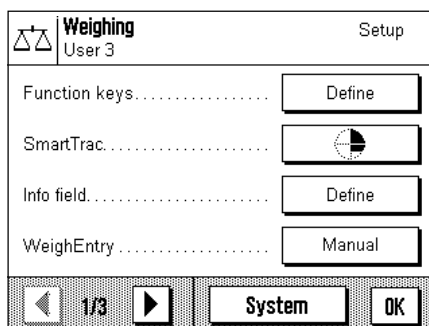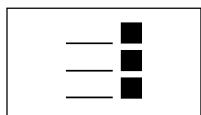
≣	⚖ **Weighing** Setup User 3 Function keys............ Define SmartTrac............... ◑ Info field.............. Define WeighEntry............. Manual ◀ 1/3 ▶ System OK	**Change settings:** If you wish to change settings, press the «≣» key. The software differentiates between two types of settings: – **Application-dependent settings** apply for the selected application and are stored in the active user profile. Check that the desired user profile and corresponding application are active before you change any settings! You will find information about the application-dependent settings together with the description of the respective application (Chapter 6 and subsequent chapters).

System

System

Adj./Test	Wghparam	SmartSens	User
Door	Peripherals	Terminal	
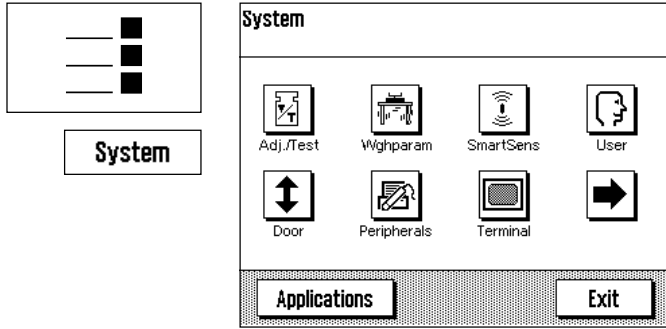
Applications   Exit

– **System settings** apply for the entire weighing system and for all applications. They are also stored in the active user profile (which is shown in the title line). Check that the desired user profile is active before you change any system settings!

Note: The system settings can also be accessed from the application menu («▦» key). The system settings are described in detail in Chapter 5.

Weighing: Carry out the desired weighing procedures. You will find information about working with the individual applications in Chapter 6 and subsequent chapters.

Weighing   14 Apr 2011   9:53

Info Weighing   (i)

V 0.79a1

OK
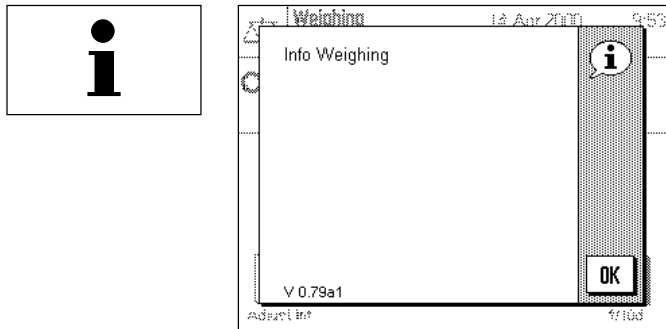
Use "Help" function: If at some point in your work you are unsure about the possibilities you have available, touch the «i» key (help function). A window appears with a brief help text.

Touching "OK" closes the help window and you can continue with your work.

On
Off
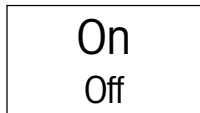
Switch off balance: When you have finished your work, switch off the balance by touching the «**On/Off**» key for a few seconds.

5   System settings

In this chapter 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.
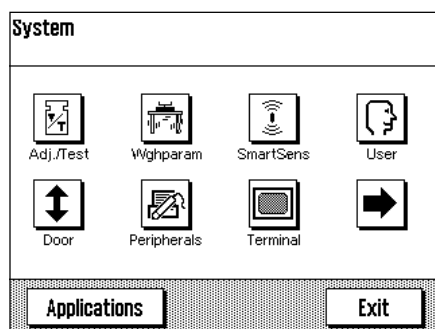
The following system settings are available:

"Adjust/Test":   Setting for adjustment (calibration), and for the test function to check the adjustment (Section 5.3).

"Weighing Parameters": Settings for adapting the balance to specific weighing tasks (Section 5.4).

"SmartSens":   Programs the two "SmartSens" sensors (Section 5.5).

"User":   Assigns a name to the user profile, selects the dialog language, and specifies a password (Section 5.6).

"Door":   Settings for opening the glass draft shield (Section 5.7).

"Peripherals":   Configures the interface for various peripheral devices (Section 5.8).

"Terminal":   Settings for the display (brightness, etc.) and for the behavior of the terminal (Section 5.9).

By touching the button with the arrow symbol, you change over to the second menu page.
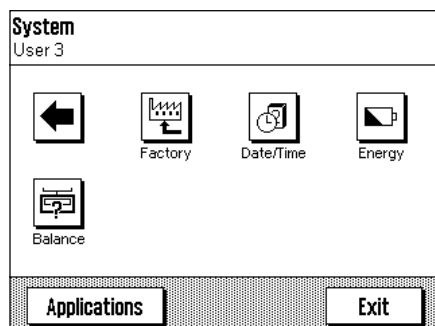
"Factory":   For resetting to the factory settings (Section 5.10).

"Date/Time":   To input the date and time, and select the desired display format (Section 5.11).

"Energy":   Settings for standby mode and to display the next date for replacing the battery (Section 5.12).

"Balance":   For specifying the balance identification and inquiring information about the balance (Section 5.13).

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 Settings for adjustment and test

You can use these menus to make all the settings associated with adjusting (calibrating) your balance.
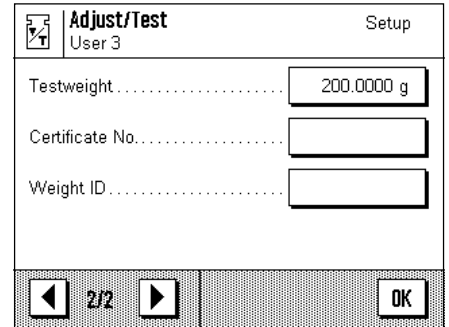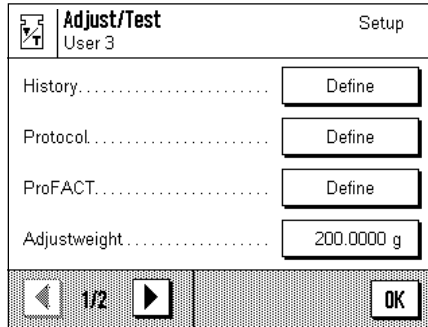
In the sections below you will find information on all the possible settings for adjustment and test procedures and for recording them.

5.3.1 Displaying the adjustment history ("History")
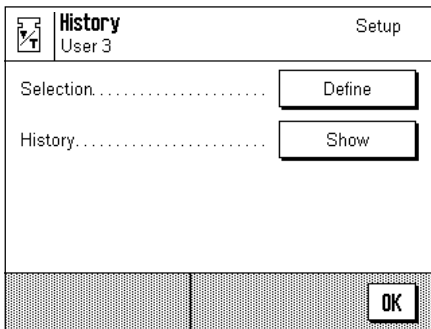
In the "**History**" menu you can call up information on adjustment procedures which have already been carried out, and print out corresponding reports.

The balance constantly records the data and results of all adjustment procedures. The last 15 procedures can be displayed and printed out.

The following settings are available:
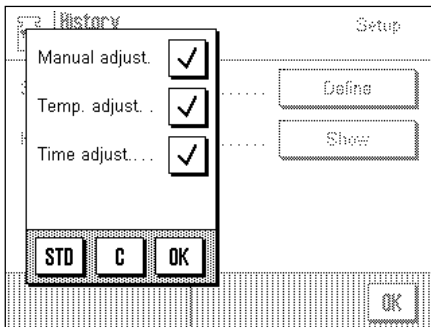
"**Selection**"

By touching the "**Define**" button you call up a menu in which you specify which procedures should be displayed. You can display manual adjustments, temperature-controlled adjustments, and/or time-controlled adjustment processes. The procedures indicated with a check mark will be displayed.

Factory setting: All display options are selected.
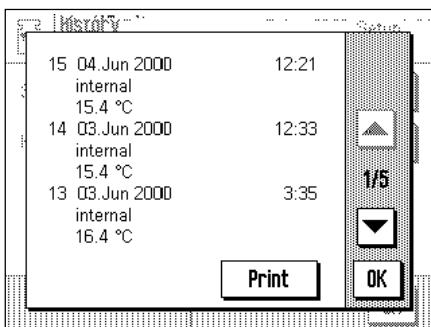
"**History**"

If you touch the "Show" button, the selected adjustment procedure is displayed. The display shows the date, time, type of adjustment made, and ambient temperature at the time of the adjustment. You can use the arrow buttons to page up and down between the individual pages (the most recent adjustments are shown at the top of the list, the oldest at the bottom). You can use the "**Print**" button to print out all adjustments (you will find an example of a report in Section 6.4.6). You can terminate the display by touching "**OK**".

5.3.2   Defining adjustment and test reports

In this menu, which has two pages, you can specify the information to be printed on the adjustment and test reports.

By touching the appropriate buttons, you can activate the desired information. The checked items of information will be included on the reports. By touching "**STD**" you can return to the factory settings. To save the changes, touch "**OK**", (or touch "**C**" to quit the input window without saving the changes).

Factory settings: The options shown checked in the illustration on the left.

The following items of information can be included in reports:

"**Date**"

Prints the date of adjustment in the defined date format (Section 5.11).

"**Time**"

Prints the time of adjustment in the selected date format (Section 5.11).

"**User**"

The active user profile is printed on the reports.

"**Balance Type**"

This information is stored in the balance and cannot be changed by the user.

"**Serial number**"

This information is stored in the balance and cannot be changed by the user.

"**Balance ID**"

Prints the specified balance identification (Section 5.13).

"**Weight ID**"

Prints the specified identification of an external adjustment weight (Section 5.3.7).

"**Certificate No.**"

Prints the specified designation for the certificate of an external adjustment weight (Section 5.3.6).

"**Temperature**"

Prints the temperature at the time of adjustment.

"**Visum**"

Prints an additional line for signing the report.

5.3.3 "ProFACT" fully automatic adjustment function
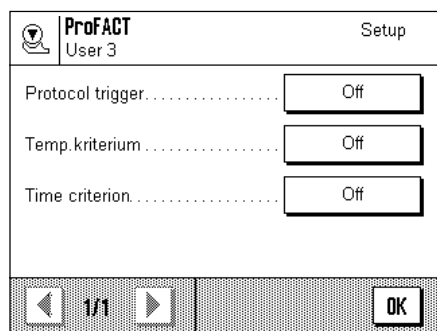
In this menu you can specify the settings for fully automatic adjustment (calibration) using the internal adjustment weight ("ProFACT"). ProFACT adjusts the balance fully automatically on the basis of pre-selected criteria.

The following settings are available:
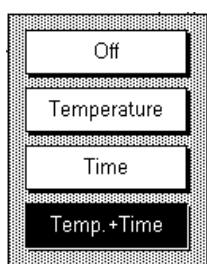
"**Protocol trigger**"

Here you specify which adjustment procedures should be automatically printed on the report. You can select time- and/or temperature-controlled adjustment procedures to be automatically reported. If you select "Off", automatic reporting does not take place.
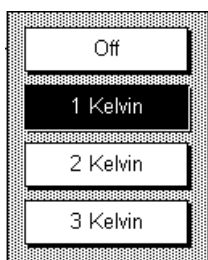
"**Temp. criterion**"

Here you define what change in the ambient temperature should trigger an automatic adjustment. If you select "Off", no automatic adjustment takes place in response to a temperature criterion.
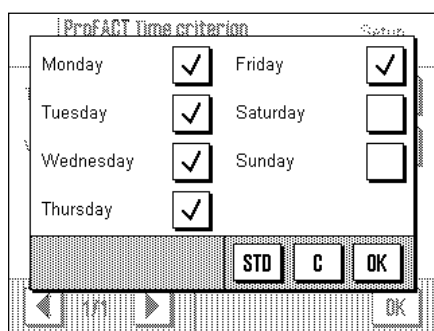
"**Time criterion**"

If you activate the time criterion, you can specify at what time, and on which days of the week, an automatic adjustment should be carried out.

Note: For the first 24 hours after installing the balance (and after every time it has been disconnected from the power supply), the fully-automatic adjustment is performed several times irrespective of the temperature or time criterion selected.

Factory settings:	"Protocol trigger":	"Off"
	"Temp. criterion":	"Off"
	"Time criterion":	"Off"

Note: The "ProFACT" fully automatic adjustment function is switched off in the factory setting.

