

**METTLER TOLEDO**

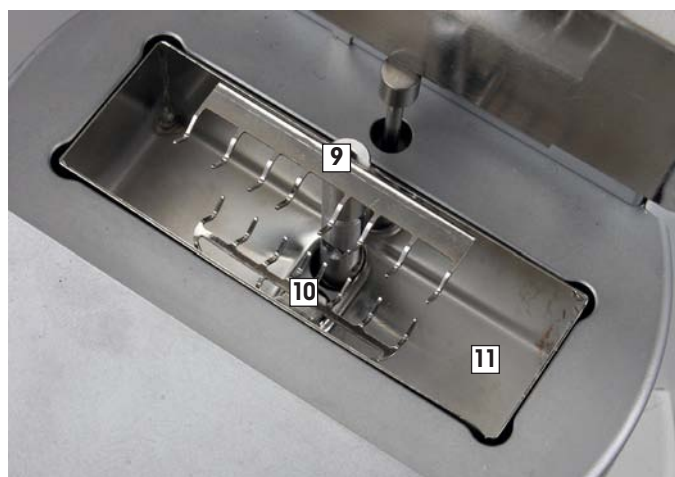
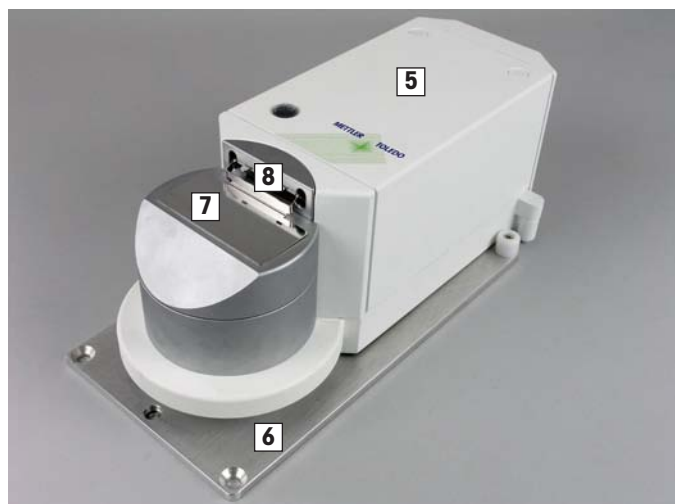
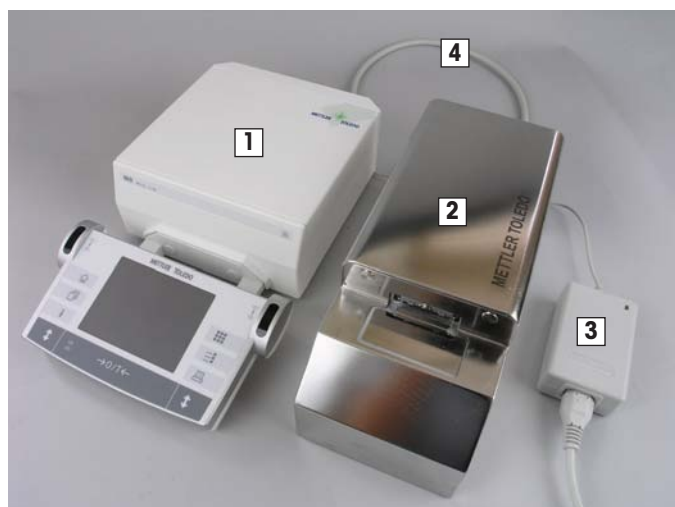
**MX5-S and UMX2-S automated**

**Microbalances for Cylindrical Weighing Samples**

Supplement to the operating instructions for MX and UMX balances



## Overview of MX5-S automated and UMX2-S automated



<b>1</b>	Control unit (for details see operating instructions for AX and MX/UMX balances)
<b>2</b>	Metal protective cover (the weighing cell is under the protective cover)
<b>3</b>	AC adapter with country-specific power cable
<b>4</b>	Connection cable for connecting the control unit and weighing cell
<b>5</b>	Weighing cell
<b>6</b>	Positioning plate
<b>7</b>	Weighing chamber cover
<b>8</b>	Locking rocker for the weighing chamber cover
<b>9</b>	Weighing sample holder
<b>10</b>	Weighing pan
<b>11</b>	Drip tray

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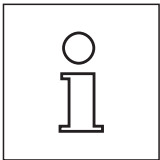
# 1 Introduction

Thank you for choosing the MX5-S automated balance or the UMX2-S automated balance from METTLER TOLEDO. These balances enable the weight of cylindrical weighing samples to be determined precisely. They provide the full range of functions of the MX and UMX balance software.

This chapter contains basic information about your MX5-S/UMX2-S automated balance. Please read this chapter carefully, even if you already have experience with similar systems.

## 1.1 What you should know about these instructions

The MX5-S automated balance and the UMX2-S automated balance have the same structure, but only differ with regard to the maximum capacity and resolution. Both models differ from the corresponding MX5/UMX2 models with regard to the special loading mechanism of the weighing cell for cylindrical weighing samples and the metal protective cover they are supplied with. However, the software and operation of the balance via the terminal is the same. For this reason, the operating instructions for AX and MX/UMX balances are supplied with your balance.

