



sartorius

User Manual

Sartorius Cubis® Series

Electronic Semimicro Micro, Precision and Analytical Balances
MSU Models



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Notes on Using this Manual

- ▶ Please read this entire manual carefully and completely before using the device.
- ▶ Read the safety precautions carefully.
- ▶ This manual is part of the product. Keep it in a safe and easily accessible location.
- ▶ If the manual should be lost or misplaced, please contact Sartorius for a replacement or download the latest manual from our website: www.sartorius.com

Symbols and Signs

The following symbols are used in this manual:



Warning symbol for various types of dangers.

These symbols are explained in more detail in Section “Safety Instructions.”



This symbol indicates useful information and tips.



This symbol indicates notes on use of the balance in legal metrology within the scope of validity of Council Directive No. 2014/31/EU for instruments for which the conformity assessment procedure has been carried out (Models MS...-CE...).



This symbol means that the USER key should be pressed.



This symbol means that the TASK key should be pressed.

Menu

When individual functions are displayed, press the associated softkey.

- ▶ Indicates a required action
- ▷ Describes the result of an action
- 1. If a procedure has multiple steps...
- 2. ... the steps are numbered consecutively.
- Indicates an item in a list

Safety Instructions

This device complies with European Council Directives as well as international regulations and standards for electrical equipment, electromagnetic compatibility, and the stipulated safety requirements. Improper use or handling can, however, result in damage and/or injury. This device should only be operated by trained personnel.

Operators must read these installation instructions, particularly the safety information, and must be familiar with the operation of the equipment. The operator is required to supplement these safety precautions as appropriate. The operating personnel must be provided with the appropriate training.

The requirements pertaining to applicable installation regulations must be followed when using electrical equipment in systems and environmental conditions with increased safety requirements. Relevant laws, standards, regulations, guidelines and environmental protection laws valid in your country must be observed.

Always keep the equipment and balance freely accessible. Any installation work or balance operation that does not conform to the instructions will result in forfeiture of all claims under the manufacturer's warranty.

Danger of Explosion!



Do not use this equipment in hazardous areas in which explosive materials are present.

Danger of Electrical Shock!

If the device is not used in accordance with the instructions, this can affect the product liability for the device.



Make sure that the voltage rating printed on the AC adapter is identical to your local line voltage. The wall outlet must have a protective grounding conductor. The operating instructions included with the AC adapter must be followed.



Do not switch on the equipment if the AC adapter or power cord are damaged. If the balance itself, the AC adapter or any cables on the balance are damaged, disconnect the equipment from the power supply and secure it so that it cannot be turned on.



Chemicals (e.g. gases or liquids) that can corrode and damage the inside or outside of the balance, AC adapter, power cable or peripherals must be kept away from the equipment.



Do not operate the balance unless the housing and the display are undamaged and the housing is closed so that inadvertent contact with parts inside the equipment is not possible. Make sure that no liquids penetrate the balance and do not allow conductive parts to touch the balance.



Note on Installation:

The operator shall be solely responsible for any modifications to the equipment and for connecting any cables or equipment not supplied by Sartorius.

Information on operational quality is available upon request from Sartorius.

You should only use peripherals and options supplied by Sartorius.

Note on cable quality:

CE conformity is only guaranteed with well shielded cables.

The shielding braid of the cable must be made of metal with at least 80% coverage and also covered with metal foil as much as possible.

The shielding on both sides on the full metal or metalized connector casing, as well as on the casing inlet, must be high-frequency compliant and have a flat design.

You can only turn off power to the device by pulling the plug or disconnecting the power cord, or by unscrewing the four-pin plug at the DC supply cable for the balance.

Do not exert mechanical pressure on the display with sharp objects, as this will damage the display. Liquid penetration can damage the electrical components.

Only use a lightly-moistened cloth for cleaning. See “Care and Maintenance” for cleaning the device. Do not compromise the IP protection of the balance.

Do not open the balance housing. If the seal is broken, this will result in forfeiture of all claims under the manufacturer’s warranty.

The device may only be opened by specialized personnel trained by Sartorius.

Disconnect the balance from the wall outlet prior to moving the device.

Avoid condensation damage to the device. When the balance is turned on, condensation build-up is not possible. If the device is moved from a cool environment to a warm environment, you must allow the device to acclimatize for approx. 2 hours before connecting to the power supply.

Hazards at the Place of Installation and During Operation



Avoid generating static electricity and establish equipotential bonding.

A 10 kOhm ground is used when connecting the balance to the power supply. Disconnecting the ground conductor is not permitted.



Exercise caution to avoid glass breakage.

There is a danger of lacerations or cuts caused by sharp edges on glass or metal (contact springs), particularly when removing or replacing the glass draft shield panels; during cleaning; if a glass sample container breaks, or when modifying the balance hardware configuration.



Models with a separate electronics module (e. g. MSU6.6/3.6/2.7), MSU225S/P and MSU125P:

Do not mix up the electronics module.

Interchanging with, e. g. models of the ME/SE series will damage the device.



Make sure all equipment operators have received proper instructions when working with hazardous or toxic materials.

Failure to follow correct handling procedures can result in breakage of parts or spillage of liquids or other substances. Make sure the necessary protective clothing or equipment is worn, such as protective gloves, clothing, eyewear.

All safety regulations applicable in the laboratory must be observed.



Exercise caution to avoid squeezing or crushing fingers when

- Operating the electronic draft shield
 - Removing or installing the panels
 - Adjusting the display
-

Do not expose the device to aggressive chemical vapors or to unnecessarily extreme temperatures, moisture, shocks, or vibration.

The device should be set up in areas away from equipment or devices that have strong magnetic properties. Extreme electromagnetic fields from electrical lines should also be avoided.

Intended Use

Cubis® models are high-resolution balances. They were specially developed for exact determination of material mass in liquid, paste, powder or solid form.

Appropriate containers must be used for each type of sample material.

Specific models cover specific weighing ranges: see “Technical Data.”

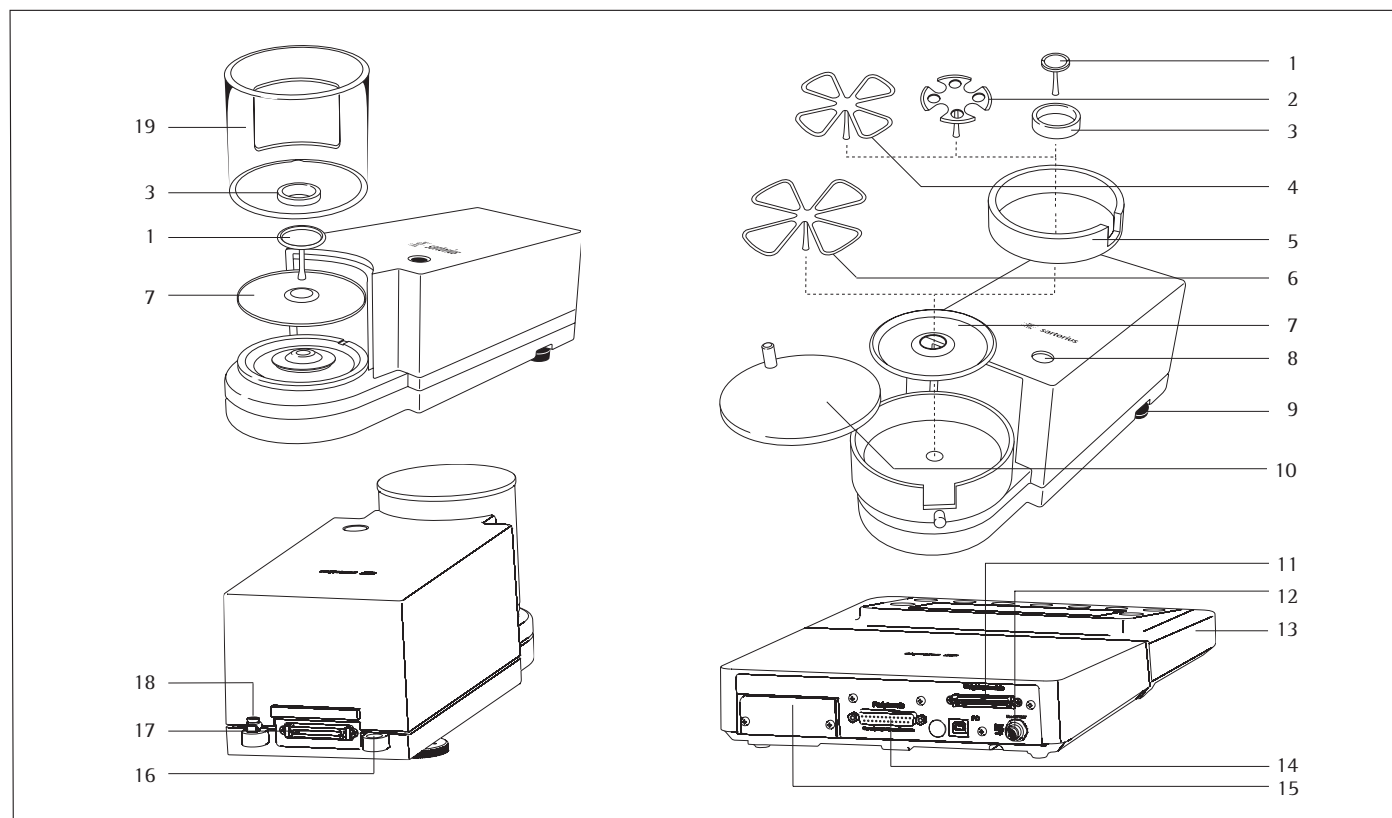
Cubis® models are designed specially for use in research, education and day-to-day laboratory tasks in science and industry.

They are designed to be used exclusively indoors.

Cubis® models can be operated as standalone, connected to a PC, or on a network.

General View of the Equipment and Equipment Supplied

Microbalances: models MSU6.6S, MSU3.6P, MSU2.7S



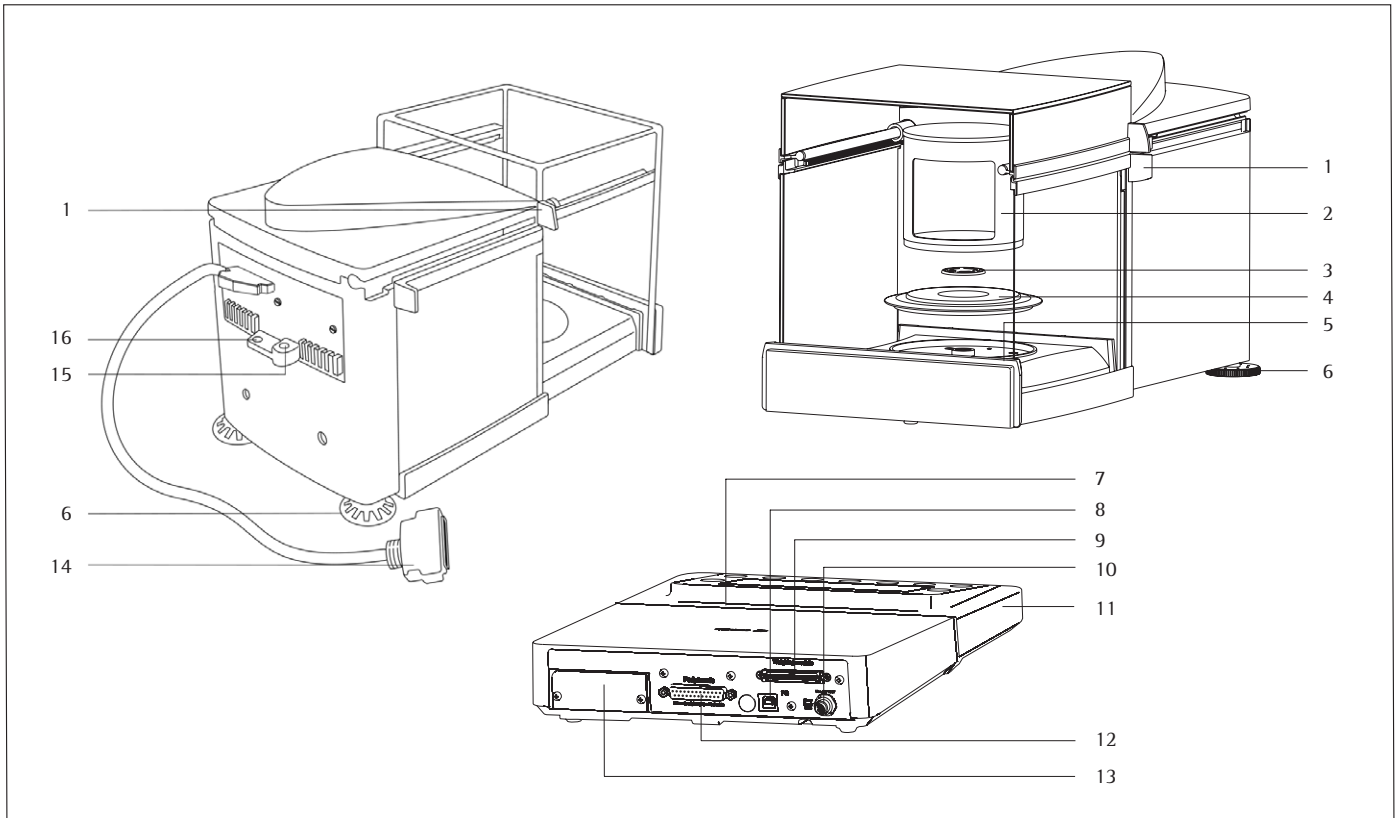
Item Description

- 1 Weighing pan
- 2 Filter weighing pan \varnothing 50 mm
- 3 Internal draft shield (for MSU2.7S-F only)
- 4 Optional weighing pan \varnothing 75 mm
- 5 Shield disk
- 6 Optional weighing pan \varnothing 90 mm
- 7 Shield plate
- 8 Level indicator
- 9 Leveling foot
- 10 MSA2.7..model: socket
- 11 Draft shield cover

Item Description

- 12 Female connector for weigh cell
 - 13 DC jack
 - 14 Display and control unit
 - 15 Serial communications port (PERIPHERALS)
 - 16 Slot for optional interfaces (e.g., 9-pin data output and PS2 or Bluetooth)
 - 17 Lug for attaching antitheft locking device
 - 18 Weigh cell connector - electronics module
 - 19 Equipotential bonding conductor terminal
 - 20 Draft shield
- Not shown: AC adapter, USB cable

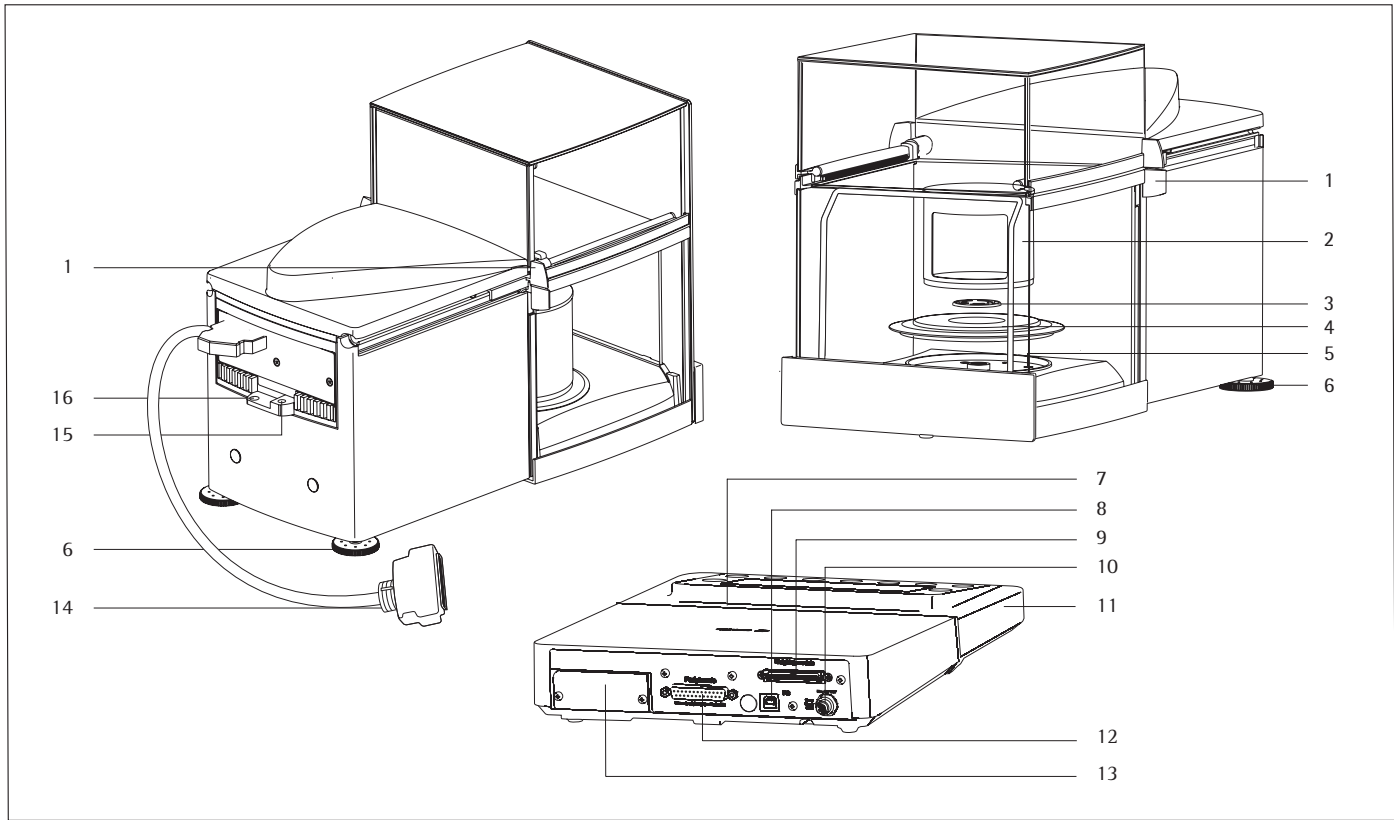
Models MSU66S, MSU66P, MSU36S, MSU36P



Item	Description	Item	Description
1	Push handle/Handle	10	DC jack
2	Inner draft shield	11	Display and control unit
3	Weighing pan	12	Serial communications port (PERIPHERALS)
4	Shield disc	13	Slot for optional interface (e.g. 9-pin data output and PS2 or Bluetooth)
5	Level indicator	14	Connection plug: Weigh cell – electronics module
6	Leveling foot	15	Equipotential bonding conductor
7	SD card slot	16	Lug for attaching anti-theft locking device
8	USB interface for PC connection		
9	Weigh cell female connector		

Not shown: AC adapter, USB cable

Model MSU116P



Item Description

- 1 Push handle/Handle
- 2 Inner draft shield
- 3 Weighing pan
- 4 Shield disc
- 5 Level indicator
- 6 Leveling foot
- 7 SD card slot
- 8 USB interface for PC connection
- 9 Weigh cell female connector

Item Description

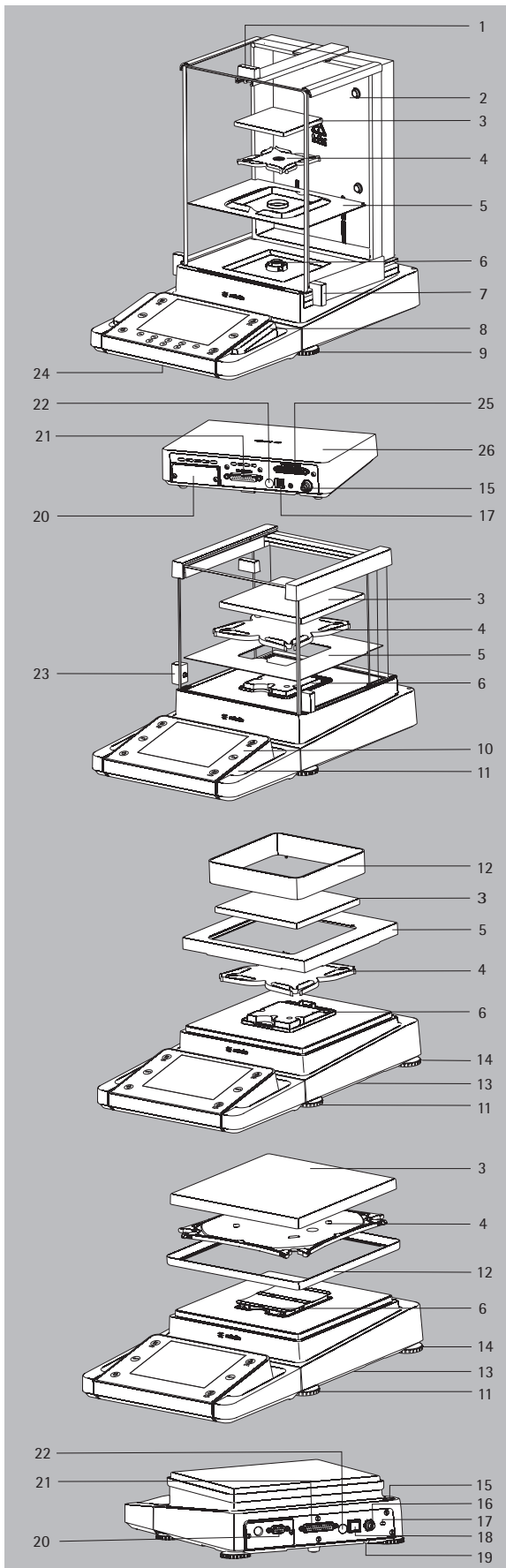
- 10 DC jack
- 11 Display and control unit
- 12 Serial communications port (PERIPHERALS)
- 13 Slot for optional interface (e.g. 9-pin data output and PS2 or Bluetooth)
- 14 Connection plug: Weigh cell – electronics module
- 15 Equipotential bonding conductor
- 16 Lug for attaching anti-theft locking device

Not shown: AC adapter, USB cable

General View of the Equipment and Equipment Supplied

Analytical and precision balances with a weighing range of up to 15 kg

Item Description



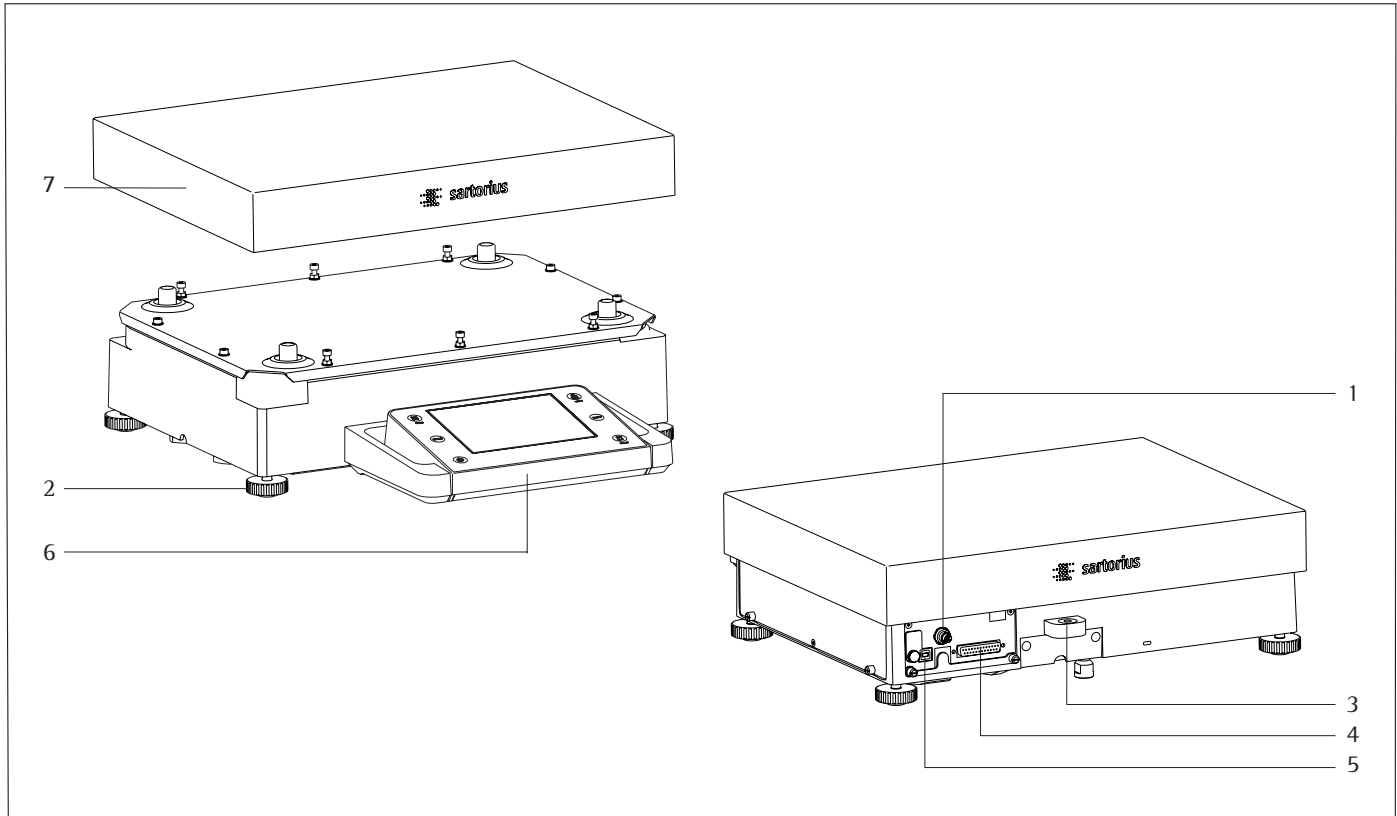
- 1 Upper sliding draft shield panel/handle
- 2 Back panel
- 3 Weighing pan
- 4 Pan support (not for MSU225.../MSU125... models)
- 5 Shield plate
- 6 Pan retainer
- 7 Right sliding panel/handle
- 8 SD card slot
- 9 Leveling foot
- 10 Display
- 11 Display and control unit
- 12 Draft shield/Shield disk (only for models with a readability of 1 mg and 10 mg)
- 13 Below-balance weighing port (on the bottom of the balance)
- 14 Leveling foot
- 15 Level indicator
- 16 Power socket
- 17 Slot for attaching an anti-theft device
- 18 USB socket for a PC connection
- 19 Below-balance weighing hook
- 20 Slot for optional interfaces, e.g., 9-pin data output and PS2 (as shown) or Bluetooth
- 21 Communication port (PERIPHERALS) for accessories
- 22 Menu access switch
- 23 Left sliding panel/handle
- 24 Ethernet interface (on the bottom of the display and control unit)
- 25 Semi-microbalances: Female connector for weigh cell
- 26 Semi-microbalances: Electronics module (for MSU225.../MSU125... models)

Not shown:

- AC adapter
- USB cable
- Operating instructions

General View of the Equipment and Equipment Supplied

Balances with a weighing range of 20 kg or more



Item Description

- 1 DC jack
- 2 Leveling foot
- 3 Level indicator
- 4 Serial communications port (PERIPHERALS)

Item Description

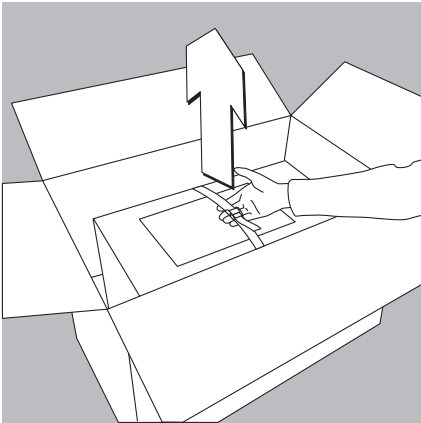
- 5 USB socket for a PC connection
- 6 Display and control unit
- 7 Weighing pan

Not shown: AC adapter, USB cable

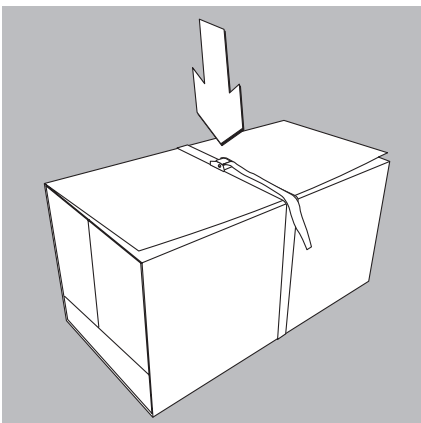
Getting Started

Unpacking

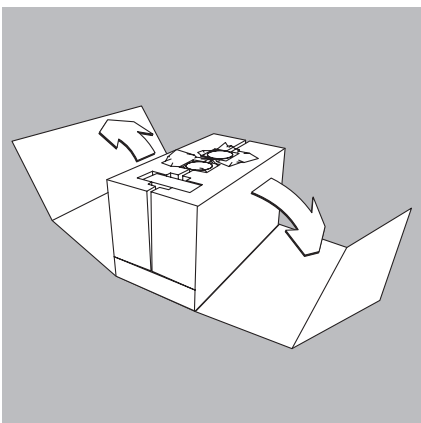
Models MSU116P, MSU66S, MSU66P, MSU36S, MSU36P:



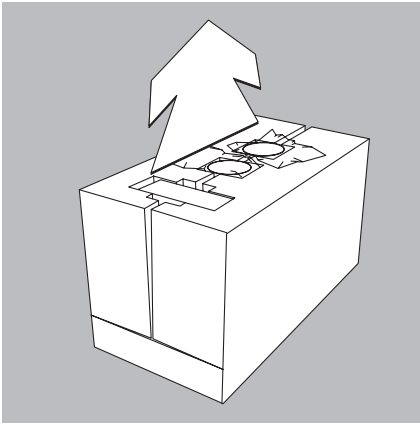
- ▶ Lift the package containing the device out of the outer packaging by the strap.