5.3.4   Defining an external adjustment weight
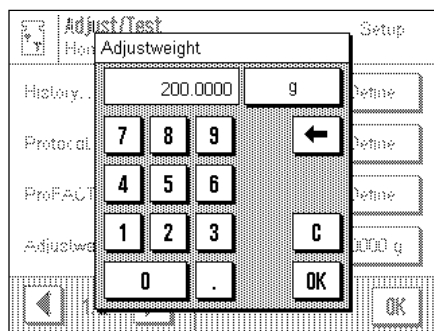
If you work with an external adjustment weight, you can define its weight and unit here. (**Note:** Depending on country-specific regulations, this function may not be available for certified balances). An input window appears which looks like a pocket calculator and can be used like one. Enter the weight of the external adjustment weight. Check the weighing unit: it is shown to the right of the weight. If you touch the weighing unit, the selection of available units appears.

Note: The units are not automatically converted, i.e. once you have input a value in a particular unit, this value is unchanged, even if you change the weighing unit.

Factory setting: Depends on model

5.3.5   Defining an external test weight

If you work with an external weight to check the adjustment, you can define its weight and unit here. The same input window appears as for the external adjustment weight.

Factory setting: Depends on model

5.3.6   Entering the weight certificate designation
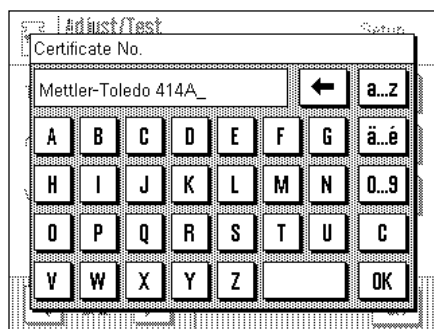
Adjustment weights are generally delivered with a certificate. You can enter the designation and/or number of the certificate delivered with the weight here (max. 20 characters). This makes it possible to unambiguously link the adjustment weight used to a specific certificate. The certificate designation is then printed out on the adjustment record. The input window allows input of alphanumeric characters.

Factory setting: None

5.3.7   Defining the weight identification
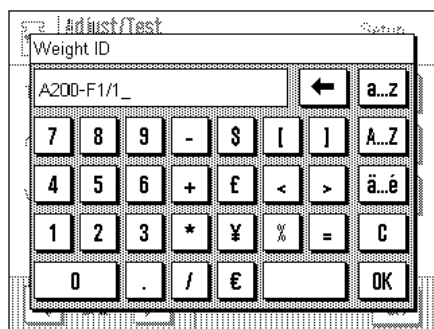
Here you can assign a designation to the adjustment weight used (max. 20 characters). This makes identifying the adjustment weight easier. The weight identification is then printed on the adjustment report. The same alphanumeric input window appears as for the certificate designation.

Factory setting: None

5.4 Specifiying the weighing parameters

Wghparam
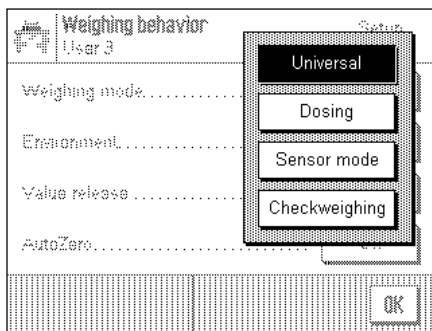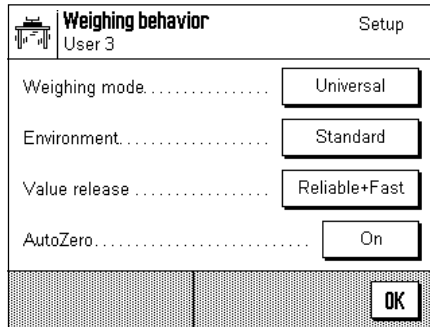
"**Weighing mode**"

You can use this setting to match the balance to the type of weighing. Select "Universal" weighing mode for all normal weighing processes, or "Dosing" for dispensing liquid or powdery weighing samples. With this setting the balance responds very quickly to minutest changes in weight. The "Sensor mode" setting delivers a raw, unfiltered weighing signal and is only suitable for special applications. If the "Control weighing" setting is used, the balance only reacts to large changes in weight, and the weighing result is very stable.

Factory setting: "Universal"
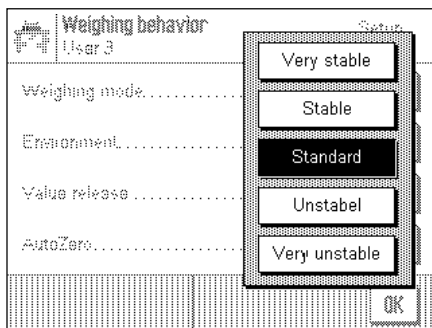
"**Environment**"

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 "Vey unstable". In between these two settings there is a choice of three further settings.

Factory setting: "Standard"
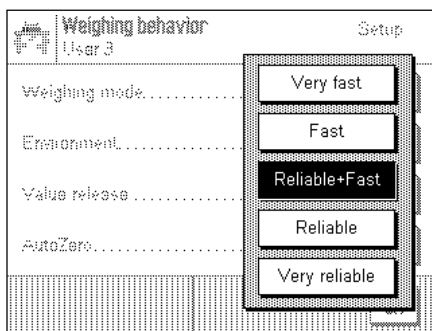
"**Measurement release**"

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 repeatibility 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"
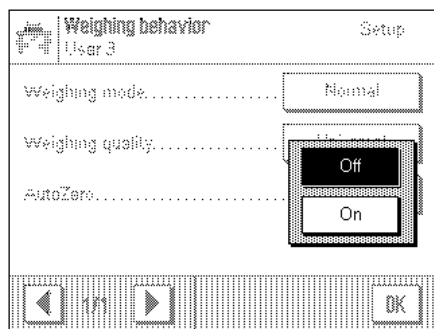
"AutoZero"

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)

5.5   "SmartSens" settings
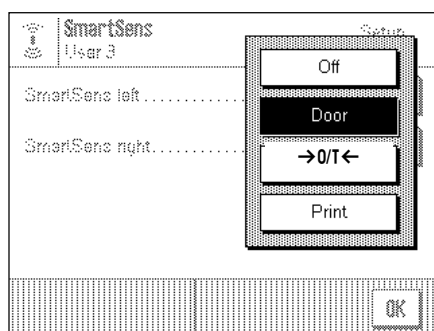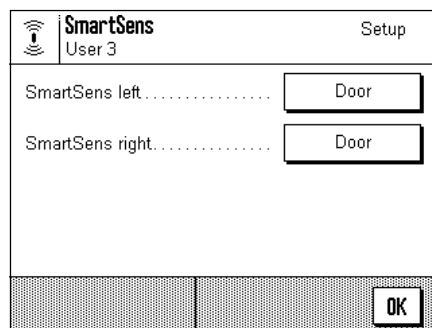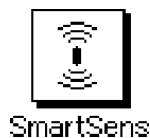
"**SmartSens left**", "**SmartSens right**"

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

"Off":   SmartSens is inactivated

"Door":   Opens/closes the glass draft shield.

"→0/T←":   Resets the display to zero

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

Factory setting: "Door" (for both sensors)

Note: In setting mode (menus), SmartSens is always inactivated.

5.6   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 10 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

5.7 Selecting the door function
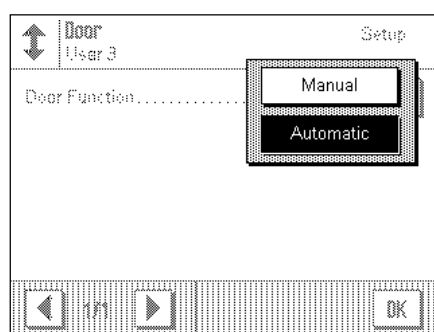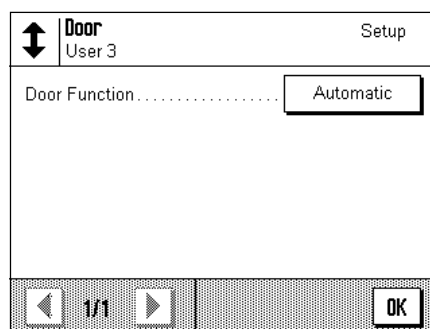
Door

"**Door Function**"

The automatic door function eases your work by making the doors of the glass draft shield open or close automatically whenever specific functions require them to do so. For example, the glass draft shield opens automatically after zeroing or taring, and prompts you to put the material for weighing, or the tare weight, onto the weighing pan. The door function is also activated during adjustment with an external weight, and when checking this, or when carrying out series weighings. If you prefer to operate the glass draft shield by using the «⇕» key, or the "SmartSens" sensors, or by hand, you can deactivate the automatic door function.

Factory setting: "Automatic"

5.8 Selecting peripheral devices
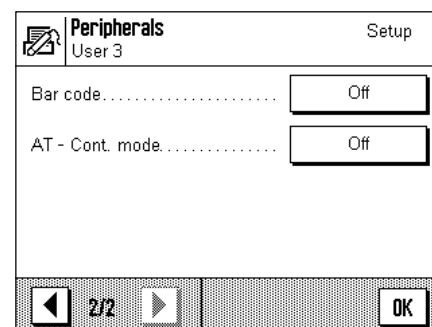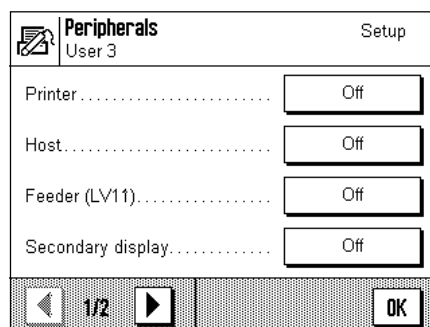
Peripherals

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)

– "Secondary display":	Secondary (auxiliary) display
– "Bar code":	Bar code reader
– "AT cont. mode":	Peripheral devices which use "AT Continuous Mode".
– "LV11":	METTLER TOLEDO LV11 automatic feeder.

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 Chapter 9).

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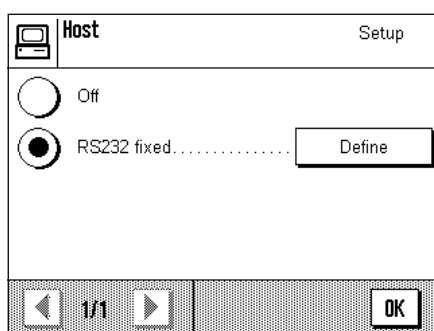
Important: To enable correct printing of special characters (e.g. "°C") on METTLER TOLEDO printers, the **balance and printer** must both be set to **8 data bits**.

5.9   Terminal settings
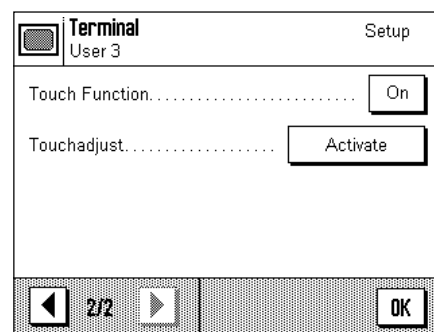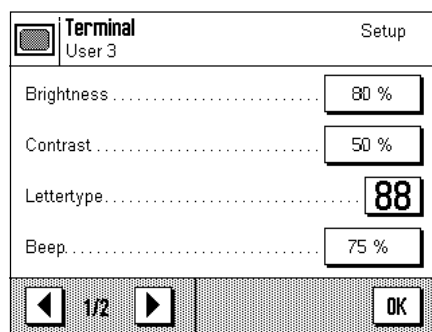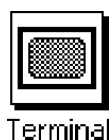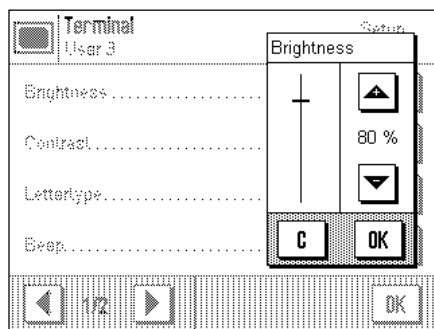
"**Brightness**"

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%
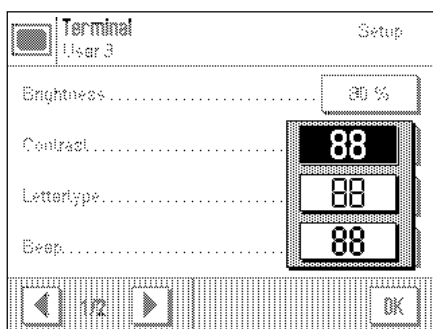
"**Font**"

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%
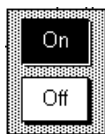
"**Touch Function**"

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"
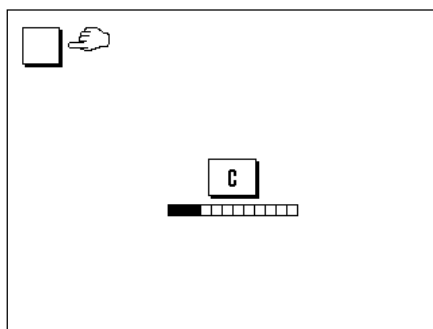
"**Touch adjustment**"

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.)

