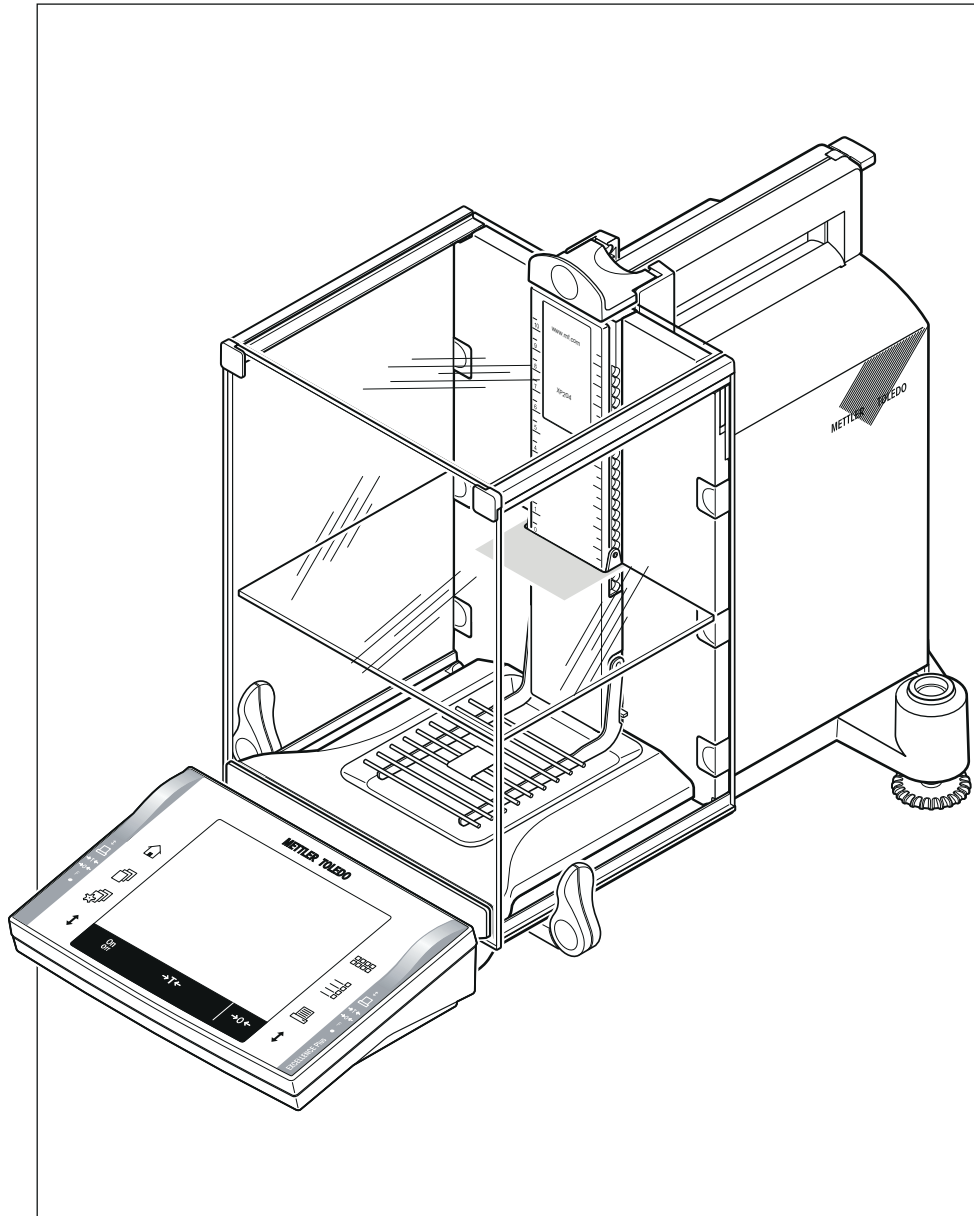


Excellence Plus Analytical Balances

XP Models – Part 1



METTLER TOLEDO

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1 Introduction

Thank you for choosing a METTLER TOLEDO balance.

The balances of the XP line combine a large number of weighing and adjustment possibilities with exceptionally convenient operation.

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!

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

The XP line comprises a range of balances which differ from each other in relation to their weighing range and resolution.

The following features are common to all models of the XP lines:

- Glass draft shield with motorized opening for precise weighing even in unstable environments.
- Fully automatic adjustment "ProFACT" using internal weights.
- Built-in level sensor, illuminated level indicator and Leveling Assistant for fast and easy leveling.
- Built-in applications for normal weighing, statistics, formulation, piece counting, percent weighing, density, differential weighing and LabX Client.
- Integral RS232C interface.
- Slot for second interface (optional).
- Touch-sensitive graphics terminal ("Touch Screen") with color display.
- Two programmable sensors for hands-off operation ("SmartSens") to speed up frequently recurring tasks.

A brief word about standards, guidelines, and methods of quality assurance: The balances comply with usual standards and guidelines. They support standard procedures, specifications, working methods, and reports according to **GLP (Good Laboratory Practice)**. In this connection, records of working procedures and adjustments become very important; for this purpose we recommend you to use a printer from the METTLER TOLEDO range, since these are optimally adapted to your balance. The balances conform to the applicable standards and guidelines and possess a EC declaration of conformity. METTLER TOLEDO is certified as manufacturer according to ISO 9001 and ISO 14001.

The Operating Instructions for the XP balances consist of 3 separate documents, whose contents are listed below.

Part 1, This Document

Contents

- Introduction
- Safety Information
- Setting up the Balance
- Leveling the Balance
- Cleaning and Service
- Technical Data
- Interface commands and MT-SICS functions
- Accessories
- Spare Parts

Part 2, Separate Document

Contents: Terminal, System and Applications

- Basic Principles for Using the Terminal and the Firmware
- System Settings
- User-specific Settings
- Applications
- Firmware (Software) Updates
- Error and Status Messages
- Conversion Table for Weight Units
- Recommended Printer Settings

Part 3, Separate Document

Contents: Adjustments and Tests

- Adjustments
- Tests

Finding More Information

Internet <http://www.mt.com/excellence>

1.1 Conventions and Symbols Used in These Operating Instructions

The following conventions apply to the operating instructions: Part 1, Part 2 and Part 3.

Key designations are indicated by a picture or text in double angular parentheses (e.g. «» or «**On/Off**»).



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



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

These symbols indicate an instruction:

- ▶ prerequisites
- 1 steps
- 2 ...
- ⇒ results

2 Safety Information

2.1 Definition of Signal Warnings and Symbols

Safety notes are marked with signal words and warning symbols. These show safety issues and warnings. Ignoring the safety notes may lead to personal injury, damage to the balance, malfunctions and false 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 damaged to the device or the property or in losing 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 Specific Safety Notes

Always operate and use your balance only in accordance with the Operating Instructions Part 1, Part 2 and Part 3.

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

If the instrument is not used according to the manufacturer's Operating Instructions (Part 1, Part 2 and Part 3), protection of the instrument may be impaired.

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).



CAUTION

Damage of Device

- For use only in dry interior rooms.
 - Do not use sharply pointed objects to operate the keyboard! Although your balance is very ruggedly constructed, it is nevertheless a precision instrument. Treat it with corresponding care.
 - Do not open the balance: It does not contain any parts which can be maintained, repaired, or replaced by the user. If you ever have problems with your balance, contact your METTLER TOLEDO dealer.
 - Use only balance accessories and peripheral devices from METTLER TOLEDO; they are optimally adapted to your balance.
-