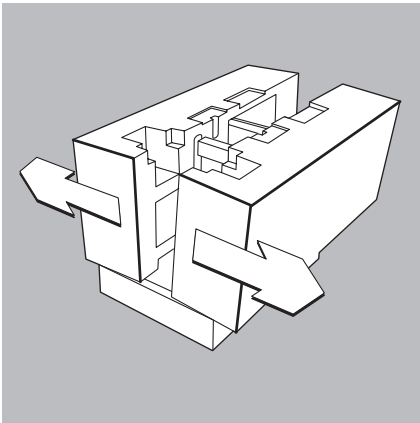
- ▶ Loosen and remove the strap.



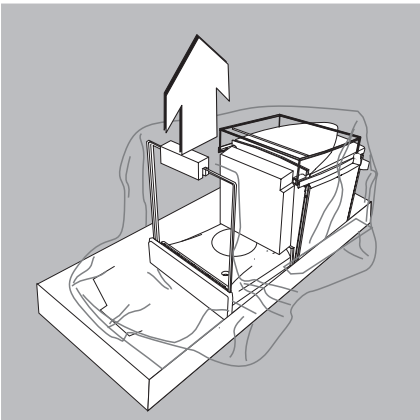
- ▶ Remove the cardboard sleeve.



- ▶ Remove the following parts from the recessed spaces of the inner packaging:
 - Weighing pan
 - Shield plate



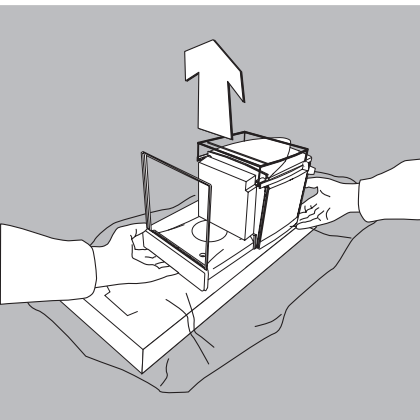
- ▶ Remove the lateral packaging paddings of the inner packaging by pulling outward.



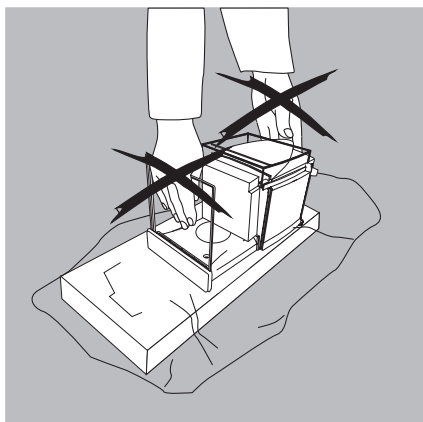
- ▶ Remove the retainer securing the front draft shield panel.
- ▶ Open the plastic wrapping.



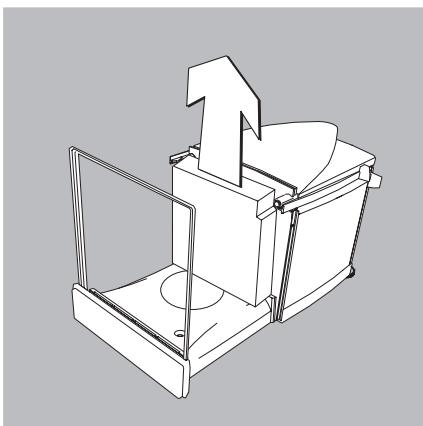
Exercise caution to avoid glass breakage.
Never lift the device by the draft shield panels to remove it from the packaging.



- ▶ Place one hand under the front panel and the other under the back of the housing and lift the device out of the lower packaging padding.

**IMPORTANT**

Do not lift the device by the draft shield or the front panel since this can result in damage.



- ▶ Place the device at the intended installation location.
- ▶ Open the draft shield doors.
- ▶ Remove the inner foam padding from the draft shield.

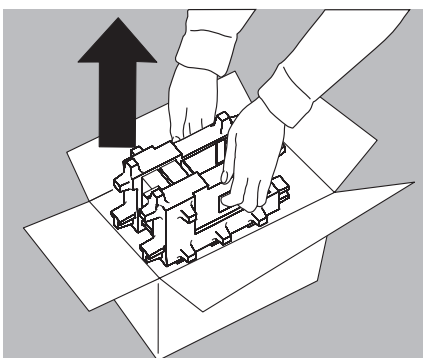


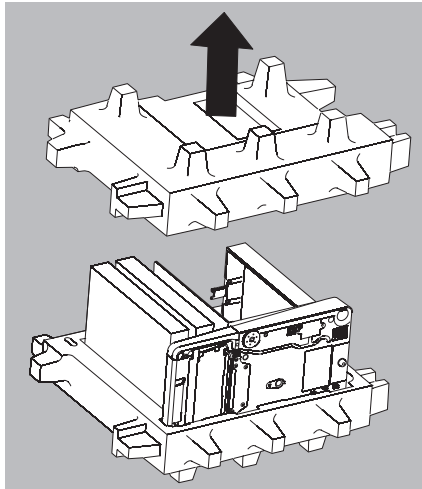
Save the box and all parts of the packaging in case it should become necessary to transport the device. Only the original packaging provides the best protection for shipment (see also Shipping on page 36).

Before packing the device for shipping, unplug all connected cables to prevent unnecessary damage.

Balance with the Analytical Draft Shield

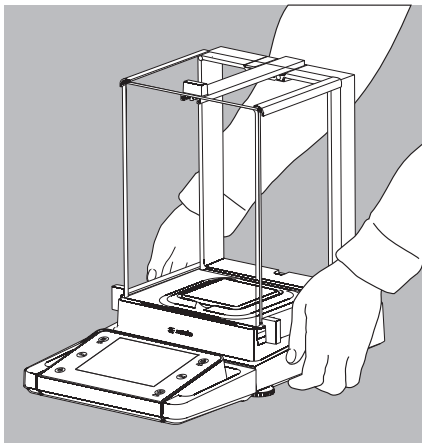
- ▶ Open the packaging at the top.
- ▶ With both hands in the side impressions lift the balance, with the packaging, out of the cardboard box.





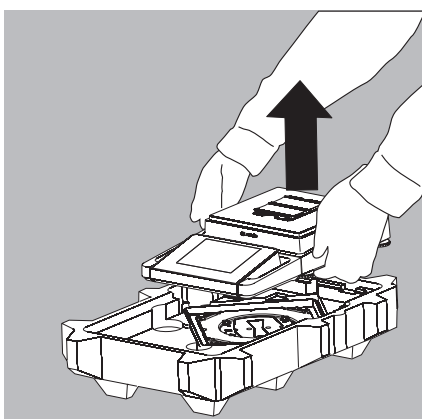
- ▶ Place the packaging with the balance on the floor.
- ▶ Remove the top part of the packaging.

- ▶ Remove the packages (containing draft shield panels, weighing pan, pan support, AC adapter, etc.) from the lower packaging and place them to one side.



Caution! Exercise caution to avoid glass breakage. Never lift the device by the draft shield panels to remove it from the packaging.

- ▶ Use both hands to lift the balance out of the packaging.
- ▶ Place the balance on an even surface.



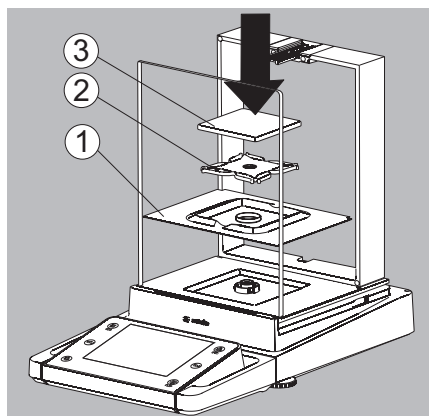
Balance with No Draft Shield

- ▶ Use both hands to remove the model without a draft shield from the packaging.

- ▶ Remove the AC adapter and the balance parts from the packaging.

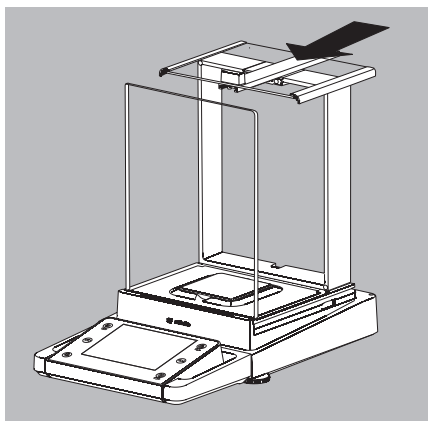
Assembly

Installing the Analytical Draft Shield Labeled DA, DI, and DU

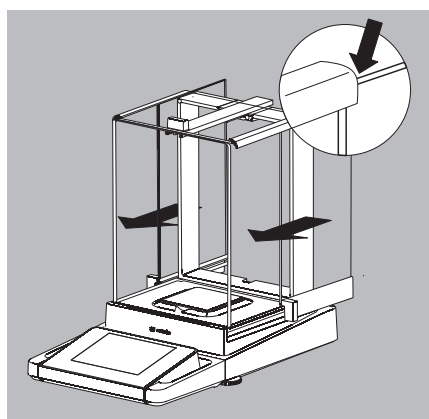


- ▶ Carefully fit parts onto the balance as shown in the picture.

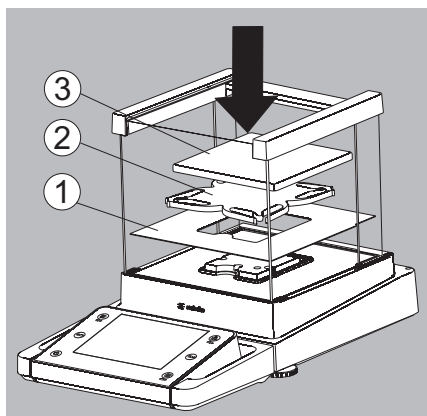
1. Shield plate
2. Pan support (not for MSU225.../MSU125... models)
3. Weighing pan



- ▶ Slide the upper draft shield panel into the guide rails from the rear.



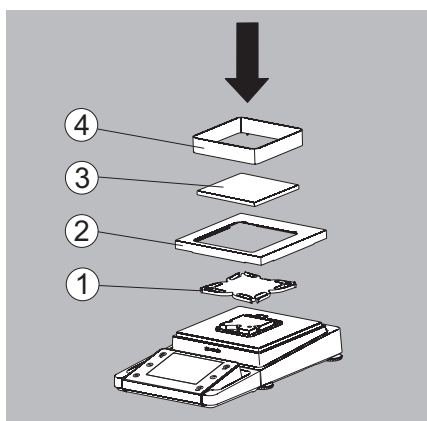
- ▶ Slide the left and right draft shield panels into the guide rails from the rear. Make sure the panels are within the upper and lower guide rails.
 - ▶ Slide the panels in until they engage.
1. Right draft shield panel
 2. Left draft shield panel
- ▶ This completes the balance assembly.



Installing the Draft Shield Labeled DE for Milligram Balances

- ▶ Carefully fit all parts as shown.

1. Shield plate
2. Pan support
3. Weighing pan

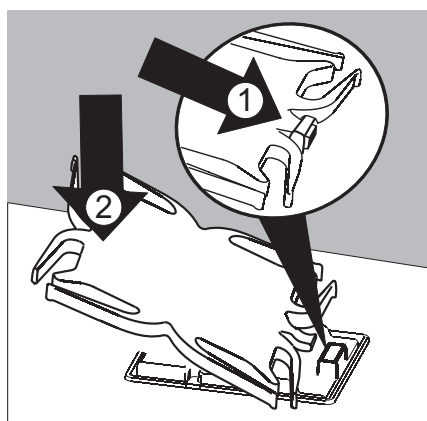


Assembly of Milligram Balances without Glass Draft Shield (DR Option)

- ▶ Fit all components listed below onto the balance in the order given:

1. Pan support (see also next section)
2. Shield plate
3. Weighing pan
4. Draft shield frame

- ▶ First insert the shield plate.



- ▶ Make sure the pin on the pan support is facing toward the front, and slide it under the clip on the pan retainer.

1. Insert the pan support.

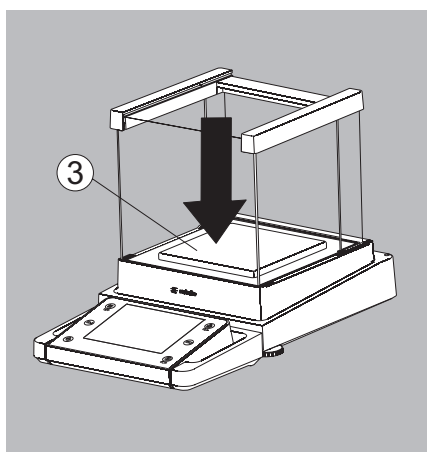
- ▶ After inserting the pan support, press it down against the shield plate so that it lies flat.

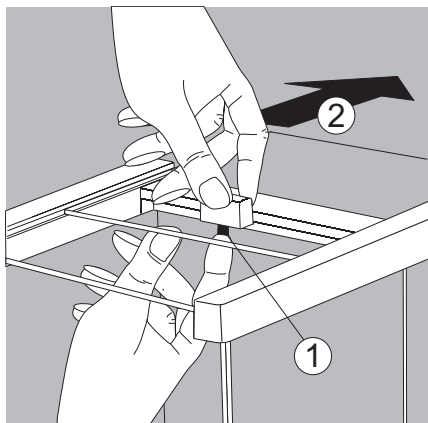


Exercise caution to avoid pinching or crushing fingers.

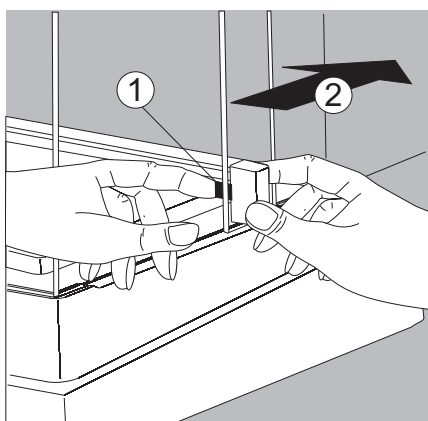
2. Press down on the pan support

- ▶ Place the weighing pan (3) on the pan support.





- ▶ Slide the upper draft shield panel into the guide rails from the rear while pressing the locking tab.



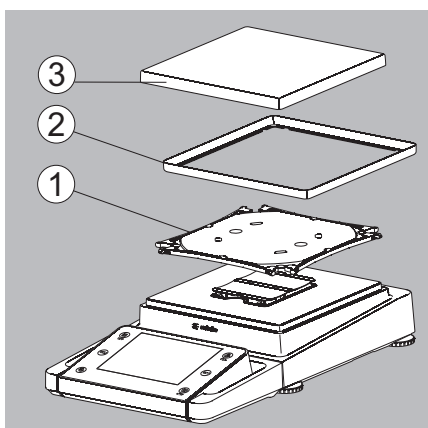
- ▶ Slide the side draft shield panel into the guide rails from the rear while pressing the locking tab.

▷ This completes the balance assembly.

- ▶ If necessary, remove the panel again:

1. Press on the locking tab
2. Remove the panel

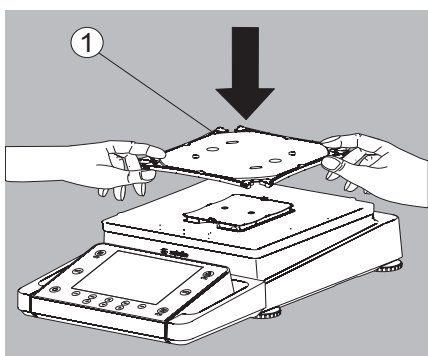
- ▶ Place the panel in the storage slot at the back of the balance.



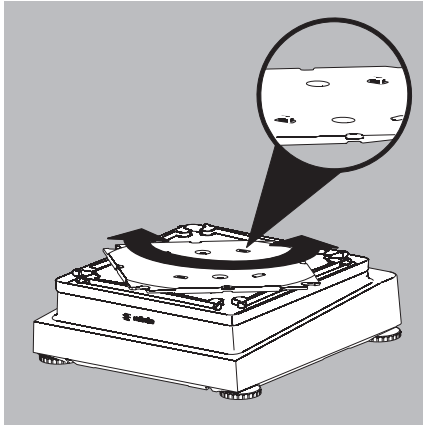
Assembling Precision Balances without a Draft Shield with a Weighing Range of up to 15 kg

- ▶ Carefully insert all parts.

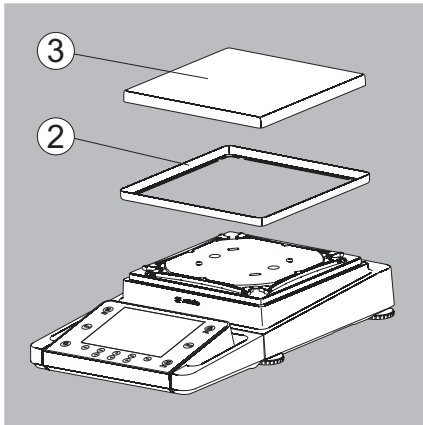
1. Pan support
2. Shield plate/Draft shield
3. Weighing pan



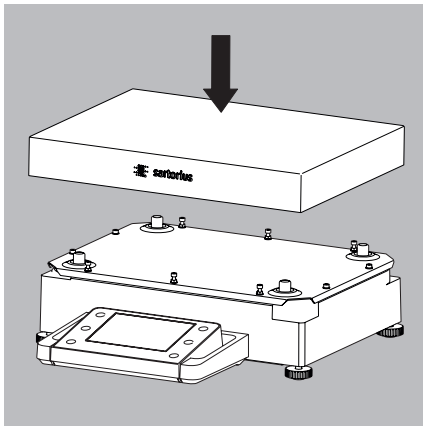
- ▶ Place the pan support (1) diagonally and press down lightly.



- ▶ Carefully turn the pan support clockwise until the two buttons engage. The pan support is now attached.

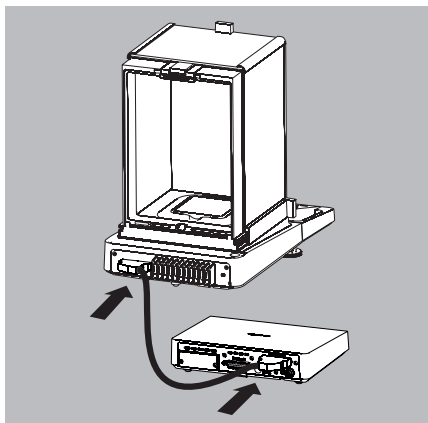


- ▶ 2. Insert the shield plate/draft shield.
- ▶ 3. Place the weighing pan on the pan support
- ▷ This completes the balance assembly.



Models with a weighing range of 15 kg or more

- ▶ Place the weighing pan on the balance.

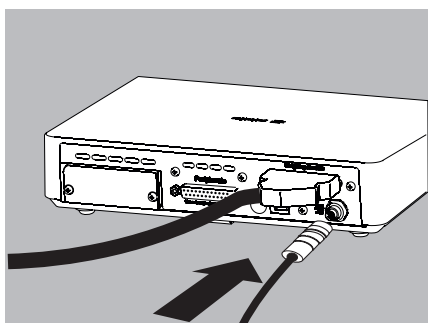


Models with an External Electronics Module: Connecting the Weigh Cell to the Electronics Module

- ▶ Connect the weigh cell and electronics module using the connection cable: Make sure that the connectors click into place so that both ends engage correctly.



Check the plug contacts to ensure that the connection is correct. There should be no tension on the connection cable, e.g. if pushed directly against a wall.



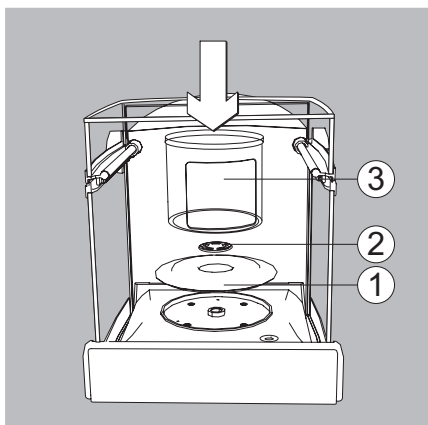
- ▶ Connecting the Weigh Cell to the Evaluation Unit: Make sure that the connector clicks into place so that the cable is engaged.



Models with a separate electronics module (e.g. MSU66/36/6.6/3.6/2.7, MSU225S/P, MSU125P and MSU116P): Do not mix up the electronics module. Interchanging with, e.g. models of the ME/SE series will damage the device.

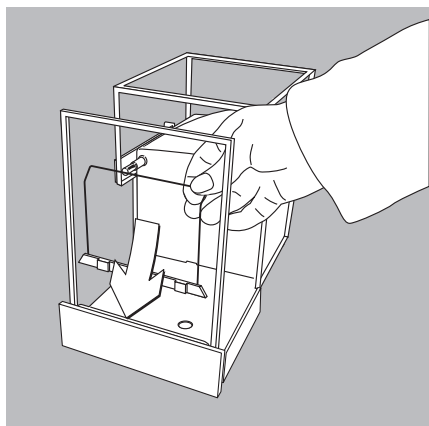
Models MSU66 and MSU36: Placing components into weighing chamber

- ▶ Insert the following components into the weighing chamber in the order given:
 1. Shield disk
 2. Weighing pan
 3. Internal draft shield

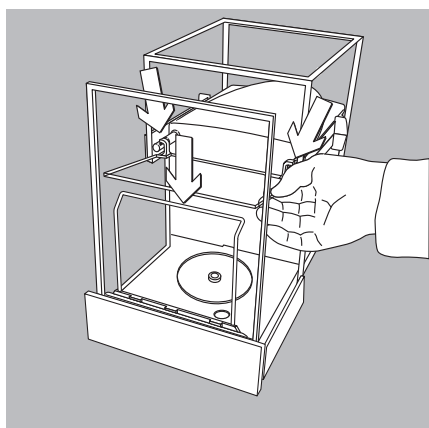


Model MSU116P: Placing components into the weighing chamber

- ▶ Position the support bracket directly behind the front panel.

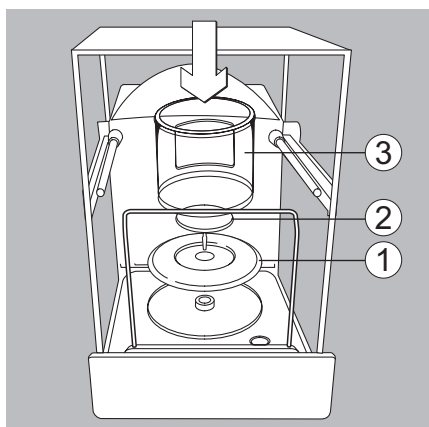


- ▶ Position the glass panel in the retainers and place it at the back of the draft shield.

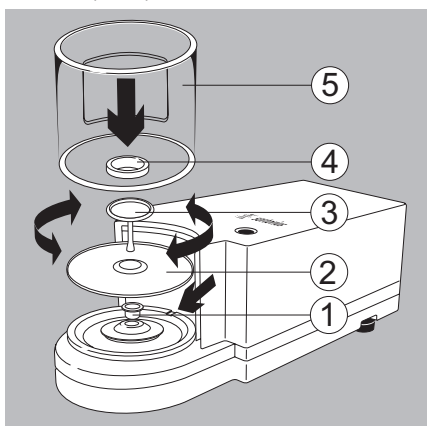


- ▶ Place the components listed below inside the weighing chamber in the order given:

1. Shield plate
2. Weighing pan
3. Internal draft shield

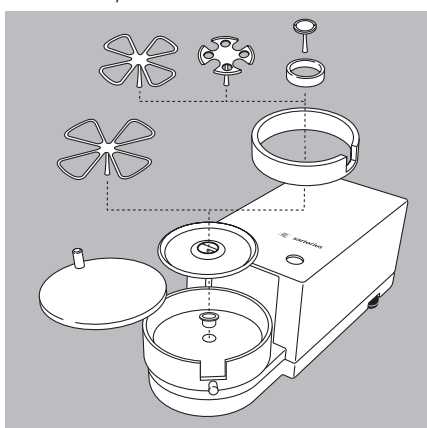


MSU6.6S/3.6P/2.7S:

**Models MSU6.6S/3.6P/2.7S: Placing Components on the Weigh Cell**

- ▶ Place the following Parts in the order listed:
- ▶ 1. Shield plate
- ▶ 2. Shield plate
- ▶ 3. Weighing pan
Tip:
After inserting the weighing pan, turn it slightly to the left and right while pressing it down lightly.
- ▶ 4. Internal draft shield (for SE2 only)
- ▶ 5. Draft shield: Center the hole over the pan (see arrows).

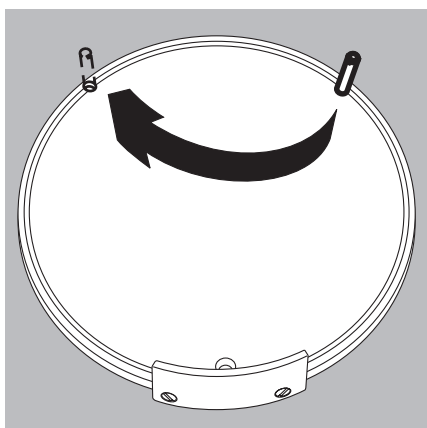
MSU6.6S-F/2.7S-F:

**Filter Balances (models MSU6.6S-F/2.7S-F): Placing Components on the Weigh Cell**

- ▶ Place the components on the weigh cell in the order given:
- ▶ 1. Model MSU2.7S-F: Connector
- ▶ 2. Shield plate
- ▶ 3. Internal draft shield
- ▶ 4. Filter weighing pan \varnothing 50 mm or weighing pan (optional filter weighing pan \varnothing 75 mm or \varnothing 90 mm)
Note: After inserting the pan, turn it slightly to the left and right, while pressing it down lightly.
- ▶ 5. Draft shield cover

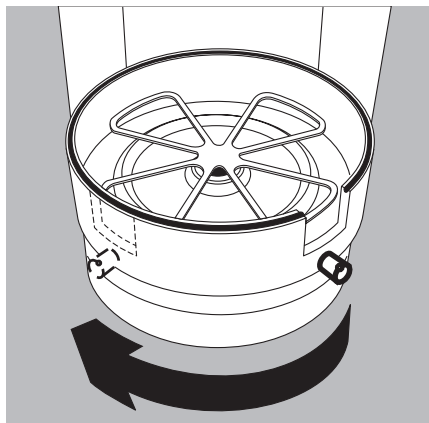
⚠ Notice

Turn the balance off and then on again after replacing the pan during operation.