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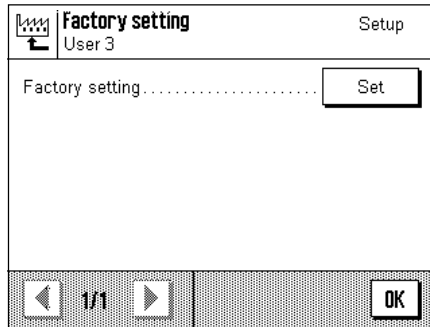
Here you can reset all the settings to the factory settings. **Important: Resetting affects all the settings (application-dependent settings and system settings) for the active user profile!**

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.
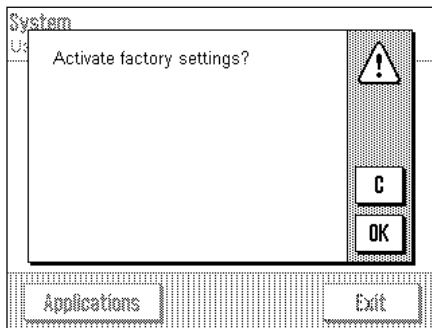
5.11   Date and time
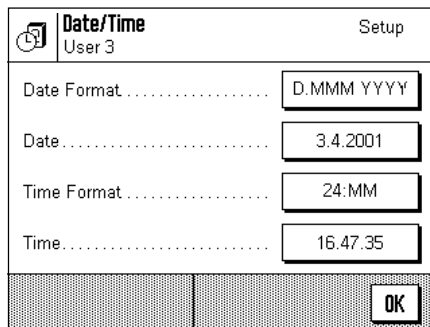
Important: In contrast to the other system settings, the settings for date and time apply to all user profiles!
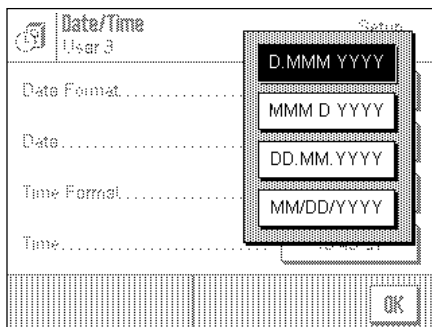
"**Date Format**" (for the display)

The following date formats are available:

"D.MMM.YYYY"	Example:	4. DEC 1999
"MMM D YYYY"	Example:	DEC 4 1999
"DD.MM.YYYY"	Example:	04.12.1999
"MM/DD/YYYY"	Example:	12/04/1999

Factory setting: "D.MMM.YYYY"
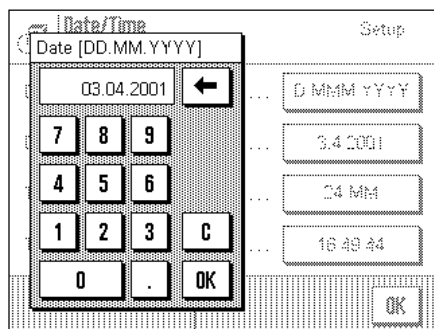
"**Date**"

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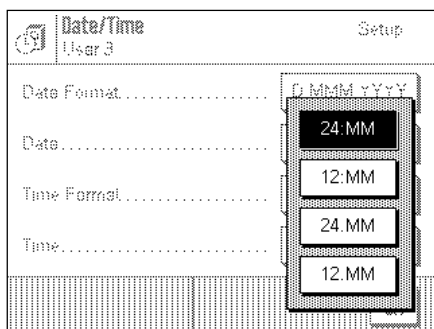
"**Time Format**" (for the display)

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"
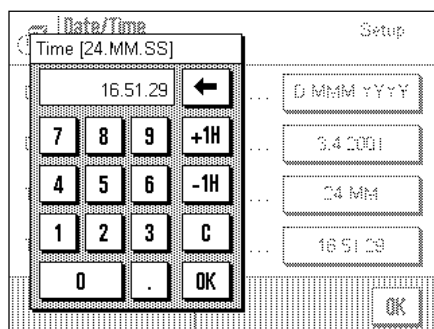
"**Time**"

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.

5.12   Energy-saving function and battery change date
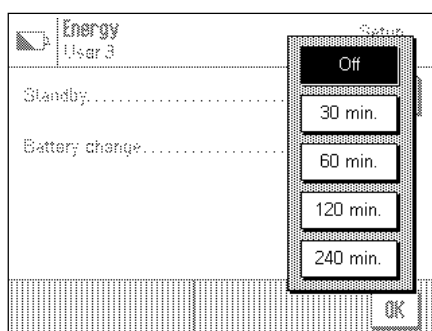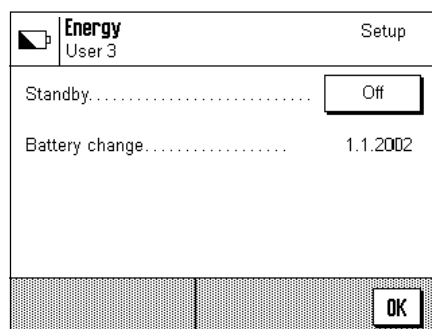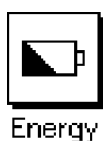
"**Standby**"

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.

5.13   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.

5.14   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 The "Weighing" Application

In this chapter we will introduce you to the "Weighing" application. You will find information for practical work with this application, and about the application-specific settings that are available (you will find information about non-application-specific system settings in Chapter 5).

6.1 Selecting the application
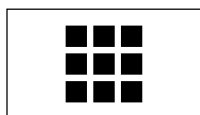
If the "Weighing" application is not already active, touch the «⠿» key. In the selection window, touch the symbol for the "Weighing" application. The balance loads the application and is then ready to be used for weighing.

6.2 Settings for the "Weighing" application

You already learned how to carry out a simple weighing in Chapter 3. As well as the work steps described there (operating the glass draft shield, taring, a simple weighing, and manually printing the weighing result), your balance provides a large number of possibilities for adapting the "Weighing" application to your specific needs.

Note: If your settings should not apply to the "Home" profile, first use the «⛰» key to select the desired user profile.

6.2.1 Overview

The application-dependent settings can be accessed with the «⬛» key. When this key is pressed, the first of 3 menu pages with application-dependent settings is displayed.

Note: You can change some of the most frequently used settings directly by touching the corresponding zone in the display (Section 4.2).

The following settings are available for the "Weighing" application:
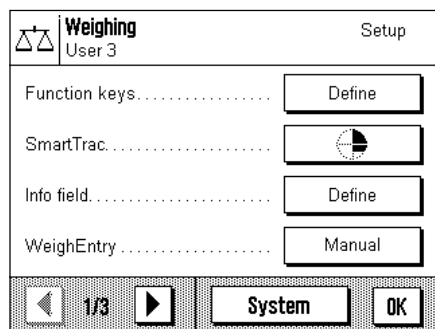
"Function keys":	Here you can specify which function keys should appear at the bottom edge of the display. These keys allow direct access to certain functions (Section 6.2.2).
"SmartTrac":	Selects the display mode for the graphical weighing-in aid or to show a stopwatch (Section 6.2.3).
"Info field":	Here you can specify which information fields should be displayed (Section 6.2.4).
"WeighEntry":	Provides a choice between entering the weight manually or automatically (Section 6.2.5).

Touching the buttons with the arrow symbols returns you to the second menu page.

```
┌─────────────────────────────┐
│ △△ Weighing          Setup  │
│    User 3                   │
│ Display Unit............  g  │
│                             │
│ Info Unit..............   g  │
│                             │
│ Custom Unit 1.........  Define│
│                             │
│ Custom Unit 2.........  Define│
│ ◄  2/4  ►   System    OK   │
└─────────────────────────────┘
```

"Display Unit":   Specifies the unit for displaying the results (Section 6.2.6).

"Info Unit":   Specifies an additional weighing unit to be displayed as an information field in the display (Section 6.2.6).

"Custom Unit 1":   Defines Custom Unit 1 (Section 6.2.7).

"Custom Unit 2":   Defines Custom Unit 2 (Section 6.2.7).

By touching one of the buttons with the arrow symbol you can either return to the first menu page or turn to the third menu page.

On the third menu page, the following settings are available:

```
┌─────────────────────────────┐
│ △△ Weighing          Setup  │
│    User 3                   │
│ Protocol..............  Define│
│                             │
│ Print key.............  Stable│
│                             │
│ Identification........  Define│
│                             │
│ Bar code..............   ID1 │
│ ◄  3/4  ►   System    OK   │
└─────────────────────────────┘
```

"Protocol":   Specifies the information to appear on the weighing reports (Section 6.2.8).

"Print key":   Specifies the behavior of the «🖶» key for printing the weighing results (Section 6.2.9).

"Identification":   Used for defining identifications (Section 6.2.10).

"Bar code":   These settings only apply if a bar code reader is connected. You can specify how its data should be processed (Section 6.2.11).

When you have made all the necessary settings, touch the "OK" button to return to the application.

In the sections following below, we will give you a detailed introduction to the various settings for the "Weighing" application.

```
---------------------
Function keys
  Adjust.int
  1/10d
SmartTrac
  No SmartTrac
Info field
WeighEntry
  Manual
Display Unit
  g
Info Unit
  mg
Custom Unit 1
  Formula
    F * Net
  Factor
    0.000000
```

Recording the application-specific settings

When you are working in the menus for the application-specific settings, you can record the settings at any time by touching the «🖶» key (provided a printer is attached and activated as output device in the system settings).

The application-specific settings printed out are those of the currently active user profile.

The illustration at left shows part of a record of the application-dependent settings.

6.2.2 Select function keys

Function keys make it possible for you to access certain functions and settings of the application directly. The function keys are displayed within the application at the bottom edge of the display (see Section 4.2). Touching a key initiates the corresponding function.
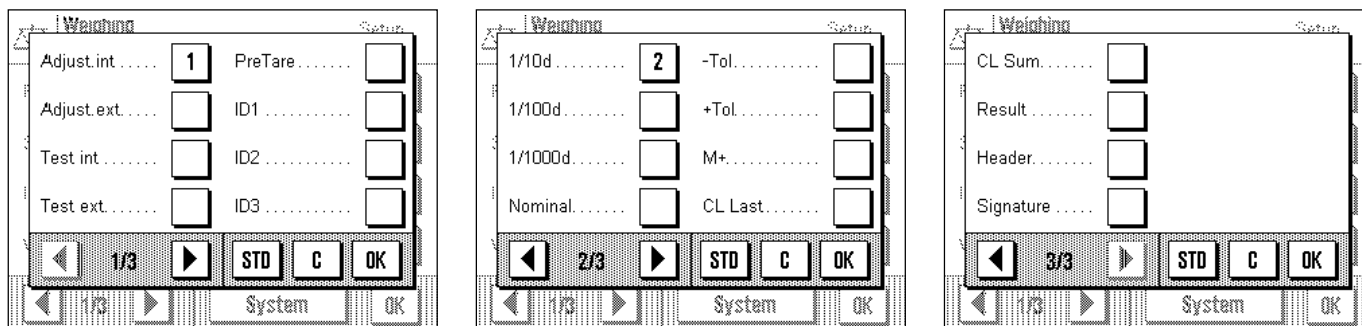
In this menu you specify which function keys should be available in the application. You can call up the menu for the function keys directly from the application by touching the corresponding zone in the display (Section 4.2).

The function keys are displayed in the application with a number. The numbers determine the sequence of the function keys in the display. If you activate or deactivate a function key by touching it, the sequence of the keys is automatically updated. To specify a completely new sequence, first deactivate all the function keys and then activate them in the desired sequence. You can use "**STD**" to reset to the factory settings. Touch "**OK**" to save the changes (or touch "**C**" to quit the input window without saving the changes).

The following function keys are available:

"**Adjust.int**" and "**Adjust.ext**":	Adjusts the balance using an internal or external adjustment weight. You will find instructions for making and recording the adjustment in Section 6.4.
"**Test int**" and "**Test ext**":	Checks the balance adjustment using an internal or external test weight. You will find instructions for carrying out the checks in Section 6.4.
"**PreTare**":	Numeric input of a fixed tare value (tare preset). You will find information about entering the tare value in Section 6.3.1.
"**ID1**", "**ID2**" and "**ID3**":	Input of identifications (descriptive texts) for individual weighing procedures. **Note:** Instead of "ID1", "ID2", and "ID3", the specified designations appear (Section 6.2.10). You will find infromation about working with identifications in Section 6.3.6).
"**1/10d**", "**1/100d**" and "**1/1000d**":	You can use these function keys to change the resolution of the weighing result (Section 6.3.2).
"**Nominal**":	You can use this function key to specify the desired target weight (Section 6.3.3).
"**–Tol**" and "**+Tol**":	You can use these function keys to specify the accuracy (tolerances) with which you wish to weigh in (Section 6.3.3).
"**M+**", "**CL Last**", "**CL Sum**" and "**Result**":	These function keys allow you to use the statistics (Section 6.3.5).
"**Header**" and "**Signature**":	These function keys print out the report header and a line for a signature (Section 6.2.8).

Factory setting: "**Adjust. int**" and "**1/10d**" activated.