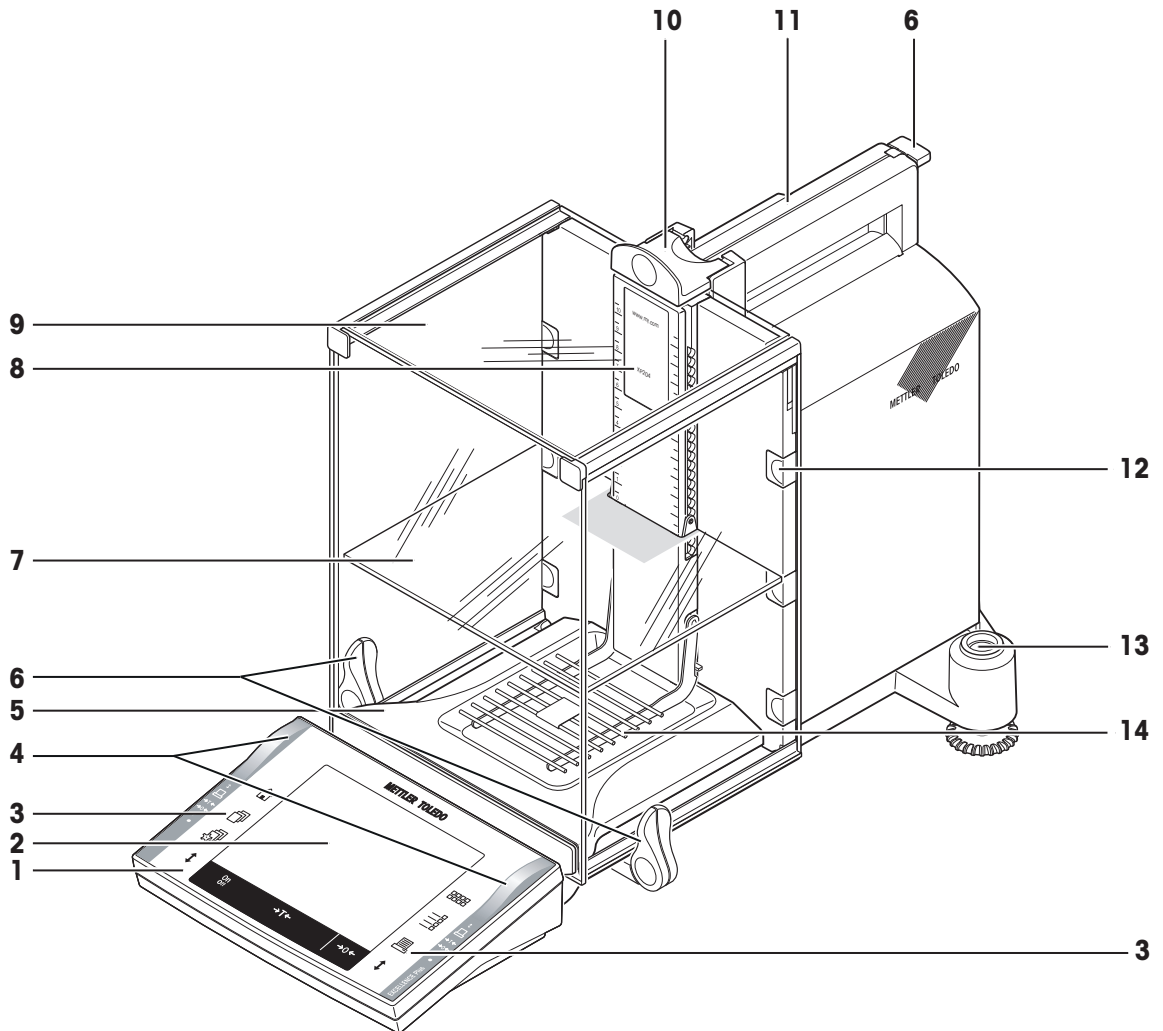


CAUTION

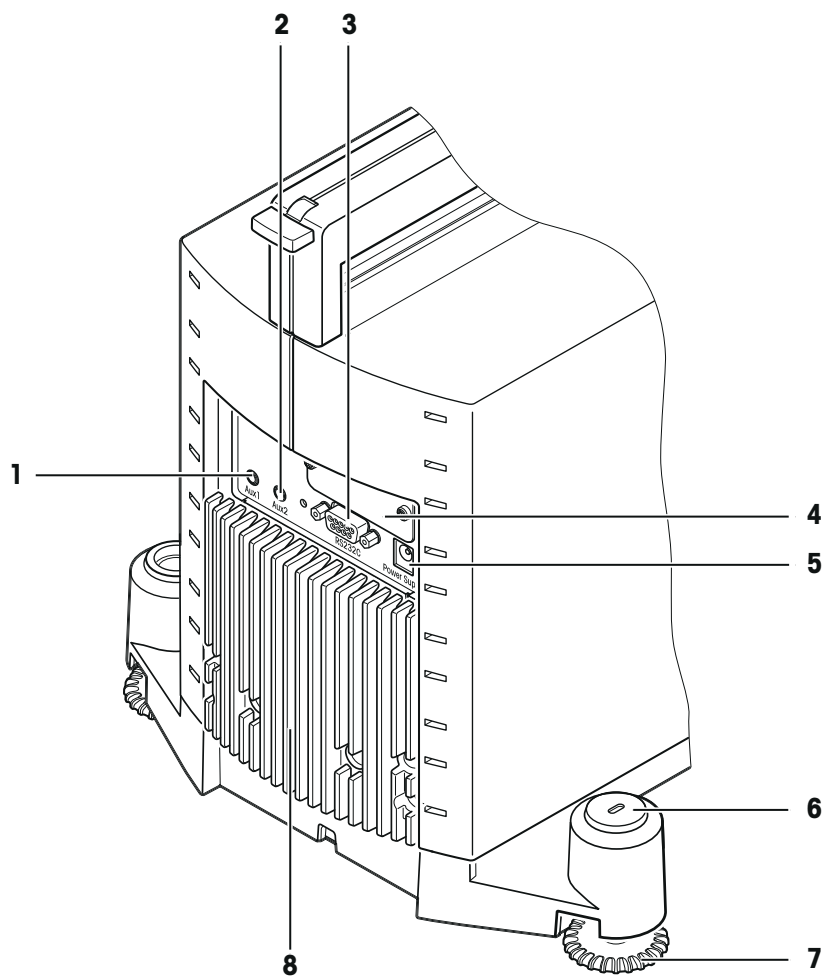
Damage of Device

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.

3 Overview XP Analytical Balance



1	Terminal (details see Operating Instructions – Part 2)	2	Display (Touch-sensitive "Touch Screen")
3	Operating keys	4	SmartSens sensors
5	Drip tray	6	Handle/Coupling element for the operation of the draft-shield doors
7	Intermediate shelf	8	Type name
9	Glass draft shield	10	Handle for operation of the draft-shield top door
11	Guide for top door of draft shield and handle for transport	12	Removable clips for feeding cables or hoses
13	Level indicator / Level sensor	14	Grid weighing pan



Rear

1	Aux 1 (connection for "ErgoSens", hand- or foot-switch)	2	Aux 2 (connection for "ErgoSens", hand- or foot-switch)
3	RS232C serial interface	4	Slot for second interface (optional)
5	Socket for AC adapter	6	Fastening point for anti-theft device
7	Foot screw	8	Cooling element (based on model)

4 Setting up the Balance

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

4.1 Unpacking and Checking the Delivered Items

4.1.1 Unpacking the Balance

Use the lifting strap to lift the balance out of the packaging carton.

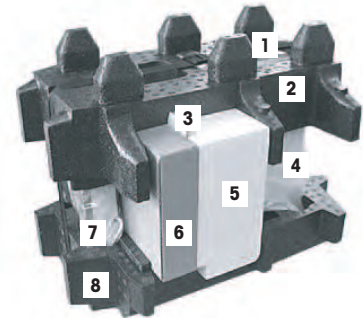
Overview

- 1 Lifting strap
- 2 Top packing cushion
- 3 Operating Instructions and other important documents
- 4 Balance
- 5 Set with draft-shield doors, intermediate shelf and terminal support
- 6 Set with AC adapter, power supply cable, drip tray, grid weighing pan, grid weighing pan cover, set of single-use pans and Ergo-Clip "Basket" (basket for small weighing objects)
- 7 Terminal

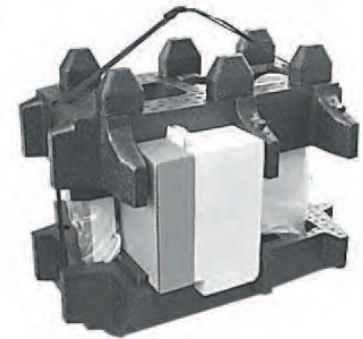
Note

The terminal is connected to the balance by a cable!

- 8 Bottom packing cushion



- 1 Unfasten lifting strap (1).
- 2 Remove top packing cushion (2).



- 1 Pull out Operating Instructions (3).
- 2 Remove set with AC adapter etc. (4).
- 3 Remove set with draft-shield doors etc. (5).



- Carefully pull the terminal out of the bottom packing cushion and remove the protective cover.

Note

The terminal is connected to the balance by a cable, so only pull the terminal just far enough out of the packing cushion to remove the protective cover.



- 1 Place the terminal on the front of the balance.
- 2 Hold the balance by the guide or handle, hold the terminal firmly with your other hand, and pull the balance and terminal together out of the bottom packing cushion.



- 1 Place the balance with the terminal in the place where the balance will be used for weighing.
- 2 Remove the cover from the balance.
- 3 Pull the transport protection (9) of the weighing pan support toward the front and off.



Note

Please keep all parts of the packaging. This packaging guarantees best possible protection of your balance for transportation, **see** Transporting the Balance (page 19)

4.2 Scope of Delivery

The standard scope of delivery contains the following items:

- Balance with terminal
 - RS232C interface
 - Slot for second interface (optional)
 - Feedthroughs for below-the-balance weighing and for antitheft device
- Set with draft-shield doors, intermediate shelf and terminal support
- Grid weighing pan
- Grid weighing pan cover of chrome-nickel steel (attachment for grid weighing pan)
- Set of single-use aluminum weighing pans (10 pans) for mounting on the grid weighing pan
- Drip tray
- AC adapter with country-specific power cable
- Protective cover for the terminal
- Cleaning brush
- ErgoClip "Basket" (basket for small weighing objects)
- Production certificate
- CE declaration of conformity
- Operating Instructions Part 1 (this document), Part 2 and Part 3
- Instructions for unpacking, re-packing, and setting up

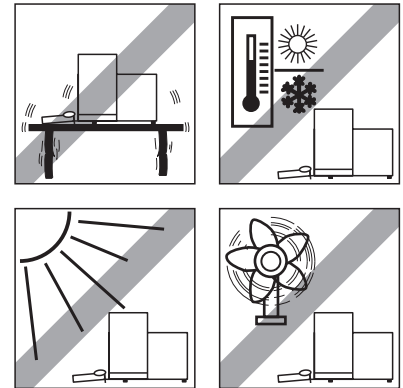
4.3 Selecting a Location

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.

Avoid the following:

- Direct sunlight
- Draft (e.g. from fans or air conditioning)
- Excessive fluctuations in temperature.

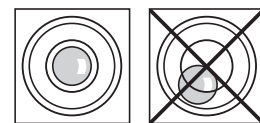
Further information can be found in Weighing the Right Way.



Observe ambient conditions. **See** Technical Data (page 28).

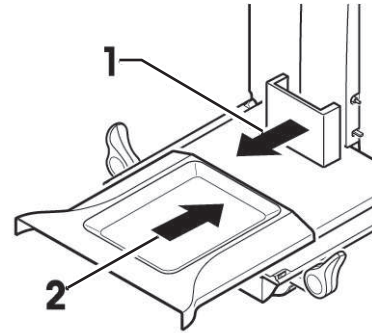
Note

If the balance is not horizontal from the beginning, it will have to be leveled during initial operation. **See** Leveling the Balance (page 25).

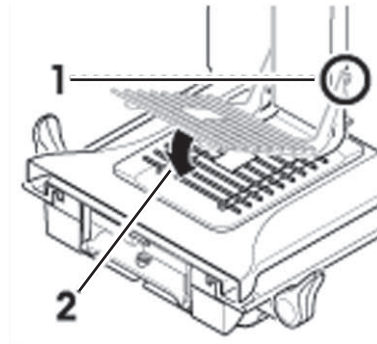


4.4 Assembling the Balance

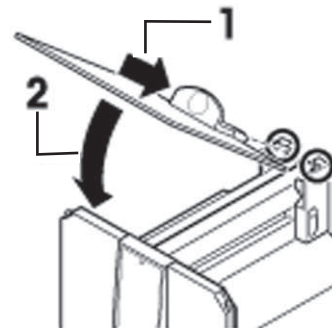
- 1 Remove the transport protection (1).
 - 2 Insert the drip tray (2).
- ⇒ Push the tray in from the front over the bottom plate as far as the partition.