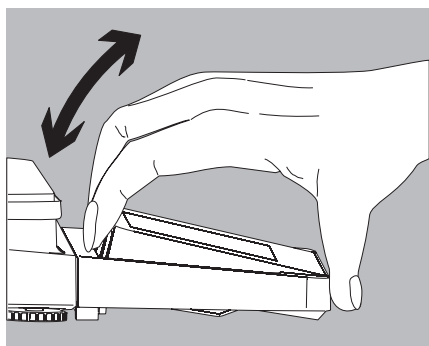


Setting up a filter weighing pan for left-handed users:

- ▶ Remove the draft shield cover
- ▶ Unscrew the pin and move from the right to the left side



- ▶ Turn draft shield parts approx. 90 degrees to the left (loosen knurled screw).



Setting the Angle for the Display and Control Unit

The angle of the display unit can be adjusted by the user in order to ensure optimal readability of the weight values on the display at all times.

- ▶ The display and control unit can be tilted as desired.

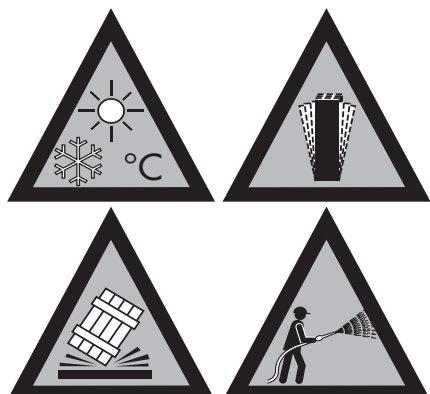
Choosing a Location

- ▶ Selecting the right setup location:
 - Set up the device on a stable, even surface that is not exposed to vibrations (e.g., weighing stone).
 - Place the device in a location with enough free space around it so that excessive heat cannot build up.
 - Maintain free access to the device at all times.
 - The balance may only be used in closed spaces and at a max. height above sea level (see, chapter Techn. Data, "Ambient conditions").

Choose a location that is not subject to the following negative influences:

- Heat (heater or direct sunlight)
- Drafts from open windows, AC systems, and doors
- Extreme vibrations during measurement
- Extreme humidity

For further information, please refer to the "Proper handling of analytical balances and microbalances" document.



Acclimatization

Condensation from humidity can form on the surfaces of a cold device when it is brought into a substantially warmer area.

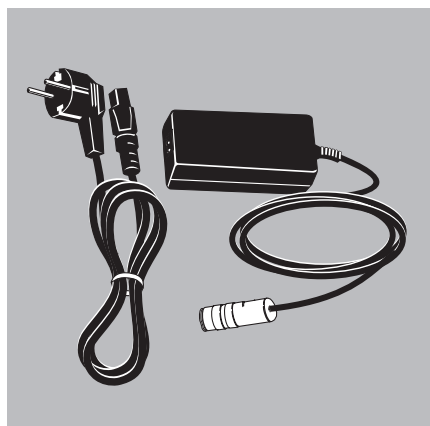
Allow the device to acclimatize for about two hours at room temperature, leaving it unplugged from the power supply.

Carefully read all warnings and safety precautions in the respective section of this manual.

Power Connection

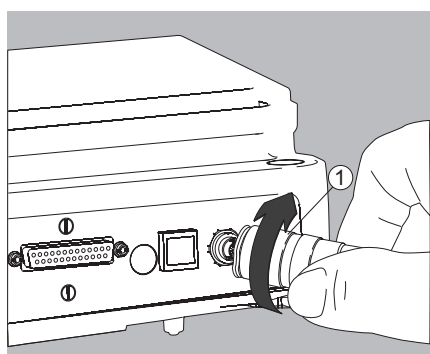
► Check the voltage rating and plug design.

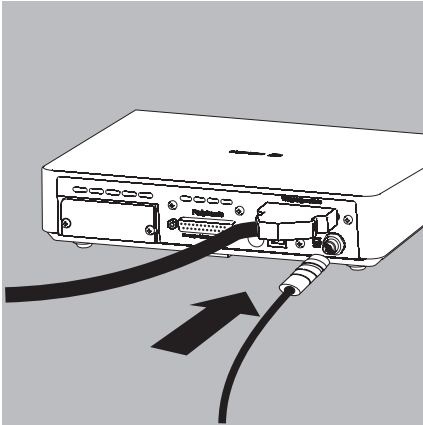
- Make sure that the voltage rating printed on the manufacturer's ID label is identical to that of your local mains voltage.
- If the stated supply voltage or the plug design of the power cord does not comply with your country's standard, please inform the nearest Sartorius representative or your dealer.
- The power must be connected in accordance with the regulations applicable in your country.
- In order to connect the equipment to the power supply (protection class 1), use a suitable, correctly installed wall outlet with a protective grounding conductor (PE) and a fuse of a maximum of 16A.
- Only use original Sartorius AC adapters.



Analytical and precision balances:

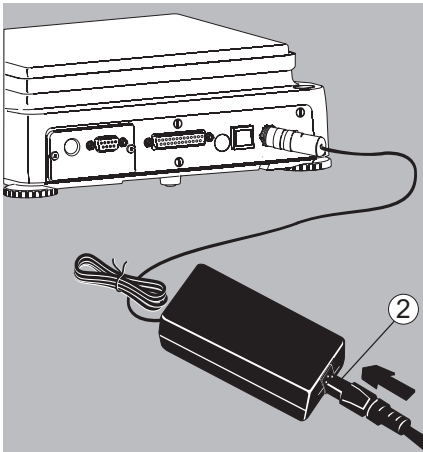
1. Plug the DC supply cable of the AC adapter into the power socket of the balance and tighten the threaded fitting.





Balances with a readability of ≤ 0.01 mg

1. Plug the DC supply cable of the AC adapter into the power socket of the electronics module and tighten the threaded fitting.



2. Plug the power cord into the AC adapter.
3. Insert the AC adapter plug into the wall outlet.

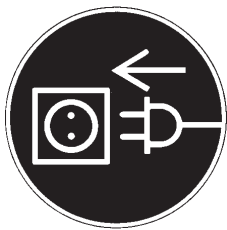
▷ The balance is now ready to use.

Safety Precautions

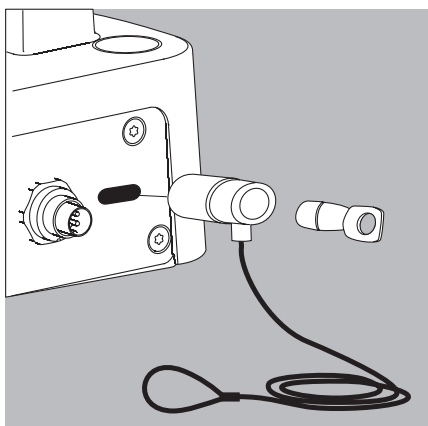
The output line of the adapter has a terminal (GND) connected to the metal housing of the balance. The data port is also galvanically linked to the balance housing (GND).

Connecting Electronic Devices (Peripherals)

- ▶ Make absolutely sure that the device is unplugged from the power supply before connecting/disconnecting any peripheral device (printer, scanner, PC) to or from the data port.



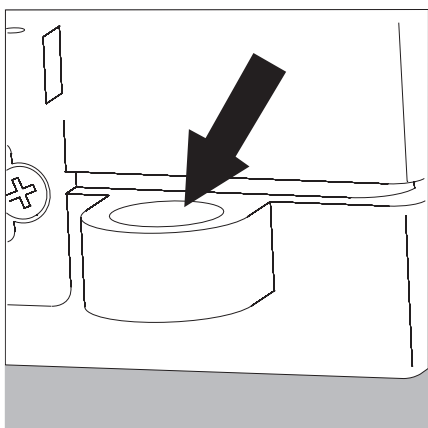
A device connected to the power supply should never be opened.



Anti-Theft Locking Device (Accessory)

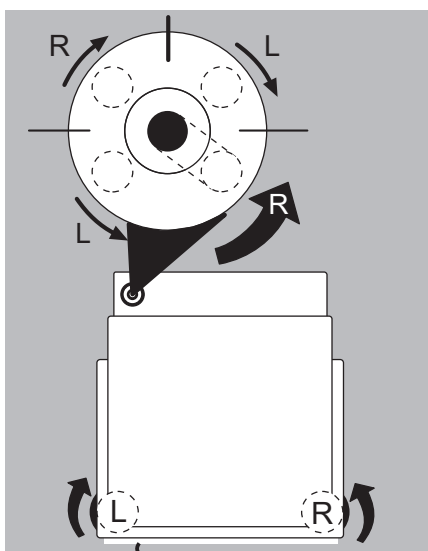
Balances with a readability of ≤ 0.01 mg:

- ▶ An anti-theft locking device can be installed to the back of the balance if required.



Balances with a readability of ≤ 1 μ g:

To fasten the anti-theft locking device, use the lug located on the back of the weigh cell.



Leveling




Leveling the balance compensates for slant or unevenness at the place of installation. The scale must be perfectly horizontal to ensure consistent, reproducible weighing results. All models are equipped with an electronic tilt angle detection feature. If the balance is not level, a warning message appears on the display.

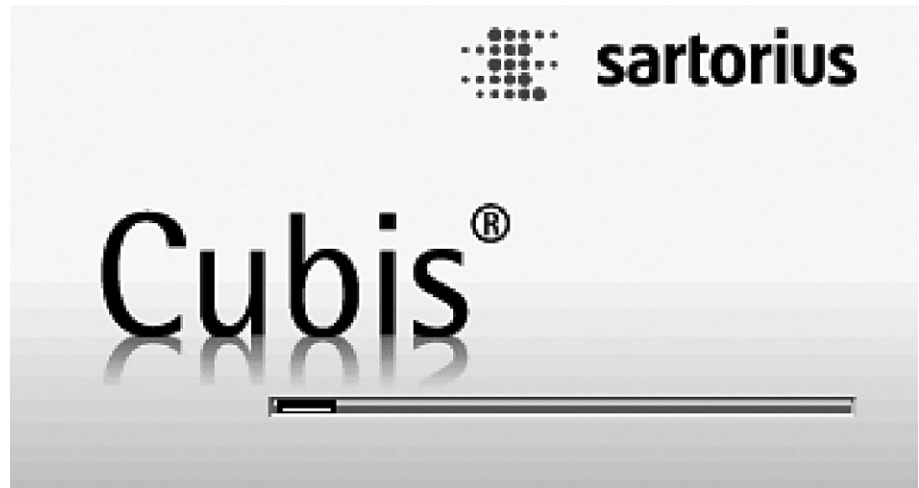
Push-button automatic leveling is available on models with motorized leveling feet. For models with manual leveling feet, please follow the instructions on the display.

Leveling the Balance Manually

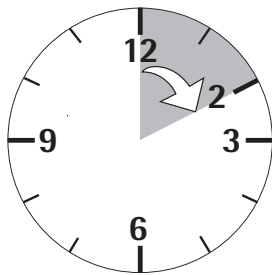
- ▷ The scale is leveled using both front leveling feet.
- ▶ Screw in both back leveling feet (only for models with back leveling feet).
- ▶ Turn the front leveling feet as shown in the illustration until the air bubble is centered within the circle of the level indicator.
- ▷ Normally, several leveling steps are required
- ▶ Turn both back leveling feet until they touch the setup surface (only for models with back leveling feet).

Switching On

- ▶ Turn on the device via the () key. The following appears on the display:



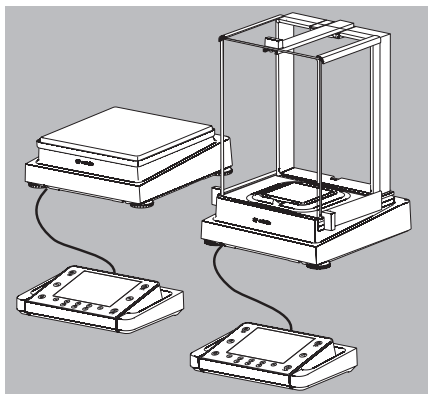
- ▷ You can now follow the brief instructions to configure further necessary balance settings before beginning weighing operations.

**Warm-up Time**

- ▷ To deliver precise results as per the Specifications, the balance must warm up for at least 30 minutes after initial connection to the power supply. Only then will the device have reached the required operating temperature.

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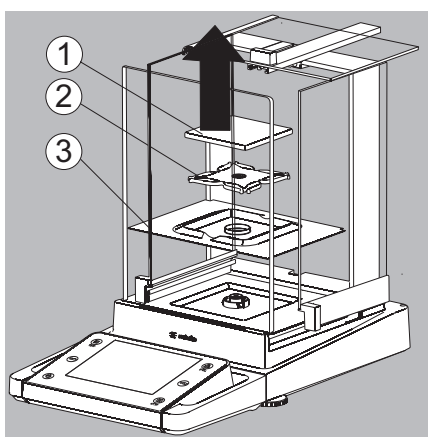
When a verified balance used in legal metrology (legal-for-trade applications) is connected to the power, it must warm up for at least two hours before operation.



Modifying the Balance

Setting Up the Display and Control Unit at the Place of Use

The display and control unit can be removed for all models to enable the operator to customize the work space.



Removing the Retainer with the Display and Control Unit

Analytical balances:

- ▶ Remove all items (such as weights) from the draft shield.
- ▶ Carefully remove all parts as shown in the illustration.

1. Weighing pan
2. Pan support (not for models MSU225.../MSU125...)
3. Shield plate/Draft shield

- ▶ Keep all parts in a safe place.

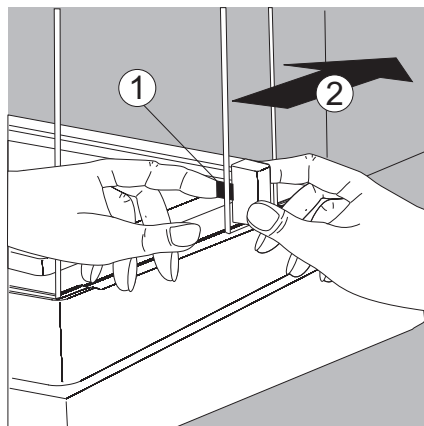
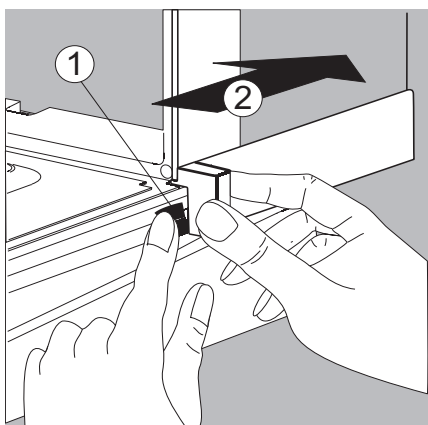
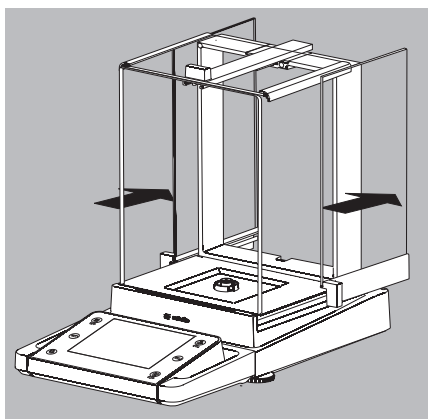
- ▶ Remove the panels (right and left).

Models with the analytical draft shield:

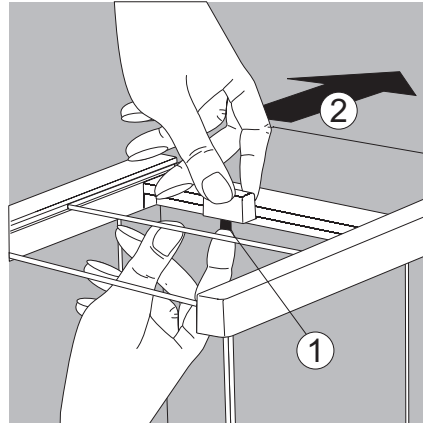
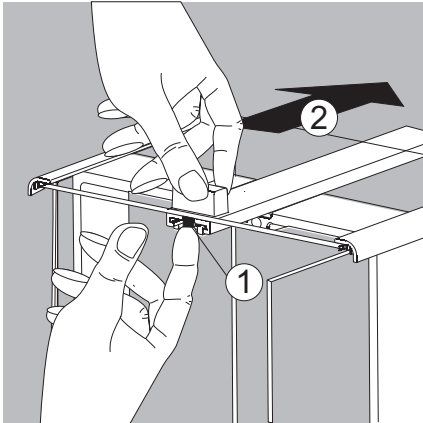
1. Press on the locking tab
2. Remove the panel

Models with the milligram draft shield:

1. Press on the locking tab
2. Remove the panel



- ▶ Keep all parts in a safe place.



► Remove the upper draft shield panel.

Models with the analytical draft shield (left illustration):

1. Press on the locking tab
2. Remove the panel

Models with the milligram draft shield (right figure):

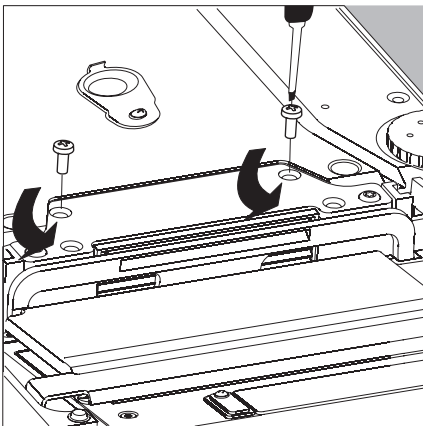
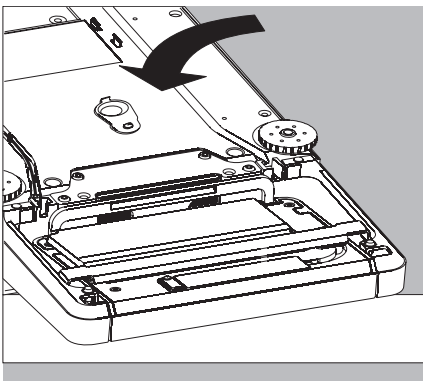
1. Press on the locking tab
2. Remove the panel

► Keep all parts in a safe place.

► Turn over the balance and place on a soft surface.



Exercise caution to avoid breaking the glass on models with a draft shield.



► Use a 2.5 mm Allen wrench to remove the two screws from the display and control unit retainer bracket.

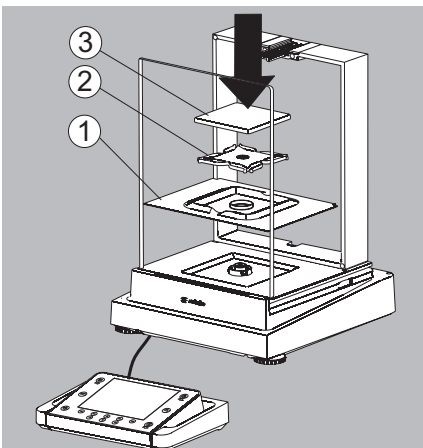
► Remove the display and re-insert both screws back into their holes.

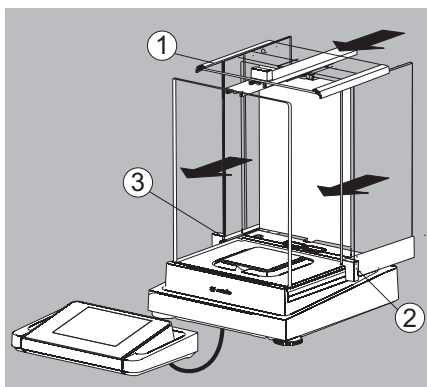
► Lengthen the cable and position the display and control unit as desired.

► Turn the balance over and place it on an even surface.

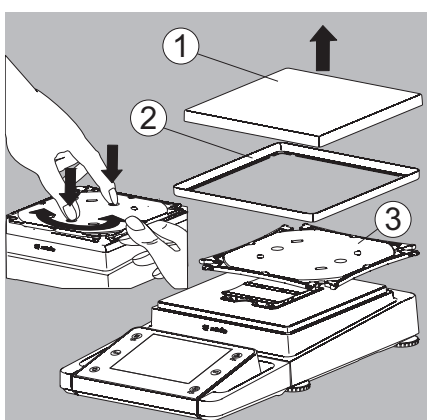
► Carefully place all parts on the balance.

1. Shield plate/Draft shield
2. Pan support (not for models MSU225.../MSU125...)
3. Weighing pan



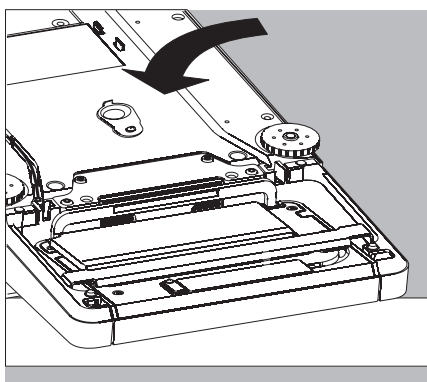


- ▶ Replace the upper and side shield panels.
- 1. Upper draft shield panel
- 2. Right draft shield panel
- 3. Left draft shield panel

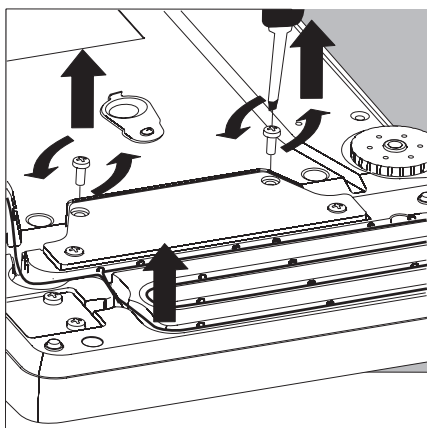


Removing the Display and Control Unit from Precision Balances without a Draft Shield with a Weighing Range of up to 15 kg

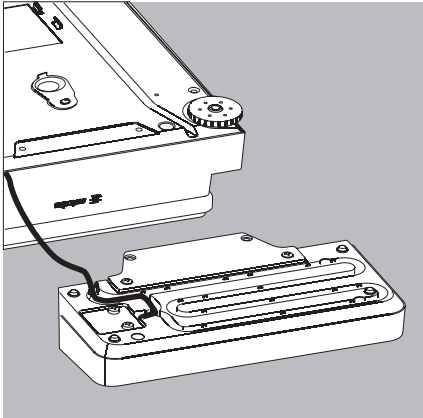
- ▶ Carefully remove all parts as shown in the illustration.
- 1. Weighing pan
- 2. Shield plate/Draft shield
- 3. Pan support



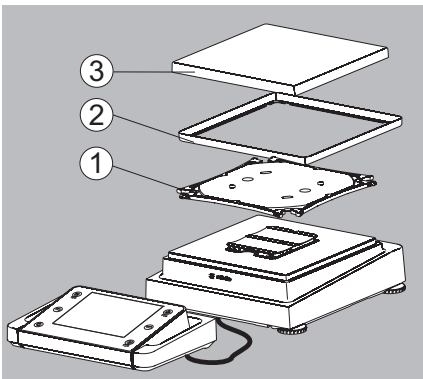
- ▶ Keep all parts in a safe place.
- ▶ Turn over the balance and place it on a soft surface.



- ▶ Remove the two retaining screws.
- ▶ Remove the display and re-insert both screws back into their holes.
- ▶ Carefully pull the cable connected between the display and control unit from the retainer.



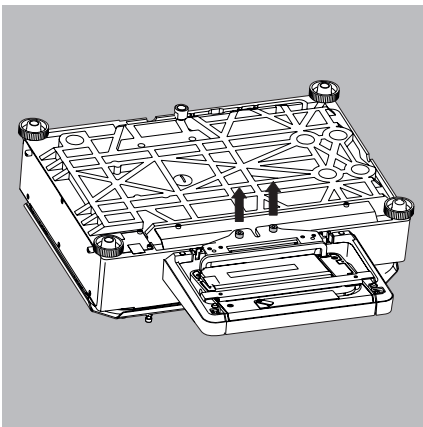
- ▶ Determine the required cable length.



- ▶ Return the balance to an upright position and fit the parts onto the balance.

1. Attach the pan support
2. Shield disk (only for models with a readability of 10 mg)
3. Weighing pan

- ▶ Level the balance.



Removing the Display and Control Unit from Models with a Weighing Range of 20 kg or more

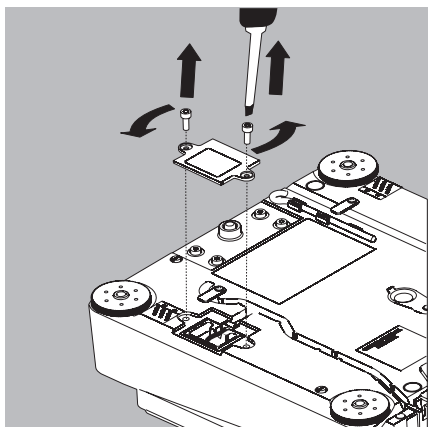


Remove the weighing pan before unscrewing the control unit, so that the weighing pan does not fall and cause injury.

- ▶ Turn over the balance so that the pan side is facing down.
- ▶ Remove the two fixing screws using a screwdriver.
- ▶ Remove the control unit and re-insert both screws into their holes.
- ▶ Carefully remove the connection cable from its holder.
- ▷ Longer connection cables should only be installed by a Sartorius technician.

Semi-microbalances: Attaching the Display and Control Unit to the Electronics Module (MSU225..., MSU125... models)

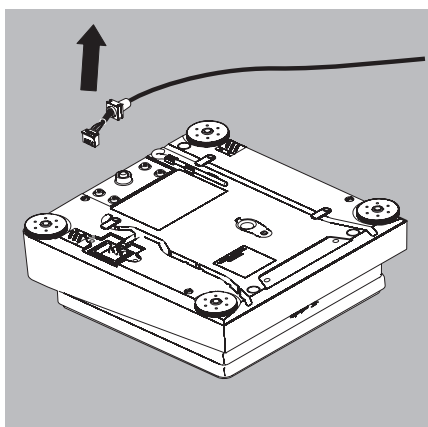
The display and control unit can also be attached to the electronics module if required for operation.



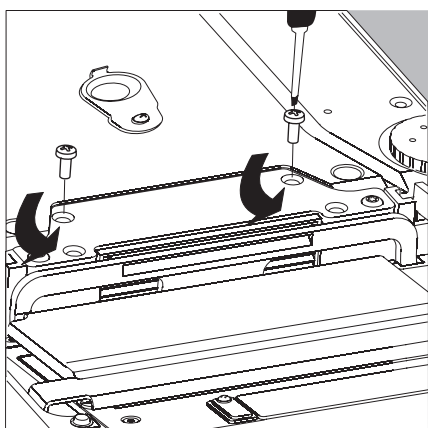
- ▶ Turn over the balance and place it on a soft surface.

Remove the connection cable from the cable channel:

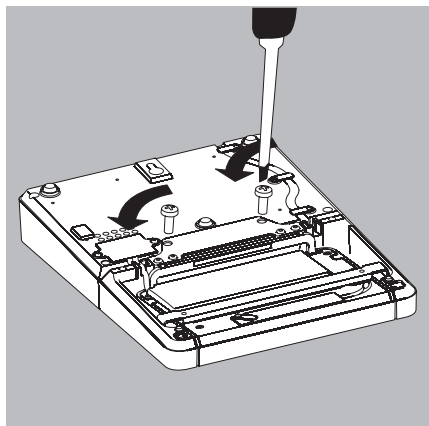
- ▶ Remove two screws from beneath the weigh cell and detach the plate.



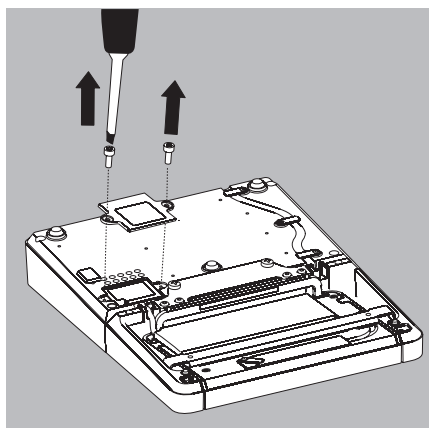
- ▶ Remove the connection cable plug.
- ▶ Then reattach the plate to the slot.



