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1 Introduction

Thank you for choosing a METTLER TOLEDO balance.

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

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

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

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

Finding more information

► <http://www.mt.com/micro>

More detailed information is in the Operating Instructions on the CD-ROM.

Software version

These operating instructions refer to the originally installed firmware (software) version V 5.40.

2 Safety Information

2.1 Definition of signal warnings and symbols

Safety notes are indicated by signal words and warning symbols and contain warnings and information about safety issues. Ignoring safety notes can lead to personal injury, damage to the instrument, malfunctions and erroneous results.

Signal words

WARNING	for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	for a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data or minor or medium injuries if not avoided.
Attention	(no symbol) for important information about the product.
Note	(no symbol) for useful information about the product.

Warning symbols



General hazard



Electrical shock

2.2 Product safety information

Intended use

Your balance is used for weighing. Use the balance exclusively for this purpose. Any other type of use and operation beyond the limits of technical specifications without written consent from Mettler-Toledo AG, is considered as not intended.



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

General safety information

This balance complies with current industry standards and the recognized safety regulations; however, it can constitute a hazard in use. Do not open the balance housing: The balance contains no user-serviceable parts. In the event of problems, please contact a METTLER TOLEDO representative.

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

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

Staff safety

These operating instructions must be read and understood before using the balance. These operating instructions must be retained for future reference.

The balance must not be altered or modified in any way. Only use METTLER TOLEDO original spare parts and accessories.

Safety notes



⚠ WARNING

Risk of electric shock

Use only the original universal 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.



CAUTION

Damage to the balance

- a) Only use indoors in dry locations.
 - b) Do not use pointed objects to operate the touch screen!
The balance is of a very sturdy design, but is still a precision instrument. It must be handled with care.
 - c) Do not open the balance:
The balance contains no user-serviceable parts. In the event of problems, please contact a METTLER TOLEDO representative.
 - d) Only use METTLER TOLEDO original accessories and peripheral devices for the balance.
These are specifically designed for the balance.
-

3 Design and Function

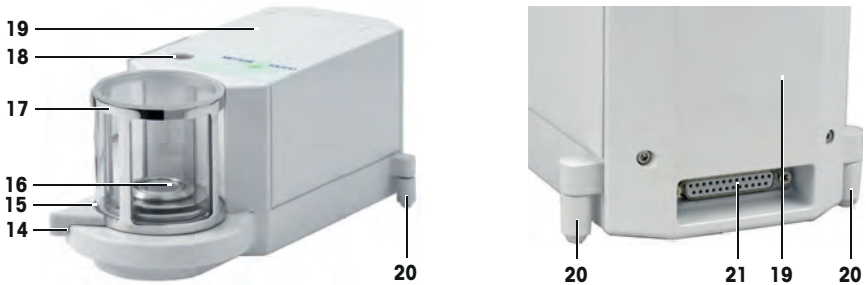
3.1 Overview

3.1.1 Balance



Control unit

1	Terminal	2	Display ("Touch screen")
3	Operating keys	4	Type designation
5	Control unit	6	Drawer with weighing tweezers, cleaning brush, and cleaning tweezers
7	Slot for second interface (optional)	8	Socket for AC adapter
9	Socket for terminal	10	RS232C serial interface
11	Socket for weighing cell	12	Aux 2 (connection for "ErgoSens", hand or foot switch)
13	Aux 1 (connection for "ErgoSens", hand or foot switch)		

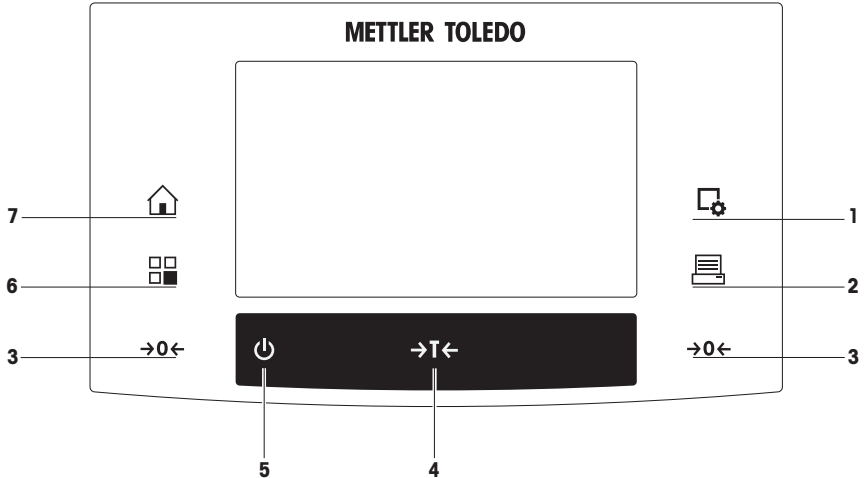


Weighing cell

14	Door handle	15	Weighing chamber plate
16	Weighing pan	17	Glass draft shield
18	Level indicator	19	Weighing cell
20	Foot screw	21	Socket for control unit

