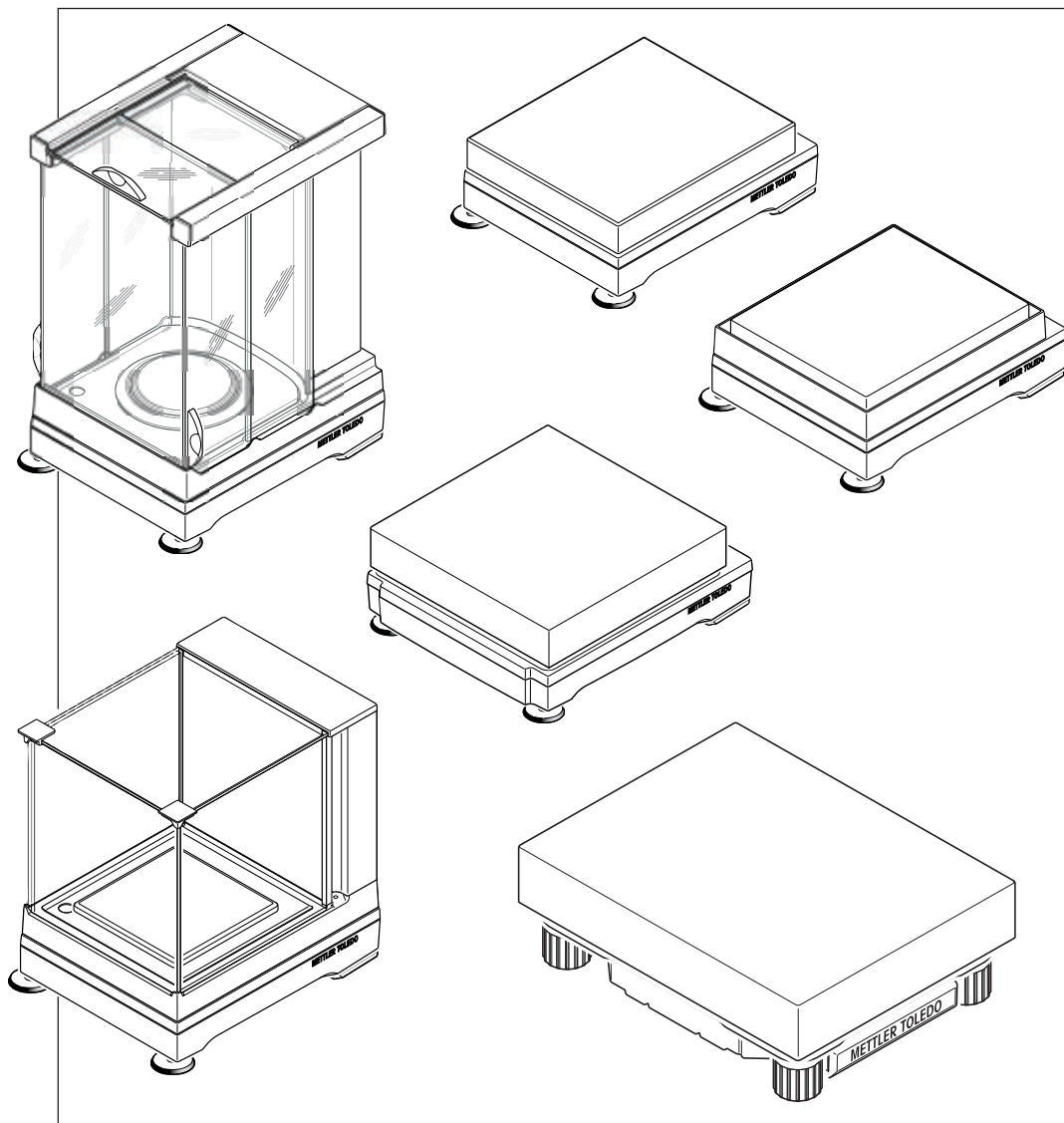


Excellence Precision Balances

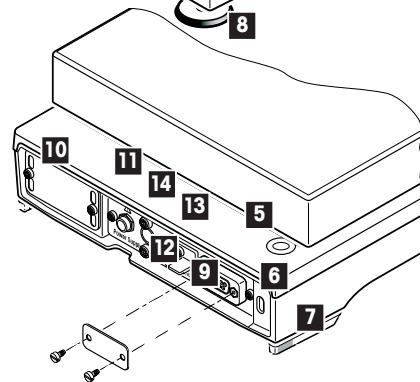
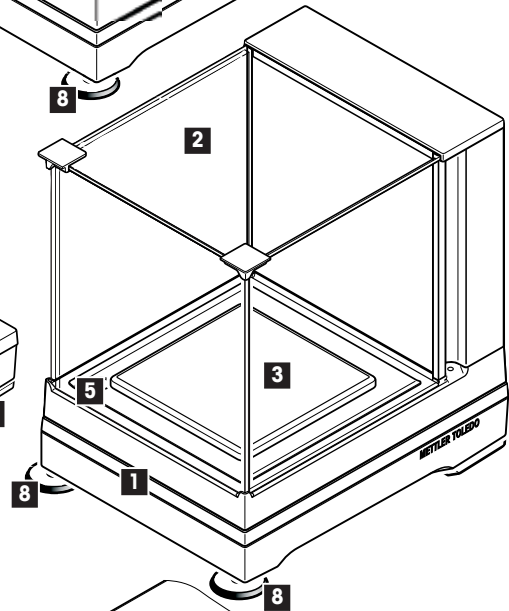
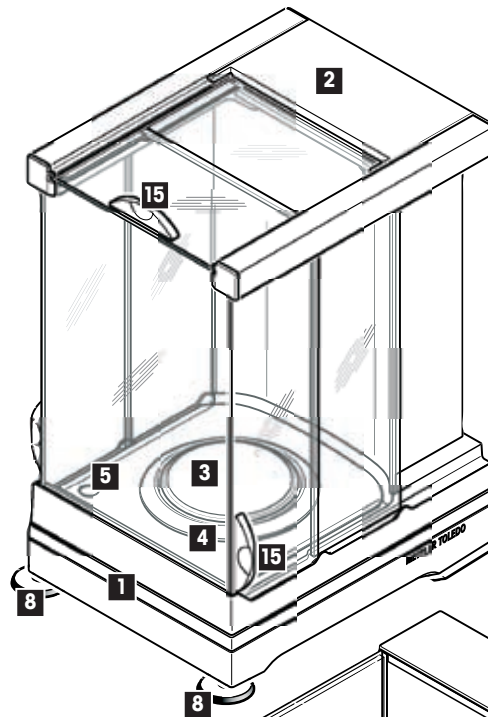
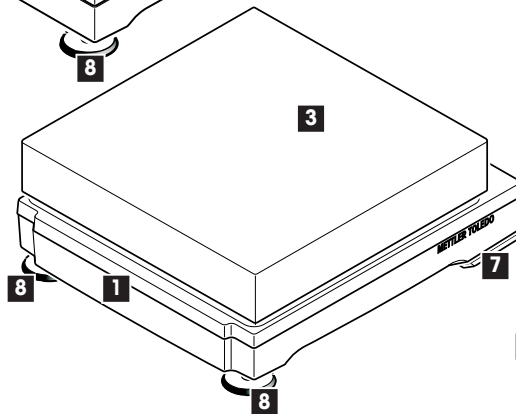
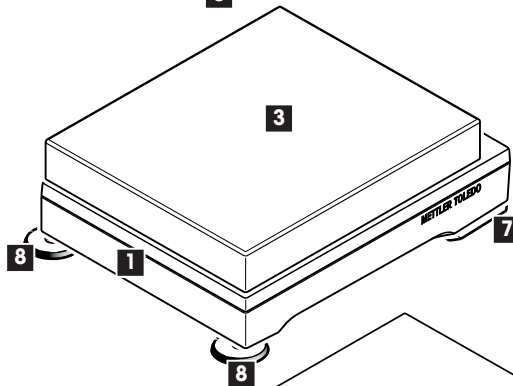
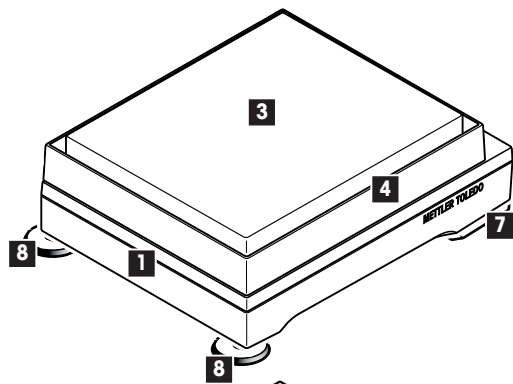
X Models



METTLER TOLEDO

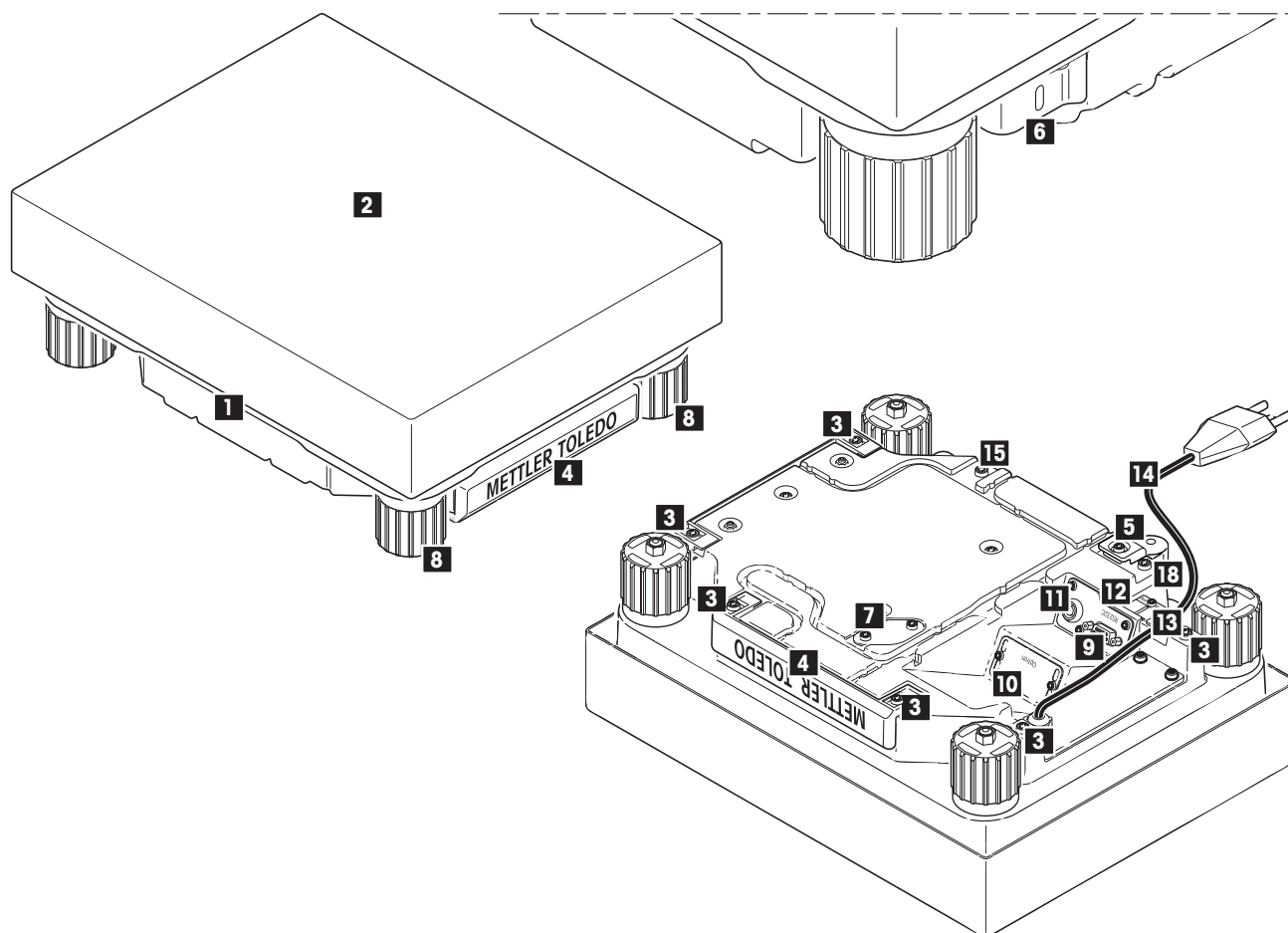
Overview of your Excellence precision weighing platform

"S" and "M" weighing platforms



- 1 Type name
- 2 Glass draft shield
- 3 Weighing pan
- 4 Draft shield element
- 5 Level indicator
- 6 Fastening point for anti-theft device
- 7 Safety feet (10 mg, 0.1 g and 1 g models)
- 8 Leveling screw
- 9 RS232C serial interface
- 10 Slot for second interface (optional)
- 11 Socket for AC adapter
- 12 Aux 1
- 13 Aux 2
- 14 Fastening for auxiliary display stand or terminal stand (optional)
- 15 Handle for operation of the draft-shield door

"L" weighing platform



- 1 Type name
- 2 Weighing pan
- 3 Fastening point for terminal or cover
- 4 Cover
- 5 Level indicator
- 6 Fastening point for anti-theft device
- 7 Cover plate for below-the-balance weighing (hook optional)
- 8 Leveling screw
- 9 RS232C serial interface
- 10 Slot for second interface (optional)
- 11 Connector for terminal cable
- 12 Aux 1
- 13 Aux 2
- 14 Power cable
- 15 Fastening point for terminal stand (optional)

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1 Getting to know your weighing platform

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

1.1 Introduction

Thank you for choosing a METTLER TOLEDO balance.

The weighing platforms of the X line combine a large number of weighing and adjustment possibilities.

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

1.2 Introducing the X precision weighing platforms

The X family of precision balances comprises a range of precision weighing platforms which differ from each other in relation to their weighing range and resolution.

The following features are common to all models of the X precision weighing platforms:

- Fully automatic adjustment "FACT" using internal weight.
- Integral RS232C interface.
- Slot for second interface (optional).

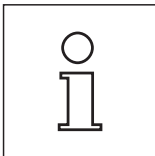
A brief word about standards, guidelines, and methods of quality assurance: The weighing platforms comply with usual standards and guidelines. They support standard procedures, specifications, working methods, and reports according to **GLP (Good Laboratory Practice)**, and allow the creation of **SOPs (Standard Operating Procedure)**. The weighing platforms have a CE Declaration of Conformity, and METTLER TOLEDO is certified as manufacturer according to ISO 9001 and ISO 14001.

1.3 What you should know about these instructions

The following conventions apply throughout these operating instructions.



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



This symbol indicates additional information and notes. These make working with your balance easier, as well as ensuring that you use it correctly and economically.

1.4 Safety has priority

To ensure safe operation of your weighing platform, please observe the following instructions.

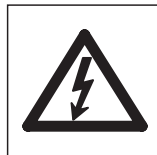
Always operate and use your weighing platform, only in accordance with the instructions contained in this manual.

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

If the instrument is not used according to the manufacturer's Operating Instructions, protection of the instrument may be impaired (see also § 5.4.4 of EN 60101:01).



It is not permitted to use the balance in hazardous environments.



Use only the AC adapter delivered with your weighing platform, 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.

Note: The L weighing platform has a built-in power supply unit.



Although your weighing platform is very ruggedly constructed, it is nevertheless a precision instrument. Treat it with corresponding care.

Do not open the weighing platform: 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 accessories and peripheral devices from METTLER TOLEDO; they are optimally adapted to your weighing platform.

Disposal



In conformance with the European Directive 2002/96/CE 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.

2 Setting up the weighing platform

This section describes how to unpack your new balance, set it up and prepare it for operation. On completion of the steps described in this section, your balance is ready for operation.



Attention: The balance must be disconnected from the power supply when carrying out all setup and mounting work.

2.1 Unpacking and checking the standard equipment

Open the packaging and carefully remove all components.