- Insert the grid weighing pan from the front.
- ⇒ Check that the grid weighing pan (1) (2) is correctly hooked in at both sides.

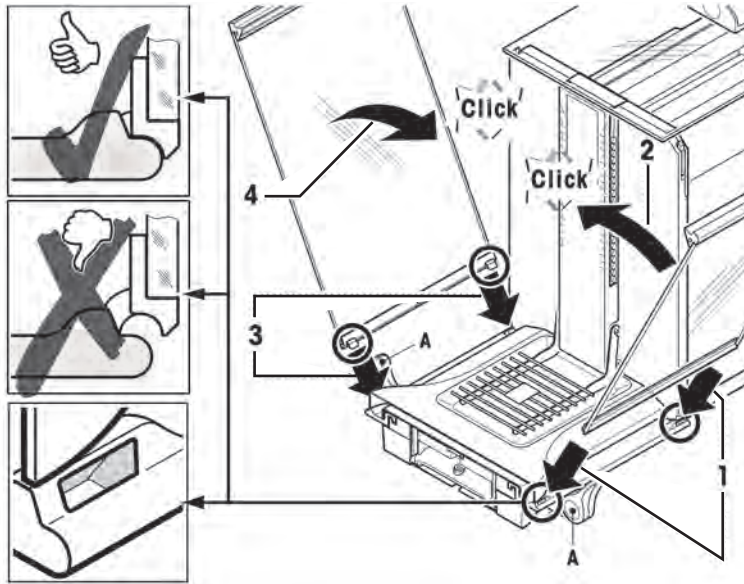


- 1 Insert the top door of the draft shield (1) at an angle (slightly less than 30 degrees) into the guide positioned at the **back**.
- 2 Swivel the draft-shield door (2) carefully down, **see** figure.

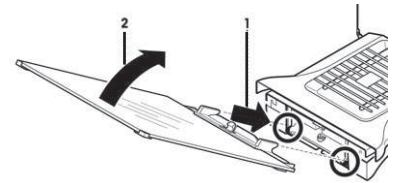


- The handles (A) must be turned toward the outside to allow installation of the side draft shield doors!

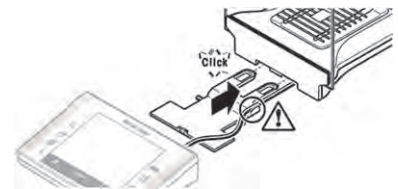
- 1 Insert the side doors of the draft shield according to the following instructions, **see** figure below.
- 2 Insert the side door at an angle of approx. 30° into the 2 openings, **see** figure.
- 3 Check that the side door is correctly inserted as shown!
- 4 Swivel the side door up against the balance until it engages with a click.
- 5 The side door must run easily, otherwise it is not correctly inserted.
- 6 Insert the second side door of the draft shield.
⇒ The procedure is identical.
- 7 Push the side doors completely to the back.



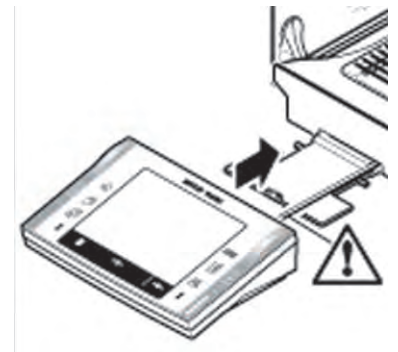
- 1 Insert the front glass (2) of the draft shield.
- 2 In the bottom part of the balance at the front, move at an angle from the top toward the bottom until the two hooks of the front glass of the draft shield lie on the rollers (1).
- 3 Swivel the front glass of the draft shield up until it engages.



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



- 1 Mount the terminal.
- 2 Place the terminal in the center of the support.
- 3 Push it against the balance until it swivels slightly down at the front by the terminal support.
 - ⇒ You can push the cable into the balance.



Attention

The balance and the terminal are not fastened together by the terminal support! When transporting by hand, always hold the balance and the terminal firmly, **see** Transporting the Balance (page 19).

Note

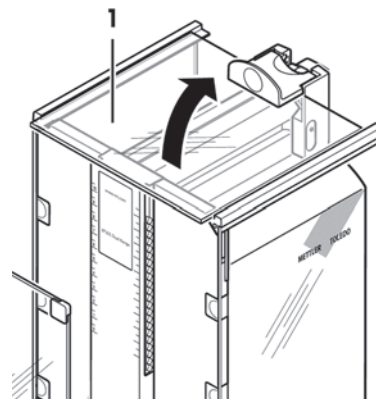
You can also place the terminal free of the terminal support anywhere around the balance where the length of the cable allows.

4.5 Intermediate Shelf Draft Shield

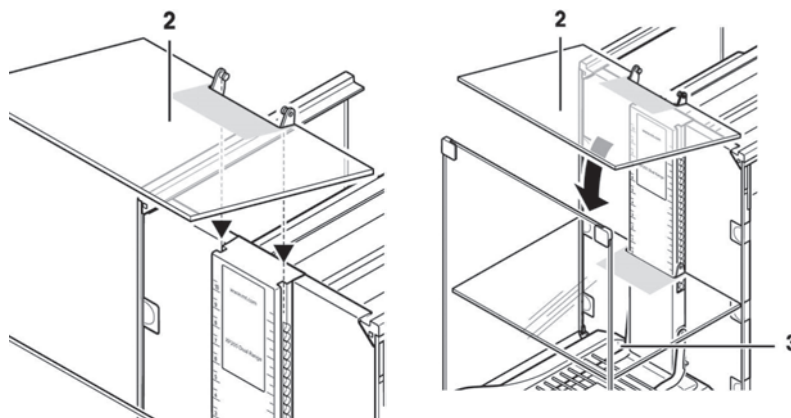
You can use the intermediate shelf to reduce the volume of the weighing chamber. So that the balance shows the result faster. You also have the option of acclimatizing the weighing material on the intermediate shelf.

Inserting the intermediate shelf

- 1 Open all draft shield doors.
- 2 Raise the front of the top draft shield door (1) and pull it out of the guide.
⇒ Lay the top draft shield door on a clean surface.



- 1 From the top, guide the intermediate shelf (2) into the guides of the middle guiderail.
- 2 Position it at the desired height (3).
- 3 Re-insert the top draft shield door (1), **see** Assembling the Balance (page 14).



4.6 Power Supply



WARNING

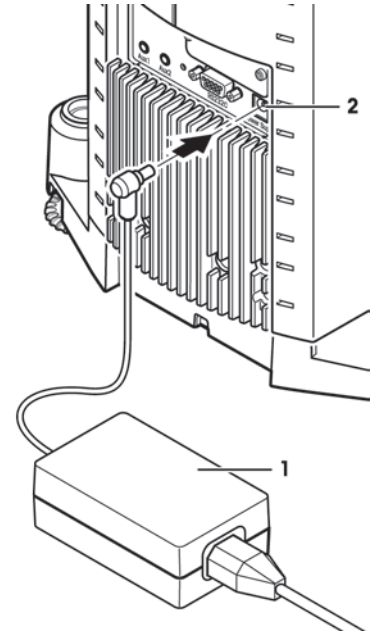
Risk of electric shock

– Ensure that the AC power pack for the balance is only used in accordance with the specifications listed in chapter General Data.

– Your instrument is supplied with a 3-pin power cable with an equipment grounding conductor. Only extension cables which meet this relevant standards and also have an equipment grounding conductor may be used. Intentional disconnection of the equipment grounding conductor is prohibited.

- 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 of: 100 – 240 VAC, 50/60 Hz, for exact specifications, **see** Technical Data (page 28).

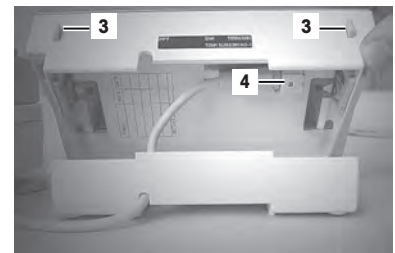
- First, check whether the voltage of the power supply matches your local line voltage. If this is not the case, on no account connect the balance to the power, but contact your METTLER TOLEDO sales representative or dealer.
 - Guide the cables so that they cannot become damaged and will not be in your way during your daily work! Take care that the AC adapter cannot come into contact with liquids!
 - The power plug must be always accessible.
 - Before operating, check all cables for damage.
- Plug the AC adapter (1) into the socket (2) in the back of your balance and into the power supply.
- ⇒ After the balance has been connected to the power supply, it carries out a self test and is then ready for operation.



Note

If the display field remains dark, even though the power supply connection functions.

- 1 First disconnect the balance from the power supply.
- 2 Open the terminal.
- 3 Press both buttons (3) on the back of the terminal and open the upper part of the terminal.
- 4 Check that the plug for the terminal cable (4) is connected correctly inside the terminal.



4.7 Operating of the Glass Draft Shield

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

The doors of the glass draft shield can be opened and closed either by means of the «↕» key, the "SmartSens" sensors, or by hand, **see** Operating Instructions – Part 2.

Try various different combinations by moving the 3 external handles up/inside and down/outside. We recommend you to set up the glass draft shield so that it only opens on the side where the balance is loaded. Your balance then works faster, because there are fewer troublesome currents of air than when both doors of the draft shield are opened together.

1 For **motorized door operation** the handles must be connected.

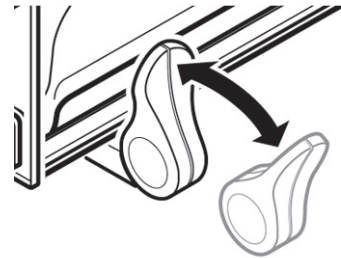
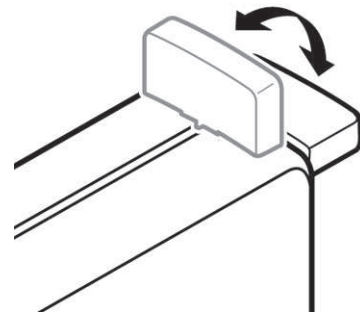
⇒ Side doors: Handles turned toward the inside.

⇒ Top door: Handle down in horizontal position.

2 For **manual door operation** the handles must be disconnected:

⇒ Side doors: Handles turned toward the outside.

⇒ Top door: Handle up in vertical position.