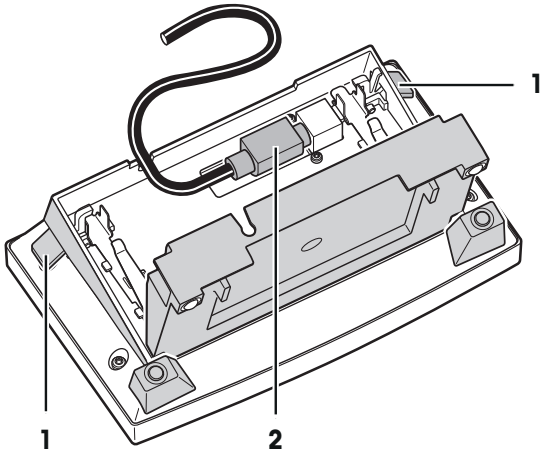
3.1.2 Terminal

Key assignments and terminal connection.



Front view

		Designation	Explanation
1		Configuration	For displaying menus for the configuration of a current application. The application can be adjusted to a specific task via numerous settings.
2		Print	This key is used to transfer data via the interface, e.g. to a printer. Other devices, e.g. a PC can also be connected. The data to be transferred can be freely defined.
3		Zeroing	This key is used for setting a new zero point manually (only required if the balance is used for normal weighings).
4		Tare	This key is used to tare the balance manually (only necessary for normal weighings). When the balance has been tared, the Net symbol is displayed to indicate that all displayed weights are net.
5		On/Off	For switching the balance on and off (standby mode). Note It is recommended not to disconnect the balance from the power supply unless it is not going to be used for an extended period.
6		Select application / System	This key is used to select a required application.
7		Home	This key takes you directly from any menu level back to the active application.



Bottom view

1	Levers	2	System connection (terminal cable)
---	--------	---	------------------------------------

3.2 User interface

3.2.1 Display

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

Note

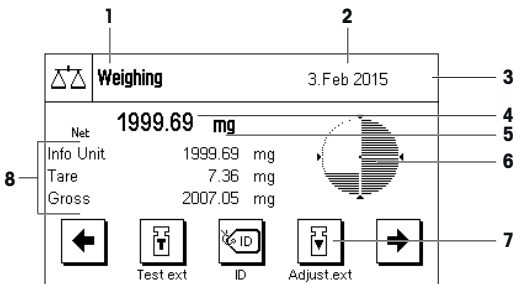
Depending on country-specific requirements, non-calibrated decimal places are highlighted on approved balances.



CAUTION

Do not touch the touch screen with pointed or sharp objects!

This may damage the touch screen.



Note

The factory setting of the balance displays the weighing result at a large size, without SmartTrac and information fields.

	Designation	Explanation
1	Application name	Select application. The application menu can be selected by tapping this zone. This menu can also be displayed by pressing [F1].
2	Date	The date can be changed by tapping this zone.
3	Status icons	These status icons indicate special balance statuses (e.g. service due, adjustment required, battery replacement, out of level). If you tap the icon, the function is explained.
4	Weight value	Tapping the weight displays a window showing the result in a large format. This is useful for reading a weight from a certain distance.
5	Weighing unit	The required weighing unit can be changed by tapping the weighing unit, e.g. from mg to g .
6	SmartTrac	SmartTrac is a graphic weighing-in aid, which shows at a glance an already used and still available weighing range.
7	Function keys	This area is reserved for Function Keys enabling direct access to frequently required functions and application settings. If more than 5 function keys are activated, these can be selected with the arrow keys.
8	Information fields	This area is used for displaying additional information (information fields) relating to an active application.