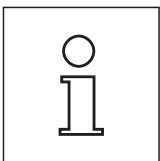


**Use the operating instructions for AX and MX/UMX balances as a basis for operating the MX5-S automated balance or the UMX2-S automated balance.**

This supplement to the operating instructions for the MX5-S automated balance and the UMX2-S automated balance only covers the special features of these balances, which differ from MX/UMX balances. These include:

- The scope of delivery
- Unpacking and packing the balance (shipping lock)
- Setting up the balance
- Installation of the optional ionizer
- Operation of the loading mechanism of the weighing cell
- Control of the loading mechanism of the weighing cell using MT-SCIS commands
- Cleaning and maintenance tasks
- Technical data and accessories

## 1.2 Safety and disposal



**Please observe all safety instructions in Chapter 1 of the operating instructions for AX and MX/UMX balances, they also apply to the MX5-S automated balance and the UMX2-S automated balance.**



**Please observe the following instructions on disposal:**

In accordance with the requirements of the European directive 2002/96/EC on old electrical and electronic appliances (WEEE), this device must not be disposed of as household refuse.

This also applies equally for countries outside of the EU in accordance with their applicable national regulations.

Please dispose of this product in accordance with the local regulations in a separate container for electrical and electronic devices.

If you have questions regarding this, please contact your responsible authority or the dealer from which you purchased the device.

If you pass the device on to a third-party (e.g. for private or commercial/industrial use), then this regulation must also be passed on accordingly.

Thank you for contributing to the care of the environment.

## 2 Unpacking and setting up the balance

This chapter provides information about unpacking and setting up your balance. This information is limited to the special features of MX5-S/UMX2-S automated balances, therefore please note the cross-references to the operating instructions for AX and MX/UMX balances.

### 2.1 Unpacking the balance

Carefully unpack your balance. Note: The packaging of MX5-S/UMX2-S automated balances differs from that of MX/UMX balances.

### 2.2 Checking the scope of delivery

Please check that the following items have been provided (please also refer to the illustrations in the device overview at the beginning of these instructions):

- Control unit with terminal installed
- Fully assembled weighing cell (drip tray, weighing pan, weighing sample holder, weighing chamber cover)
- Metal protective cover
- Positioning plate (without assembly material)
- AC adapter with country-specific power cable
- Connection cable for connecting the control unit and weighing cell
- Protective cover for the terminal
- Cleaning brush
- Cleaning tweezers
- Weighing tweezers
- Special tool for inserting and removing the weighing pan and the weighing sample holder
- 1 weighing sample holder and 1 weighing pan as spare parts
- Production certificates
- CE declaration of conformity
- Supplementary operating instructions for MX5S automated and UMX2-S automated (this document)
- Operating instructions for AX and MX/UMX balances

### 2.3 Selecting a location

Select a suitable location for the balance. Please observe the instructions in the operating instructions for AX and MX/UMX balances.

## 2.4 Assembly of the balance and connection to the power supply

Use the supplied connection cable to connect together the control unit and the weighing cell.



**Positioning plate** of the weighing cell in the desired location and secure (with screws or by gluing). The foot of the weighing cell should be in the hole (A).



**Weighing cell** in the positioning plate. Make sure that the front foot of the weighing cell is in the circular hole. The weighing cell must sit firmly between the two white plastic bushings (B). For precise positioning, unfasten the fixing screws of the plastic bushings, move both bushings towards the weighing cell and tighten the screws again.

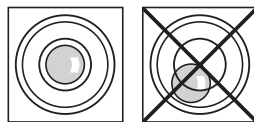


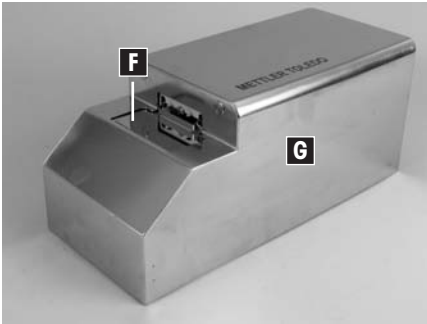
**Remove the shipping lock:** Tilt the locking rocker (C) of the weighing chamber cover to the right and remove the weighing chamber cover by pulling it forwards. Carefully remove the shipping lock (foam pad with adhesive tape), then replace the weighing chamber cover and lock.

Note: The shipping lock protects the weighing cell and ensures that the weighing pan and the weighing sample holder remain fixed in the desired position. Therefore retain the shipping lock for future transport of the weighing cell.

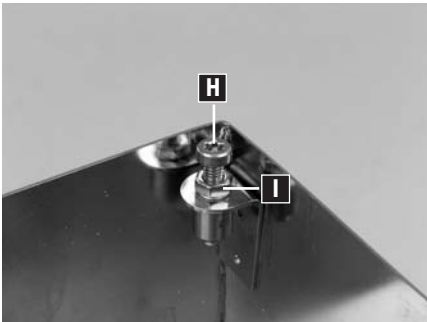


**Level the weighing cell:** Turn the two leveling screws (D) at the back of the housing until the air bubble is in the center of the level indicator (E).





Make sure that the weighing chamber cover (F) is closed, then place the **protective cover** (G) over the weighing cell.