Note

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

4.8 Setting the Reading Angle and Positioning the Terminal

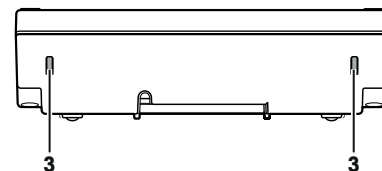
4.8.1 Optimise the Readability of the Terminal

Changing the reading angle

1 Press in the two buttons (3) on the back of the terminal.

⇒ The top of the terminal can then be pulled up or pushed down until it engages in the desired position. A total of 3 setting positions are available.

2 Move it in an appropriate position.



4.8.2 Remove Terminal and Place Close to the Balance

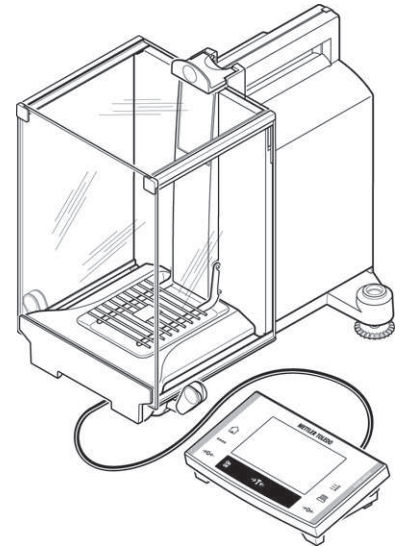
The terminal is connected to the balance by a cable. So you can arrange your workplace optimally, the terminal can be removed from the balance and placed separately.

Place the terminal separately

- 1 Switch the balance off.
- 2 Carefully lift the terminal off the terminal support.
You can leave the terminal support on the balance or remove it.
- 3 Pull the cable carefully out from the balance as far as possible.
- 4 Place the terminal where you want it to be.

Note

The cable can also be led out of the back of the balance. If working this way would be convenient for you, call your METTLER TOLEDO dealer who will adapt the balance for you.



4.9 Transporting the Balance

- 1 Switch off the balance.
- 2 The balance must be disconnected from the power supply.
- 3 Remove any interface cable from the balance.

4.9.1 Transporting Over Short Distances

If you wish to move your balance over a short distance to a new location, proceed as follows.

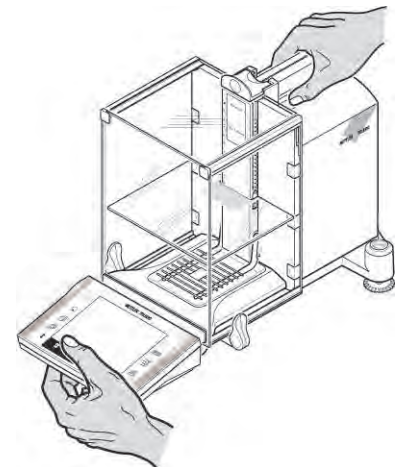


CAUTION

Damage of Device

Never lift the balance by the glass draft shield or the cooling element, as this can cause damage!

- 1 With one hand, hold the balance by the guide for the top door of the draft shield.
- 2 With your other hand, hold the terminal. The terminal is not rigidly fastened to the balance, so you must always hold the balance with one hand and the terminal with the other.
- 3 Carefully lift the balance and carry it to its new location, observe the notes in chapter Selecting a Location (page 13).

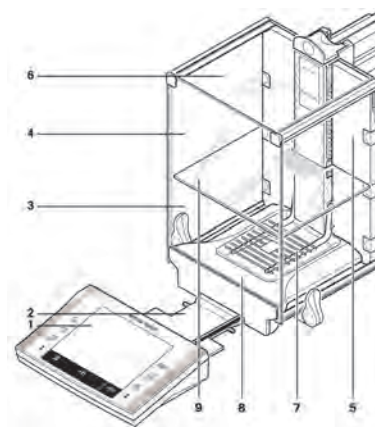


4.9.2 Transporting Over Long Distances

If you want to transport or ship your balance over long distances, or if it is not certain that the balance will be transported upright, use the complete original packaging.

Disassemble the following parts

- 1 Lift the terminal (1) out of the terminal support and place it next to the support.
- 2 Pull the terminal support (2) off the balance.
- 3 Swivel the front glass (3) of the draft shield away from the balance.
- 4 Carefully fold the side doors (4+5) of the draft shield against the respective handles and pull the side doors out of the guide.
- 5 Swivel the front of the top door (6) of the draft shield up and pull the door out of the guide.
- 6 Lift the front of the intermediate shelf (9) and pull it up and out.
- 7 Carefully raise the front of the grid weighing pan (7) and lift it out of the guide.
- 8 Pull the drip tray (8) toward the front and out.

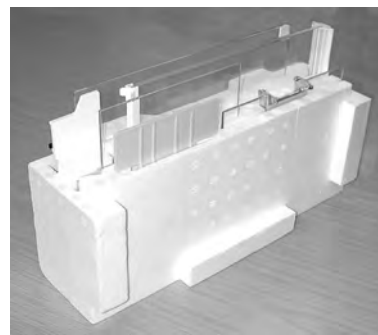


Pack the draft shield, the intermediate shelf and the terminal support (Pos. 2-6 and 9)

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

Note

We advise you to place a sheet of paper between the sides glasses of the draft shield.



Pack the AC adapter, the power supply cable, and the individual parts

- 1 Place the AC adapter and the power supply cable in the packaging.
- 2 Place the drip tray (8) upside down in the packaging.
- 3 Place the grid weighing pan (7) upside down on the drip tray.
- 4 Place the ErgoClip "Basket" in the packaging.



CAUTION

Damage of Device

These instructions must be followed exactly, otherwise the balance may be damaged when inserting it into the packing cushions.

- 1 Push the transport protection over the weighing pan guide.
- 2 Push the guide of the top draft-shield door completely to the front.
- 3 Swivel the handle of the side door of the draft shield upward, and also push this door completely to the front.



Note

For packing both the balance and the terminal, you have a protective cover in which they were delivered. These are deliberately not shown in the illustrations so you can see better how the individual items must be positioned. However, we recommend you to use these protective covers.

- 1 Place the terminal on the balance (see illustration) and carefully insert the balance into the bottom packing cushion.
 - 2 Take the terminal and place it in front of the packing cushion on the table.
- Insert the packing set with the draft-shield glasses into the packing cushion, **see** illustration.



- Place the set with the AC adapter in front of the set with the draft-shield glasses.



- Insert the terminal into the packing cushion as shown in the illustration.



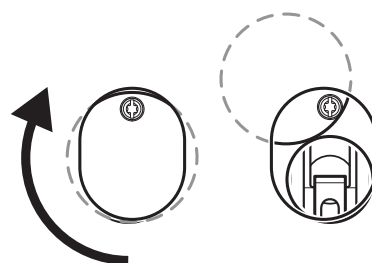
- 1 Now put the top packing cushion in place.
 - ⇒ Taking care to position it correctly.
- 2 Pass the lifting strap around both packing cushions, **see** illustration.
- 3 Tighten it until it lies close against the packaging.
 - ⇒ You can now lift the packed balance by the lifting strap and insert it into the transport carton.



4.10 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.

- 1 Switch off the balance.
- 2 Unplug the cable of the AC adapter from the back of the balance.
- 3 Also remove any interface cables.
- 4 Push all the doors of the glass draft shield completely to the back.
- 5 Lift the terminal off the terminal support.
- 6 Open the terminal and carefully pull the connecting cable out, **see** Power Supply (page 16).
- 7 Put the terminal down at the side of the balance.
- 8 Pull the balance over the table edge just far enough that you see the opening from below, **see** figure left.
- 9 Slacken the screw until the cover plate can be turned to the side and the hanger for weighing below the balance is easily accessible. You must now fasten the cover plate in the new position by tightening the screw, **see** figure right.
 - ⇒ Your balance is now ready for mounting your equipment for below-the-balance weighings.



4.11 Installing the Single-use Aluminum Weighing Pan

Note

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

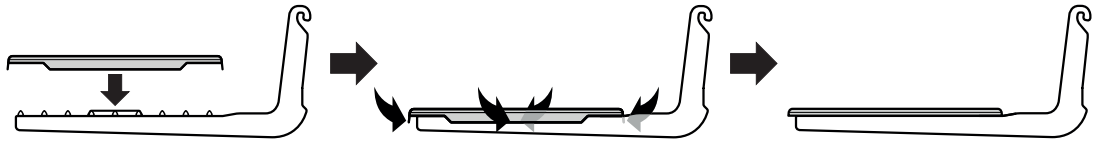


CAUTION

Hand injuries

Take care when handling the aluminum weighing pan, the corners and edges are extremely sharp!

- To install the single-use aluminum weighing pan, remove the grid weighing pan from the weighing chamber, **see** Assembling the Balance (page 14).
- ⇒ Only to be used for weighing highly-specialized tare containers.



- 1 Place the single-use aluminum weighing pan onto the grid weighing pan from above.
- 2 Fold the 4 side flaps under the bars of the grid weighing pan.

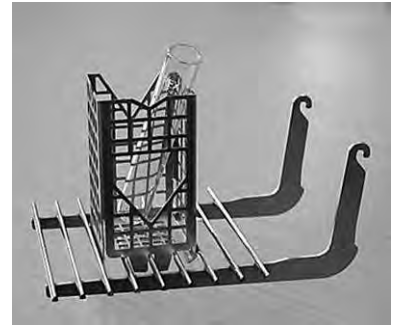
4.12 Installing the ErgoClip

Attention

Before you install an ErgoClip you must switch off the balance «**On/Off**» key.

To install the ErgoClip included in the delivery, or an optional ErgoClip, please proceed as follows:

- 1 Remove the grid weighing pan (SmartGrid) from the balance.
- 2 Snap the ErgoClip onto the grid weighing pan.
- 3 Replace the grid weighing pan (SmartGrid) along with the installed ErgoClip.
 - ⇒ The optional "Flask" or "Tube" ErgoClips can be inserted directly, **see** Accessories (page 34).
- 4 Switch the balance on again «**On/Off**» key.



Important to know!

If you do not switch the balance off before you do the installation, the ProFACT function is not activated.

Reason

Addition of the ErgoClip causes the dead-load tolerance range of the balance to be exceeded. The balance therefore does not activate ProFACT, so as not to interrupt the **assumed** weighing operation.

When this status icon appears in the display, it means: "The balance wants to execute ProFACT" but cannot.