Large display

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

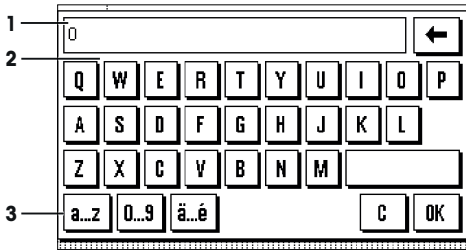


Screen saver

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

3.2.2 Input dialog boxes

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



	Designation	Explanation
1	Data field	Displays (entered) alphanumeric and numeric characters.
2	Keyboard	Data input area
3	Selection	Select various keyboard layouts.

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

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

3.2.3 Firmware

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

The firmware is divided as follows:

- System settings
- Applications
- Application-specific settings

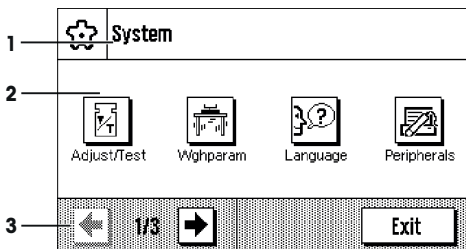
Note

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

3.2.3.1 System settings

System settings (e.g. settings for peripheral devices) are independent of the applications and apply to the entire weighing system.

Navigation: [F4] > [System]



	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.

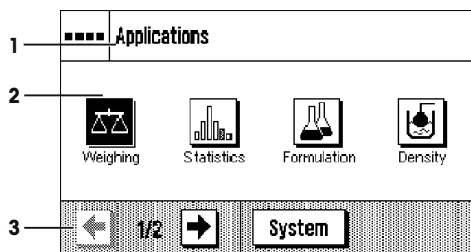
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. [Exit], [STD], [C], [OK]).

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

3.2.3.2 Applications

Applications are firmware modules for performing specific weighing tasks. The balance delivered with various applications pre-installed. After switching on the balance, the last used application are loaded. The applications are available under the [F6] key. Instructions for working with standard applications are provided in the respective sections.

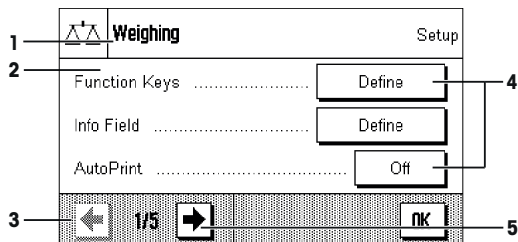
Navigation: [F6]



Application-specific settings

These settings can be used to adjust the applications. The available setting options depend on the selected application. Pressing [F3] opens the multipage menu with settings for a currently active application. Information on the individual setting options is provided in the section relating to the respective application.

Navigation: [F3]



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

- 1 Settings can be changed by tapping the respective button.
- 2 Confirm with [**OK**].
- 3 To leave the settings, select [**Exit**].
- 4 To change the system settings, tap [**System**].

3.2.4 Security system

The balance has a comprehensive security system with which individual access rights can be defined at administrator. Access to protected menu areas requires the entry of a password. On delivery of the balance, a password is defined. The menu settings are chosen, so that you have unrestricted access to all system settings.

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




CAUTION

Remember passwords!

Protected menu areas cannot be accessed without password.

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

- 1 Enter your password.
 - Case sensitive, tap the [**a...z**] and [**A...Z**] button to switch between upper and lower case.
 - To enter numbers, tap the [**0...9**] button.
 - Incorrect entries can be deleted character by character with the arrow key .

Note

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

- 2 Enter the password (for security reasons, this is displayed with asterisks instead of plain text) and confirm with [**OK**].
- ⇒ If the password are correct, the selected menu area is displayed or the required action initiated. If these are incorrect, an error message is displayed with a request to enter them again.

4 Installation and Putting into Operation

4.1 Unpacking

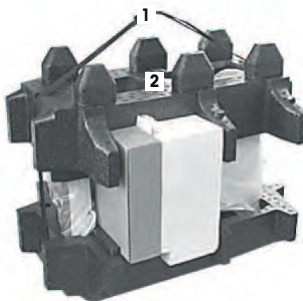
Open the balance packaging. Check the balance for transport damage. Immediately inform a METTLER TOLEDO representative in the event of complaints or missing accessories.

Note

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

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

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

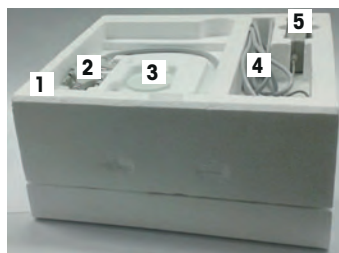


- 3 Remove the padding.
- 4 Take the inner box out of the plastic bag and place it on a level surface with the opening flap facing up.
- 5 Open the inner box (open the flap and remove the cardboard sleeve).