2.1.1 The following components are standard equipment

All types of weighing platforms

- Weighing platform
- AC adapter and country-specific power cable ("S" + "M" platforms)
- Country-specific power cable ("L" platforms)
- RS232C interface
- Slot for second interface (optional)
- Feedthroughs for below-the-balance weighing and for antitheft device
- Operating instructions
- Production certificate
- CE declaration of conformity

X weighing platforms with readability of 0.1 mg ("S" platforms)

- "Pro" draft shield with bottom plate and ring seal
- Draft shield element
- Weighing pan \varnothing 90 mm

X weighing platforms with readability of 1 mg ("S" platforms)

- "Magic Cube" draft shield with an additional draft shield door
- Bottom plate
- Weighing pan support
- Weighing pan 127 x 127 mm

X weighing platforms with readability of 10 mg ("S" and "M" platforms)

- Protective cover
- Weighing pan support
- Weighing pan
 - S platform: 170 x 205 mm
 - M platform: 237 x 237 mm
- Draft shield element (S platform only)

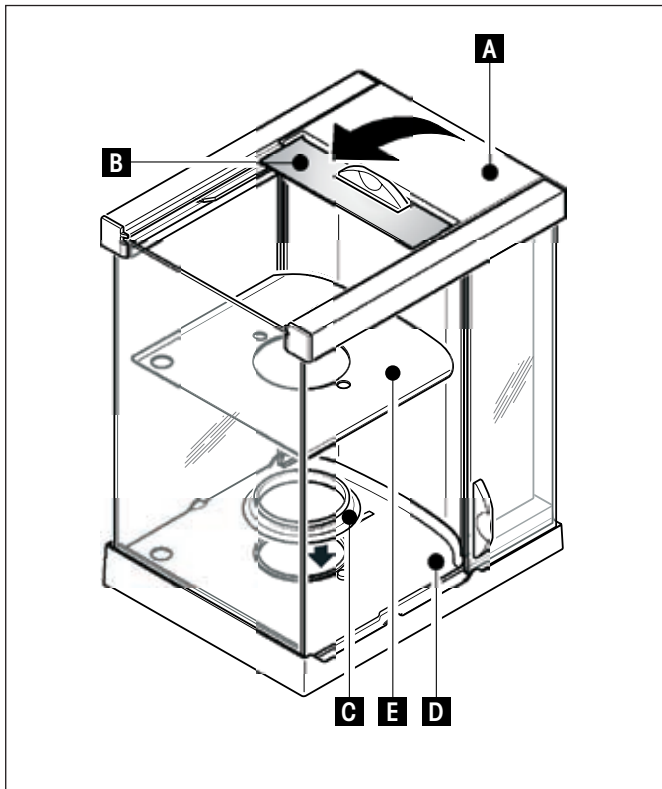
X weighing platforms with readability of 0.1 g ("S" and "M" platform) and 1 g ("M" platform)

- Protective cover
- Weighing pan support
- Weighing pan
 - S platform: 190 x 223 mm
 - M platform: 237 x 237 mm

X weighing platforms with readability of 0.1 g and 1 g ("L" platform)

- Weighing pan: 280 x 360 mm

2.1.2 Unpacking the "Pro" draft shield (0.1 mg models)



- Place the draft shield on a clean surface.
- Turn so the cover (A) is vertically on top.
- Lift the carton (B) off over the handle and the pull the carton off toward the back.



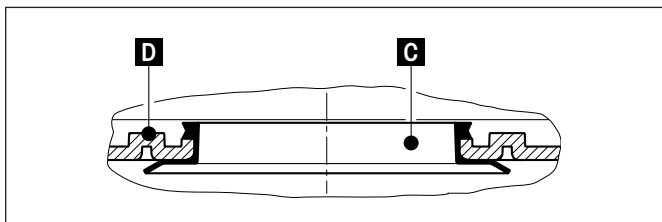
Attention: Hold the glass panels firmly so they do not get pulled off and fall to the floor!

- Close the cover (A) again.
- Push all the glass panels as far as they will go to the back.
- Place the ring seal (C) into the draft shield base (D) from above.
- Push the complete ring seal (C) through the opening in the draft shield base and then pull the top edge upward through the opening until the edge lies flat and tight all the way round.

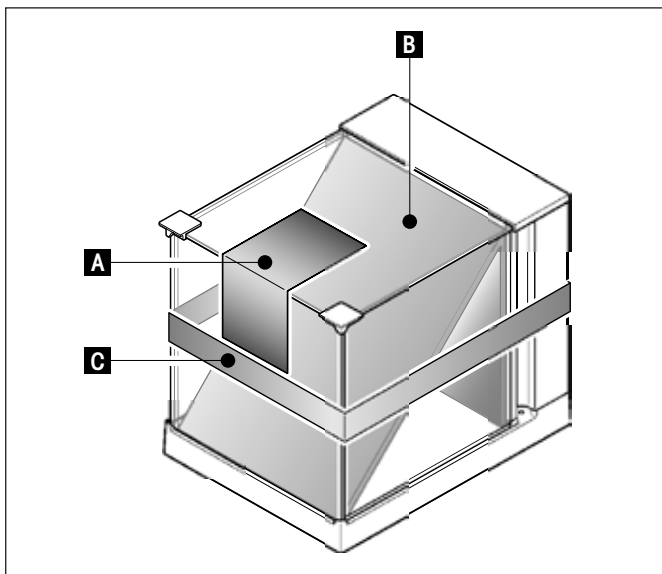


Attention: Check by running a finger all the way round that the seal ring (C) is fitted tightly into the opening in the draft shield base (D), see illustration below.

- Insert the bottom plate (E).



2.1.3 Unpacking the "Magic Cube" draft shield (1 mg models)



- Place the draft shield horizontally on a clean surface.
- Remove the adhesive tape (A).
- Open the draft shield cover.
- Pull the cardboard (B) upwards out of the weighing chamber.
- Close the draft shield cover.
- Release the holding strip (C) and pull it upwards to remove it.

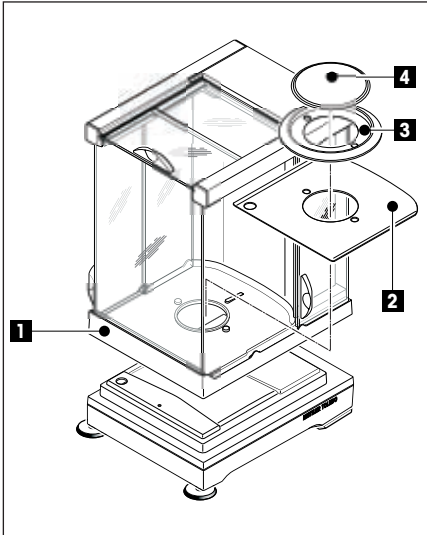


Attention: When removing the cardboard (B), hold the U-shaped draft shield glass so that it is not pulled away with it.

2.2 Setting up the weighing platform

The size of the weighing pan depends on the readability and maximum capacity of the balance.

2.2.1 Installing the draft shield and weighing pan



X weighing platforms with readability of 0.1 mg, draft shield "Pro"

Place the following components on the balance in the specified order:

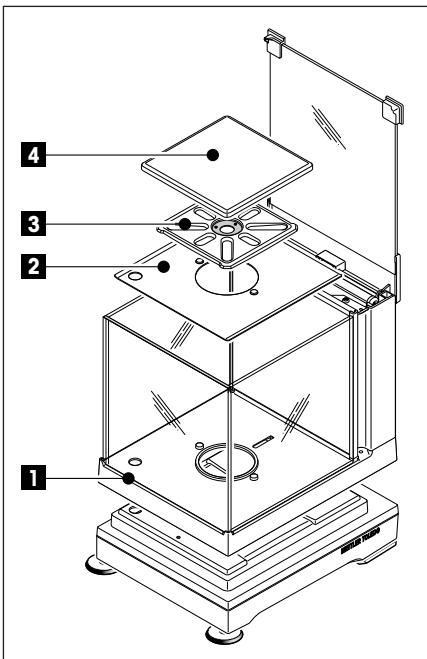


Attention: Push the side glass back as far as it will go and grasp the draft shield with both hands on the bars at the top.

- Draft shield (1) with ring seal inserted (section 2.1.2).
- Bottom plate (2), if not already inserted (section 2.1.2)!
- Draft shield element (3)
- Weighing pan (4)



Note: Cleaning the draft shield, see section 3.



X weighing platforms with readability of 1 mg, draft shield "Magic Cube"

Place the following components on the balance in the specified order:

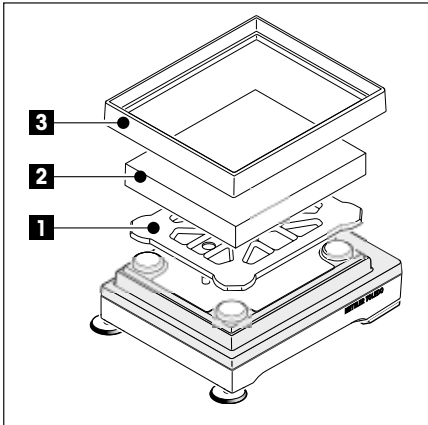


Attention: The U-shaped draft shield glass is not permanently connected to the draft shield housing. Always close the cover before picking up the draft shield. Hold the entire draft shield by the housing at the back. Always hold the draft shield with both hands and keep in a horizontal position.

- Place draft shield (1) with closed cover, and then open.
- Bottom plate (2)
- Pan support (3)
- Weighing pan (4)



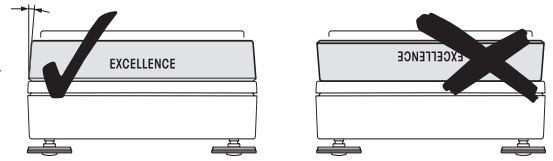
Note: For setting options for the draft shield "Magic Cube", see section 2.2.2



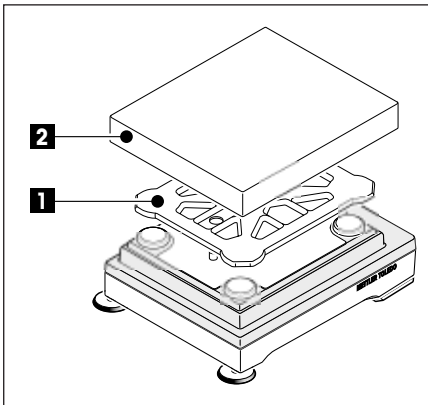
X weighing platforms with readability of 10 mg ("S" platform)

Place the following components on the balance in the specified order:

- Pan support (1)
- Weighing pan (2)
- Draft shield element (3) →



Note: It is also possible to work without the draft shield element (3). However, depending on the ambient conditions, the result may be slightly less stable.



X weighing platforms with readability of 10 mg ("M" platform), 0.1 g ("S" and "M" platform) and 1 g ("M" platform)

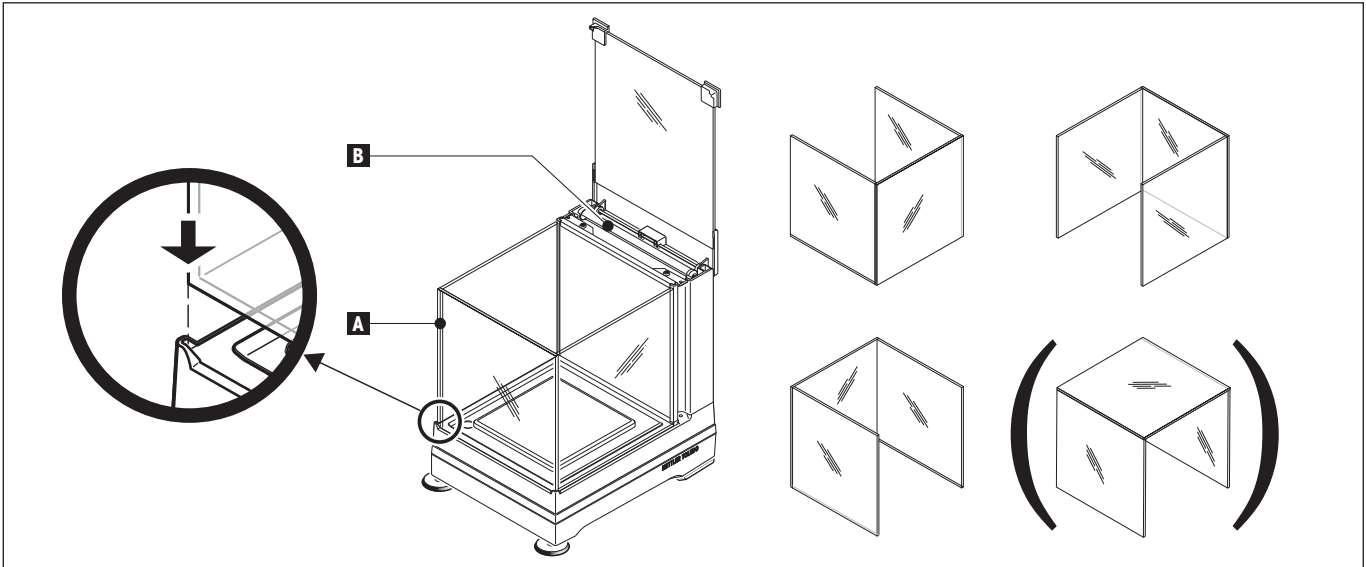
Place the following components on the balance in the specified order:

- Pan support (1)
- Weighing pan (2)

2.2.2 Setting options of the draft shield "Magic Cube" (1 mg models)

Setting options with the draft shield glass

The U-shaped draft shield glass (A) supports different setting options. The draft shield housing contains an additional draft shield pane (B), which can be used as required.

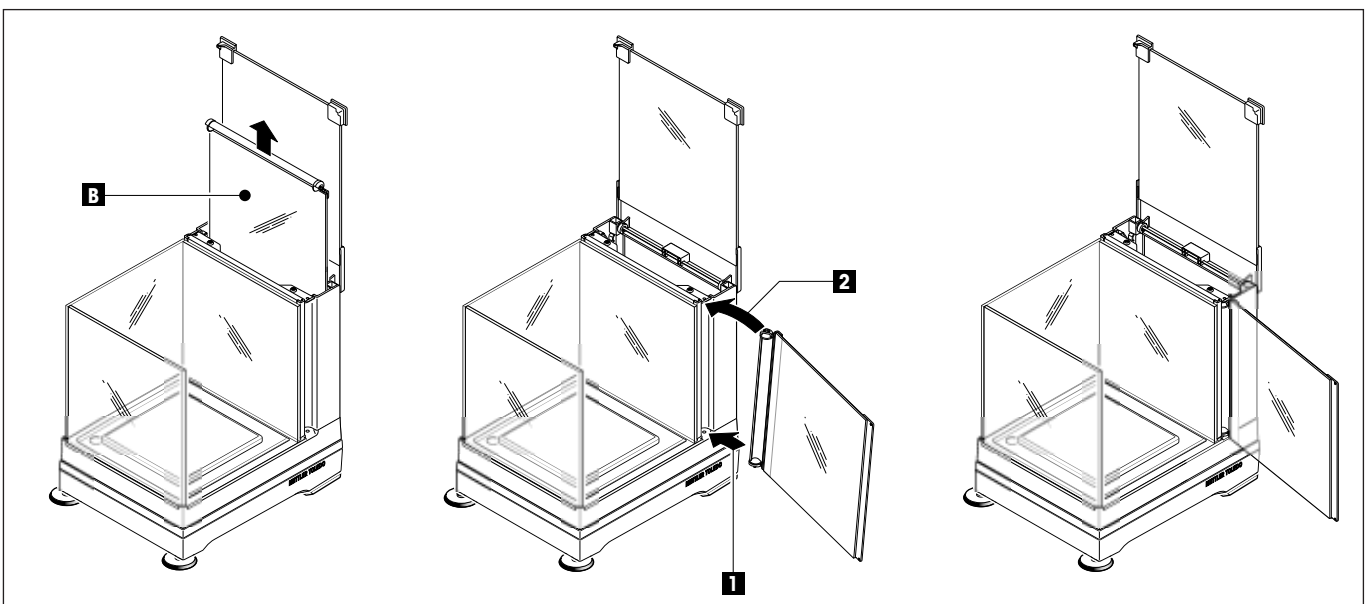


Using the additional draft shield door

- Open the draft shield cover.
- Pull the draft shield door (B) upwards out of the rear panel.
- Insert the draft shield door into the housing from the side (left or right).
 - First position the draft shield door at the bottom (1) and then swivel it upwards (2) until you **feel it snap into place** (see diagram).