**Adjust the protective cover vertically:** There are 4 screws (H) with lock nuts (I) on the inside of the protective cover. Adjust and secure these screws so that:

- The protective cover is totally horizontal and does not rock.
- There is a vertical air gap the thickness of a standard sheet of writing paper between the protective cover and the weighing chamber cover. This ensures that the protective cover does not rest on the weighing cell and that the weighing cell can perform its function (draft shield, protection against contact and protection against heat radiation from the operator).

**Place the terminal in position and set the reading angle** according to Chapter 2.6 of the operating instructions for AX and MX/UMX balances.

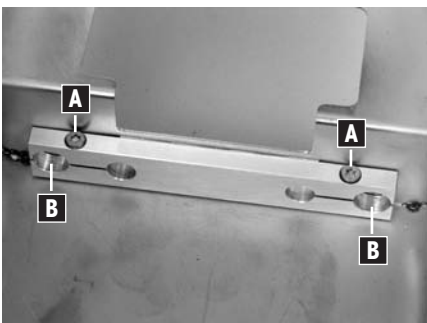
**Power supply:** Connect the control unit to the power supply (for details see operating instructions for AX and MX/UMX balances). Following connection to the power supply, the balance starts automatically and is then ready to operate.

## 2.5 Installation of the optical ionizer

This chapter must only be read if you have ordered the optional ionizer (for ordering information, see Chapter 5). The optional ionizer eliminates the static charge from weighing samples. The ionizer consists of a power supply unit (transformer for generating the high voltage, available for various power supply voltages) and two electrodes with high-voltage cable. These items must be ordered separately. For installation and operation of the ionizer, please also observe all the information provided in the instructions supplied with the device.

Install the ionizer as follows:

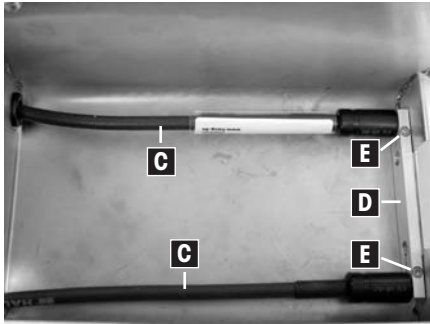
Make sure that the **weighing chamber cover is closed**, then remove the **protective cover** of the weighing cell.



Loosen the two screws (A) of the fastening strip inside the protective cover.

Remove the two plugs in the openings (B) by withdrawing them towards the front.

Insert the electrode cable (C) through the two holes at the back into the protective cover.



Insert the electrodes as far as they will go into the fastening strip (D) and tighten the two screws (E).

Place the protective cover over the weighing cell.

Connect the electrodes to the power supply unit and the power supply unit to the power supply (see instructions for the power supply unit).

## 2.6 Instructions for transporting the balance

When transporting your balance, please observe the corresponding instructions in Chapter 2.7 of the operating instructions for AX and MX/UMX balances.

When transporting the balance make sure that the **weighing sample holder is in the weighing position** (lowest position, see Chapter 3). Then insert the **shipping lock** (foam pad) in the weighing chamber and close the weighing chamber cover. The shipping lock protects the weighing cell and ensures that the items in the weighing chamber (weighing pan and weighing sample holder) remain fixed in the desired position. Secure the weighing chamber cover with a piece of adhesive tape.

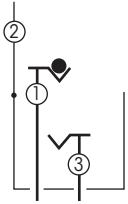
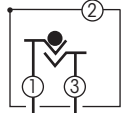
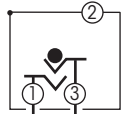


### 3 Loading mechanism of the weighing cell

The loading mechanism of the weighing cell for your MX5-S/UMX2-S automated balance has been specially developed for use in automated environments. The loading mechanism is controlled by a host computer using MT-SICS commands and loading is carried out automatically (e.g. using a robot). However, the loading mechanism can also be controlled manually using the «↕» door keys on the terminal. This chapter provides basic information about the loading mechanism and manual and automatic control.

#### 3.1 Operating principle of the loading mechanism

The loading mechanism consists of the weighing chamber cover and the weighing sample holder. Both are moving parts, while the weighing pan remains in its position. The weighing sample holder recognizes 3 positions (see diagram):

	<p><b>Loading position:</b></p> <p>The weighing sample holder (1) is in its <b>top</b> position, the weighing chamber cover (2) is open. The weighing sample is loaded in this position.</p>
	<p><b>Zero position:</b></p> <p>The weighing sample holder (1) is in the <b>middle</b> position. The weighing sample has not yet been placed on the weighing pan (3). The weighing chamber cover (2) is closed and thus ensures that the ambient conditions are stable so that the zero point can be determined.</p>
	<p><b>Weighing position:</b></p> <p>The weighing sample holder (1) is in the <b>bottom</b> position, the weighing chamber cover (2) is closed. The weighing sample is on the weighing pan (3) and the weight can be determined.</p>

#### 3.2 Controlling the loading mechanism via the terminal

The loading mechanism can be controlled using the «↕» door keys on the terminal (or via the "SmartSens" sensors). Control is as follows:

Starting position of the weighing sample holder	Left «↕» moves weighing sample holder to the following position	Right «↕» door key moves weighing sample holder to the following position
Loading position	Zero position	Zero position
Zero position	Loading position	Weighing position
Weighing position	Zero position	Zero position

In order to familiarize yourself with the operating principle of key control, you can remove the weighing chamber cover (tilt locking rocker and remove cover by pulling it forwards) and then observe the movement of the weighing sample holder after pressing the relevant keys.