4.13 Installing the Grid Weighing Pan Cover

Note

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



CAUTION

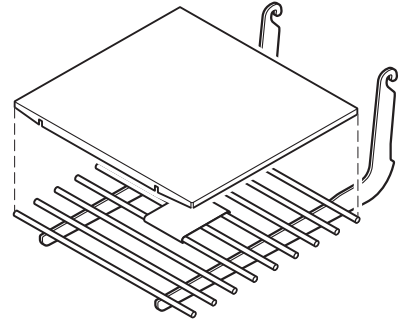
Hand injuries

Take care when handling the weighing pan, the corners and edges are extremely sharp!

Attention

With installed grid weighing pan cover, the balance does not switch to "Standby" mode!

- 1 For the installation, remove the grid weighing pan from the weighing chamber.
- 2 Gently press the cover onto the grid weighing pan.
- 3 Replace the grid weighing pan with the installed grid weighing pan cover.



5 First Steps

5.1 Switching On / Off

Switching On

- Press «**On/Off**».
- ⇒ The display appears.



Note

If the balance has not been set up exactly horizontally, a warning text will appear shortly after the balance is turned on, prompting you to level the balance, **see** chapter Leveling the Balance (page 25).

Switching Off

- Press «**On/Off**» until "Off" appears in the display.



Note

Do not disconnect the balance from the power supply except if you will not be using the balance for an extended period.

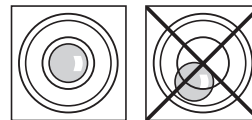
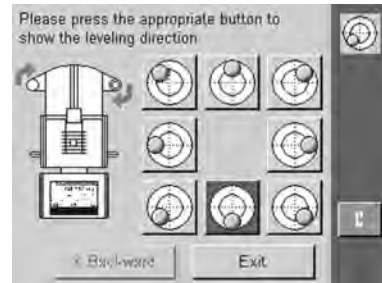
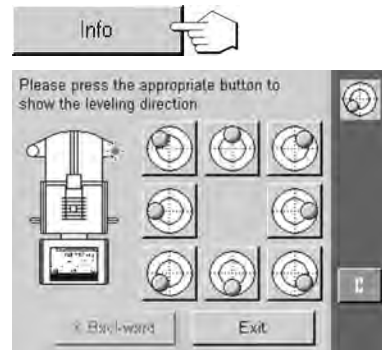
5.2 Leveling the Balance

Your balance has a built-in levelcontrol, that constantly checks the correct horizontal alignment.

When the levelcontrol detects that the level is incorrect, a warning will appear and a warning beep will sound. A status icon will also appear in the upper right-hand corner of the display.



- 1 To start the Leveling Assistent, tap «**Info**».
 ⇒ The Leveling Assistent will guide you step by step through the leveling process.
- 2 Watch the levelcontrol located of your balance and press the appropriate button of the current position.
 ⇒ The Leveling Assistent will show you with red arrows in which direction you need to turn the two footscrews on the back of the balance.
- 3 Screw the footscrew until the air bubble is in the inner circle.
- 4 Tap «**Exit**».
 ⇒ A message appears that advises you to adjust the balance.
- 5 Confirm with «**OK**».
 ⇒ Status icon will no longer appear and balance returns to normal operation.



6 Maintenance

6.1 Cleaning

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

Please observe the following notes



WARNING

Damage of balance

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



CAUTION

Damage of balance

On no account use cleaning agents which contain solvents or abrasive ingredients, as this can result in damage to 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, swivel the glasses of the draft shield (including the intermediate shelf) away from the balance and pull them out of their fastenings.
- 2 Carefully raise the front of the weighing pan and lift it out of the guide.
- 3 Pull the drip tray away from the balance.
- 4 When you replace these parts, make sure they are in the correct position.

Note

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

6.2 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.



7 Technical Data

7.1 General Data



CAUTION

Use only with a tested AC Adapter with SELV output current.
Ensure correct polarity

Power supply

Power supply connector with AC/DC adapter:	11107909 Primary: 100-240 VAC, -15%/+10%, 50/60 Hz Secondary: 12 VDC \pm 3%, 2.0 A (with electronic overload protection)
Cable to AC adapter:	Design: 3-core, with country-specific plug Note Make sure the power supply plug is freely accessible
Power supply to the balance:	12 VDC \pm 3%, 2.0 A, maximum ripple: 80 mVDCpp

Protection and standards

Overvoltage category:	Class 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% at 31 °C, linearly decreasing to 50% at 40 °C, non-condensing
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, plastic, chrome steel and glass
Terminal:	Die-cast zinc, chromed and plastics
Grid weighing pan:	Chrome-nickel steel X5CrNi18-10

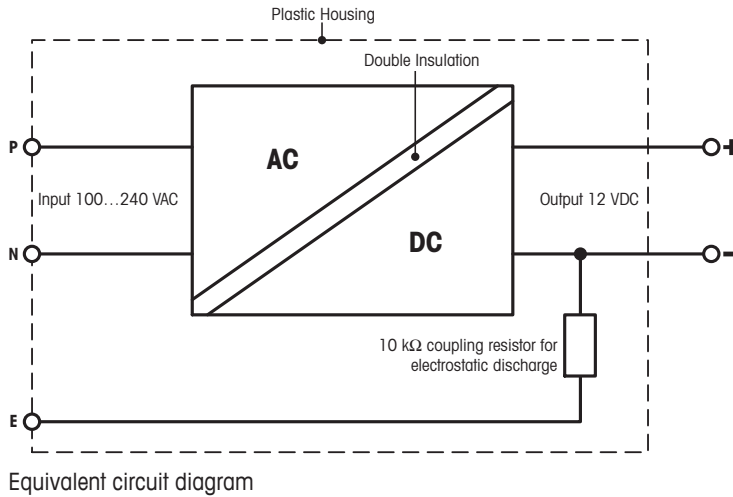
7.2 Explanatory Notes for the METTLER TOLEDO AC Adapter

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.



7.3 Model-specific Data

		XP105DR	XP205	XP205DR
Limit values				
Maximum capacity		120 g	220 g	220 g
Readability		0.1 mg	0.01 mg	0.1 mg
Tare range (from...to)		0 ... 120 g	0 ... 220 g	0 ... 220 g
Maximum capacity, fine range		31 g	–	81 g
Readability, fine range		0.01 mg	–	0.01 mg
Repeatability (at nominal load)	sd	0.06 mg (100 g)	0.03 mg (200 g)	0.06 mg (200 g)
Repeatability (at low load)	sd	0.05 mg (10 g)	0.015 mg (10 g)	0.05 mg (10 g)
Repeatability, fine range (at low load)	sd	0.015 mg (10 g)	–	0.015 mg (10 g)
Linearity deviation		0.15 mg	0.1 mg	0.15 mg
Eccentricity deviation (test load)		0.2 mg (50 g)	0.2 mg (100 g)	0.25 mg (100 g)
Sensitivity offset (test weight) ²⁾		0.4 mg (100 g)	0.4 mg (200 g)	0.5 mg (200 g)
Sensitivity temperature drift		0.0001%/°C	0.0001%/°C	0.0001%/°C
Sensitivity stability		0.0001%/a	0.0001%/a	0.0001%/a
Typical values				
Repeatability ¹⁾	sd	0.04 mg	0.007 mg	0.04 mg
Repeatability, fine range ^{1) 3)}	sd	0.007 mg	–	0.007 mg
Linearity deviation		0.1 mg	0.065 mg	0.1 mg
Eccentric deviation (test load)		0.1 mg (50 g)	0.1 mg (100 g)	0.1 mg (100 g)
Sensitivity offset (test weight) ²⁾		1.2 mg (100 g)	0.2 mg (200 g)	0.32 mg (200 g)
Minimum sample weight (according to USP)		120 mg	21 mg	120 mg
Minimum sample weight (according to USP), fine range		21 mg	–	21 mg
Minimum sample weight (U=1%, k=2)		8 mg	1.4 mg	8 mg
Minimum sample weight (U=1%, k=2), fine range		1.4 mg	–	1.4 mg
Settling time		1.5 s	2.5 s	1.5 s
Settling time, fine range		2.5 s	–	2.5 s
Dimensions				
Balance dimensions (WxDxH)		263 x 487 x 322 mm	263 x 487 x 322 mm	263 x 487 x 322 mm
Weighing pan dimensions		78 x 73 mm (WxD)	78 x 73 mm (WxD)	78 x 73 mm (WxD)
Typical uncertainties and supplementary data				
Repeatability ¹⁾	sd	0.04mg +0.00001%·Rgr	0.007mg +0.000006%·Rgr	0.04mg +0.000005%·Rgr

		XP105DR	XP205	XP205DR
Repeatability, fine range ^{1) 3)}	sd	0.007mg +0.000015%·Rgr	–	0.007mg +0.000012%·Rgr
Differential linearity deviation	sd	$\sqrt{(25pg \cdot Rnt)}$	$\sqrt{(5pg \cdot Rnt)}$	$\sqrt{(12pg \cdot Rnt)}$
Differential eccentric load deviation	sd	0.0001%·Rnt	0.00005%·Rnt	0.00005%·Rnt
Sensitivity offset ²⁾	sd	0.0006%·Rnt	0.00005%·Rnt	0.00008%·Rnt
Minimum sample weight (according to USP)		120mg+0.03%·Rgr	21mg+0.018%·Rgr	120mg+0.015%·Rgr
Minimum sample weight (according to USP), fine range		21mg+0.045%·Rgr	–	21mg+0.036%·Rgr
Minimum sample weight (U=1%, k=2)		8mg+0.002%·Rgr	1.4mg+0.0012%·Rgr	8mg+0.001%·Rgr
Minimum sample weight (U=1%, k=2), fine range		1.4mg+0.003%·Rgr	–	1.4mg+0.0024%·Rgr
Weighing time		4 s	6 s	4 s
Weighing time, fine range		6 s	–	6 s
Interface update rate		23 /s	23 /s	23 /s
Usable height of draft shield		235 mm	235 mm	235 mm
Weight of balance		10 kg	10 kg	10 kg
Number of built-in reference weights		2	2	2
Weights for routine testing				
OIML CarePac		100 g F2, 5 g E2	200 g F2, 10 g F1	200 g F2, 10 g F1
	Weights	#11123002	#11123001	#11123001
ASTM CarePac		100 g 1, 5 g 1	200 g 1, 10 g 1	200 g 1, 10 g 1
	Weights	#11123102	#11123101	#11123101

sd = Standard deviation

Rnt = Net weight (sample weight)