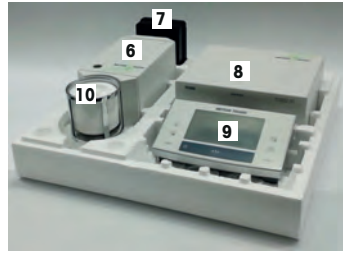


– Remove the following parts from the upper part of the packaging:

- Documents (1), already removed here.
- Connecting cable (2) for weighing cell – control unit.
- Glass cover (3) of the draft shield.
- Power cable (4) country-specific for the AC adapter.
- AC adapter (5).



- 1 Lift off the upper part of the inner packaging.
⇒ You will find the following parts in the lower part:
- 2 Remove the following parts from the packaging:
 - Weighing cell (6) with draft shield.
 - Plastic box (7), contains the parts for the draft disk.
 - Control unit (8) with mounted terminal (9) and protective cover for the terminal.
- 1 Remove the parts from the packaging.
- 2 Remove the shipping lock (10) (plastic protection) from the draft shield.



4.2 Scope of delivery

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

- Weighing cell and control unit with terminal installed, protective cover for the terminal
 - RS232C interface
 - Slot for second interface (optional)
 - Feedthroughs for below-the-balance weighing
- Weighing pan is installed, draft disk are delivered separately and must be installed by the user
- AC adapter with country-specific power cable
- Connection cable for connecting the weighing cell to the control unit
- Cleaning brush
- Cleaning tweezers
- Weighing tweezers
- Production certificate
- CE declaration of conformity
- Operating instructions or Quick Guide; printed or on CD-ROM, depending on country of use

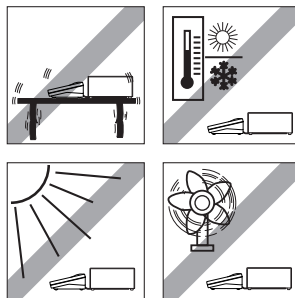
4.3 Location

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

Note

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

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



Further information can be found in Weighing the Right Way.

4.4 Assembling the balance

- 1 Remove the parts for the draft disk from the black plastic box.
- 2 Assemble the parts according to the instructions in the cover of the plastic box.
- 3 Connect the terminal cable (1) to the control unit.
- 4 Use the cable delivered (2) to connect the control unit to the weighing cell.



4.5 Connecting the balance



⚠ WARNING
Risk of electric shock

- a) To connect the balance, only use the supplied three-core power cable with equipment grounding conductor.
- b) Only connect the balance to a three-pin power socket with earthing contact.
- c) Only standardized extension cable with equipment grounding conductor must be used for operation of the balance.
- d) Intentional disconnection of the equipment grounding conductor is forbidden.

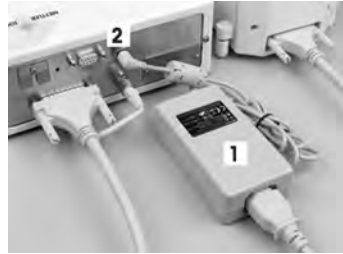
The balance is supplied with an AC adapter and country-specific power cable. The AC adapter is suitable for use with the following voltage range:

100 – 240 V AC, 50/60 Hz.

Attention

- Check whether your local power supply falls within this range. If this is not the case, under no circumstances connect the AC adapter to the power supply, but contact a METTLER TOLEDO representative.
- The power plug must be accessible at all times.
- Prior to use, check the power cable for damage.

- Route the cable in such a way that it cannot be damaged or cause a hindrance when working.
 - Ensure that no liquid comes into contact with the AC adapter.
 - ▶ Balance and terminal are at the final location.
- 1 Connect the AC adapter (1) to the connection socket (2) at the rear of the balance.
 - 2 Connect the AC adapter (1) to the power supply.
- ⇒ The balance performs a self-test after connection to the power supply and is then ready to use.



4.6 Setting up the balance

4.6.1 Weighing for the first time

After commissioning the new balance, the first weighing can be carried out. This will also familiarize you with the operation of the balance.

4.6.1.1 Switching on the balance

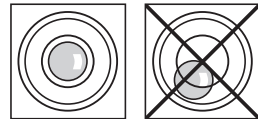
- ▶ Balance is connected to the power supply.
 - ▶ Terminal and balance are interconnected.
- To switch on, press [⏻].
- ⇒ Display appears.
- ⇒ Balance is ready to use.