### 3.3 Controlling the loading mechanism using MT-SICS commands

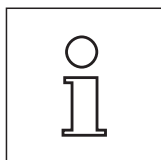
The "WS" MT-SICS command can be used to directly control each position of the weighing sample holder. Note: For standard MX/UMX balances the "WS" command is used to control the glass draft shield (see "MT-SICS for AX/MX/UMX balances 11780417" reference manual). For MX5/UMX2 automated balances the parameters of the command have a different function:

Command	Response (confirmation of command execution)	Weighing sample moving to the following position
WS $\downarrow$ 1	WS $\downarrow$ A	Loading position
WS $\downarrow$ 0	WS $\downarrow$ A	Zero position
WS $\downarrow$ 2	WS $\downarrow$ A	Weighing position

The "WS" command (without parameters) can be used to request the **current position of the weighing sample**.

The response is "WS $\downarrow$ A $\downarrow$ x" where "x" represents one of the following values:

- 0 Zero position
- 1 Loading position
- 2 Weighing position
- 8 Error
- 9 Intermediate position

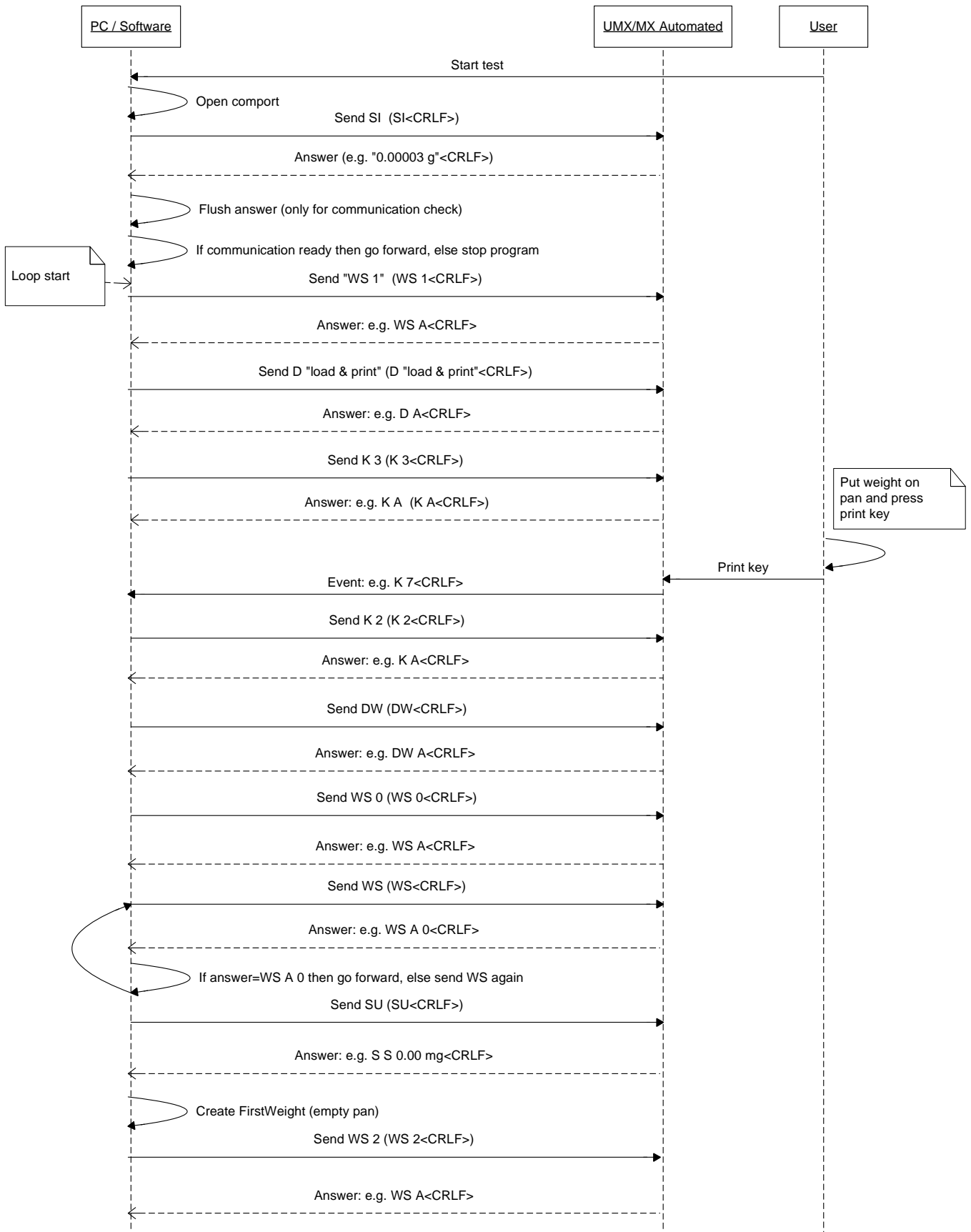


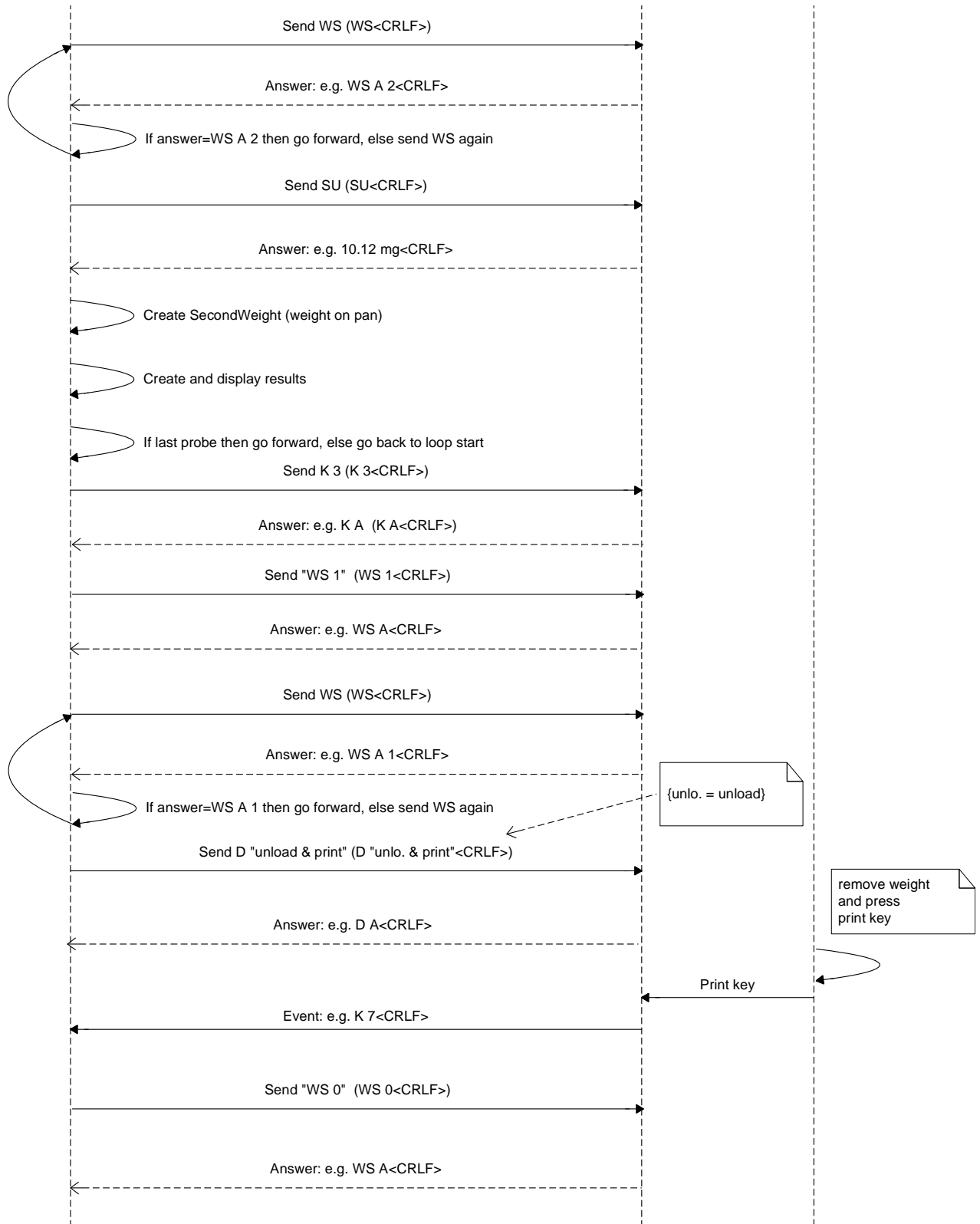
**Important:** Acknowledgment of the current position of the weighing sample is specified by the coding disk in the balance. On each run command, the disk rotates to a specific position. If, however, the weighing sample holder is blocked (e.g. by residue in the weighing chamber), the coding disk still rotates to the corresponding position on a run command, but the weighing sample holder itself does not move and acknowledgment of the current position is therefore incorrect. The user is therefore responsible for checking the plausibility of the weight in the relevant position. Preferably, this is carried out by means of appropriate routines in the relevant control program. In addition, it is recommended that the balance is checked and maintained regularly by an authorized service engineer.