Rgr = Gross weight

a = Year (annum)

¹⁾ Valid for compact objects

²⁾ After adjustment with built-in reference weight

³⁾ On DeltaRange models: fine range starts at zero gross load

		XP204	XP504	XP504DR
Limit values				
Maximum capacity		220 g	520 g	520 g
Readability		0.1 mg	0.1 mg	1 mg
Tare range (from...to)		0 ... 220 g	0 ... 520 g	0 ... 520 g
Maximum capacity, fine range		–	–	101 g
Readability, fine range		–	–	0.1 mg
Repeatability (at nominal load)	sd	0.07 mg (200 g)	0.12 mg (500 g)	0.6 mg (500 g)
Repeatability (at low load)	sd	0.05 mg (10 g)	0.1 mg (10 g)	0.5 mg (10 g)
Repeatability, fine range (at nominal load)	sd	–	–	–
Repeatability, fine range (at low load)	sd	–	–	0.1 mg (10 g)
Linearity deviation		0.2 mg	0.4 mg	0.5 mg
Eccentricity deviation (test load)		0.25 mg (100 g)	0.4 mg (200 g)	0.5 mg (200 g)
Sensitivity offset (test weight) ²⁾		0.6 mg (200 g)	1.5 mg (500 g)	2 mg (500 g)
Sensitivity temperature drift		0.0001%/°C	0.0001%/°C	0.0001%/°C
Sensitivity stability		0.0001%/a	0.0001%/a	0.0001%/a
Typical values				
Repeatability ¹⁾	sd	0.04 mg	0.04 mg	0.4 mg
Repeatability, fine range ^{1) 3)}	sd	–	–	0.04 mg
Linearity deviation		0.13 mg	0.32 mg	0.4 mg
Eccentric deviation (test load)		0.12 mg (100 g)	0.2 mg (200 g)	0.2 mg (200 g)
Sensitivity offset (test weight) ²⁾		0.4 mg (200 g)	0.6 mg (500 g)	0.8 mg (500 g)
Minimum sample weight (according to USP)		0.12 g	120 mg	1.2 g
Minimum sample weight (according to USP), fine range		–	–	0.12 g
Minimum sample weight (U=1%, k=2)		8 mg	8 mg	80 mg
Minimum sample weight (U=1%, k=2), fine range		–	–	8 mg

		XP204	XP504	XP504DR
Settling time		1.5 s	1.5 s	1.5 s
Settling time, fine range		–	–	1.5 s
Dimensions				
Balance dimensions (WxDxH)		263 x 487 x 322 mm	263 x 487 x 322 mm	263 x 487 x 322 mm
Weighing pan dimensions		78 x 73 mm (WxD)	78 x 73 mm (WxD)	78 x 73 mm (WxD)
Typical uncertainties and supplementary data				
Repeatability ¹⁾	sd	0.04mg +0.000005%·Rgr	0.04mg +0.000006%·Rgr	0.4mg +0.00002%·Rgr
Repeatability, fine range ^{1) 3)}	sd	–	–	0.04mg +0.00002%·Rgr
Differential linearity deviation	sd	$\sqrt{(20\text{pg}\cdot\text{Rnt})}$	$\sqrt{(50\text{pg}\cdot\text{Rnt})}$	$\sqrt{(80\text{pg}\cdot\text{Rnt})}$
Differential eccentric load deviation	sd	0.00006%·Rnt	0.00005%·Rnt	0.00005%·Rnt
Sensitivity offset ²⁾	sd	0.0001%·Rnt	0.00006%·Rnt	0.00008%·Rnt
Minimum sample weight (according to USP)		0.12g+0.015%·Rgr	120mg+0.018%·Rgr	1.2g+0.06%·Rgr
Minimum sample weight (according to USP), fine range		–	–	0.12g+0.06%·Rgr
Minimum sample weight (U=1%, k=2)		8mg+0.001%·Rgr	8mg+0.0012%·Rgr	80mg+0.004%·Rgr
Minimum sample weight (U=1%, k=2), fine range		–	–	8mg+0.004%·Rgr
Weighing time		4 s	4 s	3.5 s
Weighing time, fine range		–	–	4 s
Interface update rate		23 /s	23 /s	23 /s
Usable height of draft shield		235 mm	235 mm	235 mm
Weight of balance		10 kg	10 kg	10 kg
Number of built-in reference weights		2	2	2
Weights for routine testing				
OIML CarePac		200 g F2, 10 g F1	500 g F2, 20 g F1	500 g F2, 20 g F1
	Weights	#11123001	#11123007	#11123007
ASTM CarePac		200 g 1, 10 g 1	500 g 1, 20 g 1	500 g 1, 20 g 1
	Weights	#11123101	#11123107	#11123107

sd = Standard deviation

Rgr = Gross weight

¹⁾ Valid for compact objects

³⁾ On DeltaRange models: fine range starts at zero gross load

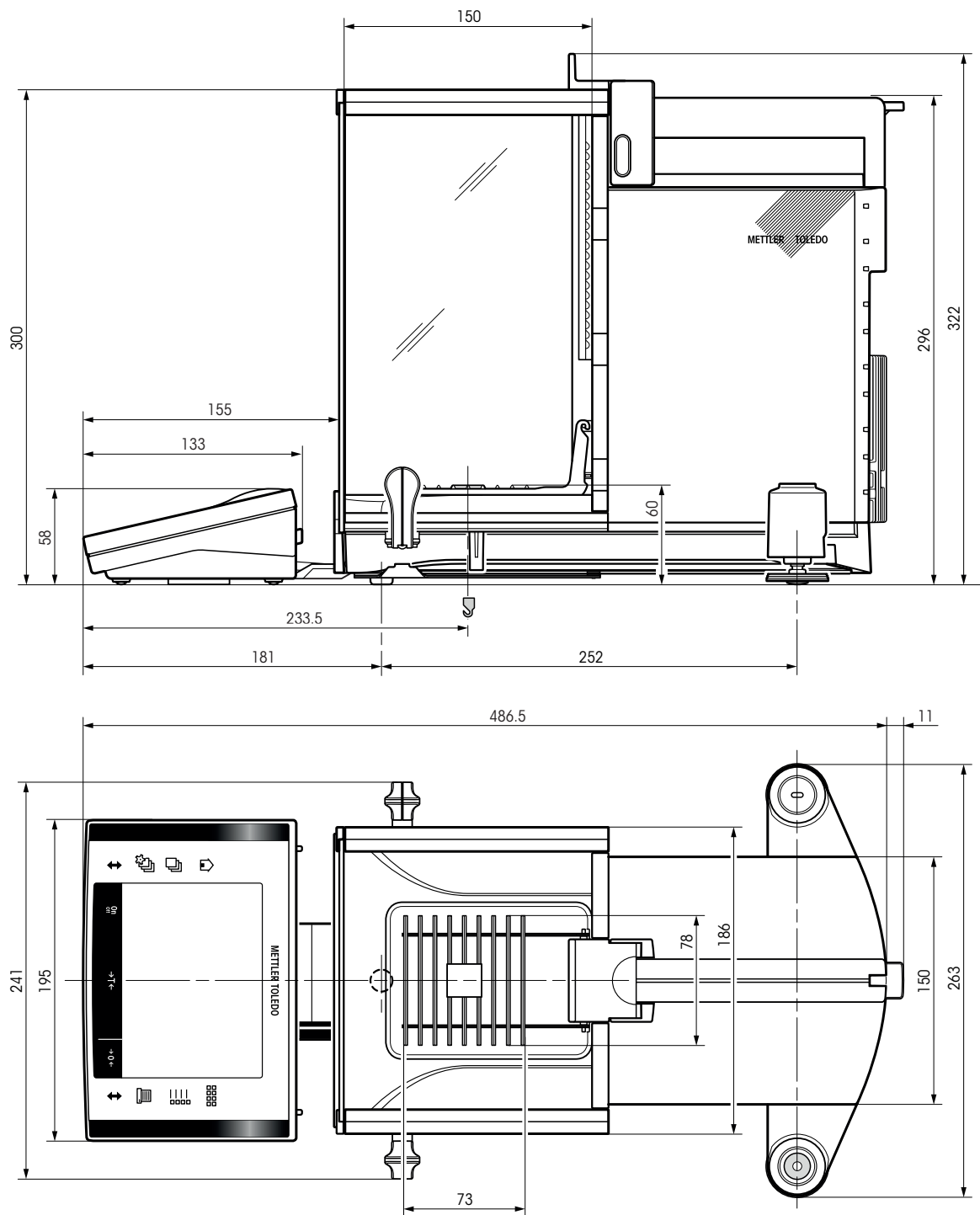
Rnt = Net weight (sample weight)

a = Year (annum)

²⁾ After adjustment with built-in reference weight

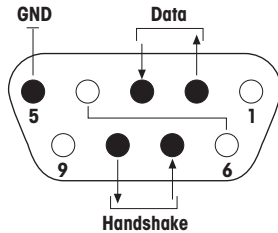
7.4 Dimensions

Dimensions in mm.



7.5 Interfaces

7.5.1 Specifications of RS232C

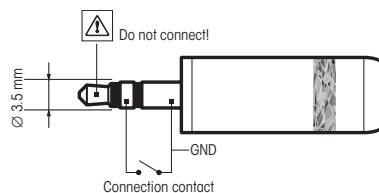
Interface type:	Voltage interface according to EIA RS-232C/DIN 66020 (CCITT V24/V.28)	
Max. cable length:	15 m	
Signal level:	Outputs: +5 V ... +15 V (RL = 3 – 7 kΩ) –5 V ... –15 V (RL = 3 – 7 kΩ)	Inputs: +3 V ... 25 V –3 V ... 25 V
Connector:	Sub-D, 9-pole, female	
Operating mode:	Full duplex	
Transmission mode:	Bit-serial, asynchronous	
Transmission code:	ASCII	
Baud rates:	600, 1200, 2400, 4800, 9600, 19200, 384001) (firmware selectable)	
Bits/parity:	7-bit/even, 7-bit/odd, 7-bit/none, 8-bit/none (firmware selectable)	
Stop bits:	1 stop bit	
Handshake:	None, XON/XOFF, RTS/CTS (firmware selectable)	
End-of-line:	<CR><LF>, <CR>, <LF> (firmware selectable)	
	Pin 2: Balance transmit line (TxD) Pin 3: Balance receive line (RxD) Pin 5: Ground signal (GND) Pin 7: Clear to send (hardware handshake) (CTS) Pin 8: Request to send (hardware handshake) (RTS)	

7.5.2 Specifications of "Aux" Connection

You can connect the METTLER TOLEDO "ErgoSens" or an external switch to sockets "Aux 1" and "Aux 2". This allows you to start functions such as taring, zeroing, printing and others.