- ▶ Remove the display and control unit from the weigh cell:
Remove two retaining screws.
- ▶ Remove the display and control unit.



- ▶ Attach the display and control unit to the electronics module:
Reattach the two retaining screws.



- ▶ Open the slot for the connection cable on the electronics module:
▶ Remove the screws from beneath the electronics module and detach the plate.

Connect the display and control unit to the electronics module:

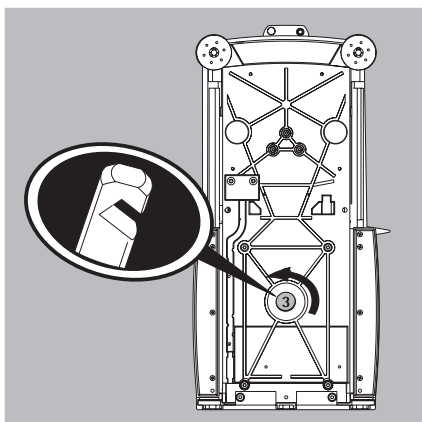
- ▶ Plug in the connection cable.
- ▶ Then reattach the plate to the slot.
- ▶ Slide the cable that sticks out into the cable channel.

Preparing Below-balance Weighing

A port for a below-balance weighing hook is located on the bottom of the balance.

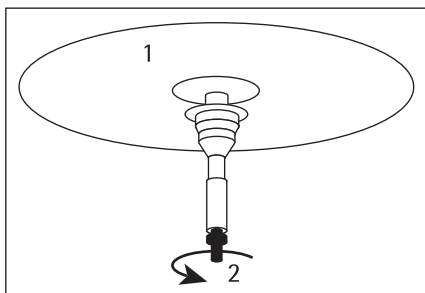
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The below-balance weighing port may not be opened or used on balances used for legal metrology.

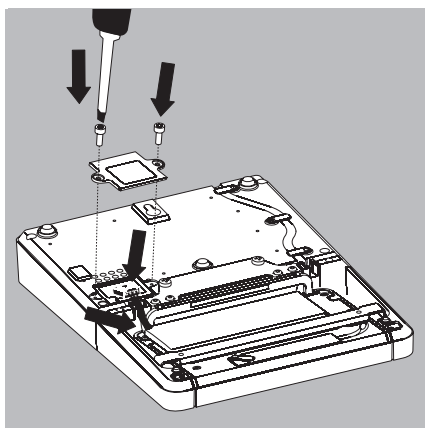


Models MSU116P, MSU66S, MSU66P, MSU36S, MSU36P:

- ▶ Unscrew cover plate 3 from the bottom of the comparator



- ▶ Hang the container with the sample on the notched hook
- ▶ Install a draft shield if necessary
- ▶ Lift up weighing pan 1
- ▶ Unscrew hook 2
- ▶ Insert opposite end of hook 2 into port and refasten
- ▶ Place weighing pan 1 back on the device

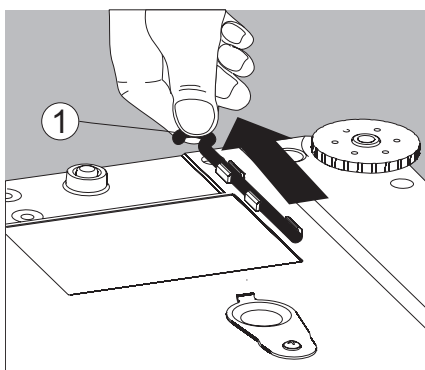


Models MSU6.6S, MSU3.6P, MSU2.7S:

- ▶ Remove both screws from beneath the weigh cell and detach the cover plate.
- ▶ For example, attach a wire to sample and hang it on the notched hook.

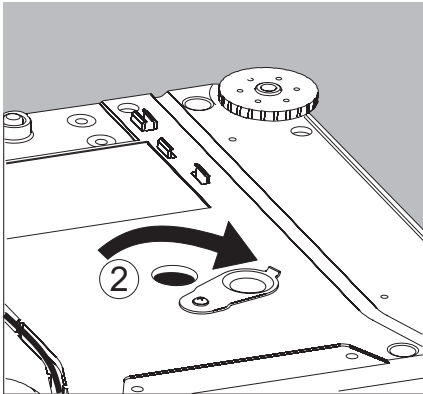


Install a draft protection shield.

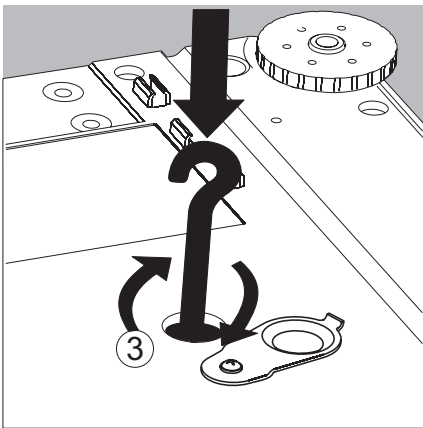


Analytical and Precision Balances with a Weighing Range of up to 15 kg:

1. Remove the hook for below-balance weighing from the bottom of the balance.



2. Push the cover of the below-balance weighing port to one side.



3. Carefully screw on the hook for below-balance weighing.



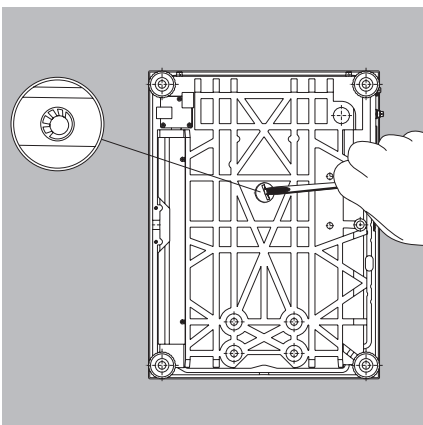
Do not screw it in too tightly, as this could damage the thread or the balance.



Install a draft protection shield.

- ▶ Attach the sample (e.g., using a suspension wire) to the hook.

4. When the below-balance weighing has been completed, unscrew the hook and return it to the clip under the balance.



Balances with a Weighing Range of 20 kg or more:

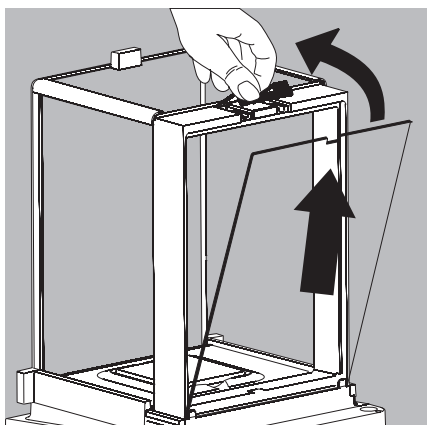
- ▶ Use a suitable screwdriver to unscrew the cover plate from the bottom of the mass comparator.
- ▶ Request the hook directly from Sartorius.



Install a draft protection shield.

Uninstalling Below-balance Weighing Equipment

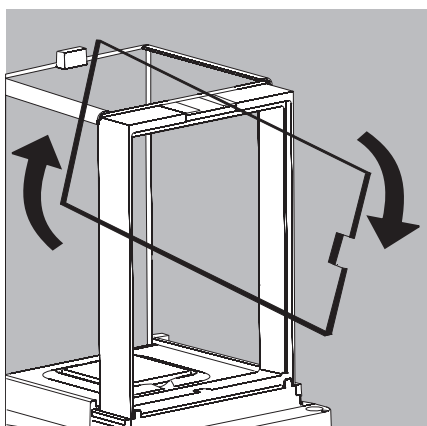
- ▶ After uninstalling the below-balance weighing equipment, you must close the opening again with the cover.



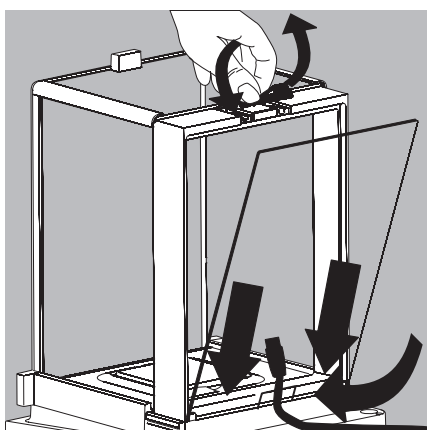
Using the Cable Opening of the Draft Shield

Models with an analytical draft shield have an opening for passing a cable (for example, for a temperature sensor) through to the interior of the weighing chamber.

1. Lift the locking tab on the rear panel of the analytical draft shield.
2. Lift the panel out of the draft shield.

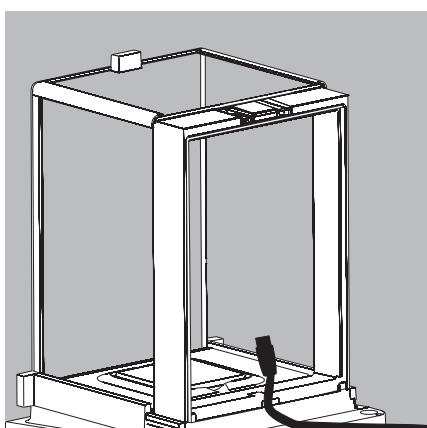


- ▶ Turn the panel clockwise 180° so that the opening is at the bottom.



- ▶ Install the desired sensor.
- ▶ Insert the panel in the guide rail.

- ▶ Lift the locking tab and gently press the panel into position.
- ▶ Press the locking tab down and close it.



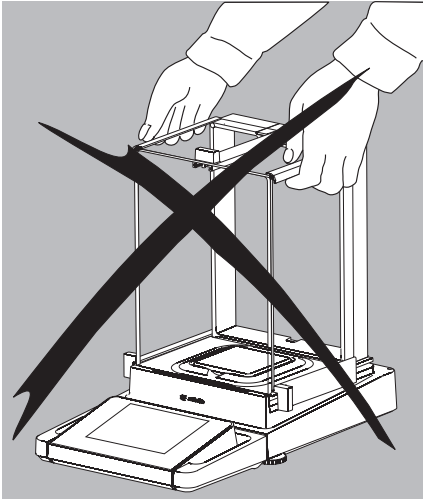
- ▶ You can now begin weighing.

Moving the Balance

Transporting the Device over Short Distances

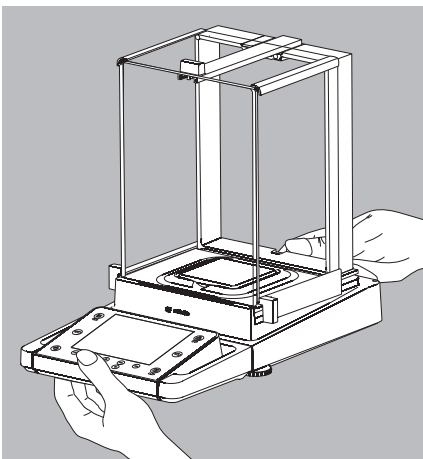


Exercise caution to avoid glass breakage.
Never lift and carry the balance by its draft shield.

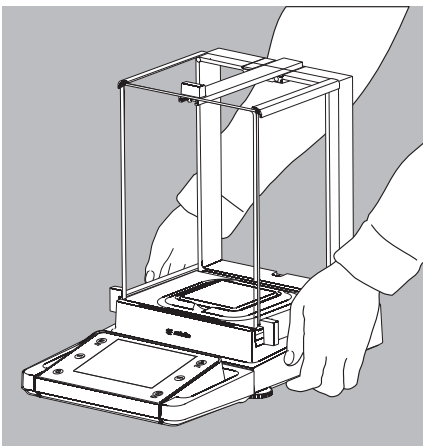


► Carry as shown in the illustration.

or



► Carry as shown in the illustration.





Storage and Shipping Conditions

- Permitted storage and shipping temperature: -10 to +60°C
 - Unpacked devices can lose their precision if subjected to extreme vibrations.
 - Excessive vibrations may compromise the safety of the equipment.
- Save the packaging for any future storage or shipment of the balance.
Only the original packaging provides optimum protection for the equipment.
- Follow all warnings and safety precautions.
 - Chapter: "Storage and Shipping"



Using the Balance

Turning the Balance On/Off

- ▶ Make sure the balance has been installed and put into operation in accordance with the installation instructions.
- () ▶ Press the on/off key () on the control unit.
- ▶ The start screen appears briefly on the display, and then the user interface appears.



On subsequent starts, the most recently active user profile and task are opened (if at least one user profile has been set up).

- () ▶ If prompted, level the balance (see Section “Leveling the Balance” for details).
- ▶ To switch the balance to standby mode or turn it off, press the () key.
- ▶ Close the draft shield (if your model has one).

Operating Design: Q-Guide

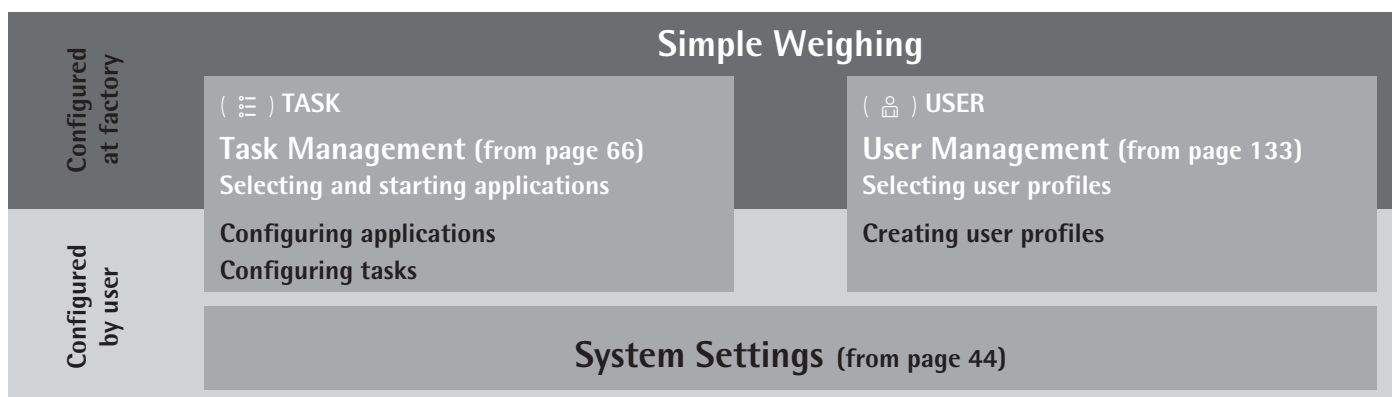
Cubis® precision and analytical balances are controlled by application software with interactive operator guidance. Once you open a menu or select an application, brief instructions appear on the display to guide you through the menu or application step-by-step. At each step along the way, the display shows only those options that are relevant to your process; this helps prevent unnecessary “detours” and enables you to reach your goal more quickly.

This type of user guidance is mostly intuitive. Although operation of the balance is also mostly intuitive, this manual includes a section with very detailed, step-by-step instructions where you can learn about all of the available options (see “Creating User Profiles” in Section “User Management”).

Basic Operational Structure

The most basic functions, weighing and taring, can be carried out as soon as the balance is switched on. The application software is divided into three general areas in which individual settings can be configured:

In **Task Management (TASK)**, task profiles with specific applications, weighing settings, and printout settings can be configured.



User Management (USER) lets you set up user profiles with specific configuration settings and user rights. You can also set up password protection to meet your security requirements. Your balance can also be used without User Management.

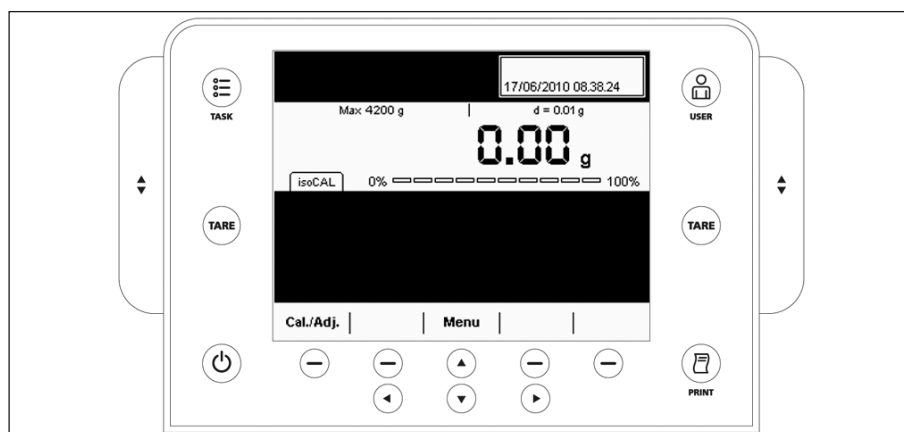
System Settings (MENU) contains all basic settings and parameters which are used to operate the balance, affect the entire operation of the balance, and can also be used for creating new tasks.

Wizard



You can choose between two display types in several menus:

- Overview** | The overview lists all parameters with their set options. You can select each individual option to change its setting.
- Wizard** | When you activate the Wizard in the same menu, the program guides you **step by step**: The individual parameters with their options are displayed in succession.






Using the Display and Control Unit



Control Keys (Softkeys):

- () **TASK** key: opens Task Management, in which applications can be selected and tasks defined. While working in this menu, you can also use the TASK key to cancel at any time and return to task overview.
- () **USER** key: opens User Management, in which user profiles can be selected and user settings defined. While working in this menu, you can also use the USER key to cancel at any time and return to user overview.
- (**TARE**) **TARE** keys – left and right: Zero and tare the balance.

M

If a balance verified for use in legal metrology is unloaded after taring: A negative gross value marked with a warning symbol appears. To avoid this: Apply the value of a container, e.g. using the application “Second tare memory” (see section “Second tare memory (preset tare)”, page 117.
- () **PRINT** key: used to print the currently displayed measurement results or a user-specific print-out
- () **On/off** key: used to turn on/off and switch to standby
- () **Softkeys**: used to activate the function displayed directly above them
- () **Cursor softkeys**: used for navigation on the display
- () **Operating elements for electronic draft shield (optional)**

Adjusting the Display and Control Unit

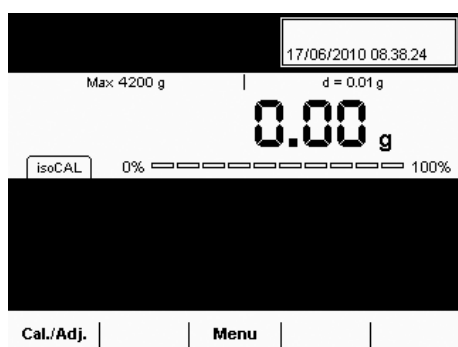
The tilt angle of the display and control unit can be set as desired to enable optimal readability for changing working conditions. The color and brightness of the display can also be changed to match the illumination in the room. (see “User Management” and “System Settings”).

SD Memory Card for Data Exchange

The display and control unit is equipped with a slot for an SD memory card where you can import and export data (tasks, user profiles). Handling the memory card is explained in Section **Importing/Exporting Data**.

Setting the Language

▷ The default language for the display is English.



▶ To change the language, select **Menu** and then **Lang.**



▶ Use the cursor softkeys to select the desired language.



▷ The display changes directly to the selected language.

▶ If you would like to select a language that was not included with the equipment supplied but was later downloaded from the Cubis® website, you must first import the language file (see Section “Importing/Exporting Data”).



▷ To display the downloaded language, select the last option in the language list (“Reloadable language”) and then select the desired language.

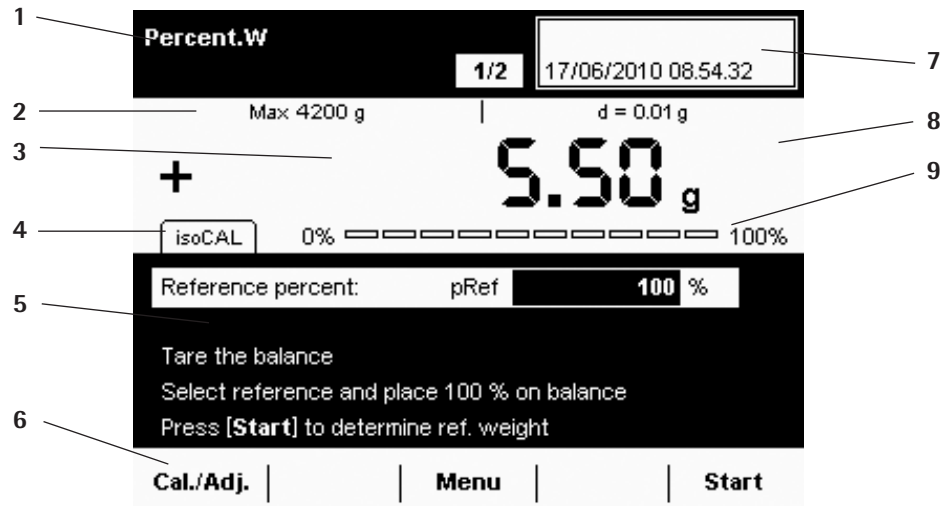
Quick Guide: First Weighing

- () ▶ Press the on/off key () to turn on the balance.
- ▶ Close the draft shield (if your model has one).
- (**TARE**) ▶ Press the tare key (**TARE**) to tare the balance.
- ▷ The balance is tared, and the displayed value is zero.
- ▶ If required, open the draft shield and carefully place the sample on the weighing pan (in a suitable container if required).
- ▶ Close the draft shield (if your model has one).
- ▶ You can read the measured value as soon as the weight value stops changing and the unit is displayed.

Display

The display varies depending on whether the application software is in operating mode or a menu is currently open (setup mode).

Display in Operating Mode



- 1 **Function display:** Current task (here: step 1 of 2)
- 2 **Metrology line:** Left: weighing capacity (max); right: **d** = readability (resolution) of the balance
- 3 **Value range** with current measurement value (the numeric value is displayed in black numbers once the weighing system reaches stability; beforehand it is shown in gray)
- 4 **Status and warning messages** (see below)
- 5 Task area with instructions on how to proceed
- 6 Functions which are currently available
- 7 User field: Display of current user, date, and time
- 8 For **_CE** model balances verified for use as legal measuring instruments: Display of weights that are not weight values, e. g., calculated values and values ≤ 0
- 9 Scaled display of measured value (percentage of weighing capacity utilization)

Status and Warning Messages

Tabs with the following messages may be displayed here:

isoCAL

isoCAL: isoCAL is active (extended temperature range)
isoCAL flashes: Calibration required

Level me

Level me! flashes: Balance is not level; leveling required

GLP

GLP: GLP print is active; header will be printed

[Maintenance]

Maintenance: The next scheduled maintenance date has been reached.

SQmin 10.0 g

SQmin: The entered SQmin value is permanently displayed
SQmin flashes: The weight value is less than the entered SQmin value

U 12.00 g

U or U* or PA: The selected DKD value (measurement uncertainty) is currently displayed.

Ion

Ion: Ionizer in progress (only if your model has an ionizer)

M Verified balances feature the following additional displays:

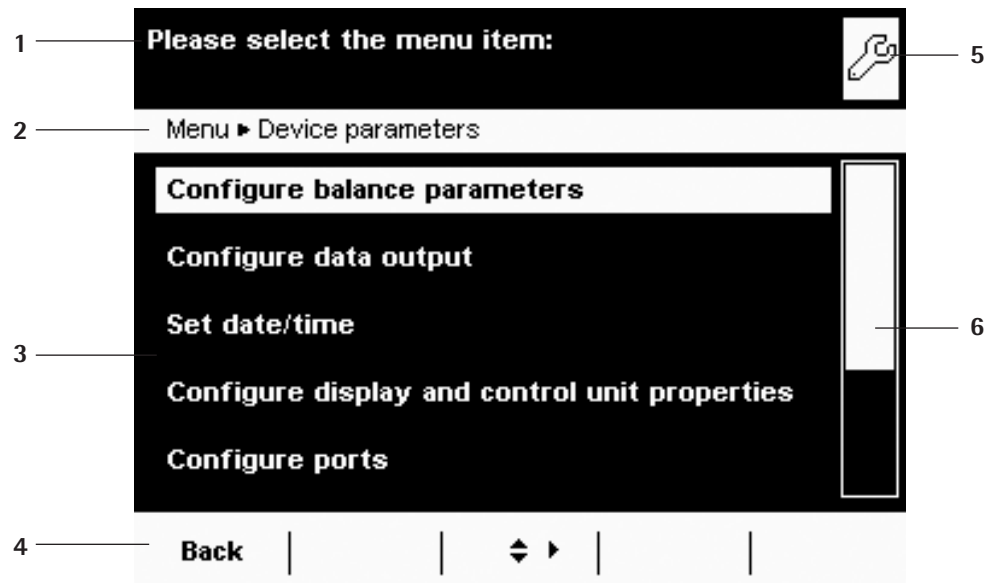
In the line for metrological data:

- Min** Minimum weight
- e** Verification scale interval

In the value range:

- o** calculated values
- Δ** Values ≤ 0 and other values
- pcs** Piece count

Display in Setup Mode



- 1 Interactive area with instructions on how to proceed
- 2 Orientation line showing your current location
- 3 Working area with selectable options
- 4 Toolbar with the available buttons
- 5 Symbol indicating which menu (TASK, USER, or MENU) is currently open
- 6 Scroll bar to view entire selection area

Operating the Display Unit



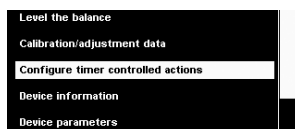
Equipment may be damaged by objects with points or sharp edges (e. g., ballpoint pens).

Use only your fingertips to operate the buttons and softkeys.

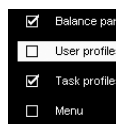


The cursor softkeys can be used to navigate to any of the selectable functions or settings on the display.

When you reach the desired menu item, press to confirm your selection.



Alternative selection: When only one out of multiple options is possible, select the desired option and confirm with .



Multiple selection: When several options are available, each option will have a checkbox. To select or deselect an option, highlight it and then press . To continue to the next program step, select **Next**.



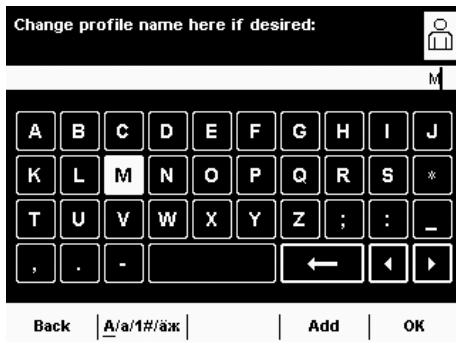
If the **scroll bar** appears on the right edge of the display, there are more options than are shown on the display. Scroll down with the cursor keys to view all of the selection options.

Entering Text and Numbers

A keyboard will appear whenever you have to enter text and numbers.

A cursor appears in the entry line above the keyboard.

- ▶ Select the character you would like to insert using the cursor softkeys.
- ▶ To accept the character, confirm with **Add**.
- ▷ The character will appear in the entry line.



A/a/1#/äx

Press the **shift softkey** to switch the input mode between uppercase letters, lowercase letters, numbers, and a complete set of special characters.

Add

Press **Add** to confirm the selected character and add it to the text line.

Cir T1

The **backspace key** is used to delete the character to the left of the cursor.



The two **arrow keys** move the cursor one character to the left or right.

OK

Press **OK** to exit input mode and save your entry.

Back

Press **Back** to cancel input mode and go back one program step to the previous screen.

Opening and closing the rotation draft shield (models MSU6.6S/3.6P/2.7S):

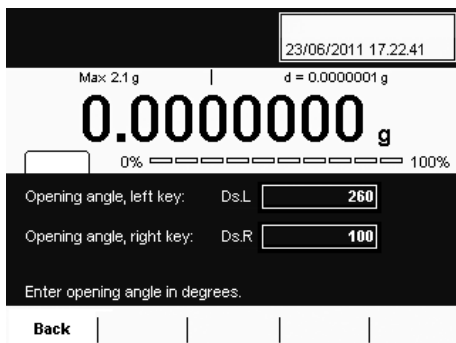
Defining the opening width:

DraftShd

- ▶ Touch **DraftShd**.

▷The settings for the opening angle are displayed.

- ▶ Check the settings and change as required.