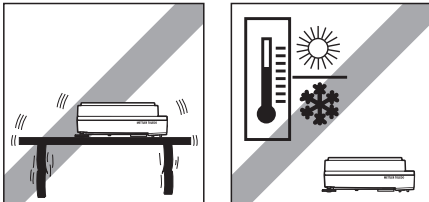
Attention: Check that the draft shield door is inserted correctly. The door must close easily. When transporting the weighing platform, except for the terminal, also hold the draft shield, as this is fitted and not permanently connected to the weighing platform.



2.3 Selecting the location and level of the weighing platform

Your weighing platform is a precision instrument and will thank you for an optimum location with high accuracy and dependability.

2.3.1 Selecting the location



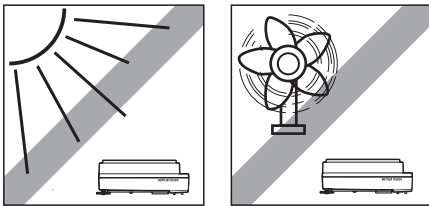
Choose a position which is stable, free from vibration, and as nearly horizontal as possible. The supporting surface must be able to bear the weight of the fully loaded weighing platform safely.

Observe ambient conditions (see section 4).

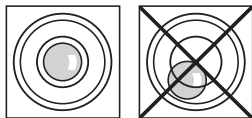
Avoid the following:

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

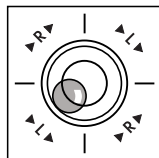
Further information can be found in Weighing the Right Way.



2.3.2 Leveling the weighing platform



Align the weighing platform horizontally by turning the leveling screws of the weighing platform housing until the air bubble is in the inner circle of the level indicator.



The position of the air bubble illustrates which leveling screw you need to turn (L = left leveling screw, R = right leveling screw) and in which direction so that the air bubble moves to the center.

Example: In this example, turn the left leveling screw counterclockwise.

"L" weighing platform

Align the weighing platform horizontally by turning the leveling screws of the weighing platform housing until the air bubble is in the inner circle of the level indicator.

Weighing platform with readability of 10 mg, 0.1 g and 1 g ("S" + "M" platforms)

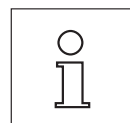
- Remove the clamps (A) for the safety feet by turning them outwards.



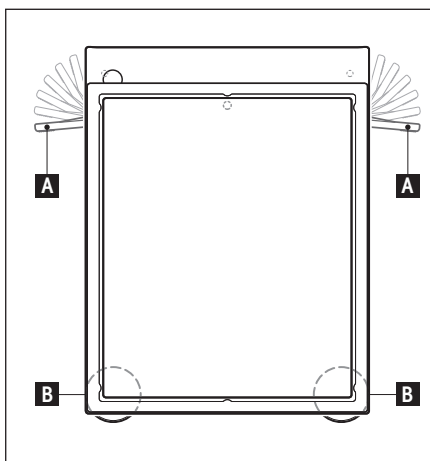
Note: Turn the clamps (A) outwards as far as they will go (~ 90°), so that the safety feet can move freely.

- Now level the weighing platform by turning both leveling screws (B) until the air bubble is in the inner circle of the level indicator.

- Secure the safety feet by turning the clamps (A) inwards as far as they will go.

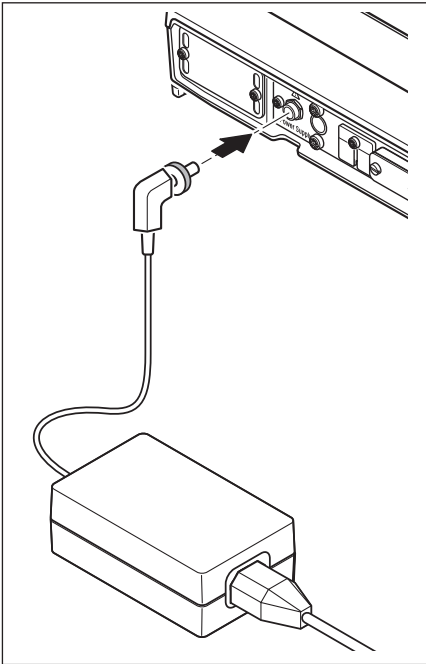


The weighing platform must be leveled and adjusted each time it is moved to a new location.



2.4 Power supply

2.4.1 "S" + "M" weighing platform



Your weighing platform is supplied with an AC adapter and a country-specific power cable. The AC adapter is suitable for all line voltages in the range:

100 - 240 VAC, -10/+15 %, 50/60 Hz.

Check whether the local line voltage is in this range. **If this is not the case, on no account connect the weighing platform or the AC adapter to the power supply**, but contact the responsible METTLER TOLEDO dealer.

Connect the AC adapter to the connection socket on the back of your weighing platform (see figure) and to the power supply. Secure the connection to your weighing platform by screwing the plug tight.



Important: Guide the cables so that they cannot become damaged or interfere with the weighing process! Take care that the AC adapter cannot come into contact with liquids!



Ensure that the AC power pack for the weighing platform is only used in accordance with the specifications listed in section 4.1.

Once connected to the power supply, the weighing platform performs a self-test and is then ready for operation.

2.4.2 "L" weighing platform



Your weighing platform has been supplied with a country-specific power cable.

First, check to see whether the power plug fits your local power supply connection. **If this is not the case, on no account connect the weighing platform to the power supply**, but contact the responsible METTLER TOLEDO dealer.



Do not connect the weighing platform to outlets that are not grounded! Do not use extension cords without PE conductors!

Important: Guide the cables so that they cannot become damaged or interfere with the weighing process! Ensure that the connectors can never come into contact with liquids!

Once connected to the power supply, the weighing platform performs a self-test and is then ready for operation.

2.5 Transporting the weighing platform

Switch off the weighing platform and remove the AC adapter cable and any interface cable from the weighing platform.

2.5.1 Transporting over short distances

Observe the following instructions to transport your weighing platform over a short distance to a new location.



For weighing platform with a draft shield: Never lift the weighing platform using the glass draft shield as this can result in damage.

2.5.2 Transporting over long distances

If you would like to transport or send your weighing platform over long distances, or if the weighing platform may not be transported in an upright position, use the **complete original packaging**.

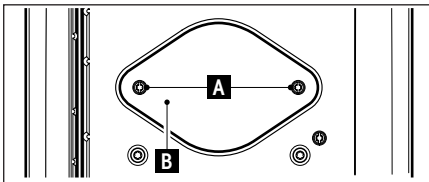
2.6 Weighing below the balance

Your weighing platform is equipped with a hanger for carrying out weighings below the work surface (weighing below the weighing platform).

- Switch off the weighing platform and remove the AC adapter cable and any interface cable from the balance.
- Remove the weighing pan (0.1 mg models).
- Remove the draft shield element (0.1 mg and 10 mg models, "S" platform only).
- Remove the weighing pan and pan support.
- Remove the bottom plate (1 mg models with draft shield).



Attention: Models with a glass draft shield: Carefully lift the draft shield from the weighing platform and put it aside.



- Tilt the weighing platform backwards until the cover plate (B) is visible.

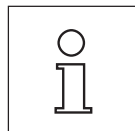
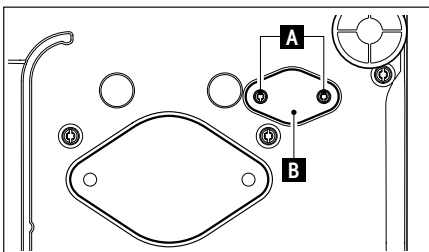


Attention: Do not place the weighing platform on the location bolt for the pan support (0.1 mg and 1 mg models).

- Remove the 2 screws (A) and the cover plate (B).
The hanger is now accessible.

Then return the weighing platform to its normal position and simply reinstall all components in the reverse order.

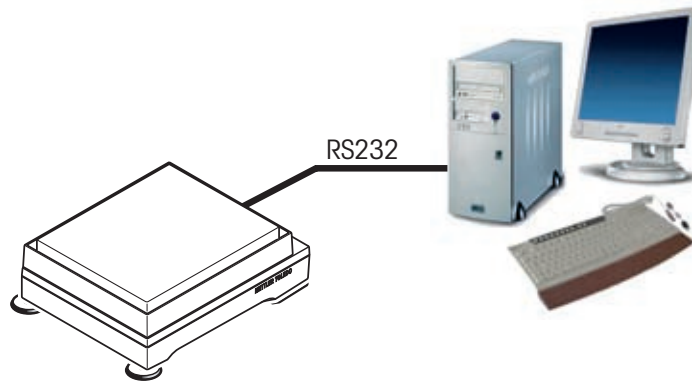
X20001M / X20000M



Note: For below-the-balance weighing with the M model (X20001M/X20000M) and all L models, you will need hook 11132565 from the accessories range.

2.7 System Integration

Weighing platforms are usually integrated into complex computer or weighing systems. The integrated RS232 or an optional data interface can be used to capture weighing results and to control or adjust the weighing platform. Standard commands are available for this purpose.



2.7.1 Specifications of the RS232C interface

Interface type:	Voltage interface according to EIA RS-232C/DIN 66020 (CCITT V24/V.28)	
Max. cable length:	15 m	
Signal level:	Outputs: +5 V ... +15 V (RL = 3 – 7 kΩ) –5 V ... –15 V (RL = 3 – 7 kΩ)	Inputs: +3 V ... 25 V –3 V ... 25 V
Connector:	Sub-D, 9-pole, female	
Operating mode:	Full duplex	
Transmission mode:	Bit-serial, asynchronous	
Transmission code:	ASCII	
Baud rates:	600, 1200, 2400, 4800, 9600 , 19200, 38400 (interface command selectable)	
Bits/parity:	7-bit/even, 7-bit/odd, 7-bit/none, 8-bit/none (interface command selectable)	
Stop bits:	1 stop bit	
Handshake:	None, XON/XOFF, RTS/CTS (interface command selectable)	
End-of-line:	<CR><LF>, <CR>, <LF> (interface command 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)	

2.7.2 MT-SICS Interface commands and functions

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

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

Basic information on data interchange with the weighing platform

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

Command formats

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

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

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

Example

S – Send stable weight value

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

Example

Command	<code>s</code>	Send a stable weight value.
Response	<code>S␣S␣␣␣␣␣␣␣␣100.00␣g</code>	The current, stable weight value is 100.00 g.

COM – Inquiry/setting the communication parameters of the serial interface

Command	<code>COM␣Port␣Baud␣Bit␣HS</code>	Setting of the fix RS232-interface (without option)
		Port: Interface
		Port = 0 (fix) fix RS232
		Baud: Baudrate
		Baud = 4 2400 Baud
		Baud = 5 4800 Baud
		Baud = 6 9600 Baud (factory setting)
		Baud = 7 19200 Baud
		Baud = 8 38400 Baud
		Bit: Bit, parity, stop bit
		Bit = 3 (fix) 8 bit, no parity, 1 stop bit
		HS: Handshake
		HS = 1 (fix) Software HS (Xon/Xoff)
Responses	<code>COM␣A</code> <code>COM␣L</code>	
Example	<code>COM␣0␣7␣3␣1 → COM␣A</code>	

C0 – Inquiry/setting of calibration setting

Command	C0	Inquiry of calibration setting
Response	C0└A└x1└x2└"└"	
Command	C0└x1└x2	Set calibration setting
		x1 Calibration mode x1 = 0 Mode = Manual x1 = 1 Mode = Auto
		x2 Calibration weight x2 = 0 Use internal weight (factory setting) x2 = 1 Use external weight
Responses	C0└A	Calibration setting set.
	C0└L	Calibration setting can not be set, e.g. parameter wrong or certified version of the weighing platform.
	C0└I	Command not executable as the weighing platform is, e.g. being tared.

Example

Command	C0└0└1	Set calibration setting to "Manual" and external weight.
Response	C0└A	Calibration setting set.

Comment

Setting x1=1 and x2=0 corresponds to the menu setting "FACT" under "Calibration".

MT-SICS commands available for X weighing platforms

For further information please refer to the Reference Manual MT-SICS, downloadable from the Internet under www.mt.com.

Commands MT-SICS level 0

I0	Inquiry of all implemented MT-SICS commands
I1	Inquiry of MT-SICS level and MT-SICS versions
I2	Inquiry of balance data
I3	Inquiry of balance SW version and type definition number
I4	Inquiry of serial number
I5	SW-Identification number
S	Send stable weight value
SI	Send weight value immediately
SIR	Send weight value immediately and repeat
Z	Zero
ZI	Zero immediately
@	Reset

Commands MT-SICS level 1

SR	Send weight value on weight change (Send and Repeat)
T	Tare
TA	Inquiry/setting of tare weight value
TAC	Clear tare value

Commands MT-SICS level 2

C0	Inquiry/setting of calibration setting
C1	Initiate calibration according to current setting
C2	Initiate calibration with external weight
C3	Initiate calibration with internal weight
COM	Inquiry/Setting the communication parameters of the serial interface

DAT	Date
I10	Balance ID – Inquiry of balance identification
I11	Balance type
I14	Inquiry of balance info
M01	Inquiry/setting of weighing mode
M02	Inquiry/setting of environment
M03	Inquiry/setting of AutoZero
M17	Inquiry/setting of ProFACT time criteria
M18	Inquiry/setting of ProFACT/FACT temperature criterion (Δ temp.)
M19	Inquiry/setting of adjustment weight
M20	Inquiry/setting of test weight
M21	Inquiry/setting of unit
M27	Inquiry of adjustment history
M28	Inquiry of temperature probe
M29	Inquiry/setting of value release
SIS	Inquiry of current net weight values
SNR	Send stable weight value and repeat after each deflection
TIM	Time
TST0	Inquiry/setting of the test function
TST1	Initiate test function in the current setting
TST2	Initiate test function with external weight
TST3	Initiate test function with internal weight
UPD	Inquiry/setting of the update rate of the host interface

3 Cleaning and service

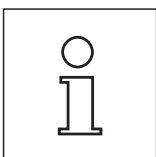
Every now and then, clean the weighing pan, draft shield element, draft shield (depending on the model), housing of your weighing platform using a damp cloth.

Your weighing platform is made from high-quality, durable materials and can therefore be cleaned with a standard, mild cleaning agent.

Please observe the following notes

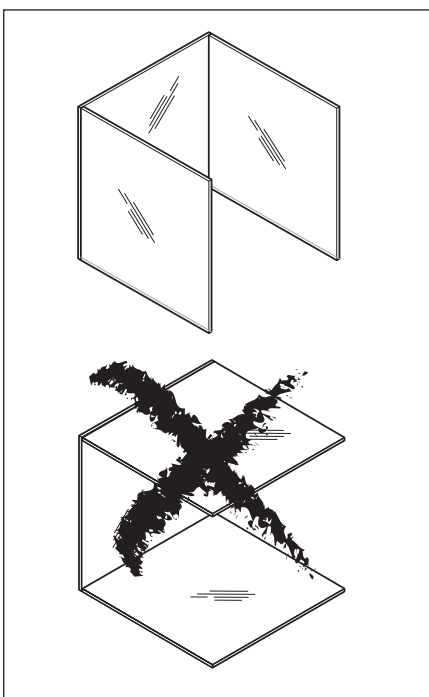


- On no account use cleaning agents, which contain solvents or abrasive ingredients, as this can result in damage to the terminal overlay.
- Ensure that no liquid comes into contact with the weighing platform, the terminal or the AC adapter.
 - The weighing platform is protected against dust and water when it is fully set up (with pan support and weighing pan).
- Never open the weighing platform or AC adapter - they contain no components, which can be cleaned, repaired or replaced by the user.



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 weighing platform.

3.1 Cleaning the draft shield "Magic Cube" (1 mg models)



To thoroughly clean the U-shaped draft shield glass, carefully remove it from the draft shield.