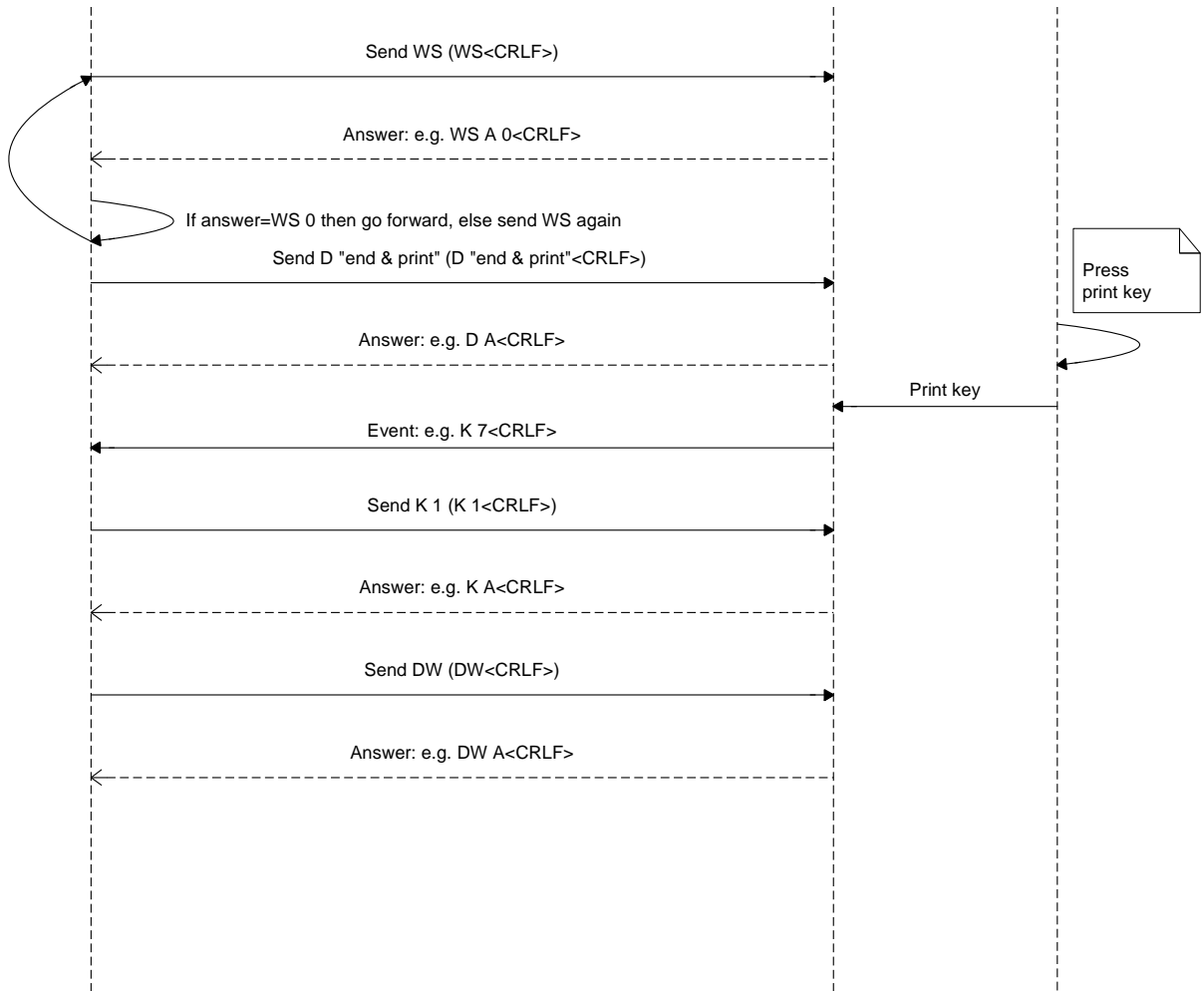
Please observe the instructions for the MT-SICS commands in the operating instructions for AX and MX/UMX balances. The "WS" command can be used directly on the host computer via a terminal program or integrated in custom applications and used to automate weighing.

Below is an **example** for an application in which the "WS" command is used to control the loading mechanism (for instructions for other MT-SICS commands used and additional information about the "WS" command, please refer to the "MT-SICS for AX/MX/UMX balances 11780417" reference manual). In this example, the user is guided through the weighing process and can only press the keys on the terminal that are required for the relevant step (the other keys are blocked).

Program example:







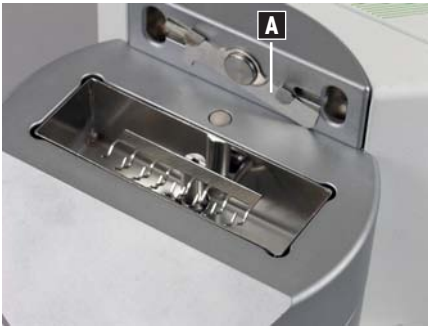
## 4 Cleaning and maintenance

Your MX2/UMX5 automated balance does not require laborious maintenance. For correct operation and to ensure correct results simply carry out the cleaning and maintenance tasks described below. For information about general cleaning tasks for the balance, please refer to Chapter 13 of the operating instructions for AX and MX/UMX balances.

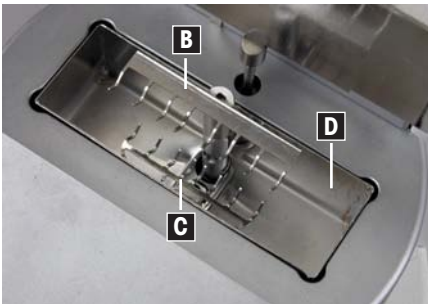
Clean the components of the weighing chamber as follows:

Switch off the balance.

Tilt the locking rocker (A) of the weighing chamber cover to the right and remove the weighing chamber cover by pulling it forwards.



First carefully remove the weighing sample holder (B) and then the weighing pan (C) by lifting it out of its guide. We recommend using the special tool supplied with the balance for this (special tweezers).



Then remove the drip tray (D) by lifting it out of the weighing chamber.