6.2.3 "SmartTrac" and stopwatch

"SmartTrac" is a graphical weighing-in aid which makes it easier for you to weigh in to a specified target value. "SmartTrac" appears in the application at the right-hand side of the display below the weighing result (Section 4.2).
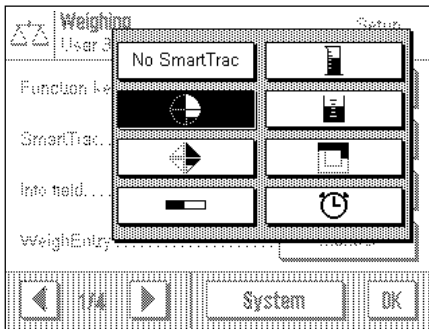
In this menu you can select the display mode for "SmartTrac" or switch it off. Instead of "SmartTrac", you can also display a stopwatch.

Note: You can also call up this menu directly from the application by touching the corresponding zone of the display (Section 4.2).

Factory setting: "SmartTrac" 1 switched on

You will find information about the various "SmartTracs" and the stopwatch in Section 6.3.4.

6.2.4 Selecting information fields

The information fields keep you constantly informed about the setting values, results obtained, etc. The information fields are displayed in the application below the weighing result (Section 4.2).
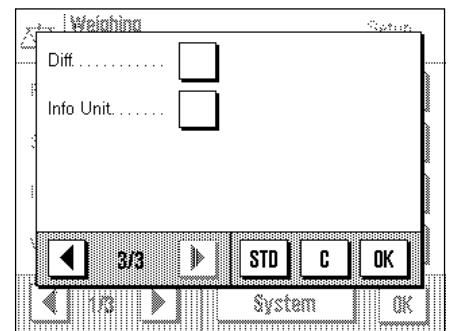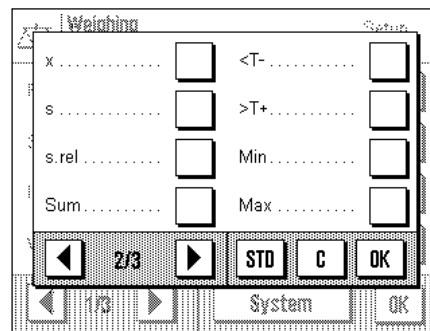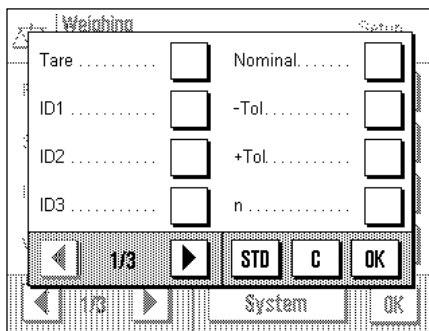
In this menu you specify which information fields should be displayed in the application. You can call up the menu for the information fields directly from the application by touching the corresponding zone of the display (Section 4.2).

The numbered information fields are displayed in the application. The numbers determine the sequence of the information fields in the display. **Important:** For reasons of space, only a maximum of 4 of the available information fields can be displayed. If you activate more than 4 information fields, only the first 4 are shown in the display. When you touch an information field to activate or deactivate it, the fields are automatically resequenced. To specify a completely new sequence, first deactivate all the information fields and then activate them in the desired sequence. You can use "**STD**" to reset to the factory settings, or touch "**C**" to quit the input window without saving the changes. If you wish to save your changes, touch "**OK**".

The following information fields are available:

"**Tare**":   This information field displays the tare preset value which was input using the "Hand tare" function key.

"**ID1**", "**ID2**" and "**ID3**":   These information fields show the identifications that were input using the function keys with the same name. **Note:** Instead of "ID1", "ID2", and "ID3", the specified designations are displayed (Section 6.2.10).

"**Target**" (Nominal):   This information field displays the target weight that was input using the function key with the same name.

"**–Tol**" and "**+Tol**":	These information fields show the tolerances on the target weight that were input using the function keys with the same name (Section 6.3.3).

"**n**", "**x**", "**s**", "**s.rel**", "**Sum**", "**<T–**",
"**>T+**", "**Min**", "**Max**" and "**Diff**" These information fields show the following statistical values:

"n":	Cumulative number of weighings
"x":	Mean weight of all saved weighings
"s":	Absolute standard deviation
"s.rel":	Relative standard deviation (in %)
"Sum":	Cumulative weight of all saved weighings.
"<T–"	Number of weight values below the lower tolerance limit
">T+"	Number of weight values above the upper tolerance limit
"Min"	Lowest weight value of the current series of measurements
"Max"	Highest weight value of the current series of measurements
"Diff"	Difference between the lowest and highest weight values

You will find information about how to use the statistics in Section 6.3.5.

"**Info Unit**":	This information field shows the weighing result in the second unit you chose (Section 6.2.6).

Factory setting: No information fields activated.

6.2.5   Manual/automatic transfer of weight values

In this menu item you specify whether the balance should operate with automatic weight transfer.
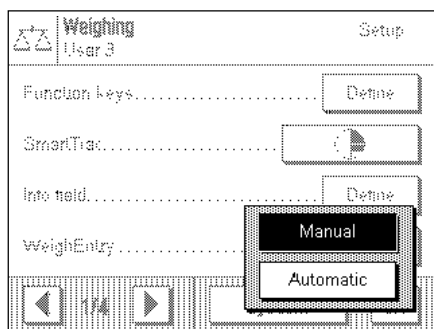
"**Manual**":	When this setting is used, and series weighings are carried out, the "**M+**" function key must be touched after each weighing to accept the weight value into the statistics. This setting is recommended for dispensing to a target value, because with automatic weight acceptance, there is a danger that the balance accepts the weight before the dispensing process is complete.
"**Automatic**":	Each time a weighing is carried out, the balance detects the change in weight and automatically writes the weight value into the statistics without a key having to be touched.

Factory setting: "Manual".

6.2.6   Selecting weighing units

In the "Display Unit" and "Info Unit" menus, you specify which weighing units you wish to work with. By choosing different units, you can have the weighing result displayed in two different weighing units simultaneously.
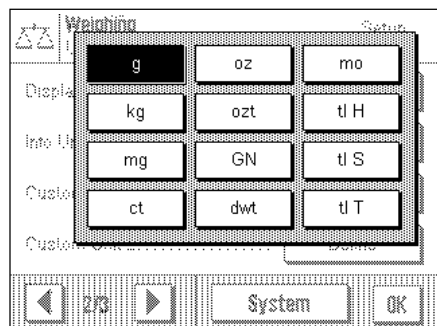
The same selection of units is available for both the "Display Unit" and the "Info Unit". When the "Display Unit" is changed, the current weighing result, the saved weighing results (sum), and the statistical values are displayed in the new unit. On the other hand, the values for tare preset, target weight, and tolerances are still displayed in the unit which was selected at the time these values were defined.

The "Info Unit" is used for the information field with the same name (Section 6.2.4).

Factory setting: **AX mass comparators**

"Display Unit":   "g" (gram)

"Info Unit":   "mg" (milligram)

6.2.7   Defining custom weighing units

You can use the two menus "Custom Unit" and "Free Unit" to define your own weighing units.
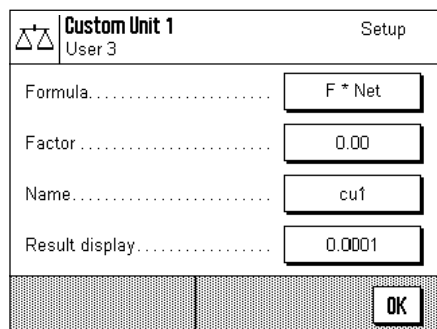
You can use a custom weighing unit to perform calculations based directly on the weighing result as soon as it is obtained (e.g. for surface areas or volumes). The custom weighing units are available in all menus and input fields in which you select weighing units.

Note: This function is not available on certified balances.

The menus for defining the two custom weighing units are identical. The following fields are available:

"Formula":   Here you define how the value for the "Factor" (which you specify afterwards) should be calculated. Two calculation formulae are available, in which "F" represents the factor and "Net" the net weight value. The first formula multiplies the net weight by the factor, whereas the second formula divides the factor by the net weight. The formula can be used, for example, to take immediate account of a known error factor in the weight determination.

"Factor (F)":   Here you specify the factor to be applied to the weighing result (net weight), using the formula previously selected.

"Name":   Enter a name for your custom weighing unit (max. 4 characters).

"Result display":   Here you define the display increments for the weighing result. The weighing result is rounded by the display increment (e.g. with a display increment of 0.05, a measured result of 123.4777 is displayed as 123.50). **Note:** This function can only be used to **reduce** the resolution of the weighing result, so do not enter a value that exceeds the maximum resolution of your balance!

Factory setting: No custom weighing units defined.

6.2.8   Defining the weighing record

In this menu you specify the information to appear on the weighing reports.
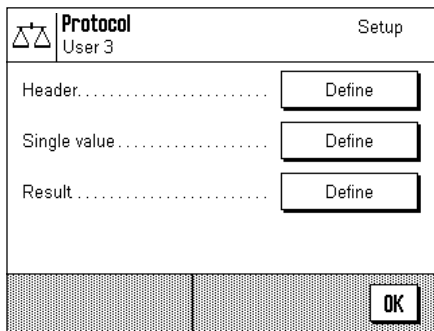
To make it clearer, this extensive menu is divided into 3 submenus in which you can specify the options for the title of the record, recording the individual values, and the weighing result.

Options for the record titles

In this submenu, which has two pages, you specify the information to be printed in the title of the weighing record.

By touching the corresponding box, you activate the desired information. The checked information will be printed on the record. You can use "**STD**" to reset to the factory settings, or touch "**C**" to quit the input window without saving the changes. If you wish to save your changes, touch "**OK**".

Factory setting: No title information activated.
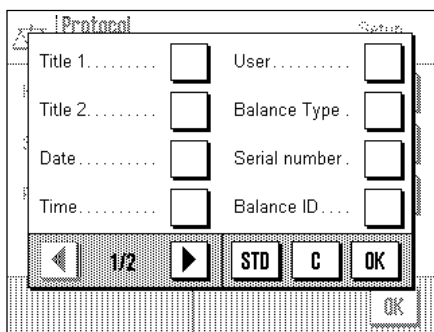
On the first page of the menu, the following title options are available:

| "**Title 1**" and "**Title 2**": | The specified record titles are printed (Section 6.2.10). |

| "**Date**" and "**Time**": | The current date and time are printed out (Section 5.11). |

| "**User**": | The name of the active user profile is printed on the records. |

| "**Balance Type**" and "**Serial number**": | This information is read from the electronics system of the balance and cannot be changed by the user. |

| "**Balance ID**": | The specified balance identification is printed out (Section 5.13). |
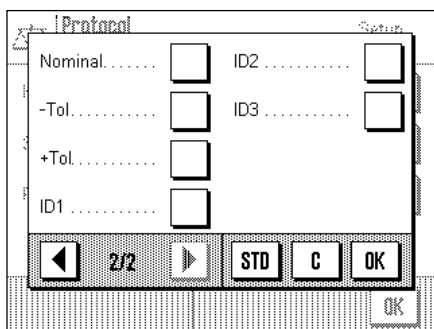
On the second page of the menu, the following title options are available:

| "**Nominal**": | The target weight entered using the function key with the same name is printed on the record. |

| "**–Tol**" and "**+Tol**": | The tolerances entered using the function key with the same name are printed on the record. |

"**ID1**", "**ID2**" and "**ID3**":

The identifications which were input using the function keys with the same names are printed out (Section 6.3.6).

Options for recording the individual values
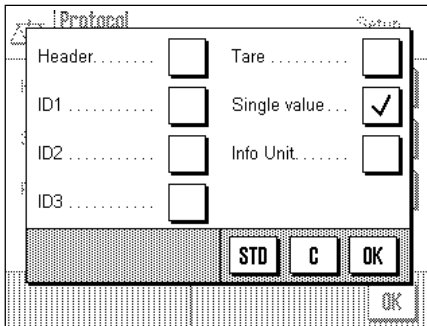
In this submenu you specify the information to be printed on the record for each individual weighing result.

Factory setting: Single values are printed with no further information.

The following items of information relating to individual values are available to be printed on the weighing records:

"**Header**": The specified header information is printed out.

"**ID1**", "**ID2**" and "**ID3**": The identifications which were input using the function keys with the same names are printed out (Section 6.3.6).

"**Tare**": The tare preset value which was input using the "Hand tare" function key is printed out (Section 6.3.1).

"**Single value**": Here you specify whether individual values are to be printed on the record, or only the final result (e.g. with series weighings).

Options for recording the final result

In this submenu you specify the information to be printed on the record for the final result. These settings are intended mainly for series weighings in which the statistics are used (Section 6.3.5).

Factory setting: All information is activated except "**<T−**" and "**>T+**".
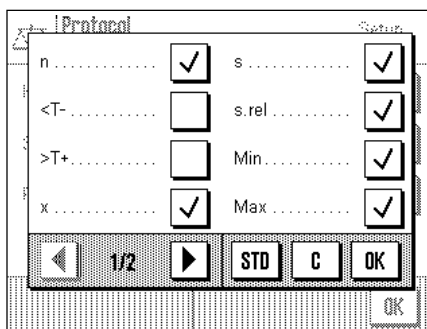
On the first page of the menu, the following information items for the record of the end result are available:

"**n**": Number of samples whose weight has been determined.