External connection

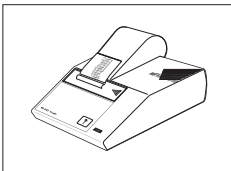
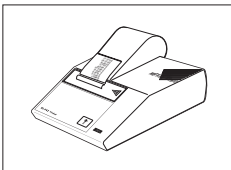
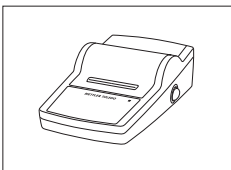
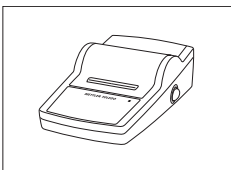
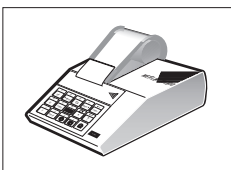
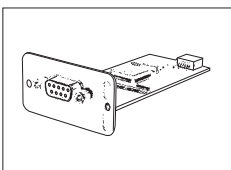
Connector:	3.5 mm stereo jack connector	
Electrical data:	Max. voltage	12 V
	Max. current	150 mA



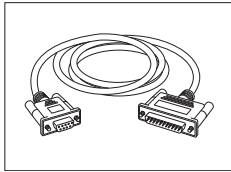
8 Accessories and Spare Parts

8.1 Accessories

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

	Description	Part No.
Printers		
	BT-P42 printer with Bluetooth connection to instrument	11132540
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P42 printer with RS232C connection to instrument	00229265
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P25 printer with RS232C connection to instrument	11124300
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P26 printer with RS232C connection to instrument (with date and time)	11124303
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	LC-P45 application printer with additional functions	00229119
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
Optional interfaces		
	Second RS232C Interface	11132500

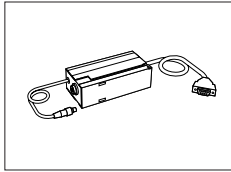
	Ethernet Interface for connection to an Ethernet network	11132515
	BT option: Bluetooth Interface for multipoint connection for up to 6 Bluetooth devices	11132530
	BTS option: Bluetooth Interface, single-point connection	11132535
	PS/2 option: Interface for connecting commercial keyboards and barcode readers	11132520
	LocalCAN option: Interface for connection of up to 5 LC (Local-CAN) instruments	11132505
	MiniMettler option: Interface MiniMettler, for connection to older (legacy) METTLER TOLEDO systems	11132510
	RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port	64088427
Cables for RS232C interface		
	RS9 – RS9 (m/f): connection cable for PC, length = 1 m	11101051



RS9 – RS25 (m/f): connection cable for PC, length = 1 m

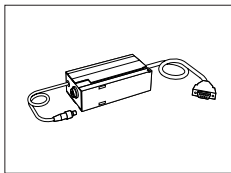
11101052

Cables for LocalCAN Interface



LC – RS9: Cable for connecting a PC with RS232C, 9-pin (f), length = 2 m

00229065



LC – RS25: Cable for connecting a printer or PC with RS232C, 25-pin (m/f), length = 2 m

00229050



LC – CL: Cable for connecting a device with METTLER TOLEDO CL interface (5-pin), length = 2 m

00229130



LC – LC2: Extension cable for LocalCAN, length = 2 m

00229115



LC – LC5: Extension cable for LocalCAN, length = 5 m

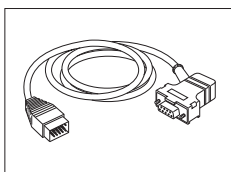
00229116



LC – LCT: Cable branch (T-connector) for LocalCAN

00229118

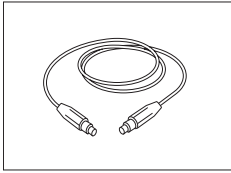
Cables for MiniMettler Interface



MM – RS9f: RS232C connection cable to MiniMettler interface, length = 1.5 m

00229029

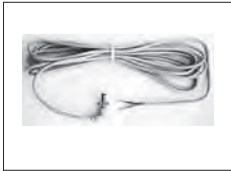
Cables for Terminal



Terminal extension cable, length = 4.5 m

11600517

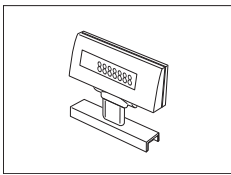
Cable, one-sided open (2-pin)



Cable between balance and AC adapter, length = 4 m

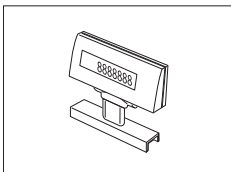
11132037

Auxiliary displays



BT-BLD Bluetooth auxiliary display for table mounting, 168 mm, LCD display with backlighting

11132555



LC/RS-BLD auxiliary display on bench stand, backlit (incl. RS cable and separate AC adapter)

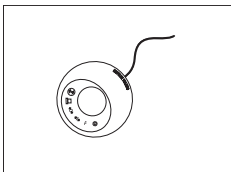
00224200



RS/LC-BLDS auxiliary display for table or balance mounting, 480 mm, LCD display with backlighting

11132630

Sensors



ErgoSens, optical sensor for hands-free operation

11132601

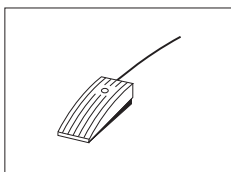
LC-Switchbox



For connection of up to 3 balances with LocalCAN interface to a printer

00229220

Footswitches



Footswitch with selectable function for balances (Aux 1, Aux 2)

11106741



LC-FS foot switch with selectable function for balances with LocalCAN interface

00229060

Filling-Process Control



LV11 automatic feeder for automatic loading of small items on the balance

21900608

LV11 Draft shield door

11106715

SQC14 filling process control

Compact instrument with printer for control of up to 16 articles

00236210

Compact instrument with printer for control of up to 60 articles

00236211

AntiStatic Kit Integrable Point-Electrode



Integrable antistatic kit incl. 1 point-electrode and power supply

11107761

Optional: Second point-electrode*

11107762

Optional: U-electrode*

11107764

* Regulated power supply for optional, second point-electrode 11107762, or the optional U-electrode 11107764

11107763

Universal AntiStatic Kit



Universal antistatic kit complete U-shaped, including electrode and power supply

11107767

Optional: Second U-electrode*

11107764

Optional: Point-electrode*

11107765

* Power supply for optional, second U-electrode 11107764, or for optional point-electrode 11107765

11107766

ErgoClips

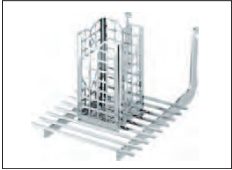




Weighing kit for various weighing containers



ErgoClip Weighing kit

11106707

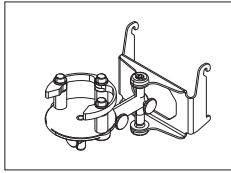
Delivery: 3 ErgoClips for Round-Bottom Flask, Weighing Boat and Tube, 20 Weighing Boat, 10 Single-use aluminium weighing pans.

	ErgoClip "Basket"	11106747
	ErgoClip "Titration Basket"	11106883
	ErgoClip "Weighing Boat"	11106748
	ErgoClip "Round-Bottom Flask"	11106746
	ErgoClip "small Flask"	11140180
	ErgoClip "Filter holder"	11140185
	ErgoClip "Stand"	11140170
	ErgoClip "Flask"	11106764



ErgoClip "Tube"

11106784



ErgoClip for Quantos

11141570



ErgoClip Syringe

30008288



ErgoClip Solution Kit

11140251



Single-use aluminium weighing pans, 10 units

11106711



SmardGrid Cover, chromium-nickel steel

11106709



Single-use weighing boats, 500 units

11106712



Grey drip tray

30038741



MinWeigh Door ideal for use with ErgoClip "Flask"

11106749

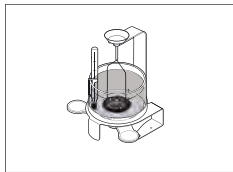
Filter Kit



Filter kit for, until 110 mm

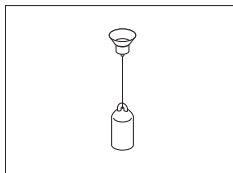
11140000

Density determination



Density kit

11106706

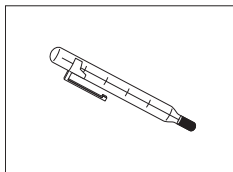


Sinker for density of liquids in conjunction with Density Kit
Calibrated (sinker + certificate)
Recalibrated (new certificate)

00210260

00210672

00210674



Calibrated thermometer with certificate

11132685

XP-SE Kit



Separate electronics kit

11106743

Extension cable 0.6 m

00211535

Extension cable 5.0 m

00210688

Pipette Calibration



Evaporation Trap, incl. adapter

11140043



Evaporation Trap large

11138440



1-channel suction pump complete
Hose 2 m for suction pump

11138268
11138132



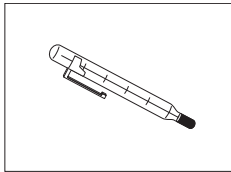
Reagent reservoirs, 5 pcs.