Clean the items (they are made from stainless steel X2CrNiMo17-12-2/1.4404). In particular, handle the weighing sample holder and the weighing pan with the greatest care and ensure that the fine holding prongs for the weighing sample are not bent. We recommend cleaning all items in an ultrasonic bath.

Replace the items in the weighing chamber in reverse order. When inserting the weighing pan, make sure that it is in the correct position: the fine holding prongs for the weighing sample must be towards the back, positioned towards the weighing sample holder. In addition, when inserting the weighing pan and the weighing sample holder make sure that the items are positioned correctly in the slot in the relevant guide. Do not forget to lock the weighing chamber cover (tilt rocking locker to the left).

## 5 Technical data and accessories

In general the technical data for MX5/UMX2 automated balances and the available accessories correspond to those of standard MX5/UMX2 models (see Chapter 14 of the operating instructions for AX and MX/UMX balances). Data that differs from the above is provided in the following chapters.

### 5.1 Specific data for MX5/UM2 automated balances

<b>Weighing sample:</b>	Cylindrical weighing samples, max. diameter: 8 mm, max. length: 50 mm
<b>Length of the weighing chamber:</b>	60 mm
<b>Material of the weighing chamber components</b>	Weighing chamber cover, drip tray, weighing sample holder and weighing pan: Stainless steel X2CrNiMo 17-12-2 (1.4404)
<b>Dimensions of the weighing cell</b>	See dimensional drawing in Chapter 5.3

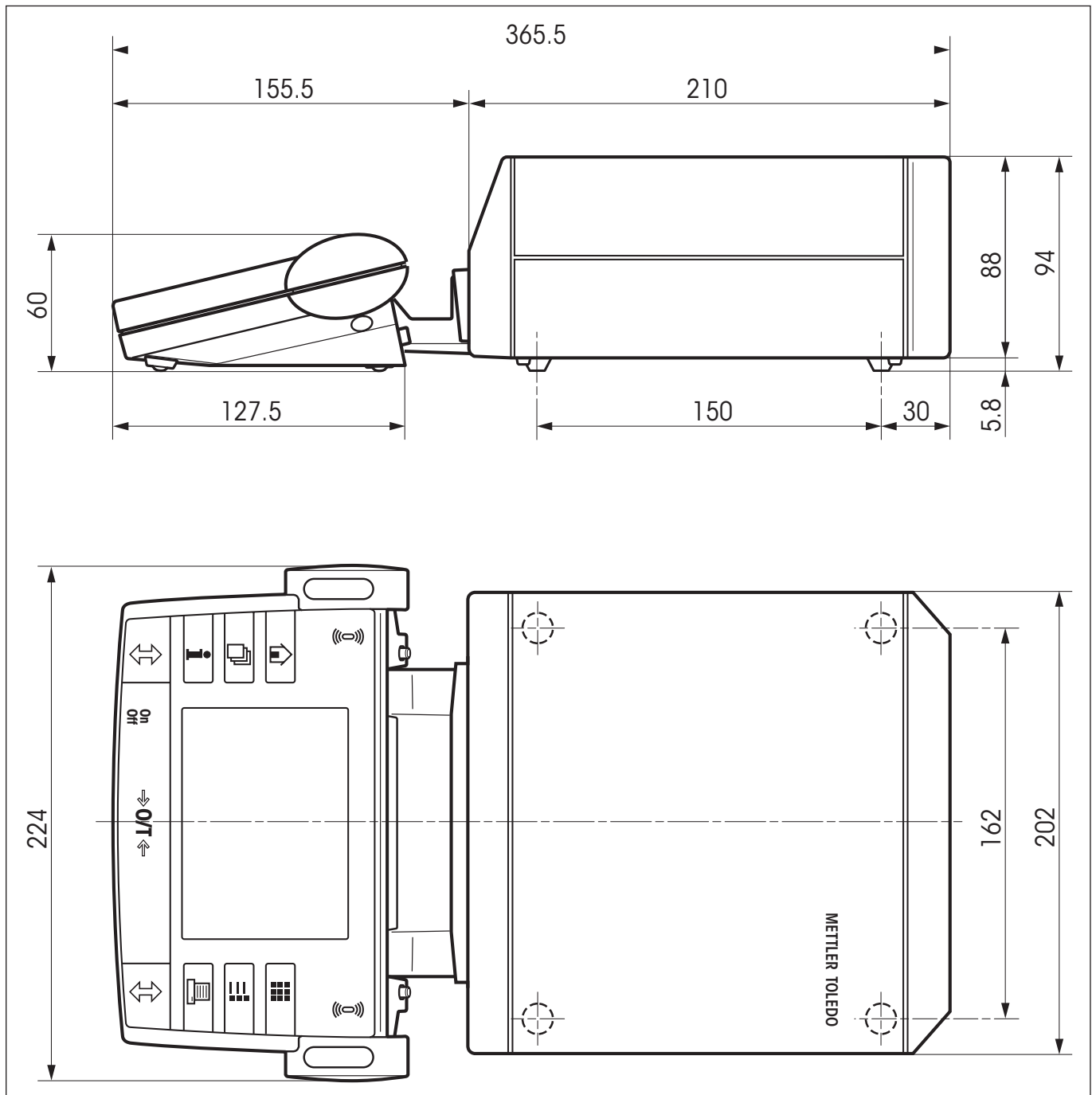
### 5.2 Accessories and spare parts

The following special accessories and spare parts are available for MX5/UMX2 automated balances:

<b>Description</b>	<b>Article No.</b>
Weighing chamber cover	11122018
Drip tray	11122005
Weighing sample holder and weighing pan (5-piece set in plastic box)	11122038
Cylindrical adjustment weight 5 mg E2 with certificate	11122181
Cylindrical adjustment weight 50 mg with certificate	11122183
Cylindrical adjustment weight 100 mg with certificate	11122185
Cylindrical adjustment weight 200 mg with certificate	11122187
Cylindrical adjustment weight 500 mg with certificate	11122163
Cylindrical adjustment weight 1.0g E2 with certificate	11122165
Cylindrical adjustment weight 1.5g with certificate	11122189
Cylindrical adjustment weight 2.0g E2 with certificate	11122167
Cylindrical adjustment weight 5.0g E2 with certificate	11122169
AC adapter for ionizer (transformer) 230V	11107758
AC adapter for ionizer (transformer) 115V	11107759
AC adapter for ionizer (transformer) 100V	11107760
Electrode with high-voltage cable for ionizer (note: 2 electrodes required)	11107757

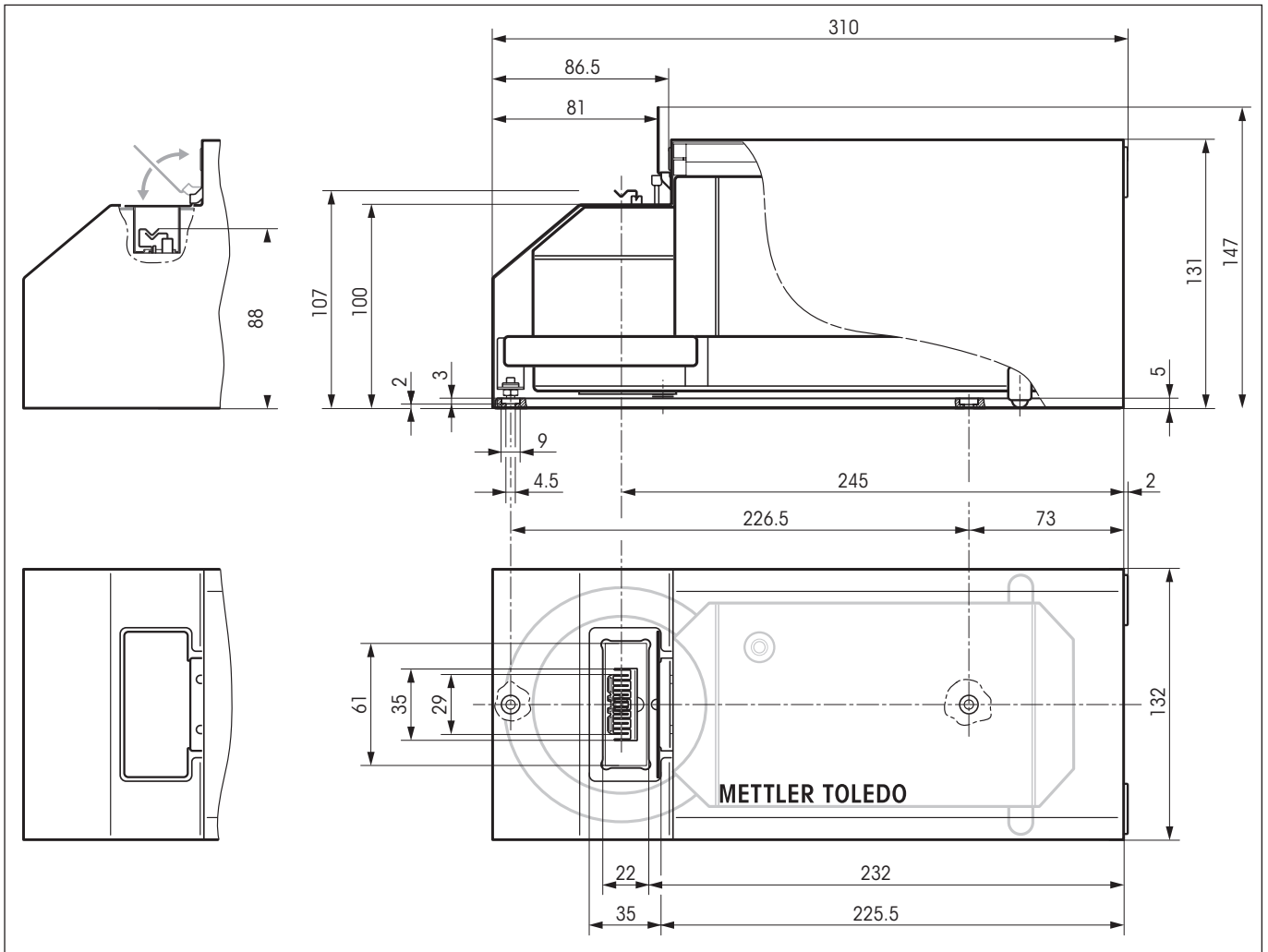
### 5.3 Dimensional drawings

**Control unit** (all dimensions in mm)





**MX5-S/UMX2-S weighing cell** (all dimensions in mm)







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

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