"**<T−**" and "**>T+**": Number of samples whose weight was below or above the upper tolerance limit.

"**x**": Mean weight of all samples.

"**sd**" and "**rsd**": Absolute and relative standard deviation within the measurement series.

"**Min**" and "**Max**": Lowest and highest weight determined in the current measurement series.
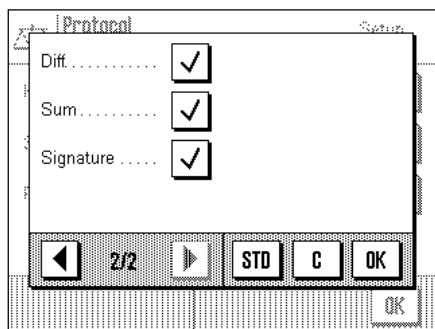
On the second page of the menu, the following information items for the record of the end result are available:

"**Diff**": Difference between the lowest and highest weight of the weighing serie.

"**Sum**": Sum of all individual weights.

"**Visum**": Adds an extra line to the record for a signature.

6.2.9 Parameters for manual record printing

You can use the settings in the "Print key" menu to specify the behavior of the «🖨» key (print report).
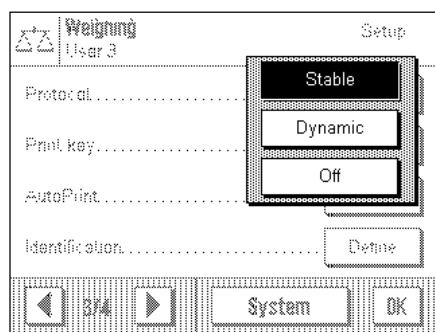
"**Stable**": When the «🖨» key is pressed, the record is only printed when the weighing result is stable.

"**Dynamic**": When the «🖨» key is pressed, the record is printed immediately, irrespective of whether the weighing result is stable.

"**Off**": When the «🖨» key is pressed, no record is printed out; the key is inactive.

Factory setting: "Stable".

6.2.10 Defining identifications and record titles

In the "Identification" menu you specify titles for the weighing records and designations for the identifications.

An identical alphanumeric input field is available for all types of input (shown illustrated at right).

"**Title 1**" and "**Title 2**":

The designations entered appear in the title of the weighing records. The maximum length of the record title is 20 characters.

"**ID1 Label**", "**ID2 Label**", "**ID3 Label**":

The designations entered (max. 20 characters) appear below the corresponding ID function keys and as designation of the respective information fields (Section 6.3.6). The ID designations are also printed on the weighing record.

In practice, "ID1 Label" can, for example, be called "Client", "ID2 Label" "Job", and "ID3 Label" "Lot".

Factory setting: No record titles specified
Designations "ID1", "ID2", and "ID3" as placeholders for identifications

6.2.11 Parameters for processing bar code data

If there is a bar code reader connected to your balance, you can specify in the "Bar code input" menu how this data should be processed.
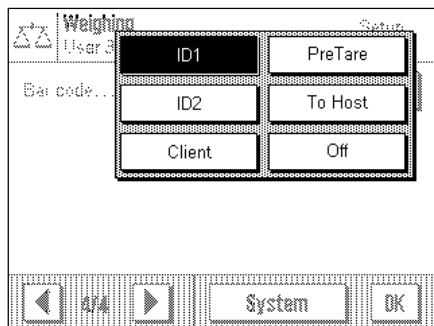
The following settings can be selected:

"ID1", **"ID2"**, and **"ID3":**	The captured data is treated as identification text and assigned to the corresponding identification (Section 6.3.6). **Note:** Instead of "ID1", "ID2", and "ID3", the specified designations are displayed (Section 6.2.10).
"PreTare":	The bar code data is interpreted as the value for the tare preset (Section 6.3.1).
"To Host":	The bar code data is not processed in the balance, but transmitted directly to a connected PC. If no PC is connected, or if it cannot accept this data, the data is ignored.
"Off":	No bar code data is processed. This is the setting to use when no bar code reader is connected.

Factory setting: "ID1".

Note: When you connect a bar code reader to your balance, you must configure the interface in the system settings to match (Section 5.8).

6.3   Working with the "Weighing" application

You have already learned how to do a simple weighing in Chapter 3. In this chapter we will show you how to use the various functions of the "Weighing" application in practice.

6.3.1   Manually entering the tare preset

You normally determine the tare by placing the weighing container on the balance and then touching the «→0/T←» key. However, if you are going to work with the same weighing container for a long period of time, you can enter its weight manually instead. This saves you having to tare when you place the weighing container on the balance. When the weighing container is taken off the balance, the tare weight is shown as a negative value; when it is replaced, the display shows zero and the balance is immediately ready for weighing again.

For you to be able to enter a tare preset value, the corresponding function key must be activated (Section 6.2.2). After the function key is touched, the window for entering the tare value opens.
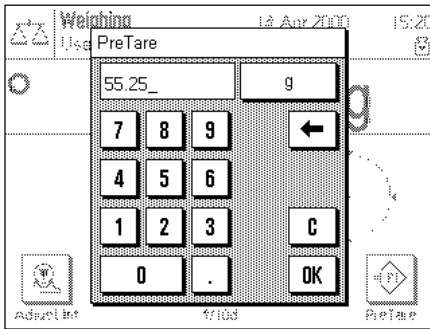
Key the desired tare value in. Check the weighing unit: this is displayed to the right of the tare value. If you touch the weighing unit, the units available for selection are displayed. **Note:** The units are not converted automatically, i.e. if you input a value in a particular unit, this value remains, even if you change the weighing unit.

After you have entered the value, touch "OK" to activate the tare preset.

If you have activated the corresponding information field (Section 6.2.4), the value which has been input for the tare preset will be displayed below the weighing result.

6.3.2 Changing the resolution of the weighing result

Before it leaves the factory, the balance is set so that the weighing result is displayed with the maximum resolution depending on the model (corresponding to 1d). You can change the resolution of the weighing result at any time during your work.

For you to be able to change the resolution of the weighing result, the corresponding function keys must be activated (Section 6.2.2). You can use these function keys to display the weighing result at a lower resolution:

"**1/10d**":   10x lower resolution

"**1/100d**":   100x lower resolution

"**1/1000d**":   1000x lower resolution

6.3.3 Specifying the target weight and tolerances

Your balance provides you with several special functions to make weighing-in to a specified target value easier. For you to be able to enter a target weight and the associated tolerances, the corresponding function keys must be activated (Section 6.2.2).

You can use this function key to specify the desired target weight. This makes weighing-in to a target value easier for you, because the target value is also used by the "SmartTrac" graphical weighing-in aid (Section 6.3.4).
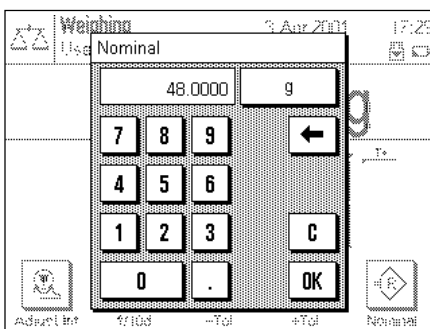
When the function key is touched, the window for entering the target weight appears.

Key in the desired target value. Check the weighing unit which is displayed to the right of the target value. If you touch the weighing unit, the units available for selection are displayed. **Note:** The units are not converted automatically, i.e. if you input a value in a particular unit, this value remains, even if you change the weighing unit.

After you have entered the value, touch "OK" to activate the tare preset.

If you have activated the corresponding information field (Section 6.2.4), the value which has been input for the target weight will be displayed below the weighing result.

You can use these two function keys to specify the accuracy with which you wish to weigh in. The selected tolerances are also used by "SmartTrac" (Section 6.3.4).
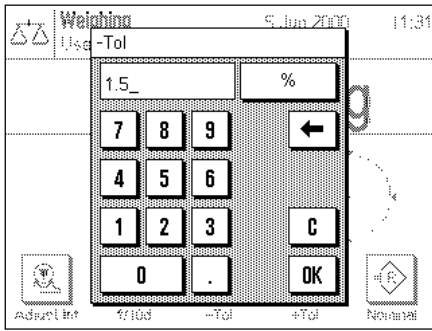
When one or other of the function keys for the minus or plus tolerance is touched, the window for entering the corresponding value appears. The input window is the same as for the target value. Here, too, check the unit which is displayed to the right of the tolerance value. You can specify the tolerance as a percentage (%) or as an absolute value in one of the available weighing units.

After you have input the respective value, touch "OK" to activate the tolerance.

If you have activated the corresponding information fields (Section 6.2.4), the specified tolerance values are displayed below the weighing result.

6.3.4 The "SmartTrac" graphical weighing-in aid

"SmartTrac" is a graphical weighing-in aid which makes weighing-in to a specific target value easier for you. In the application, "SmartTrac" appears below the weighing result on the right-hand side of the display.
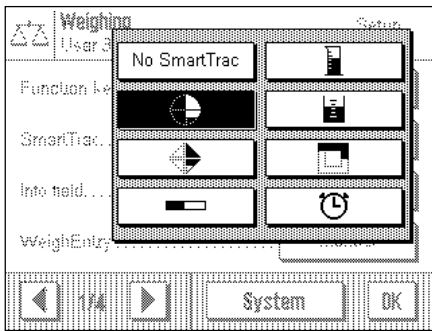
You can choose between various different display modes for "SmartTrac", or turn it off. Also, instead of "SmartTrac", you can display a stopwatch.

To make the "SmartTrac" selection, a menu is available which you can call up either with the «≡» key or by directly touching the "SmartTrac" zone in the display.

Important: The marks for the target value and the upper and lower tolerance limits are only shown if corresponding values for the target weight and tolerances have been specified as described in the preceding section.

The various different "SmartTrac" display modes are described below.
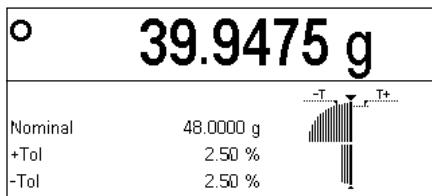
SmartTrac 1

The vertical segments in the left-hand semicircle indicate that the present weight is below the target value; if segments appear in the right-hand semicircle, the weight is above the target value. The two lower quadrants symbolize the coarse range, and the two upper quadrants the fine range. You can weigh-in rapidly until the segments in the lower quadrant disappear, and then fine-dispense until the only segments visible lie between the tolerance marks. If no more segments are visible, the target weight has been exactly reached.
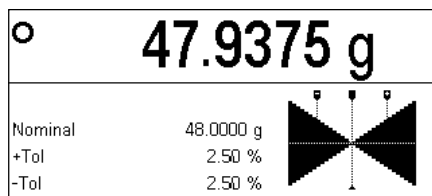
SmartTrac 2

The target weight is exactly reached when the tips of all 4 triangles touch each other. The triangles below the horizontal line symbolize the coarse range, those above the line symbolize the fine range for precisely weighing-in to the target value (represented by the vertical line).
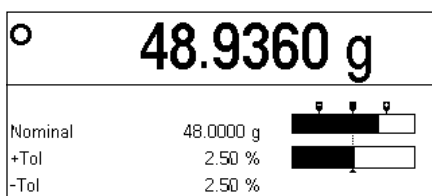
SmartTrac 3

The lower bar symbolizes the coarse range for fast weighing-in. The upper bar with the two tolerance marks represents the fine range for precise weighing-in to the target value (represented by the vertical line).

48.9361 g

Nominal	48.0000 g
+Tol	2.50 %
-Tol	2.50 %
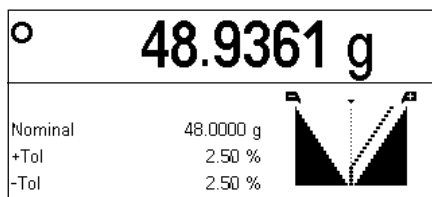
SmartTrac 4

The target value is represented by the vertical line. During weighing-in, triangular segments appear to the left and right of this line, which disappear toward the point at the top as the fine range is approached. When the fine range is reached, a pointer appears which makes precise fine-dispensing to the target value easy.

47.5172 g

Nominal	48.0000 g
+Tol	2.50 %
-Tol	2.50 %
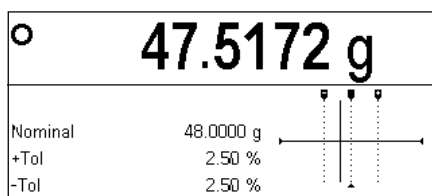
SmartTrac 5

The target value is represented by the vertical line located between the two tolerance marks. In the coarse range, a horizontal pointer appears which moves upward during weighing-in. The horizontal separating line symbolizes the boundary between the coarse and fine ranges. When this is reached, a vertical pointer appears which moves toward the right in the direction of the target weight while fine-dispensing continues.

47.5175 g

Nominal	48.0000 g
+Tol	2.50 %
-Tol	2.50 %
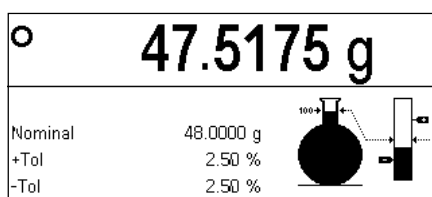
SmartTrac 6

During weighing-in, first the glass flask respresenting the coarse range fills. As soon as the fine range is reached, the increasing weight is shown in the vertical bar which also has marks for the target value and the tolerance limits.