4.6.1.2 Leveling the balance

Check the position of the air bubble in the level indicator on the top of the weighing cell. If the air bubble is not in the inner circle, the weighing cell needs to be leveled.

Turn the two leveling screws on the back of the weighing cell until the air bubble is in the inner circle of the level indicator (left figure = leveled correctly, right figure = leveled incorrectly).



4.6.1.3 Performing a simple weighing

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

Zeroing

- Press [→0←].
- ⇒ Zeroing

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

Taring

Note

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

- ▶ If a weighing container is used, the balance must first be set to zero.
- 1 Place the container on the balance.
- 2 Press [**→T←**].
 - ⇒ The balance is tared.
 - ⇒ The weight of the container is set as the new tare weight and the previous tare (if available) is overwritten.
 - ⇒ The **Net** display signals that all indicated weights are net weights.



Congratulations!

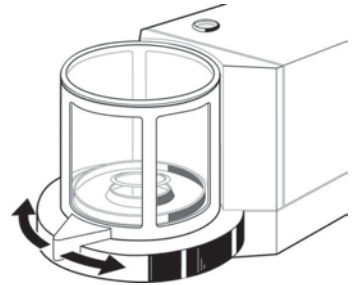
The first weighing is now complete. The following sections contain further information about the extensive functions and applications of this balance.

4.6.2 Operating of the glass draft shield

Attention

During weighing, always ensure that the draft shield is closed!

The glass draft shield on your balance can be opened and closed by turning the door handle.



5 Maintenance

5.1 Cleaning

Periodically clean the weighing chamber, the housing, and the terminal of your balance using the brush supplied with it. The maintenance interval depends on your standard operating procedure (SOP).

Please observe the following notes:



⚠ WARNING

Risk of electric shock

- a) Disconnect the balance from the power supply prior to cleaning and maintenance.
 - b) Only use METTLER TOLEDO power cable, if these need to be replaced.
 - c) Ensure that no liquid comes into contact with the balance, terminal or AC adapter.
 - d) Do not open the balance, terminal or AC adapter.
These contain no user-serviceable parts.
-



CAUTION

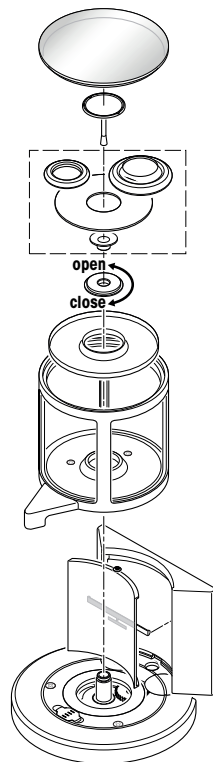
Damage to balance

Under no circumstances use cleaning agents containing solvents or abrasive agents, as this can damage the terminal overlay.

Cleaning

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

- 1 To clean the weighing chamber thoroughly, pull the draft disk and the weighing pan vertically up and off.
It may be necessary to turn the weighing pan slightly to remove it.
- 2 When you replace these parts, make sure they are in the correct position.



Note

Contact a METTLER TOLEDO representative to find about the service options available – regular maintenance by an authorized service engineer will ensure consistent weighing accuracy over the long term and extend the service life of the balance.

5.2 Disposal

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

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

Thank you for your contribution to environmental protection.



6 Technical Data

6.1 General data



CAUTION

Only use an approved AC adapter with a current-limited SELV output.
Ensure correct polarity

Power supply

AC adapter:	Primary: 100 – 240 V AC, -15%/+10%, 50/60 Hz Secondary: 12 V DC $\pm 3\%$, 2.5 A (with electronic overload protection)
Cable for AC adapter:	3-core, with country-specific plug
Balance power supply:	12 V DC $\pm 3\%$, 2.25 A, maximum ripple: 80 mVpp

Protection and standards

Overvoltage category:	II
Degree of pollution:	2
Protection:	Protected against dust and water
Standards for safety and EMC:	See Declaration of Conformity
Range of application:	For use only in closed interior rooms

Environmental conditions

Height above mean sea level:	Up to 4000 m
Ambient temperature:	5–40 °C
Relative air humidity:	Max. 80% up to 31 °C, linearly decreasing to 50% at 40 °C, noncondensing
Warm-up time:	24 hours after connecting the balance to the power supply; when switched on from standby-mode, the balance is ready for operation immediately.