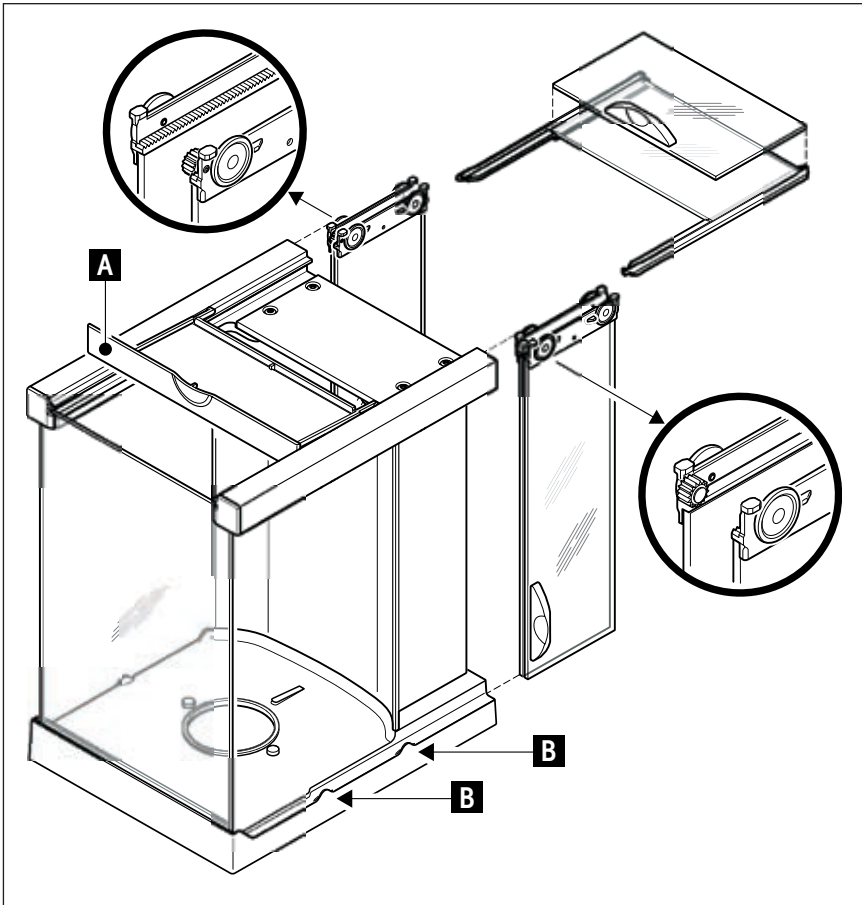
Place it on a clean, soft surface, as illustrated in the diagram.

When reinserting the glass, ensure that it is in the correct position (see section 2).

3.2 Cleaning the draft shield "Pro" (0.1 mg models)

Remove the following parts:

- Weighing pan, draft-shield element
- Lift the draft shield off the balance and place it on a clean surface.
- Remove the bottom plate.

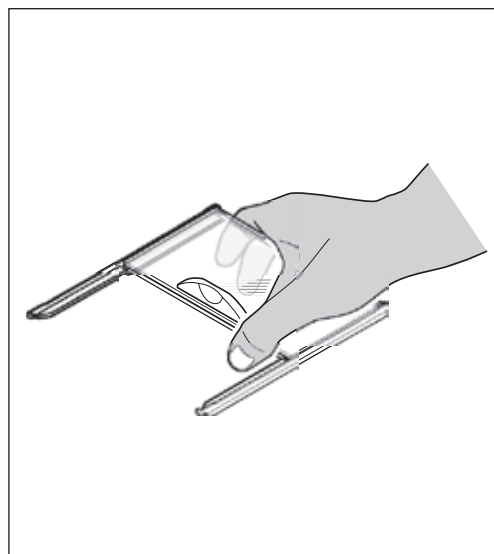
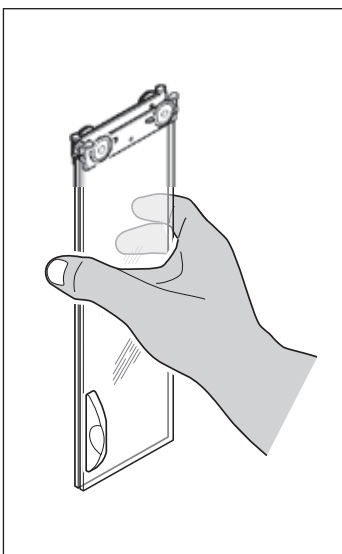


- Push all the glasses back as far as they will go.
- Turn the cover (A) to the front.
- Pull the top glass toward the back and off.
- Pull the side glasses toward the back and off.



Note: Always hold the 2 parallel guided glasses (side glasses and top glasses) **together with one hand** (illustrations below).

- Clean all parts then reassemble the draft shield in the reverse order.



Insert glasses

Note: Always hold the 2 parallel guided glasses (side glasses and top glasses) **together and parallel with one hand** (illustrations below). The side glasses must not be placed outside the projections (B).


4 Technical data

In this section you will find the most important technical data for your weighing platform.

4.1 General data

4.1.1 Precision weighing platform "S" or "M"

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: 3-core, with country-specific plug
- Power supply to the balance: 12 VDC \pm -3%, 2.0 A, maximum ripple: 80 mVDCpp
Use only with a tested AC adapter with SELV output current.
Ensure correct polarity 



Protection and standards

- Overvoltage category: Class II
- Degree of pollution: 2
- Protection: IP54, in use with weighing pan inserted, 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, noncondensing

Materials

- Housing: Die-cast aluminum, laquered, plastic and chrome steel
- Weighing pan: Chrome-nickel steel X2CrNiMo-17-13-2
- Draft shield: Plastic, chrome steel and glass
- Draft shield element: Die-cast zinc, chromed

4.1.1.1 Explanatory notes for the METTLER TOLEDO AC adapter

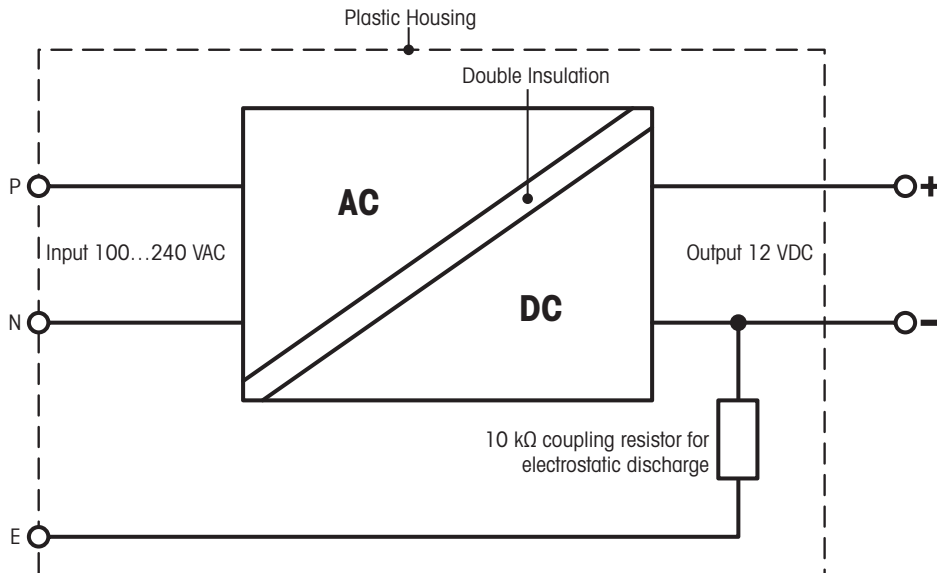
The certified external power supply which conforms to the requirements for Class II double insulated equipment and it is not provided with a protective earth connection but with a functional earth connection for EMC purposes. Information about conformance of our products can be found in the brochure "Declaration of Conformity" which is coming with each product or can be downloaded from www.mt.com.

In case of testing with regard to the directive 2001/95/CE the power supply and the balance has 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 balances can be sensitive to static charges a leakage resistor, typically 10 kΩ, is connected between the earth connector and the power supply output terminals. The arrangement is shown in Fig. 1. This resistor is not part of the electrical safety arrangement and does not require testing at regular intervals.

Equivalent circuit diagram



4.1.2 Precision weighing platform "L"

Power supply

- Power supply: 115–240 VAC, -15%/+10%, 50/60 Hz, 0.4 A
- Power cable: 3-core, with country-specific plug

Protection and standards

- Overvoltage category: Class II
- Degree of pollution: 2
- Protection: IP54, in use with weighing pan inserted, 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, noncondensing

Materials

- Housing: Sheet aluminum, die cast, laquered, plastic and chrome steel
- Weighing pan: Chrome-nickel steel X5CrNiMo-18-10

4.2 Model-specific data

4.2.1 Weighing platforms with readability of 0.1 mg, "S" platform with draft shield "Pro"

	X204S	X404S	X404SDR
Limit values			
Maximum capacity	210 g	410 g	410 g
Readability	0.1 mg	0.1 mg	1 mg
Maximum capacity, fine range	—	—	80 g
Readability, fine range	—	—	0.1 mg
Taring range (from..to)	0 .. 210 g	0 .. 410 g	0 .. 410 g
Repeatability (at nominal load)	sd 0.2 mg	0.1 mg	0.6 mg
Repeatability, fine range (at nominal load)	sd —	—	0.1 mg
Linearity deviation	0.2 mg	0.2 mg	0.6 mg
Eccentricity deviation (test load)	0.3 mg (100 g)	0.3 mg (200 g)	1 mg (200 g)
Sensitivity offset (test load)	1 mg (200 g)	2 mg (400 g)	2 mg (400 g)
Sensitivity temperature drift ¹⁾	0.00015 %/°C	0.00015 %/°C	0.00015 %/°C
Sensitivity stability	0.00025 %/a	0.00025 %/a	0.00025 %/a
Typical values			
Repeatability	sd 0.12 mg	0.06 mg	4 mg
Repeatability, fine range	sd —	—	0.06 mg
Linearity deviation	0.07 mg	0.07 mg	0.07 mg
Eccentricity deviation (test load)	0.08 mg (100 g)	0.08 mg (200 g)	0.08 mg (200 g)
Sensitivity offset (test load)	0.4 mg (200 g)	0.48 mg (400 g)	0.48 mg (400 g)
Minimum weight (according to USP) ³⁾	360 mg	180 mg	1200 mg
Minimum weight (@ U=1%, 2 sd) ³⁾	24 mg	12 mg	80 mg
Minimum weight (according to USP), fine range ³⁾	—	—	18 mg
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	12 mg
Settling time	2 s	2 s	2 s
Dimensions			
Balance dimensions (WxDxH)	214x260x363 mm	214x260x363 mm	214x260x363 mm
Weighing pan dimensions	90 mm (∅)	90 mm (∅)	90 mm (∅)
Typical uncertainties and supplementary data			
Repeatability	sd 0.12mg+0.000015%·Rgr	0.06mg+0.000005%·Rgr	4mg+0.000025%·Rgr
Repeatability, fine range	sd —	—	0.06mg+0.000025%·Rgr
Differential linearity deviation	sd √(6pg·Rnt)	√(3pg·Rnt)	√(3pg·Rnt)
Differential eccentric load deviation	sd 0.00004%·Rnt	0.00002%·Rnt	0.00002%·Rnt
Sensitivity offset	sd 0.0001%·Rnt	0.00006%·Rnt	0.00006%·Rnt
Minimum weight (according to USP) ³⁾	360mg+0.045%·Rgr	180mg+0.015%·Rgr	1200mg+0.075%·Rgr
Minimum weight (according to USP), fine range ³⁾	—	—	18mg+0.075%·Rgr
Minimum weight (@ U=1%, 2 sd) ³⁾	24mg+0.003%·Rgr	12mg+0.001%·Rgr	80mg+0.005%·Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	12mg+0.005%·Rgr
Interface update rate	23 /s	23 /s	23 /s
Usable height of draft shield	248 mm	248 mm	248 mm
Weight of balance	7 kg	7 kg	7 kg
Number of built-in reference weights ²⁾	1	1	1

Rgr = gross weight
 Rnt = net weight (sample weight)
 sd = Standard deviation
 a = Year (annum)

- 1) In the temperature range 10...30 °C
- 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
- 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers

4.2.2 Weighing platforms with readability of 1 mg, "S" platform with draft shield "Magic Cube"

	X203S	X603S	X603SDR	X1203S	X2003SDR
Limit values					
Maximum capacity	210 g	610 g	610 g	1210 g	2.1 kg
Readability	1 mg	1 mg	10 mg	1 mg	10 mg
Maximum capacity, fine range	—	—	120 g	—	0.5 kg
Readability, fine range	—	—	1 mg	—	1 mg
Taring range (from..to)	0 .. 210 g	0 .. 610 g	0 .. 610 g	0 .. 1210 g	0 .. 2.1 kg
Repeatability (at nominal load)	sd 0.9 mg	0.9 mg	6 mg	0.8 mg	6 mg
Repeatability, fine range (at nominal load)	sd —	—	1 mg	—	1 mg
Linearity deviation	2 mg	2 mg	10 mg	2 mg	6 mg
Eccentricity deviation (test load)	3 mg (100 g)	3 mg (200 g)	10 mg (200 g)	3 mg (500 g)	10 mg (1 kg)
Sensitivity offset (test load)	5 mg (200 g)	4.5 mg (600 g)	9 mg (600 g)	6 mg (1200 g)	10 mg (2 kg)
Sensitivity temperature drift ¹⁾	0.0005 %/°C	0.0002 %/°C	0.0002 %/°C	0.0002 %/°C	0.0003 %/°C
Sensitivity stability	0.0025 %/a	0.001 %/a	0.001 %/a	0.001 %/a	0.0025 %/a
Typical values					
Repeatability	sd 0.5 mg	0.5 mg	—	0.4 mg	4 mg
Repeatability, fine range	sd —	—	0.8 mg	—	0.6 mg
Linearity deviation	0.65 mg	0.7 mg	0.7 mg	0.7 mg	0.7 mg
Eccentricity deviation (test load)	0.3 mg (100 g)	0.8 mg (200 g)	0.8 mg (200 g)	1 mg (500 g)	0.6 mg (1 kg)
Sensitivity offset (test load)	3.2 mg (200 g)	2.4 mg (600 g)	6 mg (600 g)	2.9 mg (1200 g)	3.2 mg (2 kg)
Minimum weight (according to USP) ³⁾	1.5 g	1.5 g	12 g	1.2 g	12 g
Minimum weight (@ U=1%, 2 sd) ³⁾	100 mg	100 mg	800 mg	80 mg	800 mg
Minimum weight (according to USP), fine range ³⁾	—	—	2.4 g	—	1.8 g
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	160 mg	—	120 mg
Settling time	1.5 s	1.5 s	1.5 s	1.5 s	2 s
Dimensions					
Balance dimensions (WxDxH)	198x257x276 mm	198x257x276 mm	198x257x276 mm	198x257x276 mm	198x257x276 mm
Weighing pan dimensions	127x127 mm (WxD)	127x127 mm (WxD)	127x127 mm (WxD)	127x127 mm (WxD)	127x127 mm (WxD)
Typical uncertainties and supplementary data					
Repeatability	sd 0.5mg+0.00008%·Rgr	0.5mg+0.000025%·Rgr	—	0.4mg+0.000015%·Rgr	4mg+0.00005%·Rgr
Repeatability, fine range	sd —	—	0.8mg	—	0.6mg+0.00004%·Rgr
Differential linearity deviation	sd √(500pg·Rnt)	√(200pg·Rnt)	√(200pg·Rnt)	√(100pg·Rnt)	√(60pg·Rnt)
Differential eccentric load deviation	sd 0.00015%·Rnt	0.0002%·Rnt	0.0002%·Rnt	0.0001%·Rnt	0.00003%·Rnt
Sensitivity offset	sd 0.0008%·Rnt	0.0002%·Rnt	0.0005%·Rnt	0.00012%·Rnt	0.00008%·Rnt
Minimum weight (according to USP) ³⁾	1.5g+0.24%·Rgr	1.5g+0.075%·Rgr	12g+0.45%·Rgr	1.2g+0.05%·Rgr	12g+0.15%·Rgr
Minimum weight (according to USP), fine range ³⁾	—	—	2.4g	—	1.8g+0.12%·Rgr
Minimum weight (@ U=1%, 2 sd) ³⁾	100mg+0.016%·Rgr	100mg+0.005%·Rgr	800mg+0.03%·Rgr	80mg+0.003%·Rgr	800mg+0.01%·Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	160mg	—	120mg+0.008%·Rgr
Interface update rate	23 /s	23 /s	23 /s	23 /s	23 /s
Usable height of draft shield	175 mm	175 mm	175 mm	175 mm	175 mm
Weight of balance	6.5 kg	6.5 kg	6.5 kg	6.5 kg	6.8 kg
Number of built-in reference weights ²⁾	1	1	1	1	1