47.5173 g

Nominal	48.0000 g
+Tol	2.50 %
-Tol	2.50 %
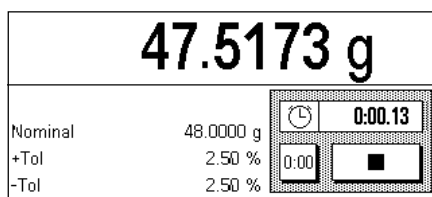
Stopwatch

The stopwatch is mentioned here for the sake of completeness, because it can be activated in the same menu as "SmartTrac". The stopwatch supports you when performing time-critical tasks. To start the stopwatch, touch the key with the arrow symbol. Touching the key again stops the stopwatch. The "0:00" key is used to reset the stopwatch to zero.

6.3.5 Weighing-in and using the statistics

When you have specified the target weight and tolerances, and activated the appropriate "SmartTrac", you can start weighing-in. If you want to compare the weights of a series of identical weighing samples, you can use the statistics functions which are built into your balance.

For you to be able to use the statistics, the 4 function keys shown at the left must be activated (Section 6.2.2).

To make optimal use of the statistics functions, a printer should be connected to your balance. If this is not the case, we recommend activating the information fields for the statistics (Section 6.2.4). Even without a printer, the information fields give you a summary of the statistical values. However, if a printer is connected to your balance, you can leave the target weight and tolerances displayed, because all the statistical values are on the record printed on the printer.

If you work with a weighing container, place this on the weighing pan and touch the «→0/T←» key to set the display to zero. (If you have specified a tare preset, touching this key is not necessary).

Place the first sample on the weighing pan and wait until the stability detector is extinguished. Touch the **"M+"** function key to accept the weight into the statistics. The weight value measured is then printed out.

Note: If you have activated **automatic weight transfer** (Section 6.2.5) the weight is accepted automatically as soon as the value becomes stable. If you have activated the **automatic door function** (Section 5.7), the glass draft shield closes automatically for the weight to be transferred and then opens again for you to place the next sample on the pan.

Remove the first sample and then place the further samples on the pan in sequence. Confirm each weight value with the "**M+**" function key.

Notes:

– If you touch the "**M+**" function key even though the weight has not changed, a message appears which prompts you to remove the weight. This prevents the same sample being recorded twice.

– If you have placed a wrong weight on the pan by mistake and accepted the weighing result, you can delete the last value with the "**CL Last**" function key. (This key is only available if the memory already has values stored in it; otherwise, the key is shown gray and cannot be operated.)

After you have weighed all the samples in, touch the "**Result**" function key. (This key is only available if the memory already has values stored in it; otherwise, the key is shown gray and cannot be operated.) This temporarily suspends the measurement process, but you can continue the series at any time. When you want to finally terminate the measurement process and clear the memory for a new series, touch the "**CL Sum**" function key. (For safety, a message appears which asks you to confirm that this is really what you want to do before the statistics are finally cleared).
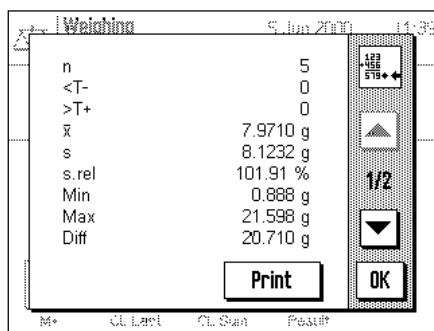
After you have touched the "**Result**" function key, the results of the weighing series appear in the display. You can use the arrow keys to page backward and forward between the different screen pages.

n	5
<T-	0
>T+	0
$\bar{x}$	7.9710 g
s	8.1232 g
s.rel	101.91 %
Min	0.888 g
Max	21.598 g
Diff	20.710 g

```
------- Statistics -----
Nominal         215.500 g
-Tol               1.5 %
+Tol               2.5 %

    1           214.3149 g
    2           214.3144 g
    3           215.1928 g
    4           215.9100 g
    5           216.0705 g

n                      5
<T-                    2
>T+                    1
x           215.16052 g
sd            0.83853 g
rsd              0.39 %
Min         214.3144 g
Max         216.0705 g
Diff          1.7561 g
Sum        1075.8026 g

Visum

.........................
```

You can produce the record for the weighing results by touching the "**Print**" key.

The illustration on the left shows an example of a record. Which values are shown on the record depends on the settings for the weighing record (Section 6.2.8). The individual items of information on the weighing record have the following meanings:

"Nominal":	Specified target weight
"–Tol":	Specified lower tolerance
"+Tol":	Specified upper tolerance
"1"..."5":	Number and weight of each sample
"n":	Number of samples
"<T–":	Number of samples whose weight is below the lower tolerance limit
">T+":	Number of samples whose weight is above the upper tolerance limit
"x":	Mean weight of all samples
"s":	Absolute standard deviation
"s.rel":	Relative standard deviation in %
"Min":	Lowest weight measured
"Max":	Highest weight measured
"Diff":	Difference between highest and lowest weight
"Sum":	Sum of all individual weights

6.3.6   Working with identifications

Identifications are descriptive texts of individual weighing procedures which allow unambiguous cross-referencing of weighing samples to specific jobs or clients. The identifications are also printed on the weighing records, or transmitted to a computer if one is connected.

For you to be able to work with the identifications, the ID function keys must be activated (Chapter 6.2.2).

At the factory, the ID function keys are given the designations "ID1", "ID2", and "ID3". You can replace these designations by more meaningful titles corresponding to your application (Section 6.2.10). The chosen designations (e.g. "Client" for ID1, "Job" for ID2 and "Lot" for ID3) appear below the corresponding ID function key.

When you work with identifications we recommend you to activate the corresponding information fields (Section 6.2.4). The information fields have the same designations as the respective ID function keys.

| Weighing | 6. Apr 2001 | 11:22 |
| User 3 | | |

0.0000 g

Client
Batch
Lot

[ID1] Client [ID2] Batch [ID3] Lot
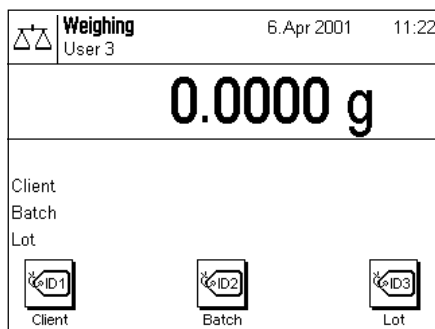
The example on the left shows the balance display after the ID function keys, and the ID information fields, have been activated.
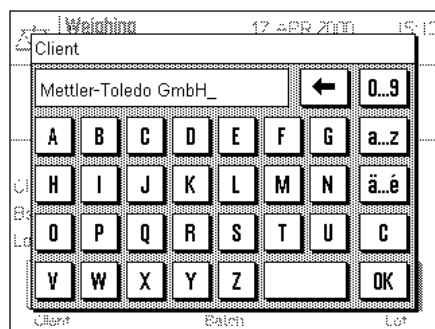
The practical example described below is based on the designations shown in the illustration above.

| Weighing | 12 APR 2001 | 15:12 |
| Client | | |

Mettler-Toledo GmbH_   ←   0...9

A B C D E F G a...z
H I J K L M N ä...é
O P Q R S T U C
V W X Y Z   OK

Client   Batch   Lot

In the application, when you process a job for a client, and when weighing is complete, touch the "ID1" ("Client") function key and a field appears to input the client (see illustration at left). Enter the name, and confirm your input with "OK".

If you then touch the "ID2" ("Job") key, a similar field appears for you to enter the job designation, and when you touch the "ID3" ("Lot") key, you can enter the lot designation. Each designation can be up to 24 characters long.

| Weighing | 6. Apr 2001 | 11:18 |
| User 3 | | |

48.2806 g

Client   Mettler Toledo...
Batch   RF414/01
Lot   07

[ID1] Client [ID2] Batch [ID3] Lot
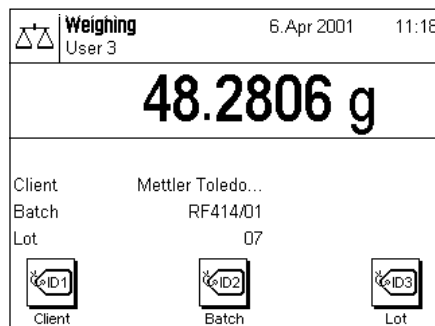
When you have completed all the inputs, you can again check the identifications you have selected by means of the information fields in the display.

All the identifications remain stored until they are replaced by new designations.

```
Type                AX106
Balance        Lab. RF/1A
Nominal      48.0000 g


CLIENT Mettler-Toledo GmbH
Batch          RF 414/01
Lot                   07
    PT       0.0000 g
             48.2806 g
```
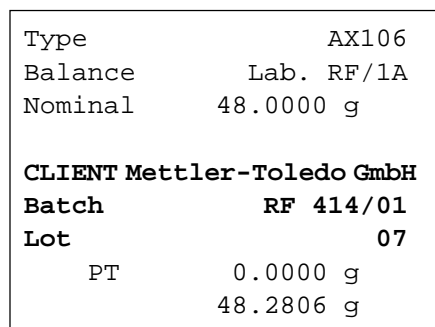
If you have defined the weighing record so that the identifications should also be printed out (Section 6.2.8), the specified ID designations (e.g. "Client") and the text you entered (e.g. "Mettler-Toledo GmbH") are both printed out. The illustration on the left shows a weighing record with the identifications corresponding to the above example.

6.4   Adjusting the balance and checking the adjustment

At the factory your balance was set for a manual adjustment. However, you can also carry out a manual adjustment and/or check using the internal weight, or an external weight, at any time.

In the descriptions following below, it is assumed that the respective function keys for adjustment and testing (Section 6.2.2) are activated.

6.4.1   Adjustment using the internal weight

By touching this function key, you start adjustment (calibration) of the balance using the built-in calibration weight.
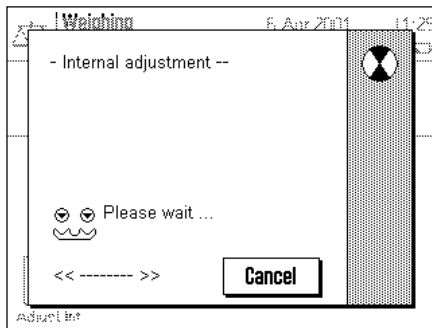
You can hear the motor placing the internal weight on the weighing pan and then removing it again. While adjustment is taking place, the window shown on the left is opened. The symbols are animated so you can follow the adjustment process visually while it is taking place. You can terminate the adjustment process at any time by touching the "Cancel" key.

When the adjustment is complete, one or other of the following messages appears:
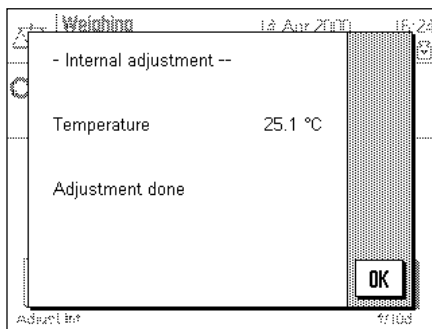
"Adjustment successfully completed". Touch "OK" to return to the application.

If a printer is connected to the balance, the adjustment is automatically recorded according to the system settings you selected for adjustment and test (Section 5.3). You will find an example of a record in Section 6.4.6.
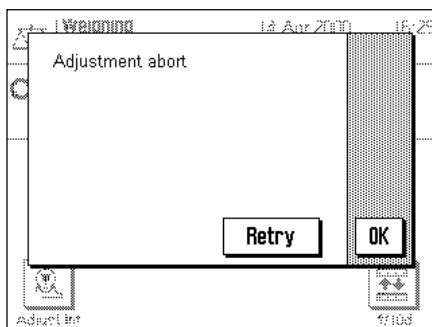
"An error has occurred while adjusting and the adjustment has been terminated". This message also appears if you terminate the adjustment yourself. You can repeat the adjustment process or return to the application by touching "OK".

6.4.2   Adjustment using an external weight

Adjust.ext

By touching this function key, you start adjustment (calibration) of the balance using an external calibration weight. **Note:** Depending on country-specific regulations, this function may not be available on certified balances.
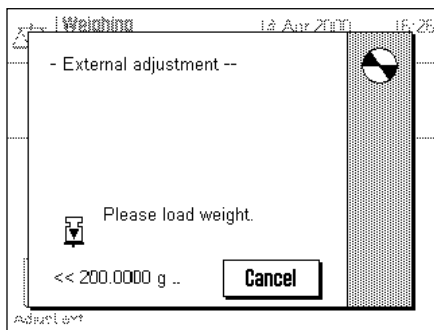
You are prompted to load the adjustment weight onto the pan. The weight needed for adjustment is shown at the bottom edge of the window. If the automatic door function is active (Section 5.7), the glass draft shield opens automatically for you to place the weight on the pan.