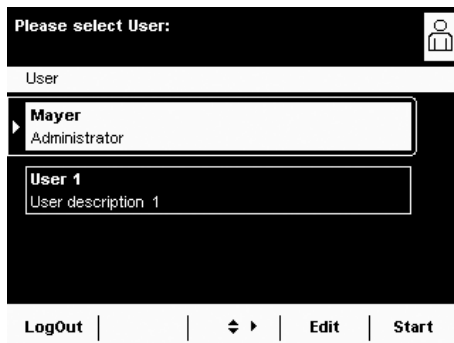




Draft shield opens according to the opening angle setting.

Activating/Switching Users

When the balance is in operating mode, the active user profile is displayed in the user field at the top right of the screen. To activate another user profile, open the User Management menu.

()



- ▶ Press the USER key ().
- ▶ The user list is displayed. The user profile that is currently active is indicated by an arrow.
- ▶ Select the user profile you would like to activate.
- ▶ Confirm your selection with .
- ▶ If password protection is activated, enter your password.
- ▶ The program switches back to operating mode, with the selected user profile activated.

System Settings (Menu)



This menu contains all balance settings relevant to the device. Basic settings can be made here that immediately affect the device. Changed settings do not affect previously defined tasks and user profiles.



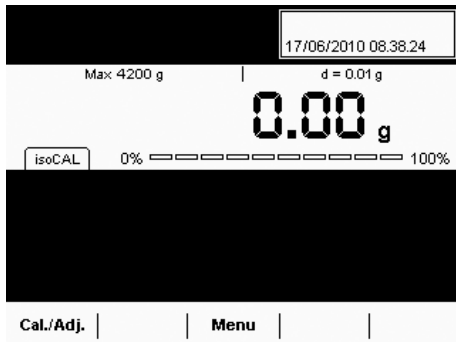
All system settings are applied to all user profiles.



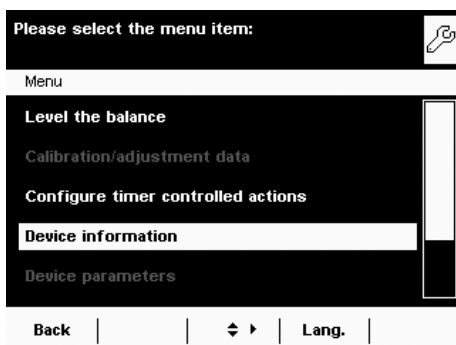
As long as a task is active and/or a user has been selected, several basic settings cannot be changed. In order to change all settings, "Weighing" has to be selected in operating mode and no user profile may be selected.



Not all functions/settings can be selected on balances used as legal measuring instruments.



► To open System Settings, select **Menu** when the balance is in operating mode.



► The list of available system settings is displayed.
 ► Use the cursor softkeys to select the menu item for the settings you would like to edit.

System settings are divided into the following menus:

- Level the balance
- Calibration/adjustment data
- Configure timer controlled actions
- Device information
- Device parameters
- Import/export data
- Service

You have already learned how to use the menus. In the following, only configuration options are described and explained.

Leveling the Balance (Q-Level)

It is essential for exact weighing results that the balance is absolutely level. The front leveling feet can be used to level out small tilts in the floor. Depending on the model, the balance is equipped with either motorized or manually operated leveling feet.

An integrated sensor detects the alignment of the balance and triggers a warning message when leveling is required. You can configure this warning message and the automatic leveling function (see System Settings > Balance Parameters).

When the isoCAL function is activated, the isoCal trigger is set after manual leveling. Balances with motorized leveling feet are leveled automatically prior to each new calibration/adjustment.



Note: The scale needs to be re-leveled and then adjusted each time its setup location is changed.

Level me

When “Level me!” appears on the display, you must level the balance.

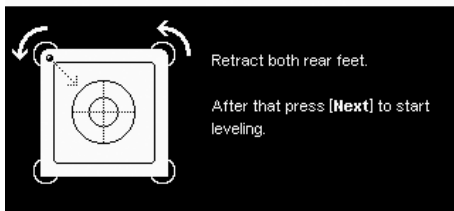
- ▶ Make sure that the weighing pan is empty.
- ▶ Select the option **Level the balance** from the menu.

Menu

Level the balance

Please follow the instructions to level the balance.

Menu ▶ Level the balance



Back



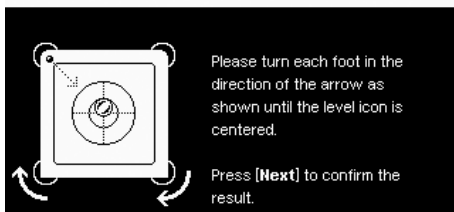
Next

Balance with Motorized Leveling Feet (Available for all models with a weighing capacity of >61 g and <6200 g):

- ▶ To start the leveling function, select **Next**.
- ▶ Follow the instructions on the display.

Please follow the instructions to level the balance.

Menu ▶ Level the balance



Back



Next

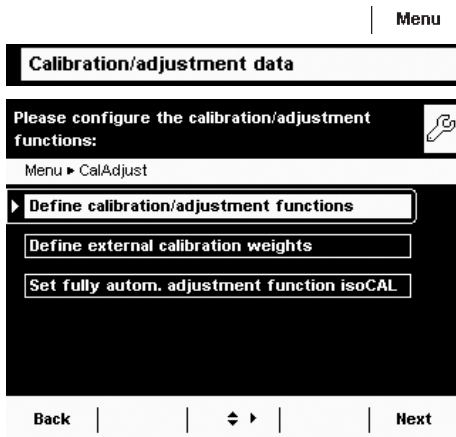
Balance with Manually Operated Leveling Feet

- ▶ Follow the instructions on the display.



After each leveling routine, the balance must be **calibrated/adjusted** (see Section “**Calibration and Adjustment**”).

Configuring Calibration/Adjustment



Settings are divided into the following submenus:

- Define calibration/adjustment functions
- Define external calibration weights
- Set fully autom. adjustment function isoCAL

- ▶ Configure the settings for all submenus.
- ▶ To save the settings, select **Save**.



Factory settings are marked with an asterisk (*).

Defining Calibration/Adjustment Functions



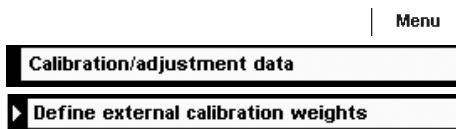
Cal./adj. key: Function: Block key / *Configure key selection menu / Select fixed 1-key function

Cal./adj. selection menu: Select which calibration/adjustment functions are listed when the Cal./adj. key is touched.

Cal./adj. sequence: Options: *Calibrate, then adjust automatically / Calibrate, then adjust manually

Cal./adj. unit: Options: *Gram / Kilogram / Defined via data record

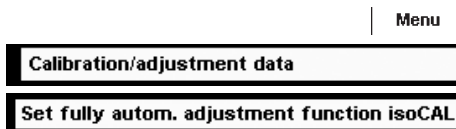
Defining External Calibration Weights



No. of ext. cal. weights: Enter the number.

Ext. cal. weight n: Enter the data for each calibration weight: weight value (in grams), ID, certificate, validation

Configuring Fully Automatic Adjustment Function isoCAL



isoCAL: Define the function setting: Off / Show alert levels, manual start / *On, automatic execution

isoCAL alert level: *isoCAL status field only / Alert message, repeating / Error message, adjustment required

isoCAL temperature: Enter temperature difference (in Kelvin).

isoCAL interval time: Enter interval time in hours.

Configuring Timer Controlled Actions

You can program the following actions so that they run automatically at preset times:

- Show message and execute command (see example below)
- Execute command
- Show message (e. g., a prompt as a reminder)

▶ The available actions are displayed. When you open this menu for the first time, the list will be empty.

▶ Select **Edit**.

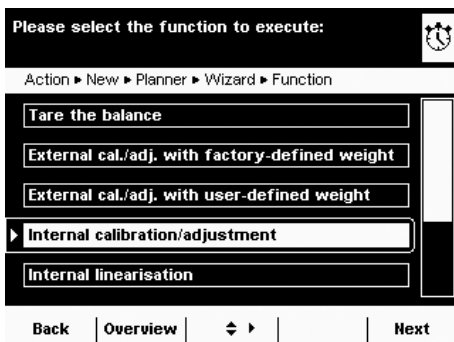
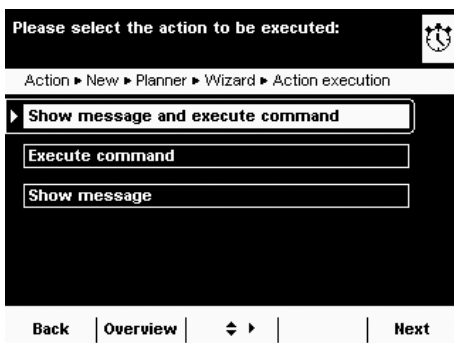
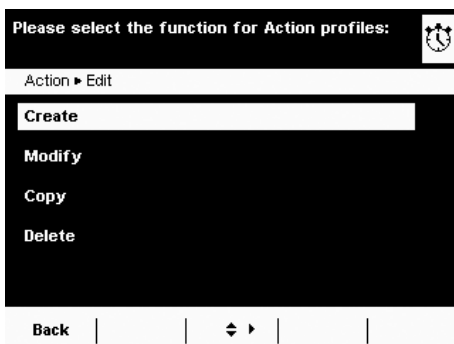
▶ To define a new timer controlled action, select **Create**.


Later you can also modify, copy, or delete each action here.

Example: You want the “Internal calibration/adjustment” function to run each morning at 7:00 a.m. In addition, you want a message to be displayed.

▶ Select the desired action (e. g., “Show message and execute command”).

▶ Select the command you want to be executed (e. g., “Internal calibration/adjustment”).




Please enter the message text: 

Action ▶ New ▶ Planner ▶ Wizard ▶ Message text

Message text:

Back | Overview | ◀ ▶ | Next

- ▶ Enter the text you want to be displayed when the action is being performed (e. g., “Timer-controlled adjustment”).

Please enter the execution date and time: 


Action ▶ New ▶ Planner ▶ Wizard ▶ Execution date/time

Date:

Time:

Back | Overview | ◀ ▶ | Next

- ▶ Enter the time when the action should be performed for the first time.

Please enter the repetition time period: 

Action ▶ New ▶ Planner ▶ Wizard ▶ Repetition time

Years:

Months:


Days:

Hours:

Minutes:

Back | Overview | ◀ ▶ | Next

- ▶ Define the time interval at which you want the action to be repeated (e. g., one day for daily occurrence).

Enable or disable execution of the action: 

Action ▶ New ▶ Planner ▶ Wizard ▶ Execution


▶ Enable action

Disable action

Back | Overview | ◀ ▶ | Next

- ▶ To start the action at the preset time, select **Enable action**.

Here you can disable the programmed action at any time and re-enable it later with a new starting time.

Check parameters for timer controlled actions: 

Action ▶ New ▶ Planner ▶ Overview

Action execution:	Msg. and command
Function:	Internal cal./adj.
Message text:	ZEITGESTEUERT JUSTIERE
Execution date/time:	17/06/2010; 09.35.45
Repetition time:	0 ; 0 ; 1 ; 0 ; 0

Back | Wizard | ◀ ▶ | Next

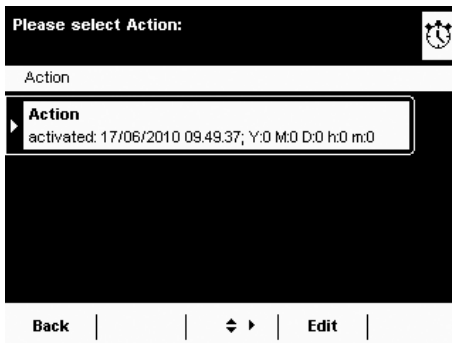
- ▷ An overview of all settings for the action is displayed.

- ▶ Check and correct all settings as required.

- ▶ Select **Next**.

- ▶ Enter a name and a description for the action.

- ▶ To save the action, select **Save**.



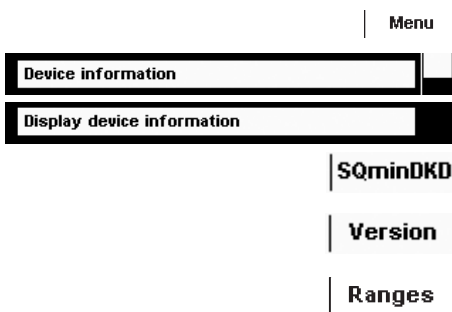
- ▶ The programmed action is displayed in the list of actions. You can edit them again at any time here.

Displaying Device Information



You can view various information here.

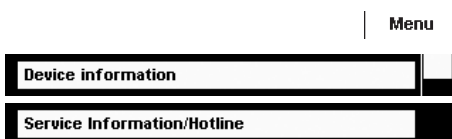
- ▶ Select the information that you want to view.



Displaying Basic Information

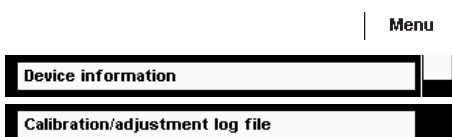
Here you can find all information about the manufacturer, model, serial number, host name, and IP address used.

- ▶ To view the parameters for SQmin and DKD, select **SQminDKD**.
- ▶ To view the version of the balance, display and control unit, and application software, select **Version**.
- ▶ To view the weighing ranges and digits (resolution), select **Ranges**.



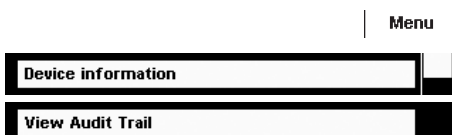
Service Information/Hotline

Service contact information is displayed here along with the hotline number and maintenance contract and interval information.



Calibration/Adjustment Log File


The log file is displayed here with the results of all calibration and adjustment routines. The older entries are deleted by new entries on a rolling basis.



View Audit Trail

All changes to the menu, user profiles, and task profiles are logged in the audit trail. These logs will include the following information: user, profile, parameter ID, parameter, old and new setting. The older entries are deleted by new entries on a rolling basis. The audit trail can be deactivated via Sartorius Service.

Alibi Memory

The alibi memory contains (stores) weighing results with date, time, and process number. This takes place every time a print job is requested [e. g., by pressing **Print** ()]. Tare and input values are also saved. The alibi memory can therefore be used as a **replacement for a log printer**.

The data memory has a ring buffer, meaning that the oldest data records can be overwritten by new ones. The user can define a memory-time dependent overwrite protection as well a storage period. Standard: 90 days, see Section “Device Parameters.” The alibi memory can contain approximately 450,000 data records; storage capacity depends on the size of each data record.

M

The alibi memory is verifiable. When the balance is calibrated, you must check that the alibi memory is correctly functioning by saving some values.

M

If the alibi memory is being used in legal metrology (according to Council Directive 2014/31/EU), the following must be observed:

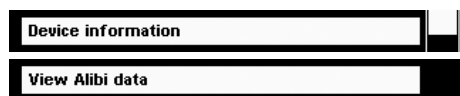
- Make sure that there is sufficient storage capacity. Responsibility for this lies with the operator.
- The weighing results should be stored together with a unique ID code (e. g., number or date and time). This makes it possible for every weighing operation or weighing result to be easily assigned and verified if necessary. These ID codes must be indicated on any receipts generated on peripheral devices.
- All the required tare and net values will be saved during data output.
- It must be possible for the contractual partners involved to be able to check and verify the stored weighing results.
- Any continuously output weighing results that have not previously been stored and have no identification codes may only be used for applications that are not used in legal metrology (e. g., batching, controlling, or similar). It is not permissible to circulate any results lacking identification codes for applications used in legal metrology.
- Receipts can be prepared by a peripheral device not subject to legal verification in accordance with the preamble to Annex I of Directive 2014/31/EU and Section 7b (3) 2 of the German Verification Act.
These receipts must contain the following information:
 - ID code for every weighing result,
 - if used in Germany, a note stating that the weighing results can be compared with the legally stored weighing results using their identification codes.

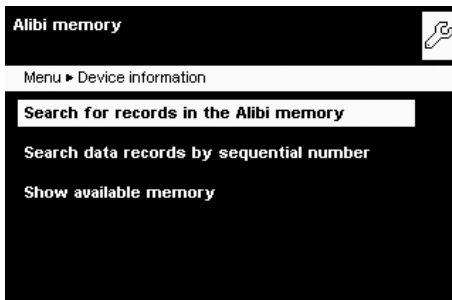
You must first install and activate the alibi memory in order to use it (see Device Parameters > Alibi Memory Configuration).

Menu

Searching for and Displaying Data in the Alibi Memory

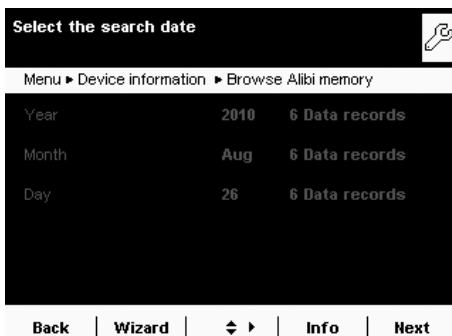
You can search for data using various search criteria and view the storage capacity of the alibi memory.



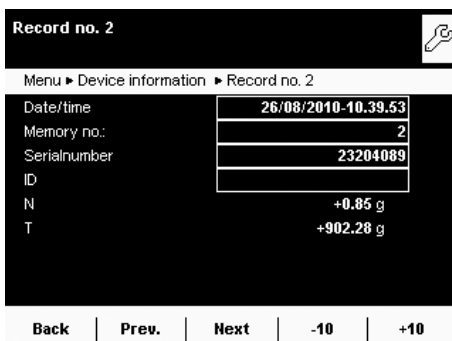


Searching for Data Records by Date

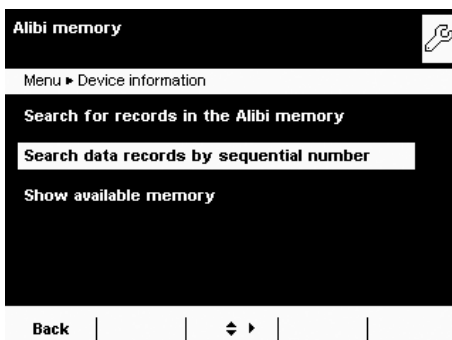
- ▶ Select the search function.



- ▶ An overview appears on the display.
- ▶ Limit the search by selecting the year, month, or day.

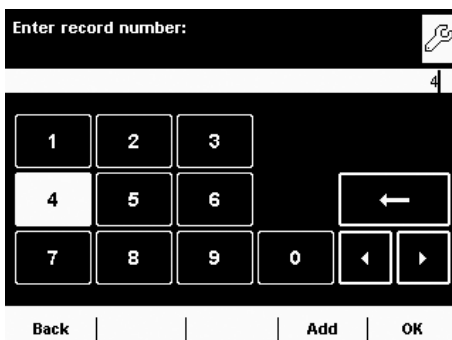


- ▶ Select **Next**.
- ▶ The desired records are displayed.
- ▶ Using the **Prev.** and **Next** buttons, you can view more data records from the selected date.

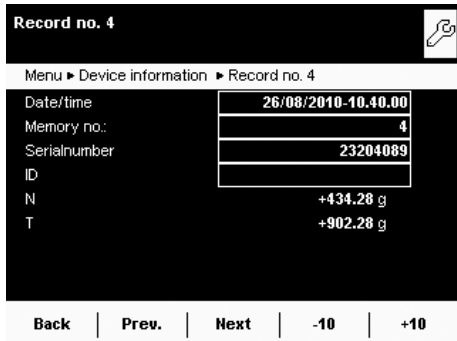


Searching Data Records by Sequential Number (Data Record Number)

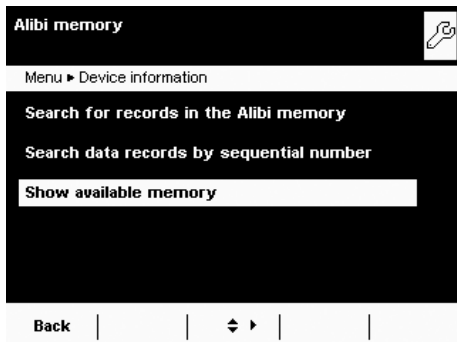
- ▶ Select the search function.



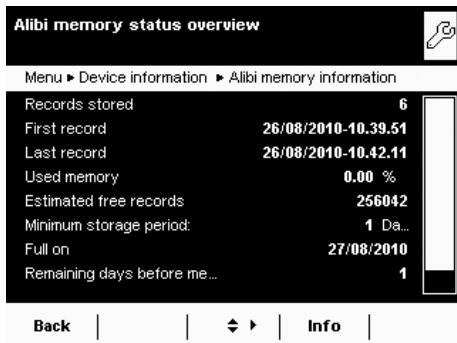
- ▶ Enter the number for the desired data record.
- ▶ Select **OK**.



▷ The desired data record appears on the display.

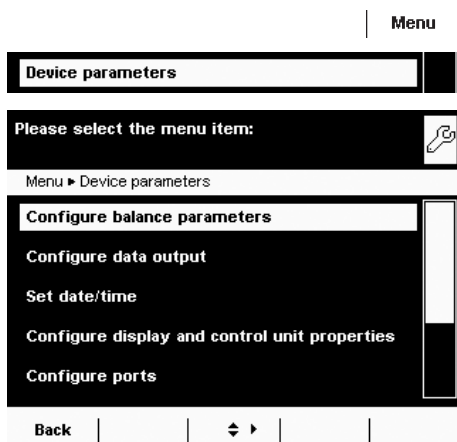


Viewing Information on the Alibi Memory and Available Memory Space



All important status information for the alibi memory is shown here. You can view the percentage of memory space in use and an estimate of how many data records can still be stored. The exact number depends on the size of each data record.

Device Parameters



Here you can update the software and change the following device settings. Settings are applied to all user profiles.

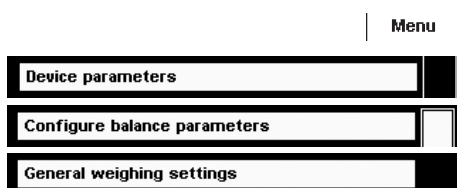
- Configure balance parameters
- Configure data output
- Entering the Device ID
- Set date/time
- Configure display and control unit properties
- Touchscreen adjustment
- Ports
- Alibi memory
- Update software
- Software activation codes (e.g. for “Q-Apps” software options)
- Restoring factory settings
- Motorized draft shield (optional)
- Ionizer (optional)

Configuring Balance Parameters

Factory settings are marked with an asterisk (*).

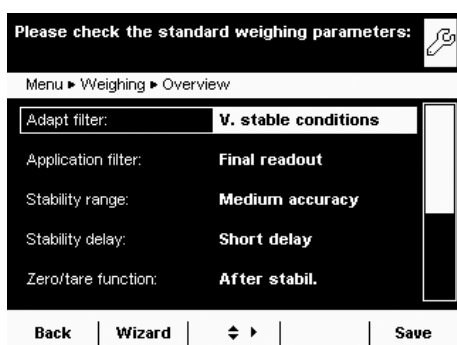
General Weighing Settings

Here you can configure the default settings for general weighing functions. These settings can be changed for a specific task whenever a new task is created.



These settings can only be changed when the balance is set to “Weighing” in operating mode. If **General weighing settings** cannot be selected, use the **TASK** (☰) button to switch to Task Management and select **Weighing**.

In order to view detailed information about individual settings, select **Info**.



Adapt filter: The effects of unfavorable weighing conditions such as drafts or vibration can be filtered out by adapting the balance filter (and thus its measuring time) to suit ambient conditions. Options: Very stable conditions / *Stable conditions / Unstable conditions / Very unstable conditions

Application filter: Equalizes the load deviations on the display. Options: *Final readout / Filling mode / Low filtering / Without filtering

Stability range: The stability indicator lights up when the weighing results are constant within a set range. Options: Maximal accuracy / High accuracy / *Medium accuracy / Fast / Very fast / Maximal fast

Stability delay: This setting compensates for slowly abating disturbances, such as turbulence in the weighing chamber of an analytical balance). Options: *Very short delay / Short delay / Median delay / Long delay

Zero/tare function: Conditions for performing the tare function.

Options: Without stability / *After stability / At stability

Automatic zeroing: When this option is turned on, the balance is tared automatically when a set fraction of scale intervals per second changes from the display zero point. Options: On / *Off

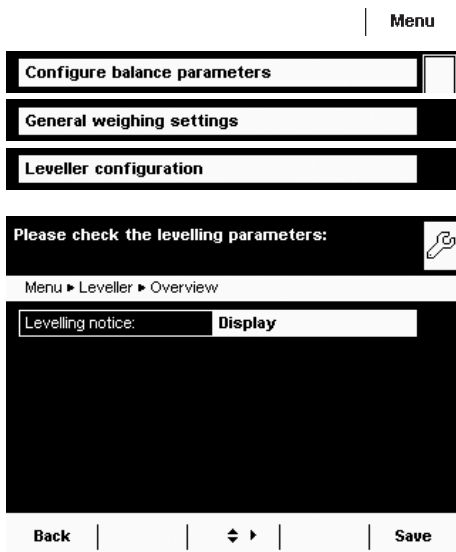
Basic unit: Weight unit to be used for this task. Options: Any available weight unit – the default setting is in grams.

Display accuracy: A lower display accuracy results in a faster display.

Options: *All digits on / Last digit off

Zero/tare at power on: Automatic taring when the balance is switched on.

Options: *On / Off



Leveler Configuration (Q-Level)

You can configure the leveling function here.

Leveling Notice

Off, no indication: Leveling prompt is disabled.

Display status: As soon as leveling is required, **Level me!** appears and flashes.

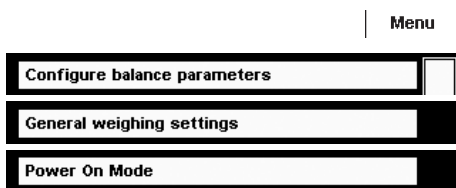
Alarm message, leveling required: As soon as leveling is required, **Level me!** appears and flashes. If this notice is ignored, an alarm message appears after five minutes. If this occurs, you can only continue working after the balance has been leveled.

Automatic Leveling (Balances with Motorized Leveling Feet Only)


Switch off, start with key: Select **Start** to activate automatic leveling.

Switch on fully automatic: The balance is leveled automatically before every calibration/adjustment routine.

▶ To save the settings, select **Save**.

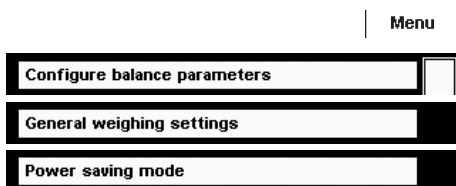


Power On Mode

▶ Select the balance's startup mode for when the balance is switched on or when the on/off key () is pressed repeatedly.

Options: **On/standby** or **Always on**

▶ To save the settings, select **Save**.



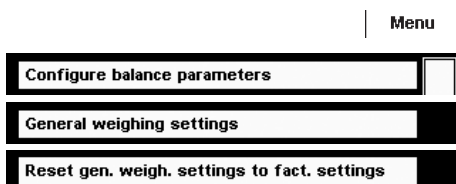
Power Saving Mode

▶ Switch the power saving mode of the balance on or off.

Off, no function: Power saving mode is not in use.

Automatic shutoff after 2 minutes: The backlight on the display and control unit switches off if the device is idle for two minutes.

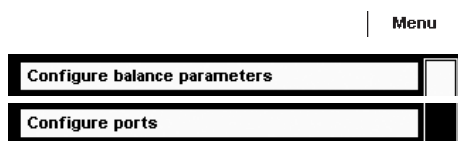
▶ To save the settings, select **Save**.



Restoring Factory Settings

You can reset all balance settings back to the default delivery status here (after confirming the reset when prompted).

Configuring Data Output (Print Parameters)



Here you can configure all settings for printing and data output. Several of these settings depend on the interface configuration (see Section “Interfaces”).



Factory settings are marked with an asterisk (*).

Info

In order to view detailed information about individual settings, select **Info**.

Printout interface: Options: COM port A, B, C (file/SD memory card), D and print to file

Protocol: Options: Print / SBI / xBPI / Web services / SICS / Second display. This setting cannot be changed here; it is defined when configuring the interfaces.



The parameters and settings that are displayed here depend on the configured protocol.

GLP printing: When should ISO/GLP printing be allowed? Options: *Off / For calibration/adjustment only / Always on.