Rgr = gross weight
Rnt = net weight (sample weight)
sd = Standard deviation
a = Year (annum)

- 1) In the temperature range 10...30 °C
- 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
- 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers

X5003SDR	
Limit values	
Maximum capacity	5.1 kg
Readability	10 mg
Maximum capacity, fine range	1 kg
Readability, fine range	1 mg
Taring range (from..to)	0 .. 5.1 kg
Repeatability (at nominal load)	sd 6 mg
Repeatability, fine range (at nominal load)	sd 1 mg
Linearity deviation	6 mg
Eccentricity deviation (test load)	10 mg (2 kg)
Sensitivity offset (test load)	20 mg (5 kg)
Sensitivity temperature drift ¹⁾	0.0003 %/°C
Sensitivity stability	0.0015 %/a
Typical values	
Repeatability	sd 4 mg
Repeatability, fine range	sd 0.6 mg
Linearity deviation	1 mg
Eccentricity deviation (test load)	0.6 mg (2 kg)
Sensitivity offset (test load)	10 mg (5 kg)
Minimum weight (according to USP) ³⁾	12 g
Minimum weight (@ U=1%, 2 sd) ³⁾	800 mg
Minimum weight (according to USP), fine range ³⁾	1.8 g
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	120 mg
Settling time	2 s
Dimensions	
Balance dimensions (WxDxH)	198x257x276 mm
Weighing pan dimensions	127x127 mm (WxD)
Typical uncertainties and supplementary data	
Repeatability	sd 4mg+0.00002%-Rgr
Repeatability, fine range	sd 0.6mg+0.00002%-Rgr
Differential linearity deviation	sd $\sqrt{(50\text{pg}\cdot\text{Rnt})}$
Differential eccentric load deviation	sd 0.000015%-Rnt
Sensitivity offset	sd 0.0001%-Rnt
Minimum weight (according to USP) ³⁾	12g+0.06%-Rgr
Minimum weight (according to USP), fine range ³⁾	1.8g+0.06%-Rgr
Minimum weight (@ U=1%, 2 sd) ³⁾	800mg+0.004%-Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	120mg+0.004%-Rgr
Interface update rate	23 /s
Usable height of draft shield	175 mm
Weight of balance	6.8 kg
Number of built-in reference weights ²⁾	1

Rgr = gross weight
 Rnt = net weight (sample weight)
 sd = Standard deviation
 a = Year (annum)

- 1) In the temperature range 10...30 °C
- 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
- 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers

4.2.3 Weighing platform with readability of 10 mg, "S" platform with draft shield element

	X1202S	X2002S	X4002S	X6002S	X6002SDR
Limit values					
Maximum capacity	1210 g	2.1 kg	4.1 kg	6.1 kg	6.1 kg
Readability	10 mg	10 mg	10 mg	10 mg	100 mg
Maximum capacity, fine range	—	—	—	—	1.2 kg
Readability, fine range	—	—	—	—	10 mg
Taring range (from..to)	0 .. 1210 g	0 .. 2.1 kg	0 .. 4.1 kg	0 .. 6.1 kg	0 .. 6.1 kg
Repeatability (at nominal load)	sd 8 mg	8 mg	8 mg	8 mg	60 mg
Repeatability, fine range (at nominal load)	sd —	—	—	—	8 mg
Linearity deviation	20 mg	20 mg	20 mg	20 mg	60 mg
Eccentricity deviation (test load)	20 mg (500 g)	30 mg (1 kg)	30 mg (2 kg)	30 mg (2 kg)	100 mg (2 kg)
Sensitivity offset (test load)	60 mg (1200 g)	50 mg (2 kg)	60 mg (4 kg)	60 mg (6 kg)	150 mg (6 kg)
Sensitivity temperature drift ¹⁾	0.0003 %/°C	0.0003 %/°C	0.0003 %/°C	0.0003 %/°C	0.0003 %/°C
Sensitivity stability	0.0025 %/a	0.0025 %/a	0.0015 %/a	0.0015 %/a	0.0015 %/a
Typical values					
Repeatability	sd 4 mg	4 mg	4 mg	4 mg	40 mg
Repeatability, fine range	sd —	—	—	—	5 mg
Linearity deviation	7 mg	7 mg	7 mg	7 mg	7 mg
Eccentricity deviation (test load)	3 mg (500 g)	3 mg (1 kg)	8 mg (2 kg)	8 mg (2 kg)	8 mg (2 kg)
Sensitivity offset (test load)	24 mg (1200 g)	32 mg (2 kg)	32 mg (4 kg)	30 mg (6 kg)	30 mg (6 kg)
Minimum weight (according to USP) ³⁾	12 g	12 g	12 g	12 g	120 g
Minimum weight (@ U=1%, 2 sd) ³⁾	800 mg	800 mg	800 mg	800 mg	8 g
Minimum weight (according to USP), fine range ³⁾	—	—	—	—	15 g
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	—	—	1 g
Settling time	1.2 s	1.2 s	1.2 s	1.2 s	1.2 s
Dimensions					
Balance dimensions (WxDxH)	194x257x96 mm	194x257x96 mm	194x257x96 mm	194x257x96 mm	194x257x96 mm
Weighing pan dimensions	170x205 mm (WxD)	170x205 mm (WxD)	170x205 mm (WxD)	170x205 mm (WxD)	170x205 mm (WxD)
Typical uncertainties and supplementary data					
Repeatability	sd 4mg+0.00015%-Rgr	4mg+0.0001%-Rgr	4mg+0.00005%-Rgr	4mg+0.00003%-Rgr	40mg+0.00015%-Rgr
Repeatability, fine range	sd —	—	—	—	5mg
Differential linearity deviation	sd $\sqrt{(10ng \cdot Rnt)}$	$\sqrt{(6ng \cdot Rnt)}$	$\sqrt{(3ng \cdot Rnt)}$	$\sqrt{(2ng \cdot Rnt)}$	$\sqrt{(2ng \cdot Rnt)}$
Differential eccentric load deviation	sd 0.0003%-Rnt	0.00015%-Rnt	0.0002%-Rnt	0.0002%-Rnt	0.0002%-Rnt
Sensitivity offset	sd 0.001%-Rnt	0.0008%-Rnt	0.0004%-Rnt	0.00025%-Rnt	0.00025%-Rnt
Minimum weight (according to USP) ³⁾	12g+0.45%-Rgr	12g+0.3%-Rgr	12g+0.15%-Rgr	12g+0.09%-Rgr	120g+0.45%-Rgr
Minimum weight (according to USP), fine range ³⁾	—	—	—	—	15g
Minimum weight (@ U=1%, 2 sd) ³⁾	800mg+0.03%-Rgr	800mg+0.02%-Rgr	800mg+0.01%-Rgr	800mg+0.006%-Rgr	8g+0.03%-Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	—	—	1g
Interface update rate	23 /s	23 /s	23 /s	23 /s	23 /s
Usable height of draft shield	—	—	—	—	—
Weight of balance	5.4 kg	5.8 kg	5.4 kg	5.4 kg	5.4 kg
Number of built-in reference weights ²⁾	1	1	1	1	1

Rgr = gross weight
Rnt = net weight (sample weight)
sd = Standard deviation
a = Year (annum)

- 1) In the temperature range 10...30 °C
- 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
- 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers

		X8002S	X10002S	X10002SDR
Limit values				
Maximum capacity		8.1 kg	10.1 kg	10.1 kg
Readability		10 mg	10 mg	100 mg
Maximum capacity, fine range		—	—	2 kg
Readability, fine range		—	—	10 mg
Taring range (from..to)		0 .. 8.1 kg	0 .. 10.1 kg	0 .. 10.1 kg
Repeatability (at nominal load)	sd	8 mg	8 mg	60 mg
Repeatability, fine range (at nominal load)	sd	—	—	8 mg
Linearity deviation		20 mg	20 mg	50 mg
Eccentricity deviation (test load)		40 mg (5 kg)	40 mg (5 kg)	100 mg (5 kg)
Sensitivity offset (test load)		60 mg (8 kg)	50 mg (10 kg)	100 mg (10 kg)
Sensitivity temperature drift ¹⁾		0.00025 %/°C	0.00025 %/°C	0.00025 %/°C
Sensitivity stability		0.0015 %/a	0.0015 %/a	0.0015 %/a
Typical values				
Repeatability	sd	4 mg	4 mg	40 mg
Repeatability, fine range	sd	—	—	5 mg
Linearity deviation		7 mg	6.5 mg	4 mg
Eccentricity deviation (test load)		10 mg (5 kg)	10 mg (5 kg)	10 mg (5 kg)
Sensitivity offset (test load)		32 mg (8 kg)	30 mg (10 kg)	30 mg (10 kg)
Minimum weight (according to USP) ³⁾		12 g	12 g	120 g
Minimum weight (@ U=1%, 2 sd) ³⁾		800 mg	800 mg	8 g
Minimum weight (according to USP), fine range ³⁾		—	—	15 g
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		—	—	1 g
Settling time		1.5 s	1.5 s	1.5 s
Dimensions				
Balance dimensions (WxDxH)		194x257x96 mm	194x257x96 mm	194x257x96 mm
Weighing pan dimensions		170x205 mm (WxD)	170x205 mm (WxD)	170x205 mm (WxD)
Typical uncertainties and supplementary data				
Repeatability	sd	4mg+0.000025%·Rgr	4mg+0.00002%·Rgr	40mg+0.0001%·Rgr
Repeatability, fine range	sd	—	—	5mg
Differential linearity deviation	sd	√(1.5ng·Rnt)	√(1ng·Rnt)	√(400pg·Rnt)
Differential eccentric load deviation	sd	0.0001%·Rnt	0.0001%·Rnt	0.0001%·Rnt
Sensitivity offset	sd	0.0002%·Rnt	0.00015%·Rnt	0.00015%·Rnt
Minimum weight (according to USP) ³⁾		12g+0.075%·Rgr	12g+0.06%·Rgr	120g+0.3%·Rgr
Minimum weight (according to USP), fine range ³⁾		—	—	15g
Minimum weight (@ U=1%, 2 sd) ³⁾		800mg+0.005%·Rgr	800mg+0.004%·Rgr	8g+0.02%·Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		—	—	1g
Interface update rate		23 /s	23 /s	23 /s
Usable height of draft shield		—	—	—
Weight of balance		5.4 kg	5.4 kg	5.4 kg
Number of built-in reference weights ²⁾		1	1	1

Rgr = gross weight
Rnt = net weight (sample weight)
sd = Standard deviation
a = Year (annum)

- 1) In the temperature range 10...30 °C
- 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
- 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers

4.2.4 Weighing platform with readability of 0.1 g, "S" platform

		X4001S	X6001S	X8001S	X10001S
Limit values					
Maximum capacity		4.1 kg	6.1 kg	8.1 kg	10.1 kg
Readability		100 mg	100 mg	100 mg	100 mg
Maximum capacity, fine range		—	—	—	—
Readability, fine range		—	—	—	—
Taring range (from..to)		0 .. 4.1 kg	0 .. 6.1 kg	0 .. 8.1 kg	0 .. 10.1 kg
Repeatability (at nominal load)	sd	80 mg	80 mg	80 mg	80 mg
Repeatability, fine range (at nominal load)	sd	—	—	—	—
Linearity deviation		60 mg	60 mg	100 mg	100 mg
Eccentricity deviation (test load)		200 mg (2 kg)	200 mg (2 kg)	200 mg (5 kg)	200 mg (5 kg)
Sensitivity offset (test load)		240 mg (4 kg)	240 mg (6 kg)	600 mg (8 kg)	500 mg (10 kg)
Sensitivity temperature drift ¹⁾		0.0015 %/°C	0.0015 %/°C	0.0015 %/°C	0.0015 %/°C
Sensitivity stability		0.005 %/a	0.005 %/a	0.005 %/a	0.005 %/a
Typical values					
Repeatability	sd	40 mg	40 mg	40 mg	40 mg
Repeatability, fine range	sd	—	—	—	—
Linearity deviation		20 mg	19 mg	34 mg	34 mg
Eccentricity deviation (test load)		32 mg (2 kg)	32 mg (2 kg)	30 mg (5 kg)	30 mg (5 kg)
Sensitivity offset (test load)		160 mg (4 kg)	140 mg (6 kg)	320 mg (8 kg)	300 mg (10 kg)
Minimum weight (according to USP) ³⁾		120 g	120 g	120 g	120 g
Minimum weight (@ U=1%, 2 sd) ³⁾		8 g	8 g	8 g	8 g
Minimum weight (according to USP), fine range ³⁾		—	—	—	—
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		—	—	—	—
Settling time		0.8 s	0.8 s	1 s	1 s
Dimensions					
Balance dimensions (WxDxH)		194x257x96 mm	194x257x96 mm	194x257x96 mm	194x257x96 mm
Weighing pan dimensions		190x223 mm (WxD)	190x223 mm (WxD)	190x223 mm (WxD)	190x223 mm (WxD)
Typical uncertainties and supplementary data					
Repeatability	sd	40mg+0.0005%-Rgr	40mg+0.0003%-Rgr	40mg+0.00025%-Rgr	40mg+0.0002%-Rgr
Repeatability, fine range	sd	—	—	—	—
Differential linearity deviation	sd	√(25ng·Rnt)	√(15ng·Rnt)	√(35ng·Rnt)	√(30ng·Rnt)
Differential eccentric load deviation	sd	0.0008%·Rnt	0.0008%·Rnt	0.0003%·Rnt	0.0003%·Rnt
Sensitivity offset	sd	0.002%·Rnt	0.0012%·Rnt	0.002%·Rnt	0.0015%·Rnt
Minimum weight (according to USP) ³⁾		120g+1.5%·Rgr	120g+0.9%·Rgr	120g+0.75%·Rgr	120g+0.6%·Rgr
Minimum weight (according to USP), fine range ³⁾		—	—	—	—
Minimum weight (@ U=1%, 2 sd) ³⁾		8g+0.1%·Rgr	8g+0.06%·Rgr	8g+0.05%·Rgr	8g+0.04%·Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		—	—	—	—
Interface update rate		23 /s	23 /s	23 /s	23 /s
Usable height of draft shield		—	—	—	—
Weight of balance		5.4 kg	5.4 kg	5.4 kg	5.4 kg
Number of built-in reference weights ²⁾		1	1	1	1

Rgr = gross weight
Rnt = net weight (sample weight)
sd = Standard deviation
a = Year (annum)

- 1) In the temperature range 10...30 °C
- 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
- 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers

4.2.5 Weighing platform with readability of 10 mg / 0.1 g / 1 g, "M" platform

		X12002MDR	X8001M	X12001M	X12000M*	X20001M
Limit values						
Maximum capacity		12.1 kg	8.1 kg	12.1 kg	12.1 kg	20.1 kg
Readability		100 mg	100 mg	100 mg	1000 mg	100 mg
Maximum capacity, fine range		2.4 kg	—	—	—	—
Readability, fine range		10 mg	—	—	—	—
Taring range (from..to)		0 .. 12.1 kg	0 .. 8.1 kg	0 .. 12.1 kg	0 .. 12.1 kg	0 .. 20.1 kg
Repeatability (at nominal load)	sd	60 mg	80 mg	80 mg	600 mg	80 mg
Repeatability, fine range (at nominal load)	sd	10 mg	—	—	—	—
Linearity deviation		60 mg	100 mg	100 mg	600 mg	200 mg
Eccentricity deviation (test load)		100 mg (5 kg)	200 mg (5 kg)	200 mg (5 kg)	1000 mg (5 kg)	200 mg (10 kg)
Sensitivity offset (test load)		96 mg (12 kg)	600 mg (8 kg)	600 mg (12 kg)	600 mg (12 kg)	800 mg (20 kg)
Sensitivity temperature drift ¹⁾		0.00025 %/°C	0.0015 %/°C	0.0015 %/°C	0.0015 %/°C	0.0015 %/°C
Sensitivity stability		0.0015 %/a	0.005 %/a	0.005 %/a	0.005 %/a	0.005 %/a
Typical values						
Repeatability	sd	40 mg	40 mg	40 mg	400 mg	40 mg
Repeatability, fine range	sd	6 mg	—	—	—	—
Linearity deviation		7 mg	36 mg	34 mg	34 mg	130 mg
Eccentricity deviation (test load)		10 mg (5 kg)	30 mg (5 kg)	30 mg (5 kg)	30 mg (5 kg)	120 mg (10 kg)
Sensitivity offset (test load)		60 mg (12 kg)	320 mg (8 kg)	290 mg (12 kg)	290 mg (12 kg)	240 mg (20 kg)
Minimum weight (according to USP) ³⁾		120 g	120 g	120 g	1200 g	120 g
Minimum weight (@ U=1%, 2 sd) ³⁾		8 g	8 g	8 g	80 g	8 g
Minimum weight (according to USP), fine range ³⁾		18 g	—	—	—	—
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		1.2 g	—	—	—	—
Settling time		1.8 s	1.2 s	1.2 s	1 s	1.2 s
Dimensions						
Balance dimensions (WxDxH)		240x278x110 mm	240x278x110 mm	240x278x110 mm	240x278x110 mm	—
Weighing pan dimensions		237x237 mm (WxD)	237x237 mm (WxD)	237x237 mm (WxD)	237x237 mm (WxD)	237x237 mm (WxD)
Typical uncertainties and supplementary data						
Repeatability	sd	40mg+0.00008%·Rgr	40mg+0.00025%·Rgr	40mg+0.00015%·Rgr	400mg+0.0008%·Rgr	40mg+0.0001%·Rgr
Repeatability, fine range	sd	6mg+0.00008%·Rgr	—	—	—	—
Differential linearity deviation	sd	$\sqrt{(1\text{ng} \cdot \text{Rnt})}$	$\sqrt{(40\text{ng} \cdot \text{Rnt})}$	$\sqrt{(25\text{ng} \cdot \text{Rnt})}$	$\sqrt{(25\text{ng} \cdot \text{Rnt})}$	$\sqrt{(200\text{ng} \cdot \text{Rnt})}$
Differential eccentric load deviation	sd	0.0001%·Rnt	0.0003%·Rnt	0.0003%·Rnt	0.0003%·Rnt	0.0006%·Rnt
Sensitivity offset	sd	0.00025%·Rnt	0.002%·Rnt	0.0012%·Rnt	0.0012%·Rnt	0.0006%·Rnt
Minimum weight (according to USP) ³⁾		120g+0.24%·Rgr	120g+0.75%·Rgr	120g+0.45%·Rgr	1200g+2.4%·Rgr	120g+0.3%·Rgr
Minimum weight (according to USP), fine range ³⁾		18g+0.24%·Rgr	—	—	—	—
Minimum weight (@ U=1%, 2 sd) ³⁾		8g+0.016%·Rgr	8g+0.05%·Rgr	8g+0.03%·Rgr	80g+0.16%·Rgr	8g+0.02%·Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		1.2g+0.016%·Rgr	—	—	—	—
Interface update rate		23 /s	23 /s	23 /s	23 /s	23 /s
Usable height of draft shield		—	—	—	—	—
Weight of balance		6.9 kg	6.9 kg	6.9 kg	6.9 kg	9.5 kg
Number of built-in reference weights ²⁾		1	1	1	1	2

Rgr = gross weight
 Rnt = net weight (sample weight)
 sd = Standard deviation
 a = Year (annum)

- 1) In the temperature range 10...30 °C
 - 2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
 - 3) The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers
- * no certified models available

The precision balances with "M" platform are no longer available.

X20000M*		
Limit values		
Maximum capacity		20.1 kg
Readability		1 g
Maximum capacity, fine range		—
Readability, fine range		—
Taring range (from..to)		0 .. 20.1 kg
Repeatability (at nominal load)	sd	0.6 g
Repeatability, fine range (at nominal load)	sd	—
Linearity deviation		0.6 g
Eccentricity deviation (test load)		1 g (10 kg)
Sensitivity offset (test load)		0.8 g (20 kg)
Sensitivity temperature drift ¹⁾		0.001 %/°C
Sensitivity stability		0.005 %/a
Typical values		
Repeatability	sd	0.4 g
Repeatability, fine range	sd	—
Linearity deviation		0.4 g
Eccentricity deviation (test load)		0.6 g (10 kg)
Sensitivity offset (test load)		0.24 g (20 kg)
Minimum weight (according to USP) ³⁾		1200 g
Minimum weight (@ U=1%, 2 sd) ³⁾		80 g
Minimum weight (according to USP), fine range ³⁾		—
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		—
Settling time		1 s
Dimensions		
Balance dimensions (WxDxH)		—
Weighing pan dimensions		237x237 mm (WxD)
Typical uncertainties and supplementary data		
Repeatability	sd	0.4g+0.0005%·Rgr
Repeatability, fine range	sd	—
Differential linearity deviation	sd	$\sqrt{(2ug \cdot Rnt)}$
Differential eccentric load deviation	sd	0.003%·Rnt
Sensitivity offset	sd	0.0006%·Rnt
Minimum weight (according to USP) ³⁾		1200g+1.5%·Rgr
Minimum weight (according to USP), fine range ³⁾		—
Minimum weight (@ U=1%, 2 sd) ³⁾		80g+0.1%·Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾		—
Interface update rate		23 /s
Usable height of draft shield		—
Weight of balance		9.5 kg
Number of built-in reference weights ²⁾		2

Rgr = gross weight
Rnt = net weight (sample weight)
sd = Standard deviation
a = Year (annum)

- 1) In the temperature range 10...30 °C
2) The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
3) The minimum weight can be improved by the following measures:
– Selecting suitable weighing parameters
– Choosing a better location
– Using smaller taring containers
* no certified models available

The precision balances with "M" platform are no longer available.

4.2.6 Weighing platform with readability of 0.1 g / 1 g, "L" platform

	X16001L	X32001L	X64001L	X32000L*
Limit values				
Maximum capacity	16.1 kg	32.1 kg	64.1 kg	32.1 kg
Readability	100 mg	100 mg	100 mg	1 g
Maximum capacity, fine range	—	—	—	—
Readability, fine range	—	—	—	—
Taring range (from..to)	0 .. 16.1 kg	0 .. 32.1 kg	0 .. 64.1 kg	0 .. 32.1 kg
Repeatability (at nominal load)	sd 80 mg	80 mg	100 mg	0.6 g
Repeatability, fine range (at nominal load)	sd —	—	—	—
Linearity deviation	200 mg	300 mg	500 mg	0.6 g
Eccentricity deviation (test load)	300 mg (5 kg)	300 mg (10 kg)	500 mg (20 kg)	1 g (10 kg)
Sensitivity offset (test load)	800 mg (16 kg)	960 mg (32 kg)	1280 mg (64 kg)	1.92 g (32 kg)
Sensitivity temperature drift ¹⁾	0.0015 %/°C	0.001 %/°C	0.001 %/°C	0.0015 %/°C
Sensitivity stability	0.005 %/a	0.003 %/a	0.005 %/a	0.005 %/a
Typical values				
Repeatability	sd 40 mg	40 mg	40 mg	0.4 g
Repeatability, fine range	sd —	—	—	—
Linearity deviation	130 mg	200 mg	320 mg	0.4 g
Eccentricity deviation (test load)	200 mg (5 kg)	200 mg (10 kg)	320 mg (20 kg)	0.6 g (10 kg)
Sensitivity offset (test load)	260 mg (16 kg)	320 mg (32 kg)	380 mg (64 kg)	0.65 g (32 kg)
Minimum weight (according to USP) ³⁾	120 g	120 g	120 g	1200 g
Minimum weight (@ U=1%, 2 sd) ³⁾	8 g	8 g	8 g	80 g
Minimum weight (according to USP), fine range ³⁾	—	—	—	—
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	—	—
Settling time	1.5 s	1.5 s	1.8 s	1.2 s
Dimensions				
Balance dimensions (WxDxH)	—	—	—	—
Weighing pan dimensions	360x280 mm (WxD)	360x280 mm (WxD)	362x282 mm (WxD)	360x280 mm (WxD)
Typical uncertainties and supplementary data				
Repeatability	sd 40mg+0.00012%-Rgr	40mg+0.00006%-Rgr	40mg+0.00006%-Rgr	0.4g+0.0003%-Rgr
Repeatability, fine range	sd —	—	—	—
Differential linearity deviation	sd √(250ng·Rnt)	√(300ng·Rnt)	√(400ng·Rnt)	√(1.2ug·Rnt)
Differential eccentric load deviation	sd 0.002%-Rnt	0.001%-Rnt	0.0008%-Rnt	0.003%-Rnt
Sensitivity offset	sd 0.0008%-Rnt	0.0005%-Rnt	0.0003%-Rnt	0.001%-Rnt
Minimum weight (according to USP) ³⁾	120g+0.36%-Rgr	120g+0.18%-Rgr	120g+0.18%-Rgr	1200g+0.9%-Rgr
Minimum weight (according to USP), fine range ³⁾	—	—	—	—
Minimum weight (@ U=1%, 2 sd) ³⁾	8g+0.024%-Rgr	8g+0.012%-Rgr	8g+0.012%-Rgr	80g+0.06%-Rgr
Minimum weight (@ U=1%, 2 sd), fine range ³⁾	—	—	—	—
Interface update rate	23 /s	23 /s	23 /s	23 /s
Usable height of draft shield	—	—	—	—
Weight of balance	12.4 kg	12.4 kg	14.1 kg	12.4 kg
Number of built-in reference weights ²⁾	2	2	2	2

Rgr = gross weight
 Rnt = net weight (sample weight)
 sd = Standard deviation
 a = Year (annum)

- ¹⁾ In the temperature range 10...30 °C
 - ²⁾ The reference weights are made from stainless antimagnetic chrome-nickel steel. The masses of the reference weights are traceable to the prototype kilogram which is the standard unit of mass kept in Paris.
 - ³⁾ The minimum weight can be improved by the following measures:
 - Selecting suitable weighing parameters
 - Choosing a better location
 - Using smaller taring containers
- * no certified models available

4.2.7 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 on.
 - The balance is always started up with the "Factory setting" unit.
- **Switch-on range**
 - A 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.

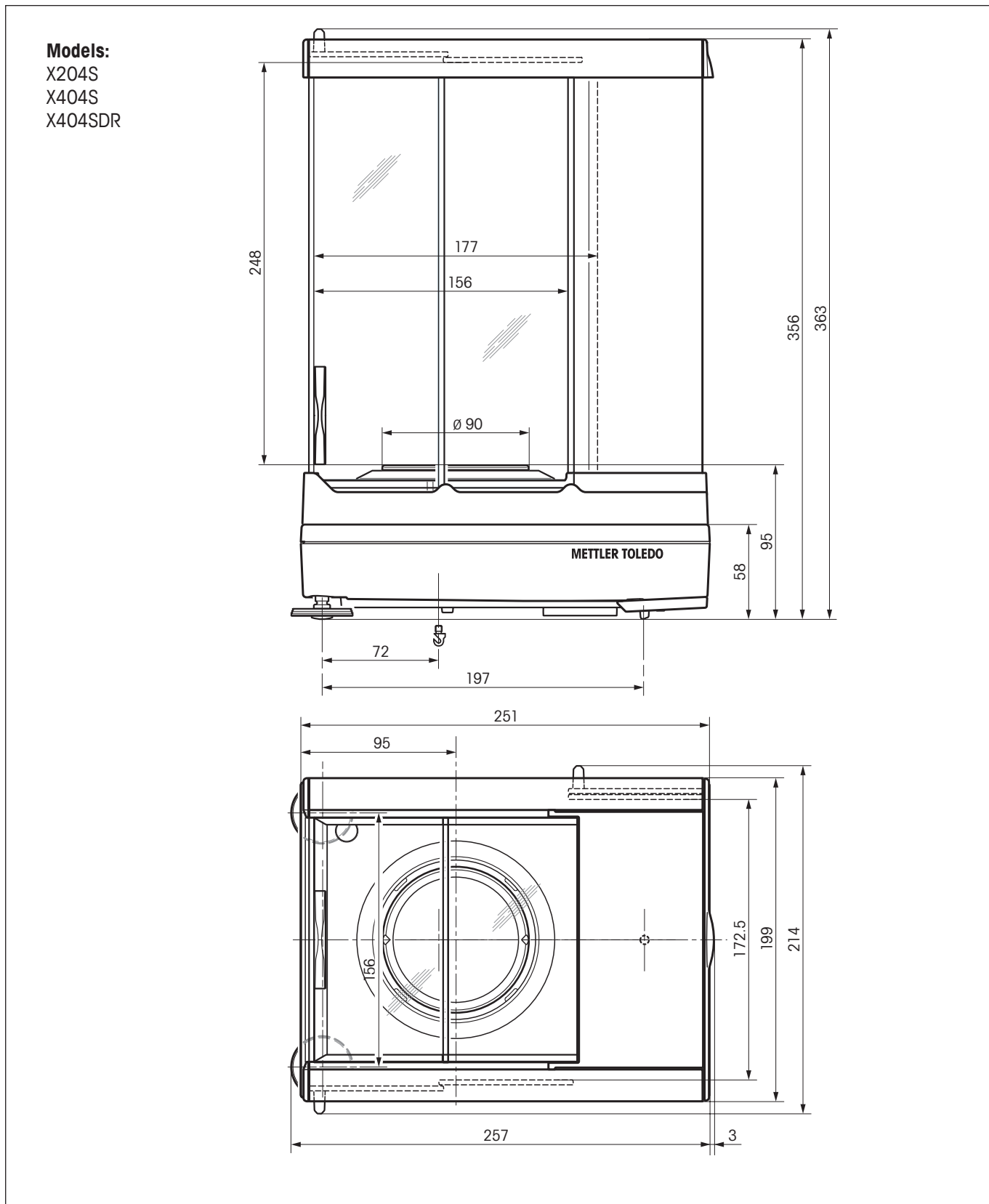
N 80.4[0] g
T 22.5[6] g → for weighed tare
G 102.9[] g