Important: Make sure that you place the correct adjustment weight on the weighing pan; otherwise, the adjustment process will be terminated with an error message. The adjustment weight can be specified in the system settings (Section 5.3).
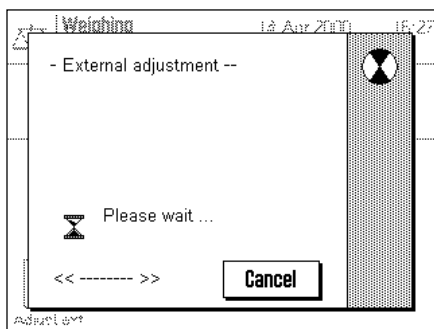
If the automatic door function is active, the glass draft shield closes automatically after you have placed the weight on the pan; otherwise, you must close it manually by touching the «‡» key. While adjustment is taking place, the window shown on the left is opened. You can terminate the adjustment process at any time by touching the "Cancel" key.
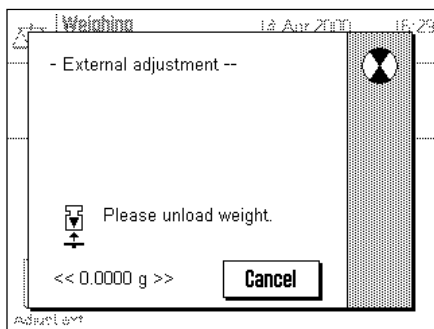
When the adjustment process is complete, you will be prompted to unload the weight. Remove the weight from the weighing pan.
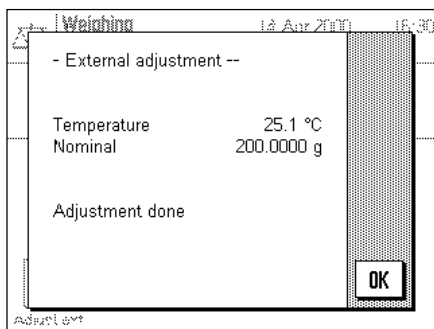
The balance confirms successful completion of the adjustment. Touch "OK" to return to the application.

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 (Section 5.3). An example of an adjustment record is shown in Section 6.4.6.

If an error occurs during adjustment, a corresponding message appears similar to the one for adjustment with the internal weight (see previous section).

6.4.3 Checking the adjustment with the internal weight

By touching this function key, you can use the internal weight to check the correct adjustment (calibration) of your balance.

The checking procedure is similar to the procedure for adjustment using the internal weight (Section 6.4.1).
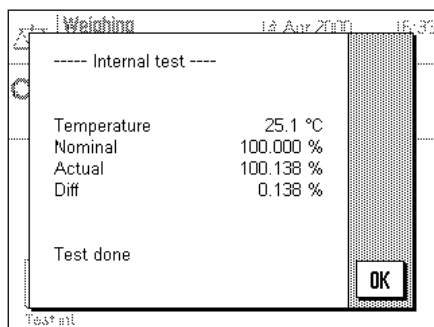
The successful conclusion of the checking procedure is confirmed with the window shown on the left. If a printer is connected to the balance, a record of the check is automatically printed out according to the system settings you selected for adjustment and test (Section 5.3). You will find an example of a record in Section 6.4.6.

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

6.4.4 Checking the adjustment with an external weight

By touching this function key, you can use an external weight to check the correct adjustment (calibration) of your balance.

The checking procedure is similar to the procedure for adjustment using an external weight (Section 6.4.2). When the check is complete, a message appears which is similar to the one displayed after checking the adjustment with the internal weight. If a printer is connected to the balance, a record of the check is automatically printed out according to the system settings you selected for adjustment and test (Section 5.3). You will find an example of a record in Section 6.4.6.

6.4.5 Fully automatic adjustment using ProFACT

Note: The "ProFACT" fully automatic adjustment function is switched off in the factory setting (Section 5.3.3).
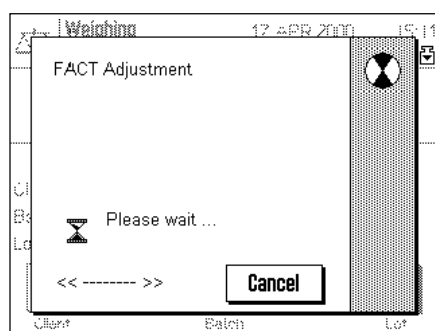
ProFACT adjusts and linearizes your balance fully automatically based on pre-specified criteria (Section 5.3.3).

As soon as the pre-specified criterion is fulfilled (time and/or temperature criterion), adjustment begins. (Note: In the first 24 hours after the balance is connected to the power supply, ProFACT is performed several times irrespective of the criteria selected). While adjustment is taking place, a window is opened which provides you with information about the adjustment process. If you are working with the balance just at that moment, you can terminate ProFACT with the "**Cancel**" key. The balance will start the adjustment again at the next opportunity. After completing the adjustment, the balance automatically returns to the application. Each ProFACT adjustment is automatically recorded according to your settings (Section 5.3.3). What information in addition to the adjustment data is recorded, depends on your settings for the adjustment and test record (Section 5.3.2). You will find an example of a record in Section 6.4.6.

6.4.6   Adjustment and test records (examples)

Record of an external adjustment

```
- External adjustment —
17.Apr 2000          11:55

METTLER TOLEDO
User                User 3

Type                 AX106
SNR            1234567890
Balance        Lab. RF/1A
Weight ID      A200-F1/1
Certificate No.  MT 414A

Temperature    20.3 °C
Nominal      10.0000 g

Adjustment done

Visum

.........................
_____
```

Record of an internal test

```
——– Internal test ——–
17.Apr 2000          11:57

METTLER TOLEDO
User                User 3

Type                 AX106
SNR            1234567890
Balance        Lab. RF/1A
Weight ID      A200-F1/1
Certificate No.  MT 414A

Temperature    20.3 °C
Nominal      10.000 %
Actual       10.139 %
Diff          0.002 %

Test done

Visum

.........................
_____
```

Record of an external test

```
 --— External test ——–
17.Apr 2000          11:59

METTLER TOLEDO
User                User 3

Type                 AX106
SNR            1234567890
Balance        Lab. RF/1A
Weight ID      A200-F1/1
Certificate No.  MT 414A

Temperature    20.6 0C
Nominal      10.0000 g
Actual        9.9999 g
Diff         -0.0001 g

Test done

Visum

.........................
_____
```

Record of an internal or ProFACT adjustment

```
- Internal adjustment —
17.Apr 2000          11:51

METTLER TOLEDO
User                User 3

Type                 AX106
SNR            1234567890
Balance        Lab. RF/1A
Weight ID      A200-F1/1
Certificate No.  MT 414A

Temperature     20.3 °C

Adjustment done

Visum

.........................
_____
```

Adjustment history record

```
  ----- History ------
17.Apr 2000        12:02

METTLER TOLEDO
User              User 3

Type              AX106
SNR          1234567890
Balance       Lab. RF/1A
Weight ID     A200-F1/1
Certificate No.  MT 414A
01  17.Apr 2000   10:04
    internal
    23.8 °C
02  17.Apr 2000   10:19
    internal
    23.8 °C
03  17.Apr 2000   10:39
    internal
    24.0 °C
04  17.Apr 2000   10:49
    internal
    24.0 °C
.
.
.
50  22.Apr 2000   16:51
    internal
    23.0 °C

```

The balance continually records the dates and results of all adjustments. The last 15 adjustments can be displayed and printed out (Section 5.3.1). An example of an adjustment history record is shown on the left.

The earliest adjustments are printed first, and the most recent adjustment is printed at the end of the record. As well as the date and time, the type of adjustment (internal or external) and the ambient temperature are recorded.

7   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.

7.1   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.

7.2   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)

7.3   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.

7.4   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 Chapter 5.8): 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.
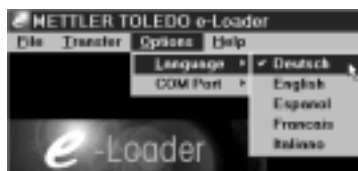
Select the **language** in which you wish to be guided through the updating process. The e-Loader will display all the instructions and infomation in the dialog language you select.
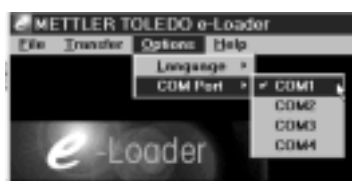
Select the **interface** of the computer to which the balance is connected.

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.
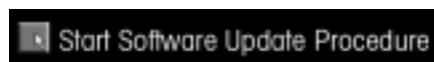
When you have made the necessary settings and checked the connection, you can start the updating process. You do this by clicking on "Start Software Update Procedure". Follow the instructions of the e-Loader which will guide you through the updating procedure step by step. The e-Loader will ask you whether 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.

7.5 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.
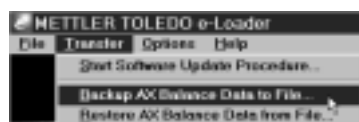
To backup the current settings from a balance onto a computer, start the e-Loader and call up the data backup function as shown in the illustration at left.
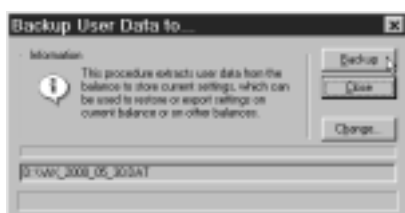
The dialog at left prompts you to confirm the data backup and to change the path for saving the backup file if necessary.
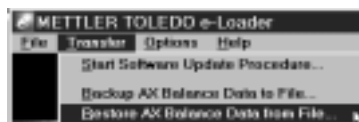
To restore the balance settings from the computer to the balance, call up the restore function as shown in the illustration at left.
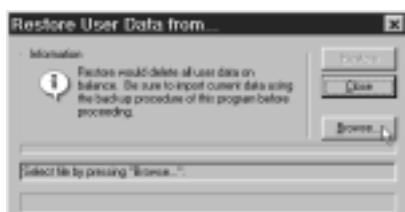
When you have started the restore function, you can use the "Browse" button to select the settings file -to be transferred to the balance. Remember that when you do this, all the current settings in the balance will be overwritten!

8 Further important information

8.1 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:

| Weighing | 16.APR 2000 | 20:06 |
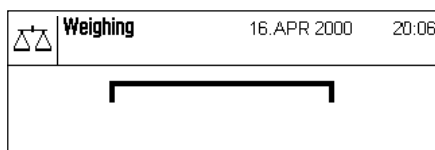
Overload

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

| Weighing | 16.APR 2000 | 20:08 |
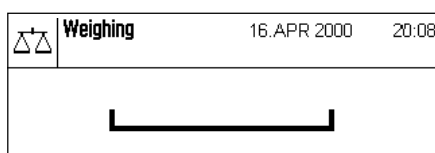
Underload

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

| Startup | 16.APR 2000 | 20:09 |
− 0.0000 g −
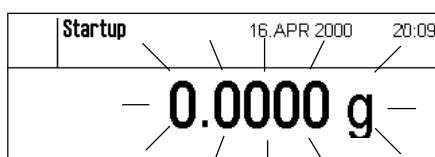
Error when switching on (weight display flashes)

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.

| Weighing | 16.APR 2000 | 20:21 |
Abort
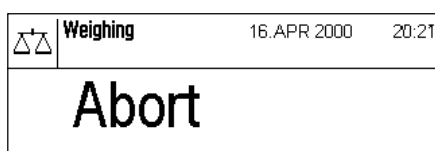
Taring or zeroing was interrupted by touching the «On/Off» key

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

8.2 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.

8.3 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!
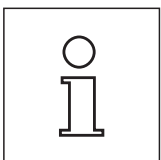
Ask your METTLER TOLEDO dealer about servicing possibilities – regular servicing by an authorized service technician guarantees consistent weighing accuracy for years and prolongs the service life of your mass comparator.

9 Technical data and accessories

In this chapter 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 chapter you will find a list of the options currently available.