Taring after printing: Automatic tare after print command. Options: *Off / On

Print event: What event should trigger printing? Options: *PRINT key / Starting a task / Initialization of an application / Application result / Printing of component / Result from an application (evaluation of application) / End of task / Calibration/adjustment result

Print key elements: Which elements should be printed?



For further information, please refer to **Configuring Printouts** in Section **Interfaces**.

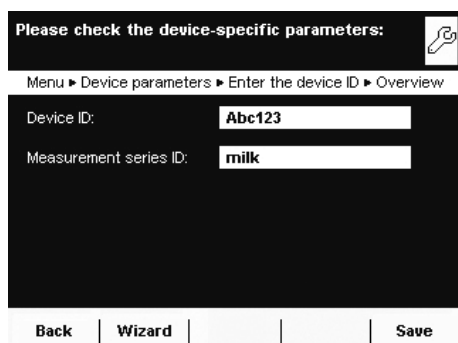
Entering the Device ID



With these two IDs, you can expand the printer protocol.

- ▶ Select the input for both the IDs
- ▶ Enter the desired value (text) for each identifier.

- ▶ To save settings, touch **Save**.



Associated input and output commands for data output: See the chapter Interfaces: SBI Commands, page 160

Setting Date/Time

The date, time, and display format can be set here.

Under **Date format**:

- ▶ Select how the date is displayed and printed out.
 - **Standard**: Language-dependent display format
 - **DD/MM/YYYY** or **DD.MM.YYYY**: The date is displayed in the order of day, month, and then year.
 - **MM/DD/YYYY**: The date is displayed in the order of month, day, and then year.
 - **YYYY-MM-DD**: The date is displayed in the order of year, month and then day.

Under **Time format**:

- ▶ Select how the time is displayed and printed out.
 - **Standard**: Language-dependent display format
 - **HH.MM.SS** or **HH:MM:SS**: The time is displayed in 24-hour format.
 - **HH.MM.SS on**: The time is displayed in 12-hour format. The hours before noon are displayed with **AM**, and the hours after noon are displayed with **PM**.

Configuring Display and Control Unit Properties

The following properties of the display and control unit can be changed as necessary: **Language**, **Background color**, **Brightness**, **Acoustic signal**.

These general properties are applied to all user profiles, are also used when no user is logged in, and serve as a template when a new user profile is created.

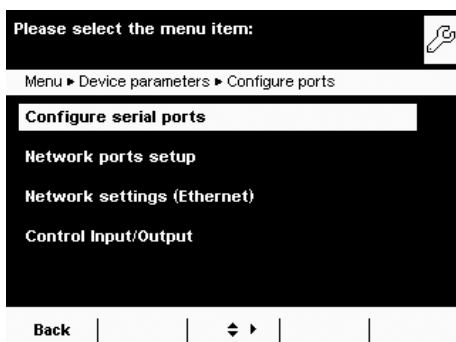
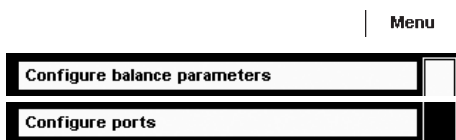
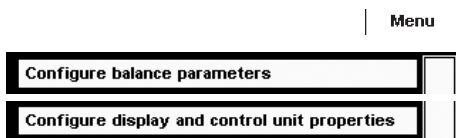
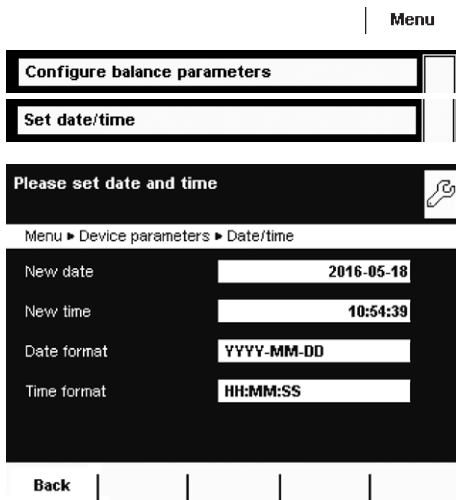
Configuring Ports and Network Settings)

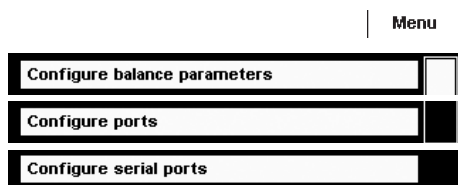
Here you can configure interfaces (serial ports and network) and settings for the network.

Also settings for:

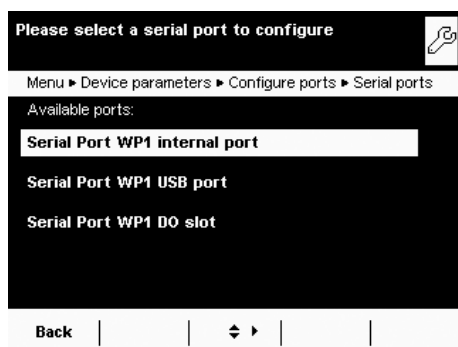
- Control inputs/outputs
- Print to file
- FTP server settings

A detailed description of the connection options and data interface ports can be found in Section **Interfaces**.

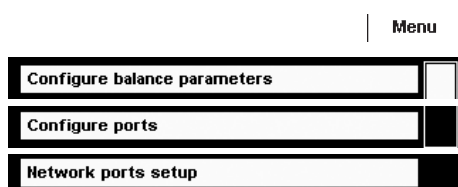




Configuring Serial Ports

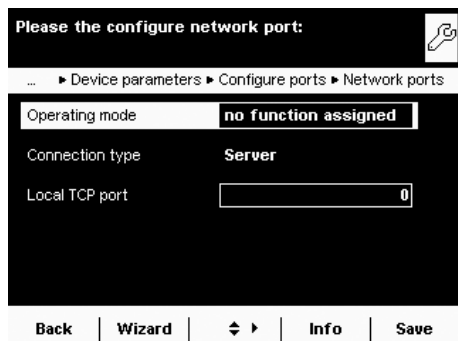


- ▶ The available ports are displayed.
- ▶ Select the port you want to configure.
- ▶ Configure all settings for this port.
- ▶ To save the settings, select **Save**.

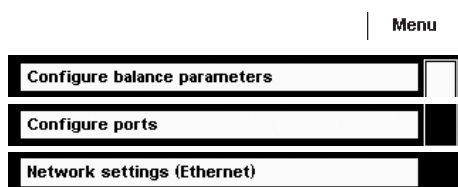


Configuring Network Ports (Ethernet)

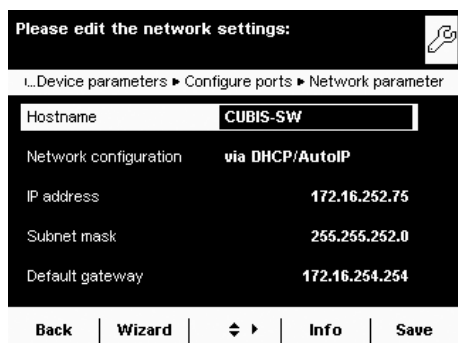
For more information on network operation, see “Network Interface” in Section **Interfaces**.



- ▶ Select operating mode for the network interface.
No function / **xBPI** (expanded Sartorius communication / **SBI** (Sartorius standard protocol) / **Printer output** / **SICS protocol**
- ▶ Select connection type.
Server or **Client** connection
- ▶ Configure the local TCP port.
- ▶ To save the settings, select **Save**.



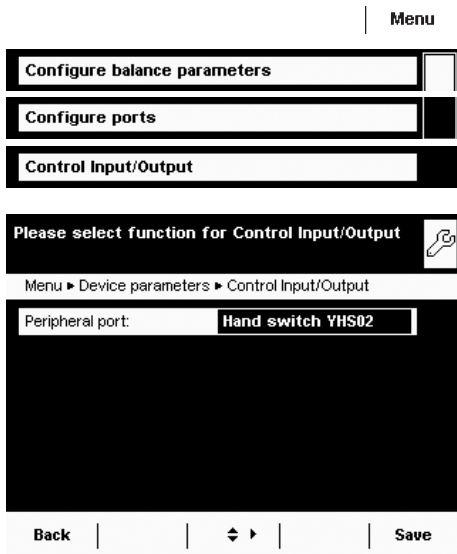
Configuring Network (Ethernet)



- ▶ Define the settings for network operation.

The **Hostname** (device name – max. 24 characters) set here can be printed on logs. The **IP address** can be entered and set as a default or obtained automatically.

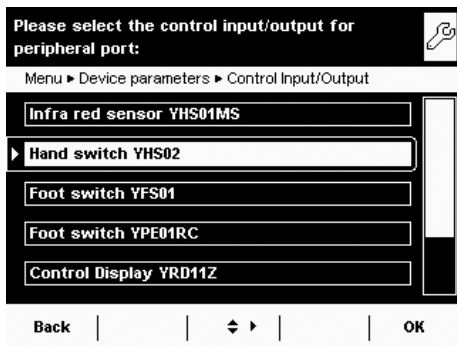
- ▶ To save the settings, select **Save**.



Control Input/Output (e.g., for Remote Switch)

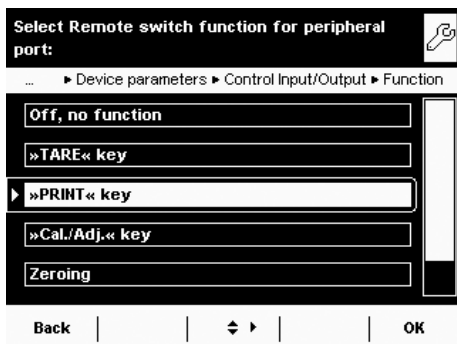
If you have connected a remote switch, for example, via the peripheral or optional port, you can define its function here.

- ▶ Configure the setting for each port.

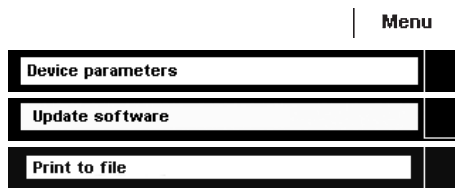


- ▶ Select the connected hardware device or control function.

- i During checkweighing, the control outputs have no function when set to:
 - Foot switch YPE01RC
 - Control inputs



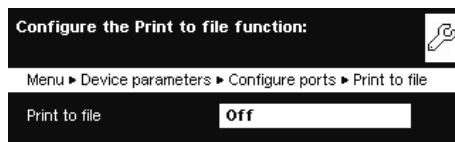
- ▶ Configure the settings for the control inputs and outputs.
Options: Off, no function / TARE key / PRINT key / Cal./Adj. key / Zeroing / Taring
- ▶ To save the settings, select **Save**.



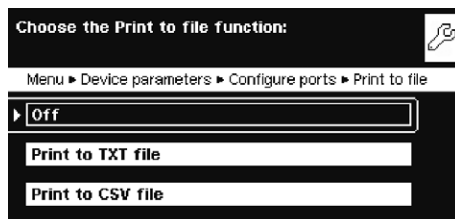
Configuring "Print to file"

Purpose:

- Transferring a print file in TXT or CSV format to a SD card or FTP server.
- Viewing a print file directly in an Internet Browser.



- ▶ Select **Off**.

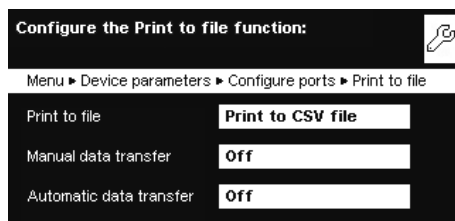


- ▶ Specify the file format.

Print to CSV file:

In addition to the SBI output (like in the TXT file), three additional columns are also written to the file: ID, Value and Unit.

The 4 columns are separated by the ";" character. The "+" sign has also been removed in the third column and the decimal point has been replaced by a decimal comma (because of Excel).

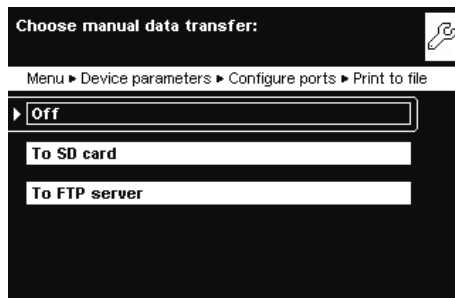


- ▶ To specify the settings for the automatic or manual data transfer, touch **Off**.
- ▷ The data are deleted from the balance after the automatic or manual transfer so that only the new data are transmitted the next time there is an automatic transfer.

▷ Manual transfer:

Touch **Trans.SD** or **Trans.FTP** during operation to transfer data to the SD card in the balance or to the FTP server.

- ▷ The transfer takes place in the data/print directory.

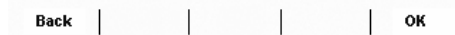


- ▶ Select the output medium for the file.

- ▷ This file can be transferred manually or automatically to the SD card of the FTP server. Combinations are also possible, e.g. manual transfer to the SD card and automatic transfer to the FTP server.

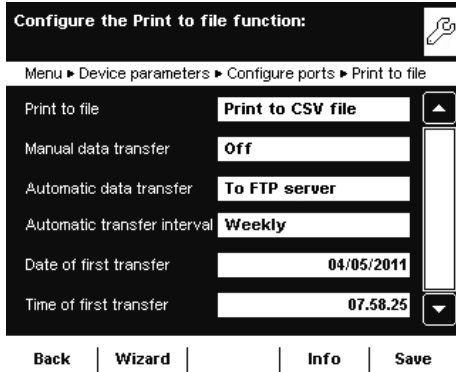
"To SD card":

- ▷ When exporting, print files can also be exported to the SD card independent of the transfer. This will create a copy (backup) of the file to the SD card. This does not delete the file from the balance. After the export, the files are located in the directory data/all/EXPORT-xxxx/print.

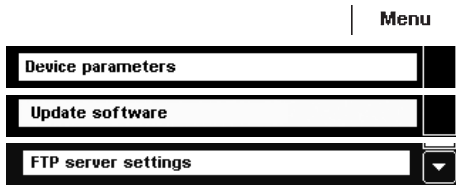


“To FTP server”:

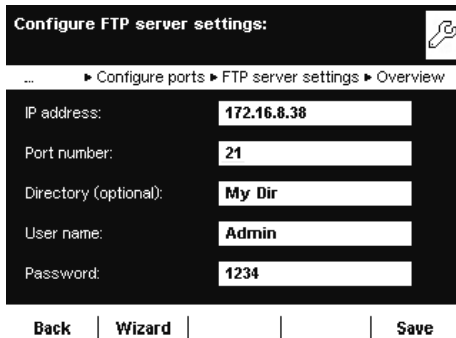
- ▶ If you use the FTP server option for the transfer, the parameters for the FTP server must be entered in the menu (see next section). The user must have the rights to create subdirectories on the FTP server.
- ▶ Select the desired interval, the date and the time of the first transfer.
- ▶ To save settings, touch **Save**.

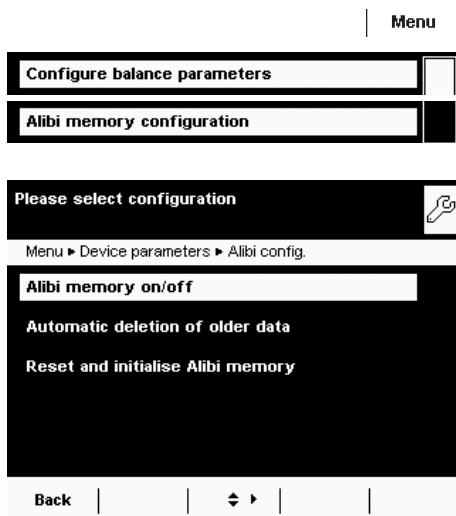


Configuring Data Transfer Settings for an FTP Server



- ▶ Specify the data transfer settings to a FTP server.
- ▶ Enter the following parameters for the FTP server: IP address, port, FTP user name, FTP password and optionally a subdirectory as well. The user must have the rights to create directories on the FTP server.
- ▶ For more information about displaying a print record via an Internet browser, go to **Interfaces**, “Remote Control of the Balance from a PC via Ethernet” section.





Configuring the Alibi Memory

Here you can switch on the alibi memory, delete the recorded data, and set the interval for automatic deletion.

- ▶ Use the cursor softkeys to navigate through the **Device parameters** submenu to **Alibi memory configuration**.

Alibi Memory On/Off

- ▶ Select whether you want to have the alibi memory switched on or off.

Automatic Deletion of Older Data

- ▶ Define whether the data stored in the alibi memory should be deleted automatically at regular intervals after a pre-specified time.
- ▶ If data should be regularly deleted, enter the desired interval (deletion cycle) in days.

Reset and Initialize Alibi Memory

You can delete all data from the alibi memory immediately. The settings for the alibi memory (on/off, deletion cycle) will remain stored.

- ▶ To delete data in the alibi memory, confirm deletion when prompted.

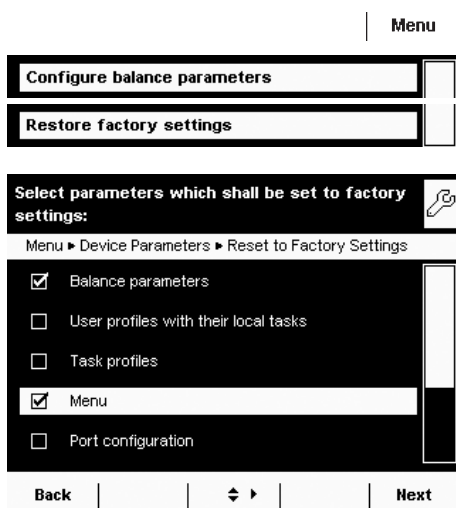
Updating the Software

Cubis® software is updated at regular intervals. A detailed description of how to perform a software update on your balance can be found in Section **Updating the Software**.

Restoring Factory Settings

You can reset all settings individually to the factory settings at any time.

- ▶ Use the cursor softkeys to navigate through the **Device parameters** submenu to **Restore factory settings**.

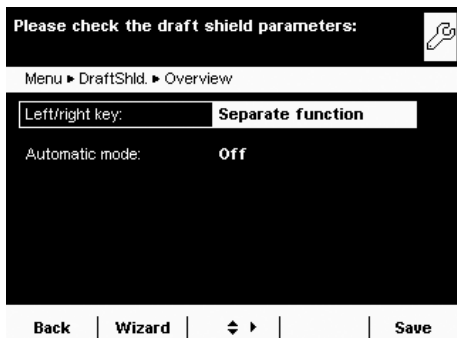
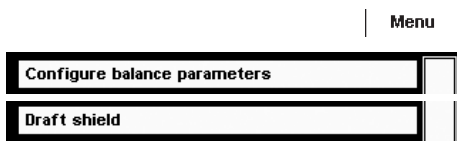


- ▶ Mark any settings you wish to reset and select **Next**.
- ▶ Confirm the reset when prompted.

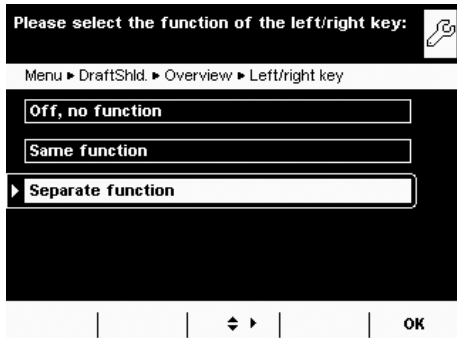
Motorized Draft Shield (Optional)

- ▲ On balances equipped with a motorized draft shield [sometimes called a windshield (WS)], the control unit has keys on the right and left sides which can be used for the motor-driven opening and closing of the draft shield doors. You can configure the functionality of these keys in the menu.

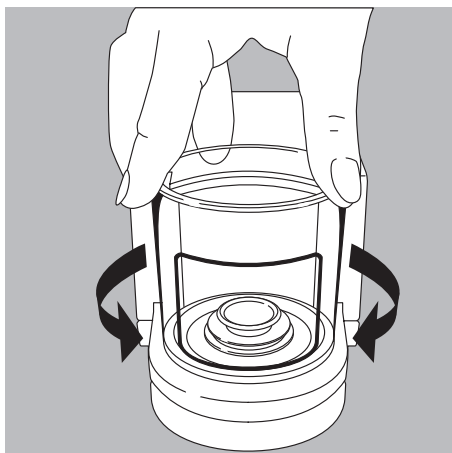
Models with the analytical draft shield: for example, you can configure the left key to open and close the right and upper door (for users who are right-handed) and the right key to open and close the left door (for users who are left-handed). The opening width (entirely or partially) of the sliding panels can also be defined. You can configure these settings manually on the draft shield itself (see “Learning Function” below).



- ▶ Check and correct all settings as required.
- ▶ To save the settings, select **Save**.

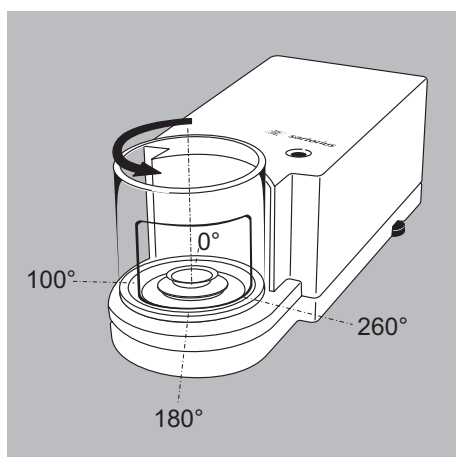


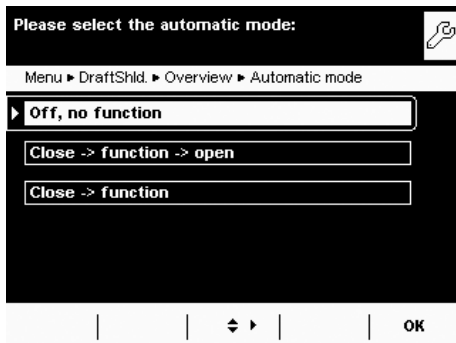
- ▶ Define the functions for the left and right keys:
 - Off, no function:** The keys have no function.
 - Same function:** Both keys have identical functions.
 - *Separate function:** The left and right keys are configured with different functions.



Models with a rotation draft shield (MSU6.6S/3.6P/2.7S):

	Same function (one open position)	Separate function (two open positions)
Defining the opening width	Manually select the desired opening position	-
Touch the \blacktriangle key	<ol style="list-style-type: none"> 1) Open to the previously selected opening position 2) Close 	<ol style="list-style-type: none"> 1) Touch the left \blacktriangle key: Opens 260° clockwise Right key \blacktriangle: Opens 100° counter clockwise 2) Close





- ▶ Configure the automatic mode for the draft shield.

***Off, no function:** Automatic mode is off.

Close -> function -> open: The draft shield doors are closed in automatic mode while the function is executed, and then the doors re-open.

Close > function: The draft shield doors are closed in automatic mode while the function is executed.

Automatic mode can be executed using the following keys:

- **TARE** key
- **PRINT** key
- **Cal./Adj.** softkey
- or can be executed **when a component is saved** for logging applications (statistics, formulation, totalization)



If automatic mode is on, the draft shield doors automatically close when the balance is switched to standby.

Assigning Opening Functions to Keys (Learning Function)

The keys should be cross-configured (for example, left key opens and closes right door and vice versa).

The balance must be turned on.

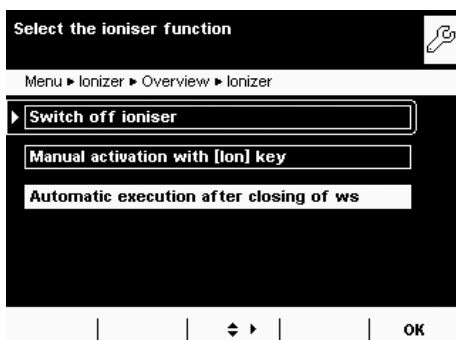
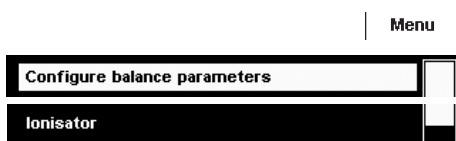
- ▶ Close all draft shield doors.
- ▶ Manually operate the door you want to assign to the left key: Push the right door open to the extent you want it to be opened (entirely or partially).
- ▶ Press the left key \blacktriangle .
- ▷ The door will close again. Now you have configured the left key so that, when pressed, it opens or closes the right door.
- ▶ Proceed accordingly to configure the left door/right key.



Using the same method, you can assign operation of the upper door to one of the keys. You can also configure one key to move both doors by manually opening both doors during setup and then pressing the desired key.

Configuring the Ionizer (Optional)

If your balance is equipped with an ionizer module, you can configure the basic settings for the ionizer module here. These settings can be changed as necessary during any **electrostatic charge eliminator** task.

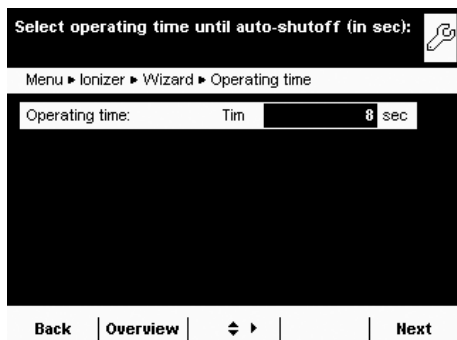


- ▶ Define ionizer function.

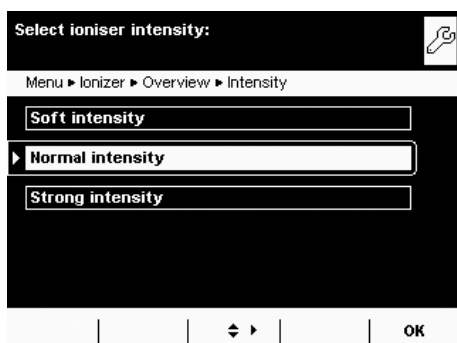
Switch off ionizer: The ionizer is switched off.

Manual activation with [lon] key: Ionization can be turned on at any time by pressing the **lon** key.

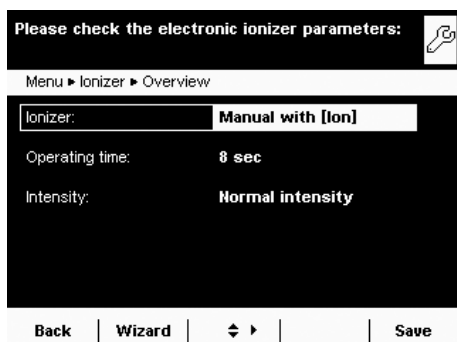
***Automatic execution after closing of ws:** Ionization is executed automatically, as soon as the draft shield is closed.



- ▶ Define how long an ionization routine should take.
Operating time in seconds: 3 to 15 sec., *8 sec.



- ▶ Define the intensity of the ionization.
Soft intensity / ***Normal intensity** / **Strong intensity**



- ▶ Check and correct all settings as required.
- ▶ To save the settings, select **Save**.

Task Management



In the Task Management menu (TASK), you can:

- Start a task
- Configure a new task
- Edit an existing task (modify, copy, delete)

For **task** configuration, there are numerous **applications** available, e. g., weighing, parts counting, calculation. Each task contains at least one of these applications. However, it can also have a combination of several applications. Each application can be used either with their factory settings, or you can modify them as desired. The **Weighing** application is available as a basic function for every task. Each task also contains the individual balance settings and the individually configured print-out.

The options available to you in Task Management depend upon your user access rights: An **Administrator** can use all options, while a **User** can only use limited options (see “User Management”). If no users have been defined, all options can be accessed. A maximum of 15 tasks can be created.

The administrator can **create tasks with restricted use**, i.e., tasks that can only be used by certain users or only by the administrator himself.

Global tasks can be used by all users.

Separate tasks are only accessible to the users who created them.

Exception: A user can copy global tasks to use them afterwards as a separate task.

Option	Administrator	User
Configure, modify, delete separate tasks		<input checked="" type="checkbox"/>
Configure, modify, delete global tasks	<input checked="" type="checkbox"/>	
Execute or copy separate tasks		<input checked="" type="checkbox"/>
Execute or copy global tasks	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Selecting Tasks



► To switch to Task Management, press **TASK** ().

▷ A list of available tasks is displayed.