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**

4.3 Dimensions

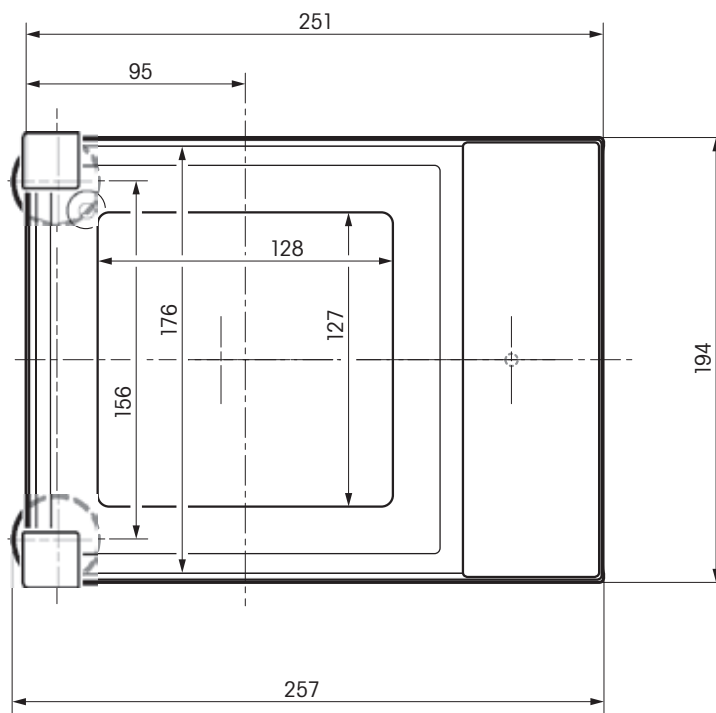
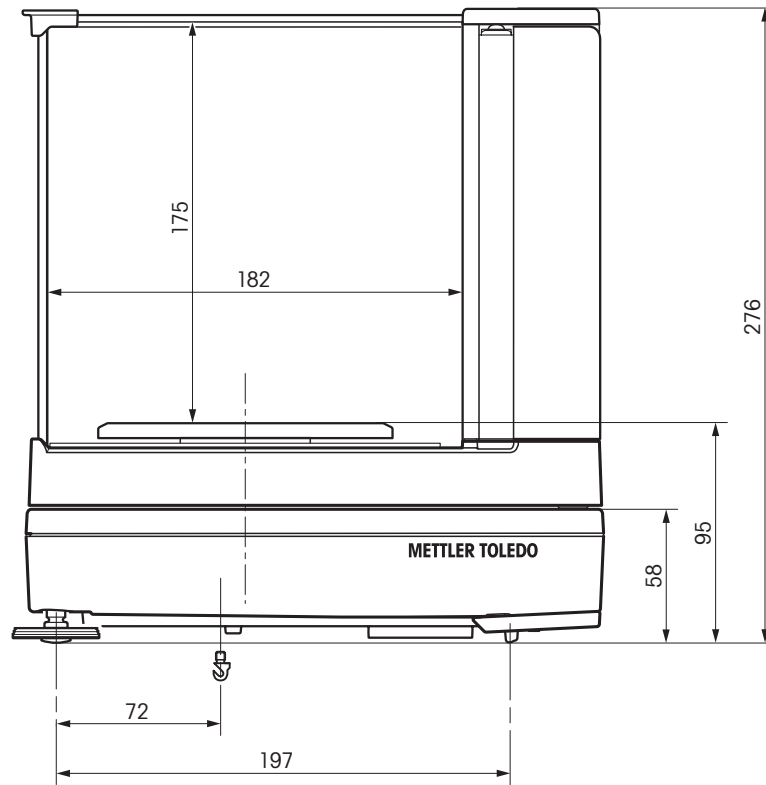
4.3.1 Weighing platforms with readability of 0.1 mg, "S" platform with draft shield "Pro"



4.3.2 Weighing platforms with readability of 1 mg, "S" platform with draft shield "Magic Cube"

Models:

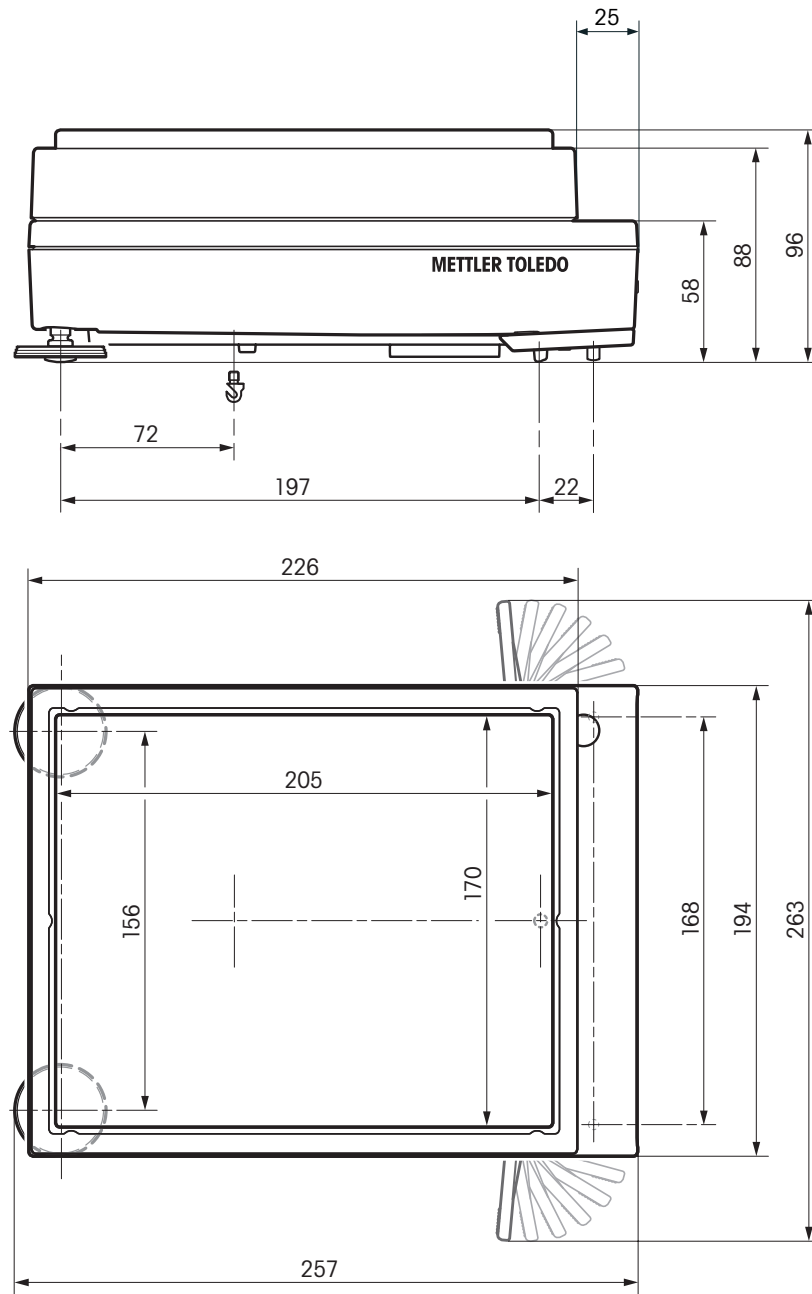
- X203S
- X603S
- X603SDR
- X1203S
- X2003SDR
- X5003SDR



4.3.3 Weighing platforms with readability of 10 mg, "S" platform with draft shield element

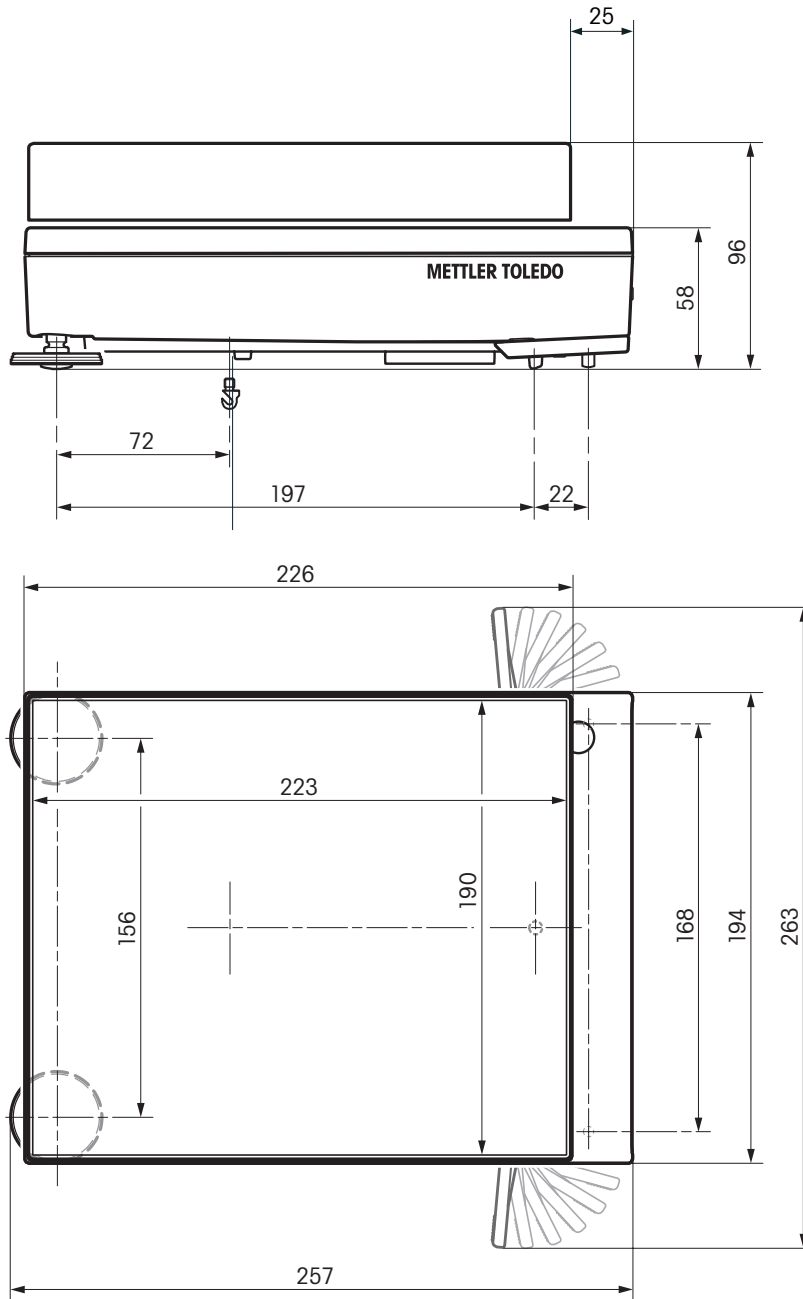
Models:

- X1202S
- X2002S
- X4002S
- X6002S
- X6002SDR
- X8002S
- X10002S
- X10002SDR



4.3.4 Weighing platforms with readability of 0.1 g, "S" platform

Models:
 X4001S
 X6001S
 X8001S
 X10001S



4.3.5 Weighing platforms with readability of 10 mg / 0.1 g / 1 g, "M" platform

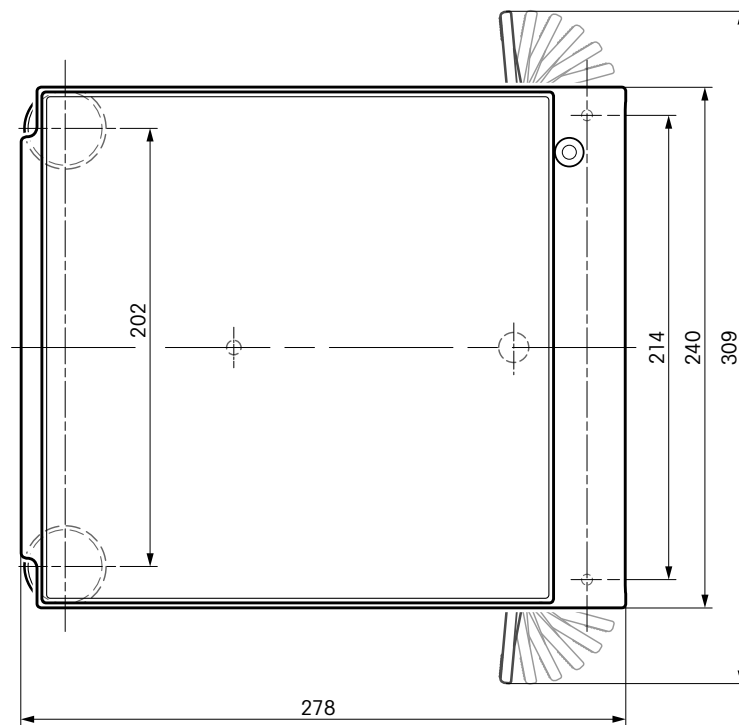
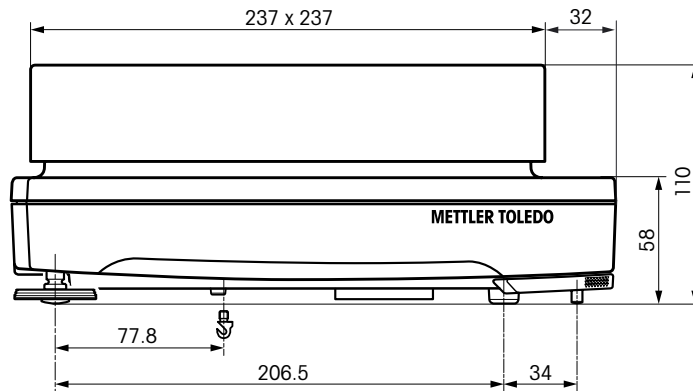
Models:

X12002MDR

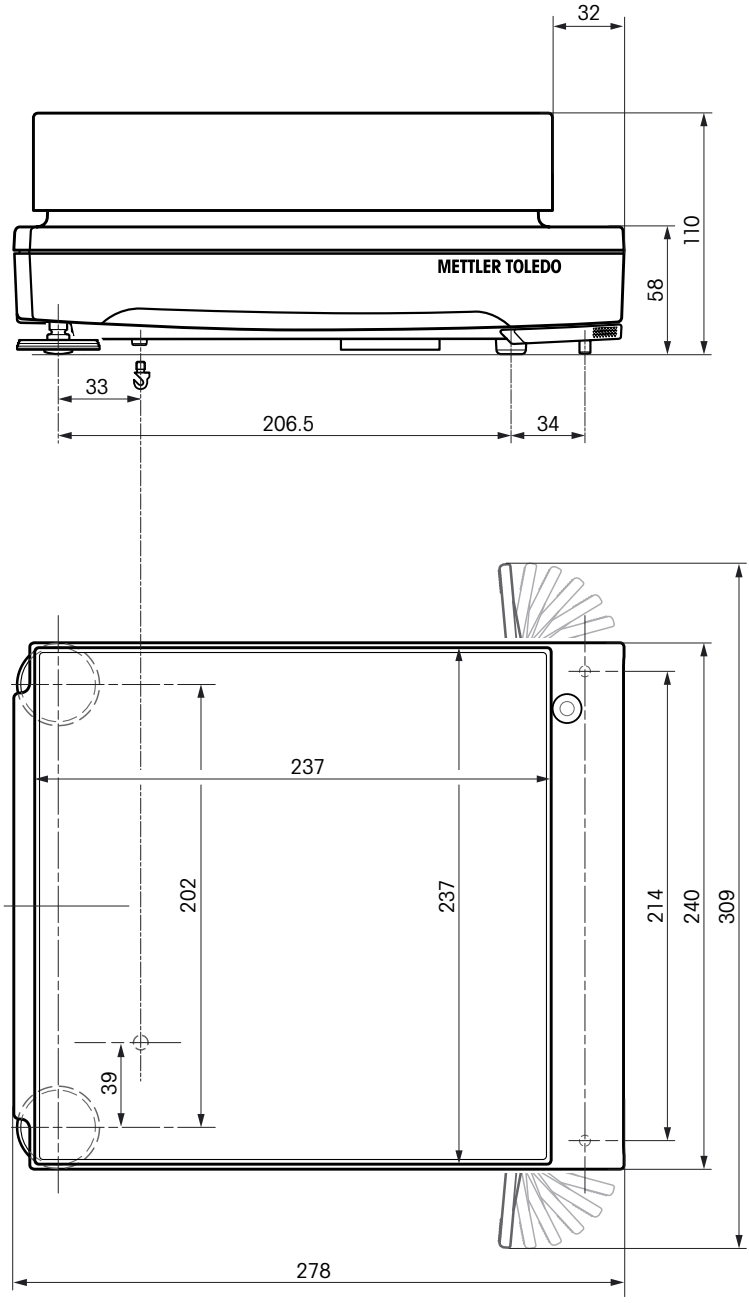
X8001M

X12001M

X12000M

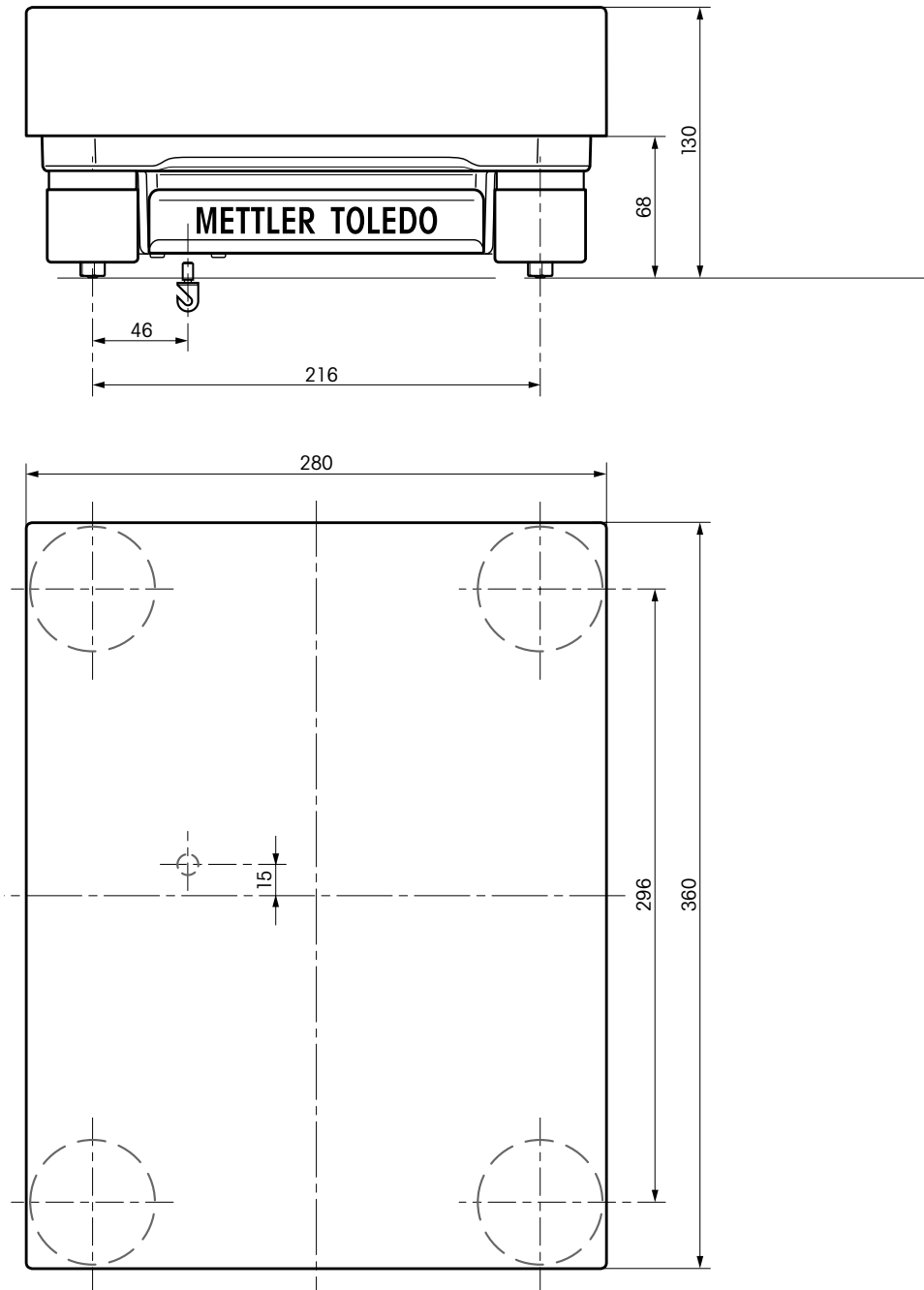


Models:
X20001M
X20000M



4.3.6 Weighing platforms with readability of 0.1 g / 1 g, "L" platform

Models:
 X16001L
 X32001L
 X64001L
 X32000L








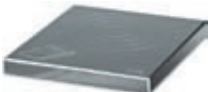






5 Accessories and spare parts

5.1 Accessories

5.1.1 Accessories for all weighing platforms "S", "M" and "L"

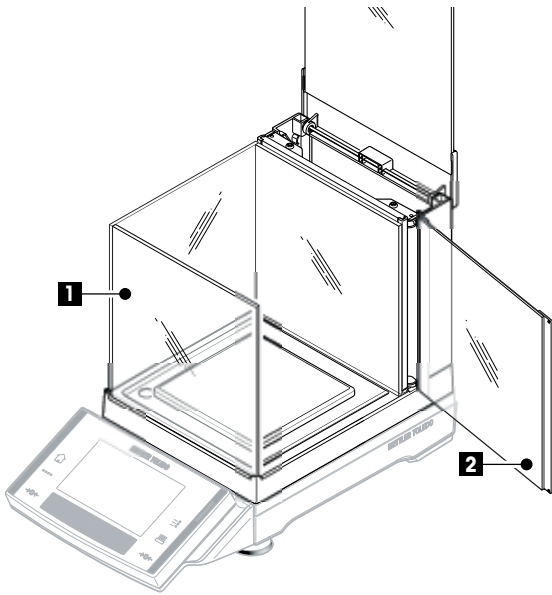
You can increase the functionality of your balance with accessories from the METTLER TOLEDO range. The following options are available:

	Description	Part No.
	Printer LC-P45 application printer with additional functions	00229119
	Optional interfaces RS232C option: Interface for connection of a printer (RS232C), computer or titrator	11132500
	Cables for RS232C Interface RS9 – RS9 (m/f): Connection cable for PC or printer RS232C, length = 1 m RS9 – RS25 (m/f): Connection cable for PC (IBM XT or compatible), length = 2 m USB – RS232 converter cable	11101051 11101052 11103691
	Cable, one-sided open (2-pin) Cable between balance and AC adapter, length = 4 m	11132037
	Anti-theft device Steel cord	11600361
	Software Freeweigh.Net	21900895
	Production certificate Production Certificate "PRO" for XS Balances	11106895

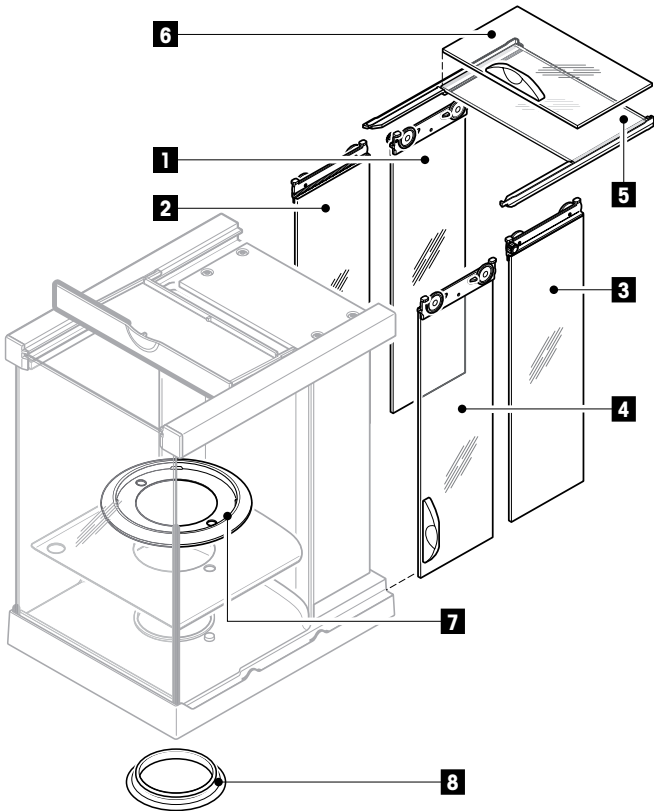
	Description	Part No.	Platform "S"	Platform "M"	Platform "L"
	Weighing pan MPS (Magnetic Protection Shield) weighing pan for 0.1 g models 190 x 223 mm	11132625	X	—	—
	MPS (Magnetic Protection Shield) weighing pan for 10 mg models 170 x 205 mm	11132626	X	—	—
	Weighing pan 190 x 223 mm, incl. pan support	11132655	X	—	—
	Weighing pan 170 x 205 mm, incl. pan support and draft shield element	11132660	X	—	—
	Draft shields "Pro" Draft shield glass free for 1 mg models (food industry), usable height 248 mm	11131652	X	—	—
	"Pro" Draft shield for 1 mg models, usable height 248 mm	11131651	X	—	—
	"Magic Cube" Draft shield for 1 mg models, usable height 175 mm	11131650	X	—	—
	Draft shield 0.1 g* and 10 mg models, usable height 175 mm * for the 0.1 g model the weighing pan set "11132660" must be ordered additionally	11131653	X	—	—
	Draft shield to cover the entire balance "XP-W12" 300 x 450 x 450 mm (W x D x H)	11134430	X	X	—
	Draft shield to cover the entire balance "XP-W64" 550 x 470 x 580 mm (W x D x H)	11134470	—	X	X
	Weighing kit for dynamic weighing Dynamic weighing kit for 0.1 and 10 mg models, 4 litre bowl and contact mat	11132657	X	—	—
	IP54 AC adapter protection IP54 AC adapter protection	11132550	X	X	—
	Hook for weighing below the balance Hook for the hanger (XS16001M, XS16000M models and "L" platform)	11132565	—	X	X
	Protective covers Protective cover for weighing platform "S" 10 mg / 0.1 g models (platform only)	11133034	X	—	—
	Protective cover for weighing platform "M", (platform only)	11132574	—	X	—
	Transport cases Transport case for XS balances, 10 mg and 0.1 g models, "S" platform	11132595	X	—	—

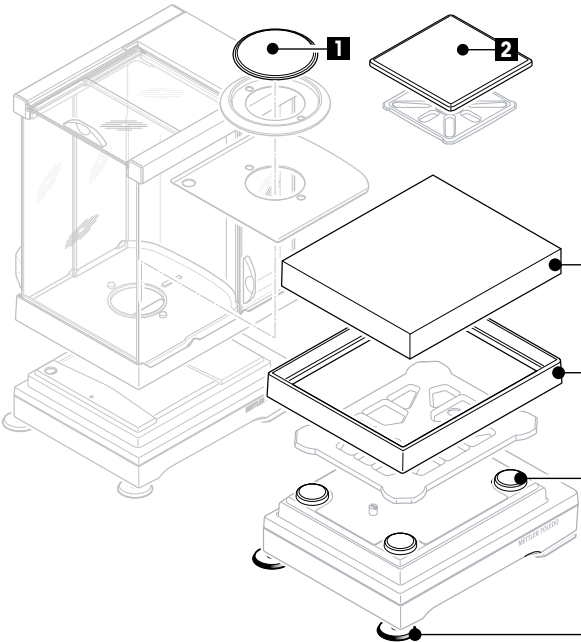
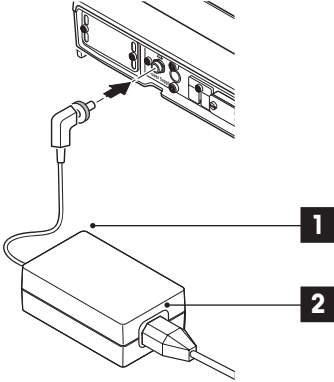
5.2 Spare parts

Pos	Description	Part No.
Draft shield "Magic Cube" weighing platform "S"		
1	U-Glass	11133035
2	Side door	11133037



Draft shield "Pro" weighing platform "S"			
1		Door back left	11133079
2		Door front left	11133080
3		Door back right	11133077
4		Door front right	11133078
5		Door top back	11133081
6		Door top front	11133082
7	0.1 mg	Draft shield element	11131531
8	0.1 mg	Seal draft shield	11131551



Pos	Description	Part No.	
			
Weighing pans			
for weighing platform "S"			
1	1 mg	Weighing pan 127 x 127 mm	11131022
2	10 mg	Weighing pan 170 x 205 mm	11131030
4	10 mg	Draft shield element	11131040
3	0.1 g	Weighing pan 190 x 223 mm	11131031
for weighing platform "M"			
3	Weighing pan 237 x 237 mm		11131173
for weighing platform "L"			
3	≤ 32 kg	Weighing pan 280 x 360 mm	00239105
	64 kg	Weighing pan 280 x 360 mm	11102124
Weighing pan support			
5	≥ 10 mg	for weighing platform "S" and "M"	11131029
5	for weighing platform "L"		00239104
Levelling foot			
6	for weighing platform "S" and "M"		11106323
AC Adapter for weighing platform "S" and "M"			
1	AC Adapter (without power cable)		11107909
2	Power cable CH		00087920
2	Power cable EU (Schuko)		00087925
2	Power cable USA		00088668
2	Power cable IT		00087457
2	Power cable DK		00087452
2	Power cable GB		00089405
2	Power cable AUS		00088751
2	Power cable SA		00089728
			



Pos	Description	Part No.
Transport		
Weighing platform "S", Type XSxx3S (1 mg)		
1	Packaging compl.	11133053
2	Export carton	11132834
Weighing platform "S", Type XSxx2S (10 mg)		
1	Packaging compl.	11133050
2	Export carton	11132839
Weighing platform "S", Type XSxx1S (0.1 g)		
1	Packaging compl.	11133051
2	Export carton	11132839
Weighing platform "M", Type XSxxM		
1	Packaging compl.	11133056
2	Export carton	11132879
Weighing platform "L", Type XSxxxL		
1	Packaging compl.	11133057
2	Export carton	11132912
Draft shield "Magic Cube"		
1	Packaging compl.	11133049
2	Export carton	11132824
Draft shield "Pro"		
1	Packaging compl.	11133054
2	Export carton	11132867

6 Appendix

6.1 Conversion table for weight units

Kilogram	1 kg = 1000.0	g	1 g = 0.001	kg
Milligram	1 mg = 0.001	g	1 g = 1000.0	mg
Microgram	1 µg = 0.000001	g	1 g = 1000000.0	µg
Carat	1 ct = 0.2	g	1 g = 5.0	ct
Pound	1 lb = 453.59237	g	1 g ≈ 0.00220462262184878	lb
Ounce (avdp)	1 oz = 28.349523125	g	1 g ≈ 0.0352739619495804	oz
Ounce (troy)	1 ozt = 31.1034768	g	1 g ≈ 0.0321507465686280	ozt
Grain	1 GN = 0.06479891	g	1 g ≈ 15.4323583529414	GN
Pennyweight	1 dwt = 1.55517384	g	1 g ≈ 0.643014931372560	dwt
Momme	1 mom = 3.75	g	1 g ≈ 0.2666666666666667	mom
Mesghal	1 msg ≈ 4.6083	g	1 g ≈ 0.217	msg
Tael Hong Kong	1 tih = 37.429	g	1 g ≈ 0.0267172513291833	tih
Tael Singapore (Malaysia)	1 tls ≈ 37.7993641666667	g	1 g ≈ 0.0264554714621853	tls
Tael Taiwan	1 ttt = 37.5	g	1 g ≈ 0.0266666666666667	ttt
Tola	1 tola = 11.6638038	g	1 g ≈ 0.0857353241830079	tola
Baht	1 baht = 15.16	g	1 g ≈ 0.0659630606860158	baht

6.2 SOPs - Standard Operating Procedures

In the documentation of a GLP test, the SOPs are a small, but very important part.

Practical experience confirms that SOPs written in-house are followed much better than SOPs written by an external, anonymous source.

You will find below a brief overview of the responsibilities in relation to SOPs, as well as a checklist for creating an SOP.

Responsibilities in relation to SOPs

Head of testing laboratory	Instructs SOPs to be created Approves SOPs with date and signature
Testing supervisor	Ensures that SOPs are available Approves SOPs as deputy to laboratory head
Employees	Follow the SOPs and other guidelines
GLP quality assurance	Checks whether valid SOPs are available Checks whether the SOPs are followed Checks how and when changes are documented

Checklist for creating SOPs

Administrative matters	Yes	No
1. Use of SOP forms		
2. Name of testing laboratory		
3. Date of creation of SOP		
4. Archive reference for SOPs		
5. Page number (1 of n)		
6. Title		
7. Date of release		
8. Modification number		
9. Designation of departments/offices responsible for implementation		
10. Date and signatures: a) Author b) Person checking c) Person authorized to approve		
11. Distribution list		

Contents of the SOP	Yes	No
1. Introduction and objective		
2. Material required		
3. Description of work steps		
4. Description of documentation		
5. Data processing and evaluation		
6. Documents, samples, etc., to be preserved		
7. Archiving information		

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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

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