Materials

Housing:	Die-cast aluminum, plastic, chrome steel and glass
Terminal:	Die-cast zinc, chromed and plastics
Weighing pan:	Aluminum, chromed (AlMgSi1 coated chem Ni 15 μm , Cr 0.3 – 0.5 μm)

6.2 Explanatory notes for the METTLER TOLEDO AC adapter

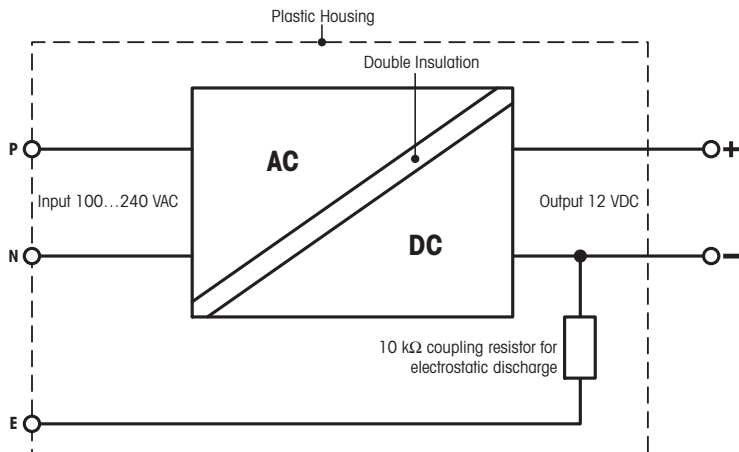
The certified external power supply which conforms to the requirements for Class II double insulated equipment is not provided with a protective earth connection but with a functional earth connection for EMC purposes. This earth connection IS NOT a safety feature. Further information about conformance of our products can be found in the brochure "Declaration of Conformity" which is coming with each product.

In case of testing with regard to the European Directive 2001/95/EC the power supply and the balance have to be handled as Class II double insulated equipment.

Consequently an earth bonding test is not required. Similarly it is not necessary to carry out an earth bonding test between the supply earth conductor and any exposed metalwork on the balance.

Because the balance are sensitive to static charges a leakage resistor, typically 10 k Ω , is connected between the earth connector and the power supply output terminals. The arrangement is shown in the

equivalent circuit diagram. This resistor is not part of the electrical safety arrangement and does not require testing at regular intervals.



Equivalent circuit diagram

6.3 Model-specific data

More detailed information is in the Operating Instructions on the CD-ROM.

		XS3DU
Limit values		
Maximum capacity		3.1 g
Readability		0.01 mg
Tare range (from...to)		0 ... 3.1 g
Maximum capacity in fine range		800 mg
Readability in fine range		0.001 mg
Repeatability (at nominal load)	sd	6 µg (3 g)
Repeatability in fine range (at nominal load)	sd	0.8 µg (0.2 g)
Linearity deviation		10 µg (0.5 g)
Eccentricity deviation (test load) ¹⁾		4 µg (1 g)
Sensitivity offset (test weight)		45 µg (3 g)
Sensitivity temperature drift ²⁾		0.0001%/°C
Sensitivity stability ³⁾		0.0001%/a
Typical values		
Repeatability (at low load)	sd	3 µg (0.2 g)
Repeatability in fine range (at low load)	sd	0.2 g (0.5 µg)
Linearity deviation		3 µg (3 g)
Eccentricity deviation (test load) ¹⁾		1.2 µg
Sensitivity offset (test weight)		9 µg (3 g)
Minimum weight (according to USP)		6 mg
Minimum weight (according to USP) in fine range		1 mg
Minimum weight (U=1%, k=2)		0.6 mg

Minimum weight (U=1%, k=2) in fine range	0.1 mg
Settling time	6 s
Settling time in fine range	10 s
Interface update rate	23 1/s
Usable height of draft shield	55 mm
Weight of balance	7 kg
Number of built-in reference weights	2
Dimensions	
Balance dimensions (W × D × H)	128 × 287 × 113 mm
Weighing pan dimensions	∅ 27 mm
Weights for routine testing	
OIML CarePac	2 g E2, 0.1 g E2
Weights	#11123004
ASTM CarePac	2 g 1, 0.1 g 1
Weights	#11123104

sd = Standard deviation

- 1) According to OIML R76
- 2) In the temperature range 10 ... 30 °C
- 3) After putting into operation for the first time, with the self-adjustment function activated (ProFACT or FACT)

GWP®

Good Weighing Practice™

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

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

► www.mt.com/GWP

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For more information

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Subject to technical changes.

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