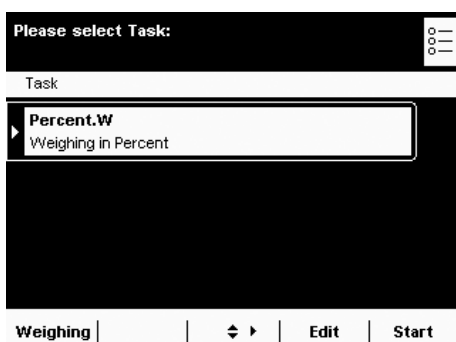
Initially, this overview will be empty. Once tasks have been configured, they will be displayed here.

► When you touch **Start**, the task currently selected will be started (indicated by the dark background).

Importing Tasks:

You can also load preconfigured tasks to the balance:

- 1) Unpack the desired ZIP archive file to the root directory (Root Dir) of a SD card after downloading from the Sartorius homepage or from the included CD.
- 2) In the Balance menu, submenu “Import/Export data: Import files from the SD card.”
- 3) Insert the SD card into the balance.
- 4) Select the corresponding import file and active the task download via **Next**. Then exit the menu.
- 5) Start the loaded task via the selection list.



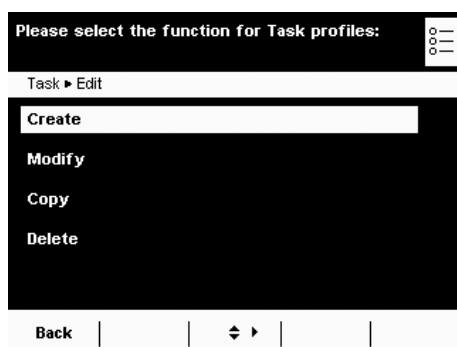
Using Applications with the Factory Settings

Each application comes with specific factory settings.

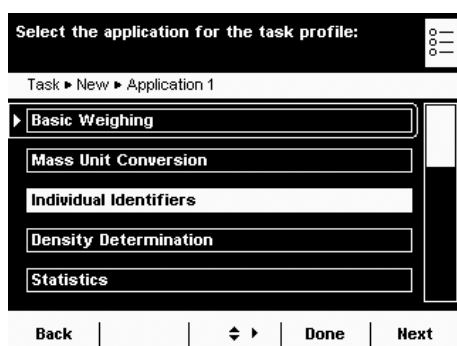
If you want to apply these settings unchanged, you can do this quickly during configuration:

() | **Edit** |

- ▶ Open Task Management and select **Edit**.




- ▶ Select **Create**.



- ▶ An application list is displayed.
- ▶ Select the application you want to assign to the new task.
- ▶ Select **Done**.
- ▶ Enter a name and a description for the task and select **Save**.
- ▶ The new task is saved with the factory settings and displayed in the task list.

Sorting the Task List

New tasks are always added to the end of the task list. After you have configured several tasks, it may be helpful to sort the task list.

() | **Sort.** |

- ▶ The task selection is displayed.
- ▶ Select **Sort**.
- ▶ The list is sorted alphabetically (A – Z).
- ▶ To reverse the sort order, select **Sort** again.
- ▶ To sort tasks by the date of last use, select **Sort** again.

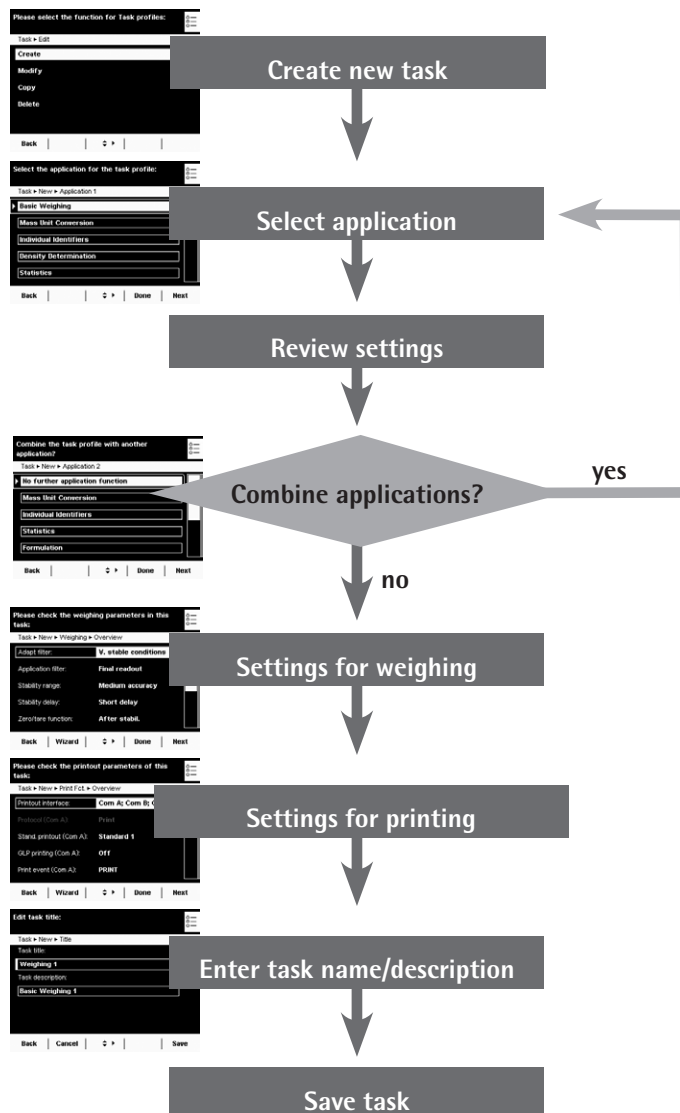
Creating New Tasks (Configuration)

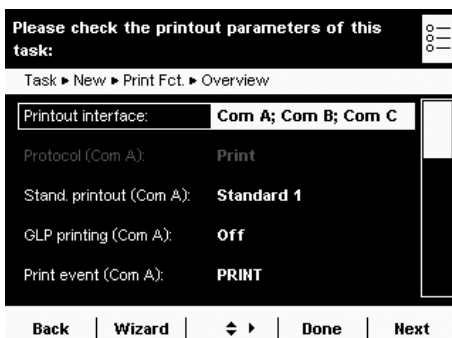
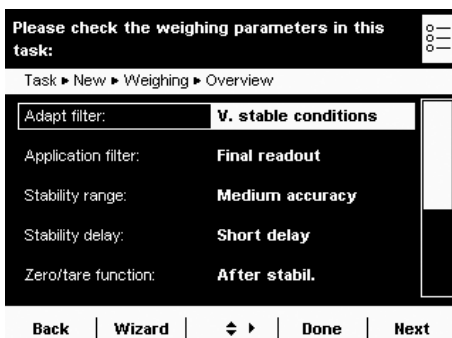
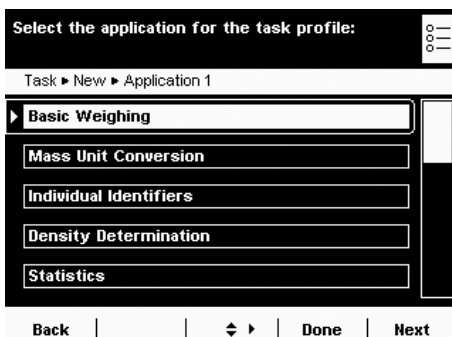
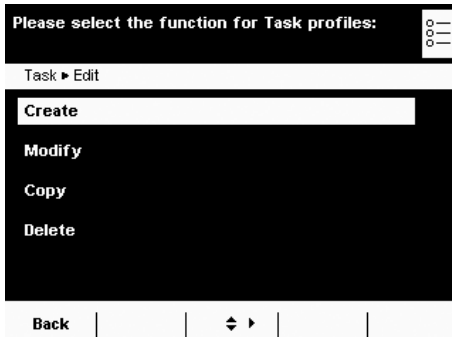
The Cubis® software contains the following applications that you can configure as tasks as required:

- Weighing
- Mass unit conversion
- SQmin minimum weighing (optional)
- Individual identifiers
- Density determination
- Statistics
- Calculation
- Averaging
- Formulation
- Weighing in percent
- Timer-controlled functions
- Totalizing
- DKD uncertainty of measurement (optional)
- Second tare memory (preset tare)
- Parts counting
- Checkweighing
- Draft shield (optional)
- Ionizer (optional)

The basic procedure for configuring a task is:

1. Create new task.
2. Select application.
3. Review all of the following prompts and configure your own settings as required.
4. Perform steps 2 and 3 for additional applications if you would like to combine multiple applications.
5. Check settings for weighing and printouts and modify as required.
6. If you are an administrator, define whether the new task can be used by all or only by certain users.
7. Enter a name and description for the new task.
8. Save task.





Example: Creating a Task

- ▶ Open Task Management and select **Edit**.
 - ▷ The list of options is displayed.
 - ▶ To define a new task, select **Create**.
 - ▷ The list of applications is displayed.
 - ▶ Use the cursor softkeys to view all applications.
 - ▶ Select the application you want to assign to the new task.
 - ▶ Configure this application as required. The program guides you through the configuration menu.
 - ▶ If you want to assign additional applications to the task, these applications should also be configured (see “Combining Applications into One Task”).
 - ▷ After all applications for the new task have been configured, the settings for weighing and printouts must be configured. All settings configured here will only affect **the new task**.
- On balances verified for use in legal metrology, the modification of some settings may be limited or prohibited altogether.

Settings for Weighing

- ▶ Check all settings and change as required.

Explanations for the individual options can be found in **Device Parameters** in Section **System Settings**.

- ▶ Select **Next**.

Settings for Printouts

- ▶ Check all settings and change as required.

Explanations for the individual options can be found in the following section.

- ▶ Select **Next**.
- ▶ Enter a short name and a description for the new task.
- ▶ Select **Save**.
- ▷ The task selection list with the new task is displayed.

Configuring Printouts


You can configure the printout at two places; for example, you can have the printout for basic weighing differ from all the other applications.

In the System Settings (Menu)

You define the basic settings in the menu. Previously created tasks will not be affected by modifications to the basic settings.


Creating Tasks

This is where you can specifically modify the user-defined settings for any task. You will be routinely prompted for the printer settings with every new task you create and can then modify them.

Printout (Example):	Print events	Printout content (record)	Print elements
	Start task	----- 21.02.2017 09:17 SARTORIUS Mod. MSU 224S Ser. no. 12-34-56 -----	GLP header
	Start task e.g. here:	Laboratory technician	Operator name
	Start task () key	Product..... 123.5678g -----	ID1, identification: fixed/variable Measured values
	End task	21.02.2017 09:20 Name : -----	GLP footer

Settings for Printouts

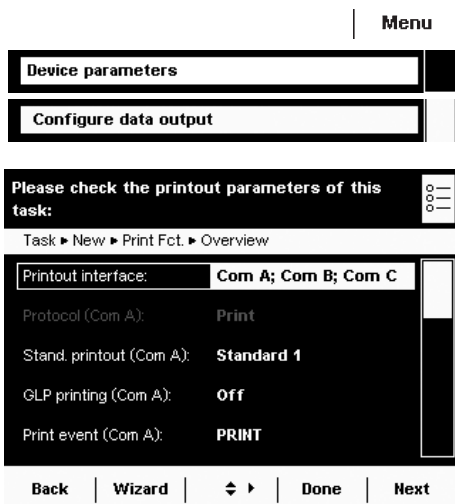
During printout configuration the following parameters are defined:

Printout interface	Peripheral ports (Com A), USB/PC (Com B), optional interface (Com C), Ethernet (Com D)
Protocol (operating mode)	Depends on the interface: Print, SBI, xBPI, SICS
Output	Depends on the operating mode: Single printout or automatic print (not with printer), with/without stability.
Printout criterion	Manual without stability, manual with stability
Format auto. print	22 characters for applications, 16 characters for raw data
Standard data output	Standard 1 (measured value only), Standard 2 (measured value and date/time), Standard 3 [date/time, weight block (N,T,G), and dotted line]
GLP printing	Off, no GLP printout / For calibration/adjustment only / Always on
Print event	Defines which event should trigger a print job. The selectable print events depend on the selected application. For basic weighing: () key, start or end of task, calibration/adjustment result. For calculating applications: additional initialization and result. For logging applications: additional component and evaluation
Print elements	The elements to be printed also depend on the selected application. Define the print elements for each event, e. g., date and time, dotted line, measured value, and the sequence in which they should be printed, etc.
Tare after printing:	Off, no tare / On (automatic tare after print request)

Configuring Printouts in the System Settings (Menu).



The settings can only be modified as long as no task has been activated (ready to start) in the operating mode. Make sure that basic weighing is active in the operating mode.



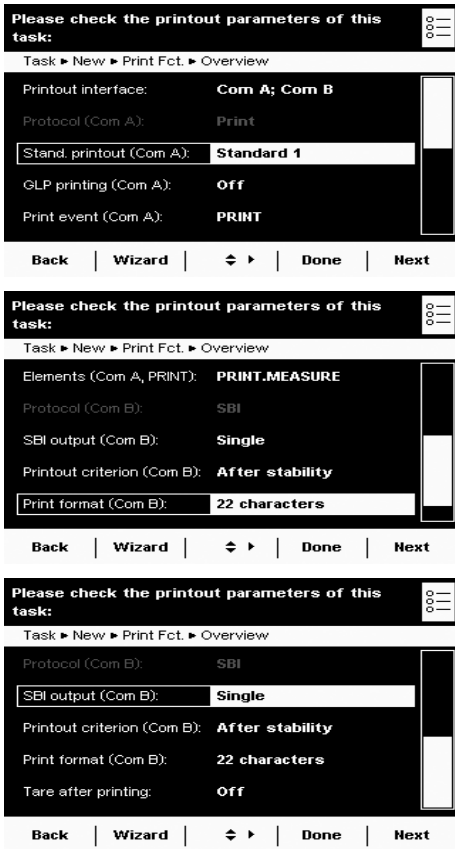
► Toggle to the System Settings menu.

► Open the **Configure data output** submenu.

If the submenu is not selectable, check the operating mode and select basic weighing.


► The setting menu will open. Several options are not modifiable because they are preset by the interface configuration.

The initial default setting and several examples of settings are described in the following.



Standard Printout Parameters When the Balance is First Delivered

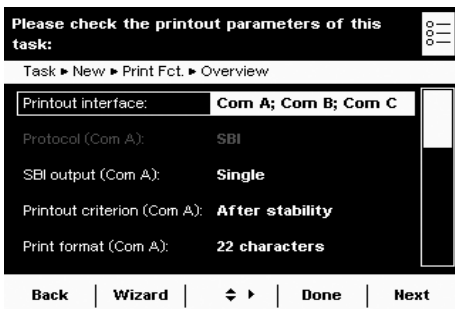
When the balance is first delivered, two ports are configured: The peripheral port (Com A) is configured for one printout; the USB port (Com B) is configured for data exchange with a PC via SBI protocol.

- Printout interface: Com A (peripheral port) and Com B (USB/PC)
- Protocol to Com A: Print (preset by the port configuration)
- Standard printout to Com A: Standard 1 (measured value only)
- GLP printing to Com A: Off, no GLP printout
- Print event for output to Com A: Press the PRINT () key
- Element to be output via Com A: Measured value
- Protocol to Com B: SBI (preset by the port configuration)
- SBI output to Com B: Single printout to the PC
- Criterion for output to Com B: After stability of balance
- Format for output to Com B: 22 characters
- Tare after printing: Off, no tare

- ▶ The cursor softkeys can be used to select configurable parameters individually.
- or
- ▶ To be guided step-by-step through the settings, use the wizard.

Wizard

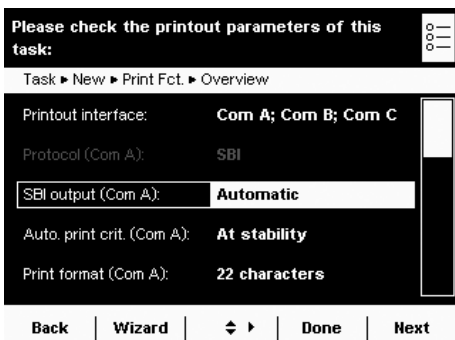
Example Manual Printout to Peripheral Port, SBI Operating Mode




- ▶ After manual operation, you would like a single printout to be printed by the connected peripheral device.

- Printout interface: Com A (peripheral port)
- Protocol: SBI (toggling to port configuration possible)
- SBI output: Single printout
- Criterion: Manual without stability
- Format: 22 characters (for applications)
- Tare after printing: On or off

Example Automatic Printout to Peripheral Port, SBI Operating Mode



- ▶ At a preset interval, automatic printouts should be sent to the connected peripheral device.

- Interface: Com A (peripheral port)
- Protocol: SBI (toggling to port configuration possible)
- SBI output: Automatic printout
- Criterion: Without stability, at stability, or after weight change
- Format: 22 characters (for applications)
- Stop automatic printing: Not possible or by pressing Print () key.
- Interval for automatic printing: Number of cycles (1, 2, 5, 10 to 100) and 0.1, 0.2, 0.5 to 10 seconds

Example Automatic Printout to Peripheral Port, Second Display Operating Mode

Please check the printout parameters of this task:

Task ► Weigh ► Print Fct. ► Overview

Printout interface: **Com A; Com B; Com C**

Protocol (Com A): **Second display**

Auto. print crit. (Com A): **Without stability**

Print format (Com A): **22 characters**

Auto.print interv. (Com A): **1 disp.upd.**

Back | Wizard | ◀ ▶ | Done | Next

- ▷ At a preset interval, automatic printouts should be sent to the connected peripheral device as a second display.

Printout interface: Com A (peripheral port)
 Protocol: Remote display (toggling to port configuration possible)
 SBI output: Automatic printout
 Criterion: Without stability, at stability, or after weight change
 Format: 22 characters (for applications)
 Interval for automatic printing: Display updates (1, 2, 5, 10 to 100) or every 0.1, 0.2, 0.5 to 10 seconds

Example Printout to Peripheral Port Only By Pressing the PRINT () Key; Printer Operating Mode

Please check the printout parameters of this task:

Task ► Weigh ► Print Fct. ► Overview

Stand. printout (Com C): **Standard 1**

GLP printing (Com C): **Off**

Print event (Com C): **PRINT**

Elements (Com C, PRINT): **PRINT.MEASURE**

Tare after printing: **Off**

Back | Wizard | ◀ ▶ | Done | Next

- ▷ After pressing the Print key, the measured value should be printed by the connected peripheral device.

Printout interface: Com A (peripheral port)
 Protocol: Print (toggling to port configuration possible)
 Standard printout: Standard 1 (measured value only), Standard 2 (measured value and date/time), Standard 3 (measured value with date/time and weight block)
 GLP printing: On or off
 Print event: Press the PRINT key
 Elements for print event PRINT: Measured value PRINT.MEASURE
 Tare after printing: On or off

Printout Parameter Settings

Standard Printout

You can select which data should be printed out as default.

Standard 1 (measured value only)

Standard 2 (measured value and date/time)

Standard 3 (measured value with date/time and weight block)

User input is only selectable if the default settings have been modified by the user.

Please select the standard printout (Com C):

... ► Print Fct. ► Overview ► Stand. printout (Com C)

▶ **Standard 1 (measured value only)**

Standard 2 (measured value and date/time)

Standard 3 (...)

User input

◀ ▶ | OK

GLP Printing

You can select if and when the printout should be GLP-compliant.

Off, no GLP printout

For calibration/adjustment only

Always on

User input is only selectable as long as none of the three options apply, i.e., if only a GLP header but not a GLP footer has been configured.

Please select the GLP printout (Com C):

► Application 1 ► Print Fct. ► Overview ► GLP printing (Com C)

▶ **Off, no GLP printout**

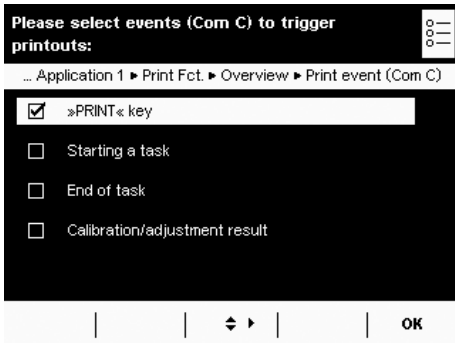
For calibration/adjustment only

Activated in the application

Always on

User input

◀ ▶ | OK



Print Events

You can define one or several events that trigger a printout. The number of selectable print events depends on the selected application.

Basic Weighing:

PRINT key

Starting a task

End of task

Calibration/adjustment result, after calibration/adjustment

For **calculating applications** the following events are **also** possible:

Initialization of an application

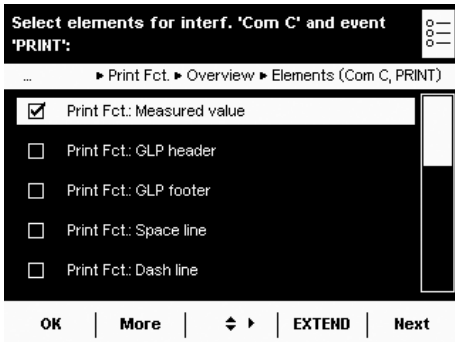
Application result

For **logging applications** the following events are **also** available:

Component

Evaluation

The application-specific print events cannot only be configured when a new task is created and not in the basic menu.



Print Elements

Which information should be printed?

Measured value

GLP header

GLP footer

Space line

Dash line

Form feed

Date and time

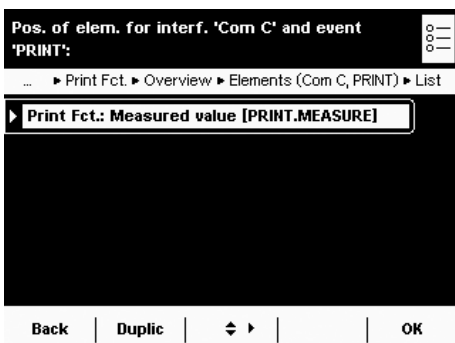
etc.



► The cursor softkeys can be used to select elements individually.

► To view the complete list, select **EXTEND**.

► To minimize the list, select **REDUCE**.



Sequence of Print Elements

In which order should the print elements be printed?

► The list of selected print elements is displayed.

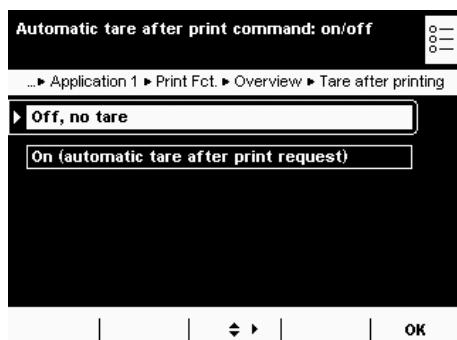
You can change the order and duplicate individual elements for multiple printouts (e. g., at the beginning and end of the list).

► Select the element that you wish to move or duplicate.



► To duplicate the element, select **Duplic**.

► To move the element downwards in the list, select **Down**.

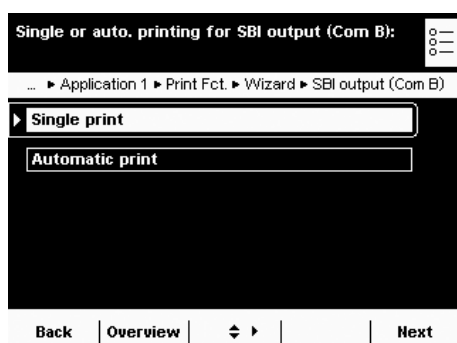


Automatic Tare after Printing

Should the balance be tared automatically after each printout?

Off, no tare


On (automatic tare after print request)



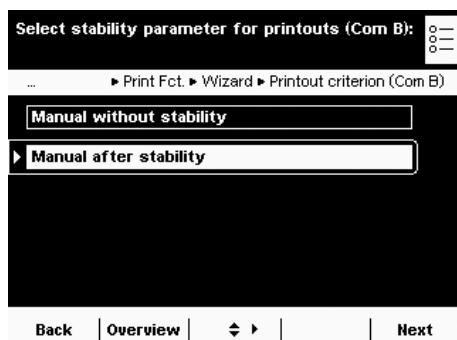
Settings for SBI Output

SBI Output Mode

How should SBI printout be printed?

Single print: Printout generated by pressing the PRINT () key or by ESC command via the interface

Automatic print: Printout generated automatically in the weighing cycle

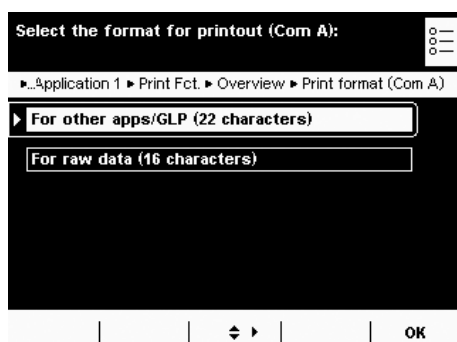


Stability Parameter for Printout

Should the printout be dependent on balance stability?

Manual without stability: Immediate printout without waiting

Manual after stability: Printout generated immediately at stability, otherwise not until after next stability



Format for Printout

How should the printout be formatted?

For other apps/GLP (22 characters): Printout with header; 20 characters plus line break (“space line”) (CR) and dotted line (“dash line”) (LF)

For raw data (16 characters): Printout without header; 14 characters plus line break (CR) and dotted line (LF)

Combining Applications into One Task

You can combine applications that are saved in the balance into one task. The following rules need to be followed (see table below):

- An application can only be combined with applications from **different groups**.
- You can only combine the applications of the first three groups in the **order** given below, e.g., weighing, checkweighing, and totalizing, but not weighing, totalizing, and checkweighing in that order.
- The applications of the **Additional Functions** group can be combined freely; the order is not relevant in this case.

When you combine applications, the Cubis® software automatically suggests only those applications that follow these rules.

Application group	Application	Weighing	Mass unit conversion	SQmin function	Individual Identifiers	Density Determination	Statistics	Calculation	Averaging	Formulation	Weighing in Percent	Timer-controlled actions	Totalizing	DKD Measurement Uncertainty	Second Tare Memory	Parts Counting	Checkweighing	Draft Shield	Ionizer
		Calculating applications	Weighing	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Density determination	◆		●	⊗	●	○	●	○	○	○	○	○	○	⊗	●	○	○	●	●
Calculation	◆		●	⊗	●	○	●	○	○	○	○	○	○	⊗	●	○	●	●	●
Averaging	◆		●	●	●	○	●	○	○	○	○	○	○	○	●	○	●	●	●
Weighing in Percent	◆		●	⊗	●	○	●	○	○	○	○	○	○	⊗	●	○	●	●	●
Parts Counting	◆		●	⊗	●	○	●	○	○	○	○	○	○	⊗	●	○	●	●	●
Check-king applications	Timer-controlled actions	◆	●	●	●	○	●	○	○	○	○	○	○	●	○	○	○	●	●
	Checkweighing	◆	●	●	●	○	●	○	○	○	○	○	○	●	○	○	○	●	●
Logging applications	Statistics	◆	●	●	●	○	○	○	○	○	○	○	○	●	○	○	○	○	○
	Formulation	◆	●	●	●	○	○	○	○	○	○	○	○	○	●	○	○	○	○
	Totalizing	◆	●	●	●	○	○	○	○	○	○	○	○	○	●	○	○	○	○
Additional functions	Mass unit conversion	◆	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	SQmin function	◆	●	○	●	⊗	●	⊗	⊗	●	⊗	●	●	●	●	⊗	●	●	●
	Individual Identifiers	◆	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	DKD measurement uncertainty	◆	●	●	●	⊗	●	⊗	⊗	●	⊗	●	○	○	●	⊗	●	●	●
	Second tare memory	◆	●	●	●	●	●	●	●	●	●	●	●	○	○	○	●	●	●
	Draft Shield	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○
	Ionizer	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○

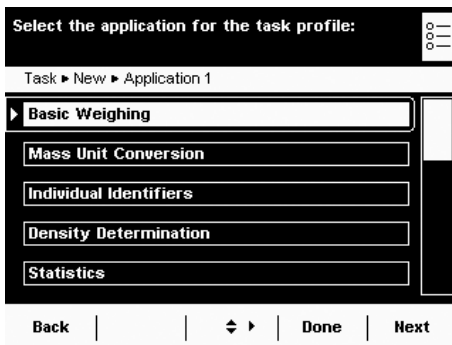
- ◆ Weighing is always available
- Combination possible
- ⊗ Combination possible is only activated as long as no calculating applications are active.
- No combination with identical application possible
- No combination with an application of the same group possible
- No combination possible because it is not meaningful

Executing Tasks

After all required settings have been configured, you can now start and execute a task.