11600616



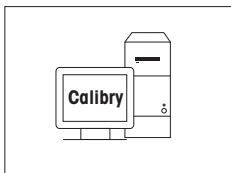
Barometer

11600086



Precision thermometer with clip, not certified

00238767



Calibry PC Software

Calibry Light; for single channel pipettes

11138423

Update

30007342

Calibry Single workstation; for calibration with one system MPC

11138419

Update

30007340

Calibry Network; Installation on several PC of the network accessing the same database

11138420

Update

30007341

Calibry Validation manual

11780959

RFID Reader



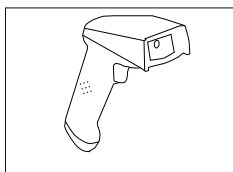
RFID Reader for Pipette Calibration

17011964

Power User Option

30007309

Barcode Reader



RS232C Barcode Reader

21901297

The following accessories are needed for operation (not included):

RS232 F cable 21901305

Null modem adapter 21900924

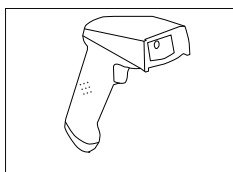
Plus one of the following: AC adapter 5 V for EU 21901370

AC adapter 5 V for US 21901372

AC adapter 5 V for GB 21901371

AC adapter 5 V for AU 21901370

+ 71209966



RS232C Barcode Reader – Cordless

21901299

The following accessories are needed for operation (not included):

Cradle 21901300

RS232 F cable 21901305

Null modem adapter 21900924

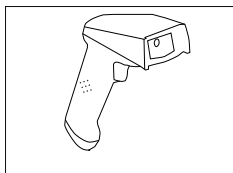
Plus one of the following: AC adapter 12 V for EU 21901373

AC adapter 12 V for US 21901375

AC adapter 12 V for GB 21901374

AC adapter 12 V for AU 21901373

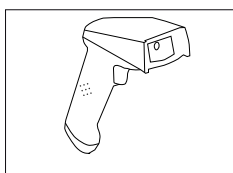
+ 71209966



PS/2 Barcode Reader, without cable

21901297

PS/2 wedge single cable 21901307

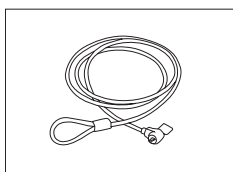


PS/2Y Barcode Reader, without cable

21901297

PS/2 wedge twin (Y) cable 21901308

Anti-theft devices



Steel cable

11600361

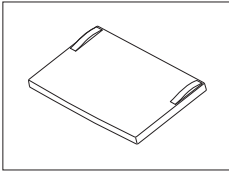
Transport Cases



Transport case for analytical balances

11106869

Protective Covers



Protective cover for XP terminal

11132570

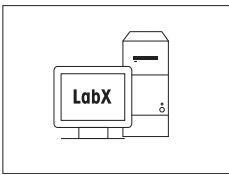
Dust covers



Dust cover

30035838

Software



LabX Software for One Click™ Weighing Solutions

Enables you to perform One Click™ Standard Preparation, One Click™ Loss on Drying, One Click™ Sieve Analysis and many other applications.

Simply start the method with the One Click™ shortcut on the balance touchscreen. LabX guides you step-by-step through the SOP on the balance, performs your calculations automatically, and takes care of saving all your data. The complete solution can be tailored to match your process requirements. Visit www.mt.com/one-click-weighing for more information

Freeweigh.Net

on request

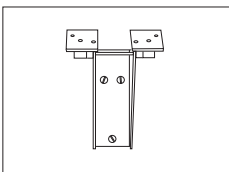
21900895

Various



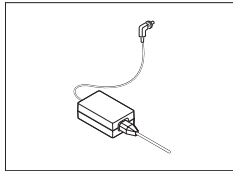
Terminal and printer stand, mounting on balance

11106730



Wall fixture for terminal

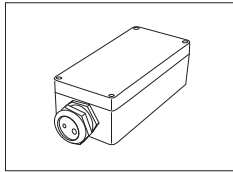
11132665



AC/DC adapter (without power cable) 100–240 VAC,
50/60 Hz, 0.3 A, 12 VDC 2.25 A

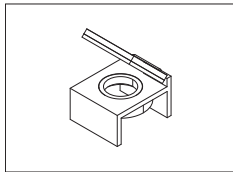
11107909

Power cable CH	00087920
Power cable EU	00087925
Power cable US	00088668
Power cable IT	00087457
Power cable DK	00087452
Power cable GB	00089405
Power cable AU	00088751
Power cable ZA	00089728
Power cable BR	30015268
Power cable JL	00225297
Power cable IN	11600569
Power cable JP	11107881
Power cable TH, PE	11107880



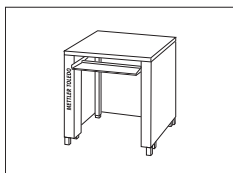
IP54 protective housing for AC adapter

11132550



Level bubble mirror

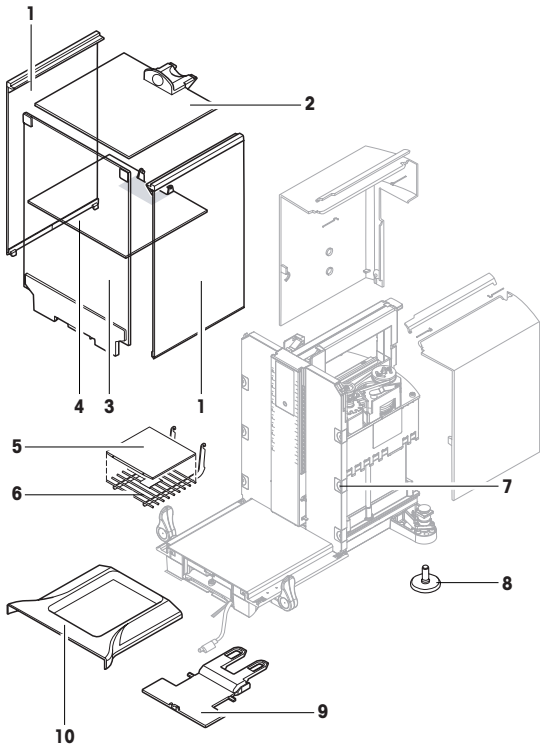

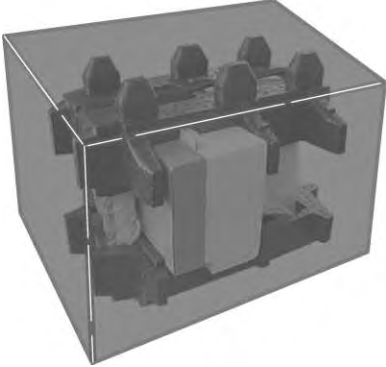
11140150




Weighing table

11138042

8.2 Spare Parts

	Pos	Description	Part No.
	1	Side draft shield door	11106841
	2	Top draft shield door	11106842
	3	Front glass	11106843
	4	Intermediate shelf	11106803
	5	Grid weighing pan cover	11106709
	6	Grid weighing pan	11106333
	7	Clip (Set of 6 pieces)	11106511
	8	Foot screw	11106323
	9	Terminal support	11106540
	10	Drip tray	11106449
		XP Terminal complete with firmware	11130692
		Packaging complete	11106879

	Pos	Description	Part No.
		Export box	11106871

9 Appendix

9.1 MT-SICS Interface Commands and Functions

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

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

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

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

► www.mt.com/xp-analytical

9.2 Procedure for Certified Balances

Preface

Certified balances are subject to the national, legal requirements of "non-automatic balances".

Switching on the balance

- **Switching on**
 - Immediately after being switched on, the balance displays 0.000.. g.
 - The balance is always started up with the "Factory setting" unit.
- **Switch-on range**
 - At maximum 20% of the type load, otherwise overload is displayed (OIML R76 4.5.1).
- **Stored value as switch-on zero point**
 - It is not permissible to use a stored value as a switch-on zero point; the MT-SICS M35 command is not available (OIML R76 T.5.2).

Display

- **Display of the weight value**
 - The "e" certification value is always shown in the display and is specified at the model designation plate (OIML R76 T.3.2.3 and 7.1.4).
 - If the display increment is lower than the "e" certification value, this is variably displayed for the net, gross and weighed tare. (Graying of the digits or certification brackets) (OIML R76 T.2.5.4 and 3.4.1).
- In accordance with guidelines, the tested display increment (certification value) is never lower than 1 mg (OIML R76 T.3.4.2).
- At balances with $d = 0.1$ mg, the digits below 1 mg are displayed in gray. These digits in brackets are printed. In accordance with legal metrology requirements, this illustration does not affect the accuracy of the weighing results.
- **Units of measurement**
 - The display and info unit are firmly set to g or mg (depending on the model).
 - The following applies for the "Custom unit":
 - No certification brackets.
 - The following names are blocked, this applies to upper and lower case letters.
 - All official units (g, kg, ct etc.).
 - c, ca, car, cm, crt, cart, kt, gr, gra, gram, grm, k, kilo, to, ton.
 - All names with "o" which can be replaced by a zero (Oz, Ozt etc.).

- **Identification of the weight display**

- Gross, net, tare and other weight values are accordingly marked (OIML R76 4.6.5).
 - Net for net when a tare value has been used.
 - B or G for gross.
 - T for the weighed tare.
 - PT for the specified tare.
 - * or diff for the difference between the net or gross.

- **Info field**

- The info weight value is handled metrologically in the same way as the weight value in the main display.

Printout (OIML R76 4.6.11)

- If a tare value is entered manually (PreTare), the PreTare value is always printed along with the net value (PT 123.45 g).
- The printed weight values are identified in the same way as the weight value on the display. I.e. N, B or G, T, PT, diff or *, with differentiation.

Example:

Single-range balance.

N	123.4[5] g
PT	10.00 g → for PreTare
G	133.4[5] g

DR balance with 100.00 g fine range.

N	80.4[0] g
T	22.5[6] g → for weighed tare
G	102.9[] g

Balance functions

- **Reset to zero**

- The zero range is limited to a maximum of $\pm 2\%$ of the full load (OIML R76 4.5.1).

- **Tare**

- No negative tare values are permitted.
- Tare immediate (TI) is not permitted, the MT-SICS `TI` command is not available (OIML R76 4.6.4).

- **1/xd**

- **e = d**

The 1/xd switchover is not permitted (OIML R76 3.1.2).

- **e = 10d**

This is only permitted in the case of the 1/10d switchover.

- **e = 100d**

Only the 1/10d and 1/100d switchover are permitted.

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GWP® – Good Weighing Practice™

The global weighing guideline GWP® reduces risks associated with your weighing processes and helps to

- choose the appropriate balance
- reduce costs by optimizing testing procedures
- comply with the most common regulatory requirements

► www.mt.com/GWP

www.mt.com/excellence

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Fax +41 (0)44 944 30 60

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Subject to technical changes.

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