9.1 General data

Power supply

• Power supply connector 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

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 – 70% C (±10%)
• 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
• Weighing pan:	Chrome steel

Standard equipment

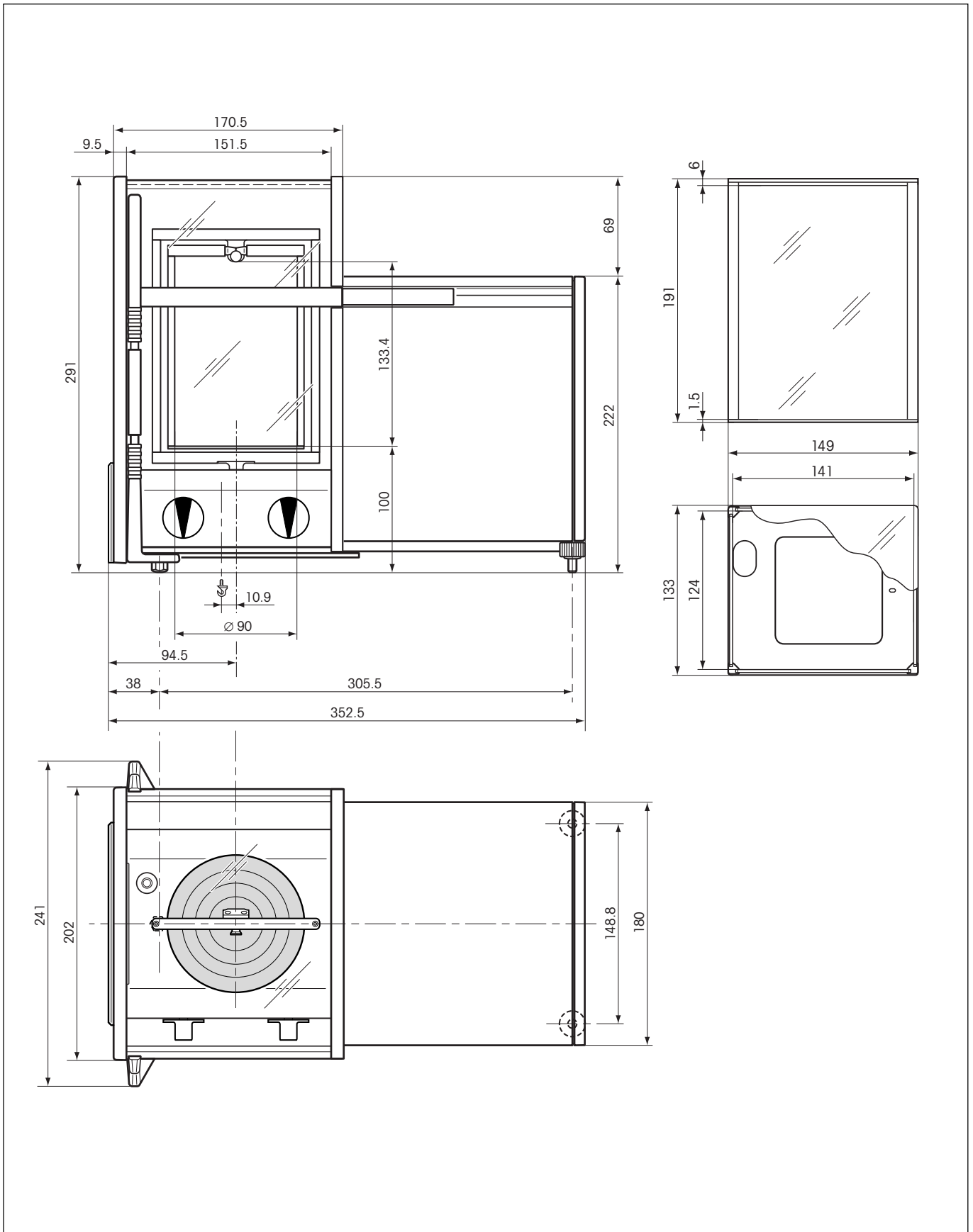|	
• Delivered with balance:	AC adapter with country-specific power cable RS232C interface Protective cover for the terminal Feedthrough for below-the-balance weighing
• Documentation:	Operating instructions and booklet "Weighing the right way with METTLER TOLEDO" Operating instructions "WeighCom Application" Production certificate Instructions for the "METTLER TOLEDO Standard Interface Command Set" (MT-SICS), in English

9.2   Model-specific data

	AX106 Comparator	AX206 Comparator	AX1005 Comparator	AX1004 Comparator	AX2005 Comparator
Readability	1 µg	1µg	0.01 mg	0.1 mg	0.01 mg
Maximum load	111 g	211 g	1109 g	1109 g	2109 g (min. load 998 g)
Taring range	0…11 g	0… 11 g	0…109 g	0…109 g	0… 109 g
Repeatability	3 µg	4µg	0.02 mg	0.07 mg	0.04 mg
Built-in dial weights	50 g, 30 g 10 g, 10 g	50 g, 30 g 10 g, 10 g, 100g	500 g, 300 g 100 g, 100 g	500 g, 300 g 100 g, 100 g	500 g, 300 g 100 g, 100 g
Linearity	±8 µg	±8 µg	±0.12 mg	±0.15 mg	±0.12 mg
Stabilization time	10…20 s	10…20 s	10…20 s	10…20 s	10…20 s
Adjusting weights Number of built-in weights External weights	2 10 g	2 200 g	2 100 g	2 100 g	2 2 kg
Sensitivity Temperature drift (10…30°C)	±1.0 ppm/°C	±1.0 ppm/°C	±1.0 ppm/°C	±1.0 ppm/°C	±1.0 ppm/°C
Separation cell/electronics	separate	separate	separate	separate	separate
Dimensions Weighing cell (W x D x H) [mm] Control unit (W x D x H) [mm] Weighing pan dia. [mm] Effective height of draft shield [mm]	241x 433 x 289 224 x 366 x 94 45 mm (suspended 60mm) 120 mm (85 mm)	241x 433 x 289 224 x 366 x 94 45mm (suspended 60 mm) 120 mm (85 mm)	241x 433 x 289 224 x 366 x 94 suspended 100 mm 135 mm	241x 433 x 289 224 x 366 x 94 suspended 100 mm 135 mm	241x 433 x 289 224 x 366 x 94 suspended 100 mm 135 mm

9.3   Dimensions
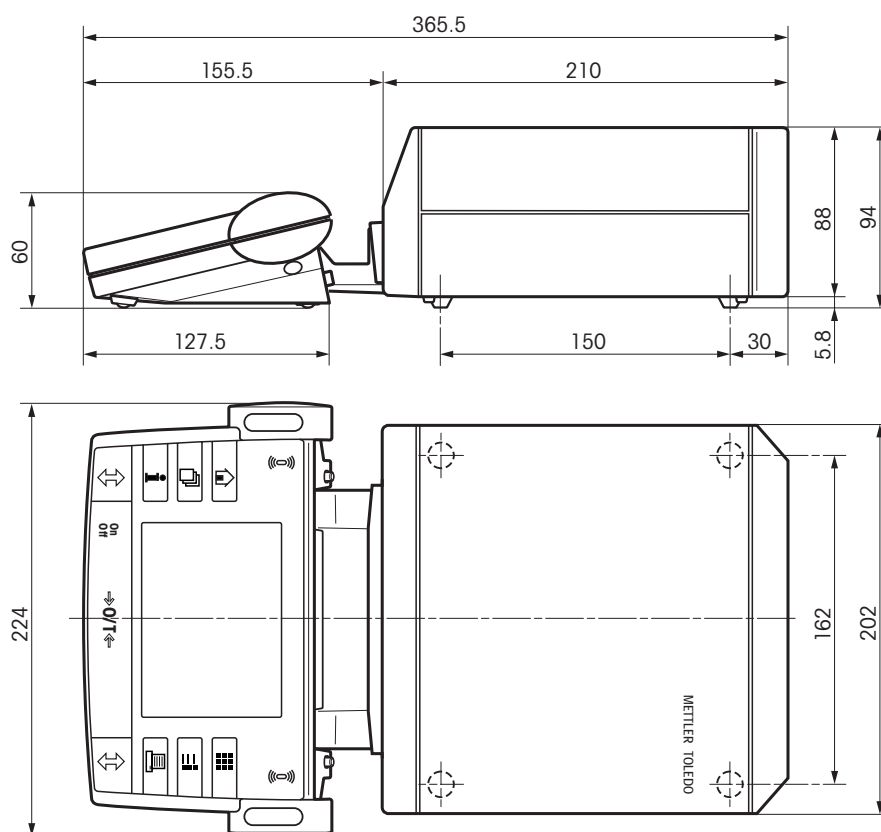
AX106/206 mass comparator and inner draft shield
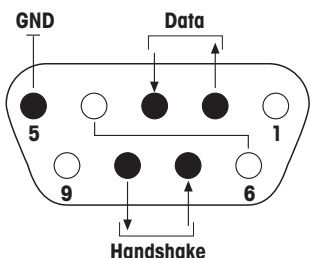
External draft shield for AX106/206 mass comparator
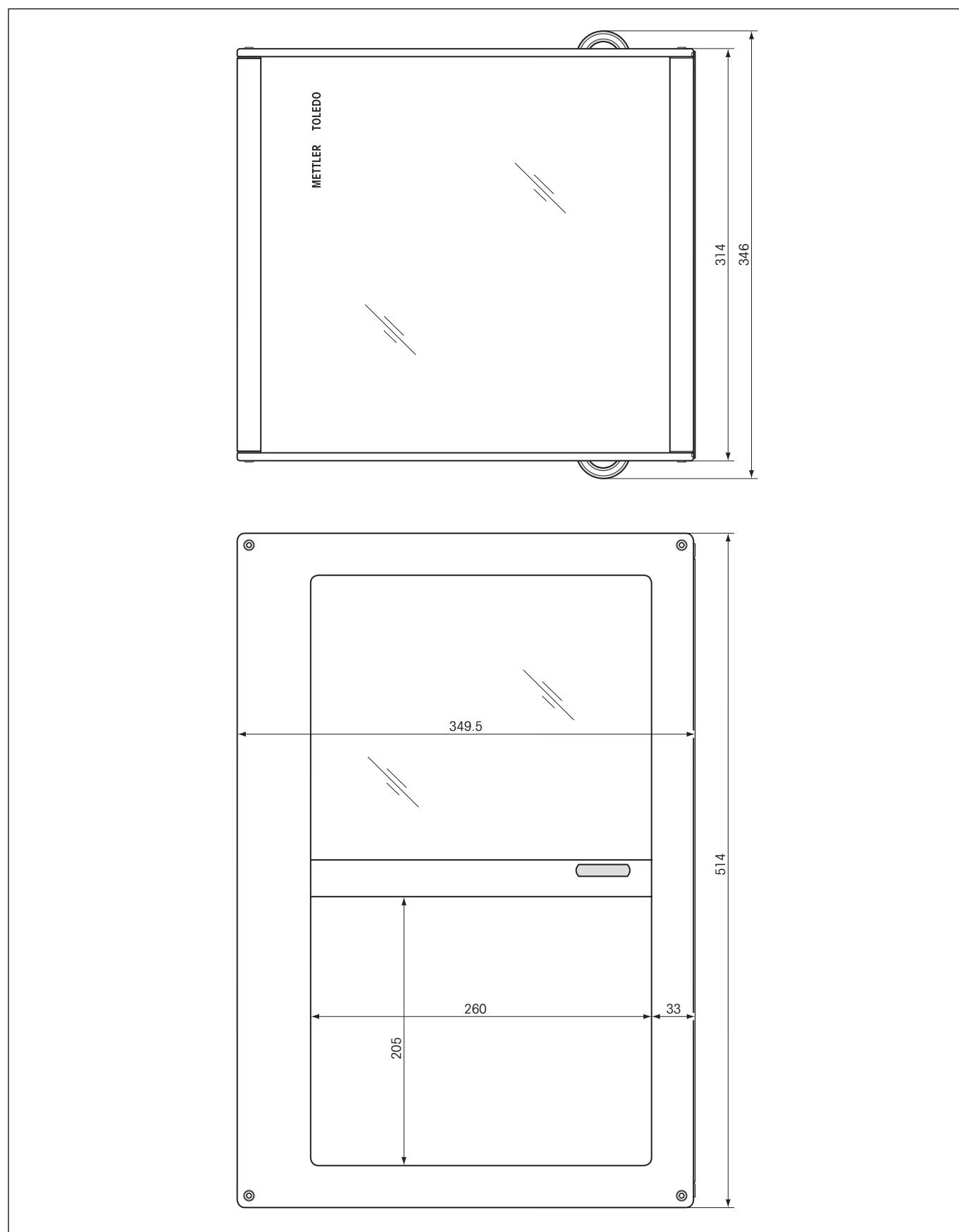
AX1005/2005/1004 mass comparator and inner draft shield (AX1005/2005)

Control unit

9.4   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: Inputs: +5 V … +15 V (RL = 3 – 7 kΩ) +3 V … 25 V −5 V … −15 V (RL = 3 – 7 kΩ) −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)

9.5 Accessories

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

Draft shield	
External draft shield for AX1005, AX2005 und AX1004	11115915
Cable	
Extension cable between cell and evaluation electronics for AX-SE and MX/UMX, length 0.6 m	211535
Extension cable between cell and evaluation electronics for AX-SE and MX/UMX, length 5 m	11100080
Terminal accessories	
5 m terminal cable including cover	11100081
Protective cover	
Protective cover for terminal	11100830
Climatic measurement station Klimet A30	
Klimet A30 certified Includes: 1 sensor for air temperature, 1 sensor for air pressure, 1 sensor for relative humidity.	222012
Klimet A30 not certified Includes: 1 sensor for air temperature, 1 sensor for air pressure, 1 sensor for relative humidity.	222011
Temperature sensor (with 5 m cable)	222014
Temperature sensor (with 2.5 cable)	222013
MC Link	
Windows® software to perform the comparative weighings.	11116504

To protect your METTLER TOLEDO product's future:
METTLER TOLEDO Service assures the quality, measuring accuracy and
preservation of value of all METTLER TOLEDO products for years to
come.
Please send for full details about our attractive terms of service.
Thank you.
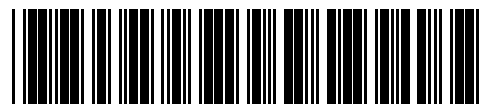
P11780486

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