▶ If you haven't already done so, go to Task Management.



▶ The task selection is displayed.
▶ Select the desired task.

or

Start


▶ If the desired task is already marked (dark background and arrow on left), select **Start**.
▶ The program switches to operating mode and the selected task is activated.
▶ Follow the instructions on the display.

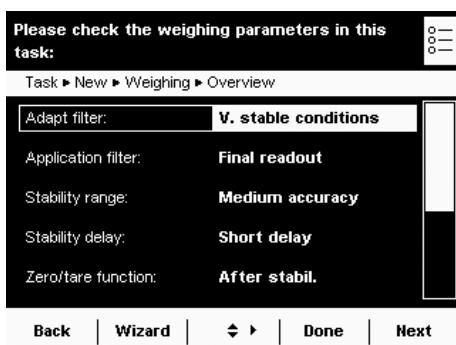
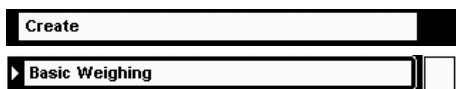
Weighing

Purpose: Weight determination within the scope of the device-specific weighing capacity (see “Technical Data”)

Combination options: Mass unit conversion, second tare memory, and individual identifiers (SQmin function, DKD measurement uncertainty)

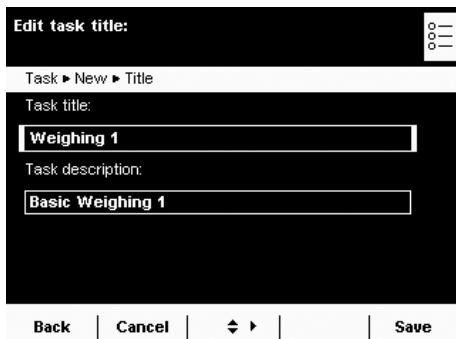
Configuring a Task: My Weighing

() | **Edit** |



Weighing without combining with any other application:

- ▷ The settings for **Weighing** are displayed.
- ▶ Check all settings and change as required.
- ▶ Select **Next**.
- ▷ The settings for **Printouts** are displayed.
- ▶ Check all settings and change as required.
- ▶ Select **Next**.
- ▶ If you are an administrator: Define whether all or only certain users may use this task.
- ▶ Select **Next**.
- ▶ Enter a short name and a description for the new task (e.g., “My Weighing”).
- ▶ To save the new task, select **Save**.

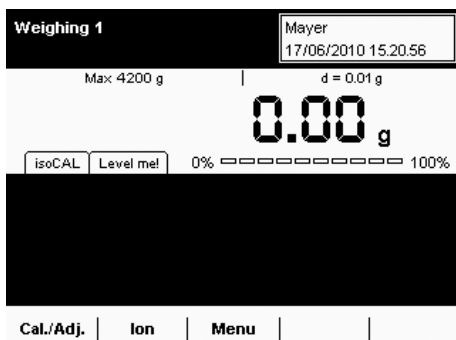


()

Start

Executing a Task: My Weighing

- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.
- or
- ▶ If the desired task is already marked, select **Start**.
- ▷ The program switches to the operating mode, and the task is activated.



Mass Unit Conversion

Purpose: The weight value can be displayed in up to a maximum of five different units in succession (see table below). However, the desired weight units must be assigned beforehand (1 through 5).

Combination options: Second tare (SQmin function, DKD measurement uncertainty)

M

Not all units can be selected on balances used for legal metrology. The user can only switch between metric units (e. g., milligram, gram, kilogram). This may also depend on the balance model.

Conversion Factors for Weight Units

Unit	Factor	Display
Gram	1.000000000000	g
Kilogram	0.001000000000	kg
Carat	5.000000000000	ct
Pound	0.00220462260	lb
Ounce	0.03527396200	oz
Troy ounce	0,03215074700	ozt
Hong Kong tael	0.02671725000	tlh
Singapore tael	0.02645544638	tls
Taiwan tael	0.02666666000	tlt
Grain	15.43235835000	GN
Pennyweight	0.64301493100	dwt
Milligram	1000.000000000000	mg
Parts per pound	1.12876677120	/lb
Chinese tael	0.02645547175	tlc
Momme	0.2666666666666667	mom
Carat	5.000000000000	K
Tola	0.08573333810	tol
Baht	0.06578947437	bat
Mesghal	0.21700000000	MS
Ton	0.00000100000	t
Pound: ounce	0.03527396200	lb:oz
Newton	0.00980665000	N
Microgram	1000000.000000000000	µg

Configuring a Task: Mass Unit Conversion

(☰) | **Edit** |

Create

▶ **Basic Weighing**

Please enter the number of units:

... New ▶ Application 1 ▶ WtUnit ▶ Wizard ▶ Number of units

Number of units: n

Back | **Overview** | ⇄ ▶ | **Next**

- ▶ Select the desired number of units (max. 5) to be used to display the weighing results.

Please check parameters of unit 1:

Task ▶ New ▶ Application 1 ▶ WtUnit ▶ Wizard ▶ Unit 1

Weight unit 1:

Display accuracy 1: **All dig. on**

Back | **Overview** | ⇄ ▶ | **Next**

- ▷ Now you will be prompted to enter the display accuracy and weight units of all the desired units one by one.
- ▶ Select the **Weight unit** (e. g., gram, kilogram, carat, pound) for the first unit.
- ▶ Select the **Display accuracy**: (e. g., complete display of all decimal places or leave off last digit).

Please check the weight unit parameters:

Task ▶ New ▶ Application 1 ▶ WtUnit ▶ Overview

Number of units:


Unit 1: **Grams; All dig. on**

Unit 2: **Grams; All dig. on**

Back | **Wizard** | ⇄ ▶ | **Done** | **Next**

- ▷ An overview of all settings is displayed.
- ▶ Check settings and change as required.
- ▷ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▷ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

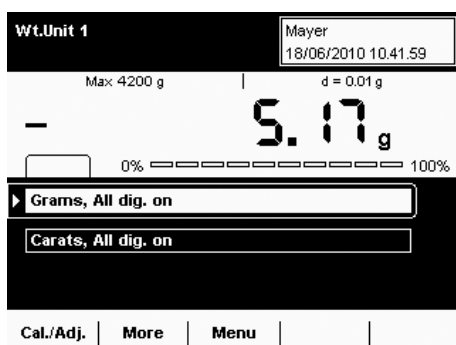
Executing a Task: Mass Unit Conversion

- () ▶ If you haven't already done so, go to Application Management.
- ▶ The task selection is displayed.
- ▶ Select the desired task.

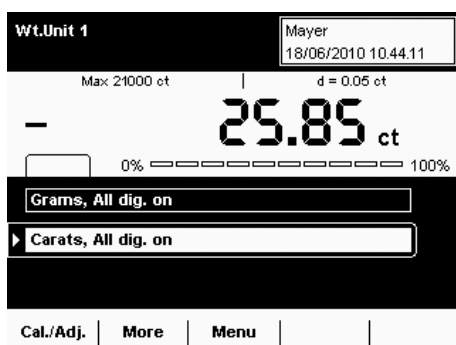
or

- Start** ▶ If the desired task is already marked, select **Start**.

- ▶ Follow the instructions on the display.



- Toggle** ▶ To change the displayed unit, select **Toggle**.



- ▶ Select the unit to be used to display the weighing results. This setting remains in effect until you change the selection or end the task.
- ▶ To display weighing results in all units, select **Toggle**.

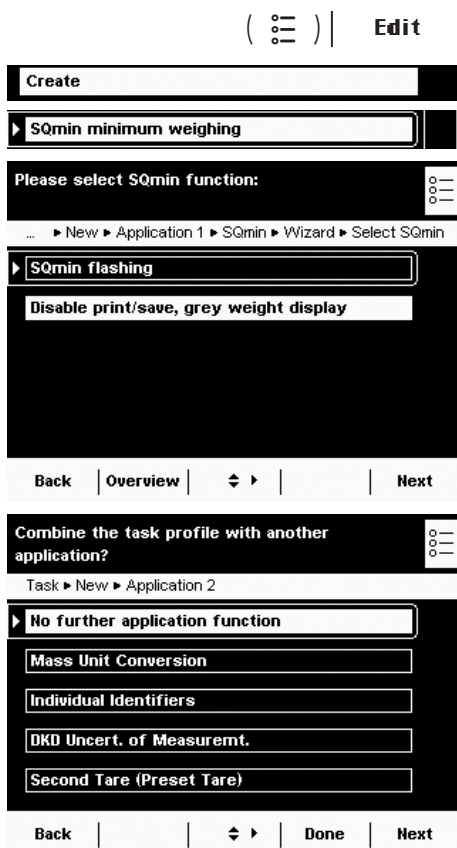
SQmin Minimum Weighing

Purpose: This application is used to compare the measured weight value directly with the defined minimum sample quantity (SQmin = sample quantity minimum). This ensures that weighing results are within tolerances defined by your quality assurance system. This fulfils the requirements of the United States Pharmacopeia (USP). According to USP guidelines, the measurement uncertainty can be a max. of 0.1% in terms of the initial weight when weighing substances for quantitative analyses.

Requirements: The balance must be set up by a service technician to be able to use the SQmin function. The technician will determine the permitted minimum sample quantity and set this on your balance using your QA system's guidelines. He will document this setting via a "Weighing module test as per USP" certificate in which the measurements and min. sample quantity are logged. The SQmin function ensures that the weighing results correspond to USP guidelines.

Combination options: Mass unit conversion, second tare memory, individual identifiers (DKD measurement uncertainty)

Configuring a Task: SQmin Minimum Weighing



► Select which function should be triggered for minimum sample quantity.

SQmin flashing: The SQmin tab flashes.

Disable print/save ...: Printout and saving of the weight value are disabled; the weight value is displayed in gray.

- ▷ An overview of all settings is displayed.
- ▷ Check all settings and change as required.

▷ A message asks whether you would like to add another application.

▷ If required, select additional applications you would like to combine.


▷ Now you will be prompted to configure the weighing and printing functions.

▷ Check all settings and change as required.

▷ Enter a short name and a description for the new task.

▷ To save the new task, select **Save**.

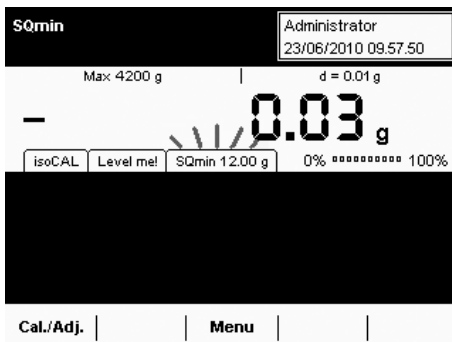
Executing a Task: SQmin Minimum Weighing

- ()
- ▶ If you haven't already done so, go to Application Management.
 - ▶ The task selection is displayed.
 - ▶ Select the desired task.

or

Start

- ▶ If the desired task is already marked, select **Start**.



- ▶ When you start a task with the SQmin function, the defined SQmin value is shown on the display.
- ▶ As long as the weight value is lower than the SQmin value, the tab "SQmin" will flash.

Individual Identifiers

Purpose: You can define identifiers for the following print jobs:

- Printout by pressing PRINT
- Starting a task
- End of task
- Initialization (for calculating applications only)
- Result (for calculating applications only)
- Component (for logging applications only)
- Evaluation (for logging applications only)

These identifiers are also printed in the log (“protocol”).

Combination options: Second tare (SQmin function, DKD measurement uncertainty)

Example: You want to configure the application as follows:

- You want the printout to be activated with the PRINT key.
- You want to configure the application so that four identifiers are included in the printed log: your company address in three lines and the batch number in one line.
- The batch number is to be counted up automatically.

Configuring a Task: Individual Identifiers



Create

Individual Identifiers

Please enter number of IDs for subsequent results:

Task ▶ New ▶ Application 1 ▶ Identifier ▶ Wizard ▶ No. of IDs

Print output:

Task start:

Task exit:

Back | Overview | ◀ ▶ | Next

▶ Enter the desired number of individual IDs that you want to set up.

Print output: Identifier for the Print key

Task start, task exit: Number of identifiers for task start or task end.

Please enter the identifier title:

... ▶ New ▶ Application 1 ▶ Identifier ▶ Wizard ▶ Identifier title

Title 1 for print output:

Title 1 for task start:

Title 2 for task start:

Title 3 for task start:

Back | Overview | ◀ ▶ | Next

▶ The corresponding ID (P-ID1, T-ID1, T-ID2, etc.) will be displayed for each identifier.

▶ Enter the desired title for each ID.

Please enter the identifier title:

... ▶ New ▶ Application 1 ▶ Identifier ▶ Wizard ▶ Identifier title

Title 1 for print output: CHARGE

Title 1 for task start: FIRMA

Title 2 for task start: STRASSE

Title 3 for task start: ORT

Back | Overview | ⇄ ▶ | Next

- ▶ In the example, a unique title has been defined for each identifier.

Enter identifier (ID):

... ▶ New ▶ Application 1 ▶ Identifier ▶ Wizard ▶ List of IDs

Print ID 1: 1

Task ID1: SARTORIUS

Task ID2: WENDER LANDSTR.

Task ID3: GOETTINGEN

Back | Overview | ⇄ ▶ | Next

- ▶ Enter the desired value (text) for each **identifier** .

Please select identifier for entry during task:

... Application 1 ▶ Identifier ▶ Wizard ▶ ID that can be entered

Print output ID1

Task start ID1

Task start ID2

Task start ID3

Back | Overview | ⇄ ▶ | Next

- ▶ Select the identifiers that can be entered for executing the task.

Please select IDs for automatic incrementation:

... ▶ Application 1 ▶ Identifier ▶ Wizard ▶ Auto. incrementation ▶

Print output ID1

Back | Overview | ⇄ ▶ | Next

- ▶ Select whether or not the variable identifiers should be counted up automatically.

In the example, the identifier for printout ID1 can be entered and will be counted up automatically.

Please check the identification parameters:

Task ▶ New ▶ Application 1 ▶ Identifier ▶ Overview

No. of IDs: 1 ; 3 ; 0 ; 0 ; 0 ; 0

Identifier title: CHARGE; FIRMA; STRASS

List of IDs: 1; SARTORIUS; WENDER..I

ID that can be entered: P-ID1


Auto. incrementation: P-ID1

Back | Wizard | ⇄ ▶ | Done | Next

- ▶ An overview of all settings is displayed.
- ▶ Check all settings and change as required.

- ▶ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Executing a Task: Individual Identifiers

- ()
 - ▶ If you haven't already done so, go to Application Management.
 - ▷ The task selection is displayed.
 - ▶ Select the desired task.




or


- Start**
 - ▶ If the desired task is already marked, select **Start**.

- ▷ The defined identifiers are displayed (cf. example above).
- ▶ Select **Next**.

- ▷ The predefined lines are printed when the task starts:

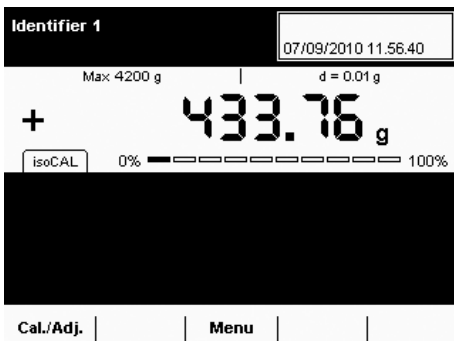
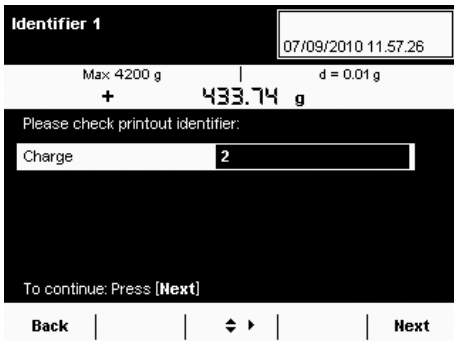
```
Company:      Sartorius
Street:
              Weender Landstr.
City:         Goettingen
```

- ()
 - ▶ Place the sample on the weighing pan and press the PRINT key .
 - ▷ The identifier for the printout is displayed and can be changed if necessary.
 - ▷ In the example, BATCH was defined for the printout.
 - ▶ If required, you can change this value now.
 - ▶ Select **Next** or press the PRINT key  again.

- ▶ To log the value, press the Print key .

- ▷ The complete printout looks like this:

```
Company:      Sartorius
Street:
              Weender Landstr.
City:         Goettingen
N      +      214.5 g
BATCH                                1
N      +      213.3 g
BATCH                                2
```



Density Determination

Purpose: You can determine the density and volume of liquid, solid, or pasty materials.

Combination options: Checkweighing, statistics, second tare, or individual identifiers

Requirements: You require the Sartorius YDK01MS density determination kit or your own customer-specific set. The basic calculations for density determination are described at the end of this section.

Features * = Factory setting

Liquid

***Water:** For density determination using water; the density for the corresponding temperature is calculated automatically

Ethanol: For density determination using ethanol; the density for the corresponding temperature is calculated automatically

User input: For density determination using another liquid, enter liquid and its density for corresponding temperature

Density at 20°C/68°F and exp. coefficient: For density determination using another liquid, enter density at 20°C and the coefficients of expansion; the density for the corresponding temperature is calculated automatically.

Air Density

***Air density at 20°:** For measurement under standard laboratory conditions

User input: For measurement under other conditions, enter air density

Decimal Places

No decimal place: The measurement value is displayed without decimal places.

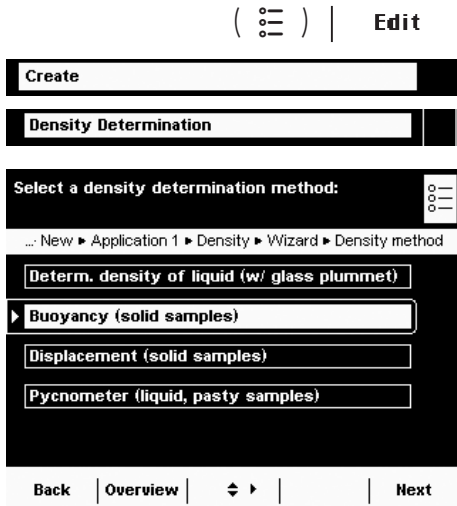
1, *2, 3, or 4 decimal places: The measurement value is displayed with the selected number of decimal places.

You can choose from **four methods** for density determination:

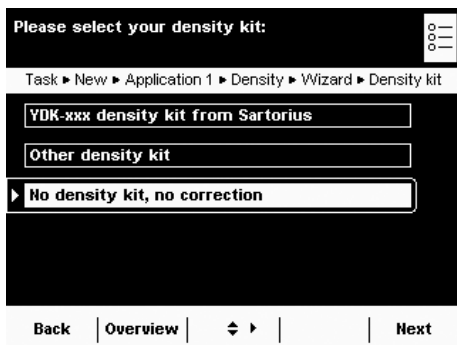
- Determine density of liquid (with glass plummet)
- Determine density via buoyancy with Sartorius YDK01MS density determination kit (for solid samples)
- Determine density via displacement (for solid samples)
- Determine density via pycnometer (for liquid, pasty, and powder samples)

Configuring a Task: Determining the Density of a Solid

You can choose from two methods to determine the density of a solid: **buoyancy** or **displacement**.



- ▶ Select the method that you want to use: buoyancy or displacement.



- ▶ Select the density kit you want to use.
YDK-xxx density kit from Sartorius: For measuring with the YDK kit
Other density kit: If you want to use another kit
No density kit: If you do not want to use any kit.
- ▶ Select or enter the prompted values (for explanations see **Features** on page 87).

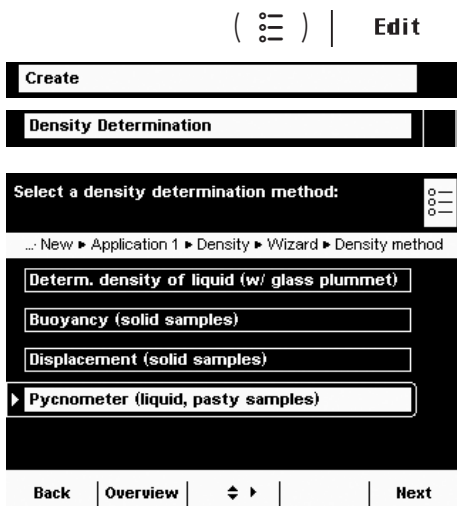
Additional Prompts/Settings for Other Density Kits

* = Factory setting

Parameters for the density kit

- Name: Enter a name.
- Number of wires: Enter the number of wires for the density kit that are immersed into the liquid.
- Wire diameter: Enter wire diameter (in mm).
- Vessel diameter: Enter vessel diameter (in mm).

Configuring a Task: Determining Density Using a Pycnometer



- ▶ Select the **Pycnometer** method.
- ▶ Select or enter the prompted values (for explanations see **Features** on page 87).

Configuring a Task: Determining Density of Liquid

(☰) | Edit |

Create

Density Determination

Select a density determination method:

... New ▶ Application 1 ▶ Density ▶ Wizard ▶ Density method

▶ **Determ. density of liquid (w/ glass plummet)**

Buoyancy (solid samples)

Displacement (solid samples)

Pycnometer (liquid, pasty samples)

Back | Overview | ⇄ ▶ | Next

- ▶ Select **Determine density of liquid**.

How should air density be accounted for in the result?

... ▶ Application 1 ▶ Density ▶ Wizard ▶ Defining air density

▶ **With fixed air density (at 20 °C)**

User input

Back | Overview | ⇄ ▶ | Next

- ▶ Select the measurement conditions.
Air density at 20°: Measurement takes place under standard laboratory conditions (20°C room and material temperature).
User input: If the measurement is to take place under deviating conditions.
- ▶ Enter the required values.

Enter the volume of the glass plummet:

... ▶ Application 1 ▶ Density ▶ Wizard ▶ Vol. of glass plummet

Vol. of glass plummet: Pl.vol cm³

Back | Overview | ⇄ ▶ | Next

- ▶ Enter the volume of the glass plummet.

Select decimal places for the result:

... ▶ New ▶ Application 1 ▶ Density ▶ Wizard ▶ Decimal places

No decimal places

▶ **1 decimal place**

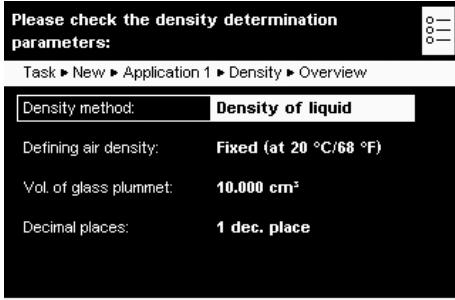
2 decimal places

3 decimal places

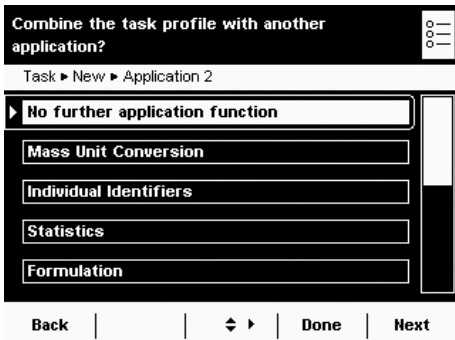
4 decimal places

Back | Overview | ⇄ ▶ | Next

- ▶ Select the number of decimal places to be used for the density results.



- ▶ Check all settings in the overview and change individual parameters as required.



- ▷ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▷ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Executing a Task: Density Determination

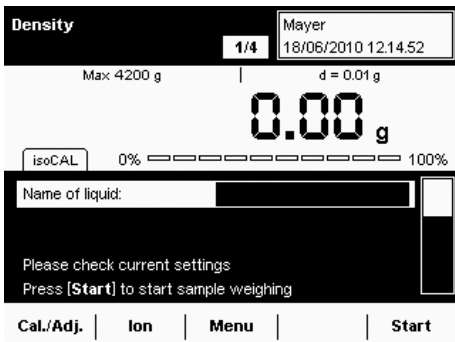


- ▶ Prepare the density determination kit that you want to use.
- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or



- ▶ If the desired task is already marked, select **Start**.



- ▷ The program switches to operating mode.
- ▶ Follow the instructions on the display.

Calculation Basis for Density Determination

The density determination application is based on the equations:

- Rho** Density of sample (ρ)
- ρ_{fl} Density of buoyancy liquid
- W_a Weight of sample in air
- W_{fl} Weight of sample in liquid (when determining liquid density, buoyancy and displacement)
Weight of fill medium (for pycnometer)
- W_r Weight of sample and fill medium (for pycnometer)
- LA** Air buoyancy correction = 0.0012 g/ccm

Buoyancy: $Rho = (W_a * (\rho_{fl} - LA)) / ((W_a - W_{fl}) * corr) + LA$

Displacement: $Rho = (W_a * (\rho_{fl} - LA)) / (W_{fl} * corr) + LA$

When the displacement method is used to correct for buoyancy by means of a wire (string) suspended in liquid, the factor 1.00000 is used in the calculation as a factory-set default.

The correction factor **Corr** is calculated from: $Corr = 1 - n * d^2 / D^2$
with:

- n** Number of wires
- d** Wire diameter (YDK01MS: 0.7 mm)
- D** Inner diameter of the vessel being used (YDK01MS: 76 mm)

Please check density determination kit parameters:

... ▶ New ▶ Application 1 ▶ Density ▶ Wizard ▶ D.kit param.

Name of kit:	Set 2
Number of wires:	n 2
Wire diameter:	d 0.70 mm
Vessel diameter:	D 76 mm

Back | Overview | ⇅ ▶ | Next

When other vessels or other submersion assemblies are used, this factor can be changed by modifying the parameters for the density kit.

Statistics

Purpose: Saving and statistical analysis of weight values and other calculated values.

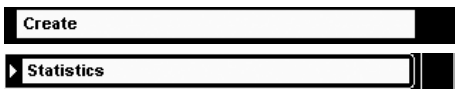
The values are generated as results:

- Transaction counter
- Sum of all values
- Average value
- Standard deviation
- Lowest value (minimum)
- Highest value (maximum)
- Difference between maximum and minimum

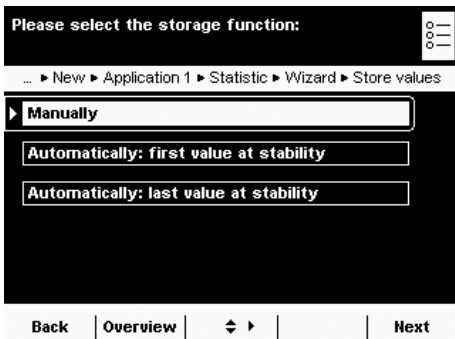
Options: You can save a maximum of 65,535 components.

Combination options: Density determination, calculation, averaging, weighing in percent, parts counting, timer-controlled functions, checkweighing, mass unit conversion, second tare memory, individual identifiers (SQmin function, DKD measurement uncertainty)

Configuring a Task: Statistics



* = Factory setting



► Define how the weight value will be applied.

***Manually:** The weight value is applied as soon as the corresponding button is touched.

Automatically: first value at stability: The weight value is applied automatically as soon as the balance has stabilized after filling and the value exceeds the minimum load.

Automatically: last value at stability: The last weight value with stability is applied automatically, as soon as the balance is unloaded and the value falls short of the minimum load. If stability was reached repeatedly between measurements, the last stable weight value will be stored.

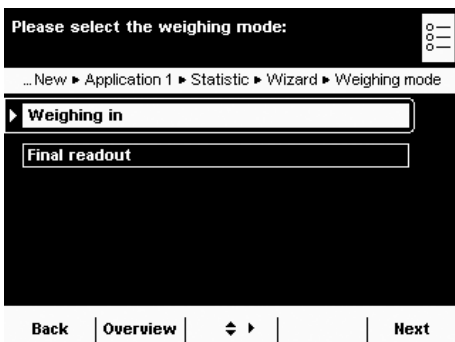
You must now select the minimum load to be applied:

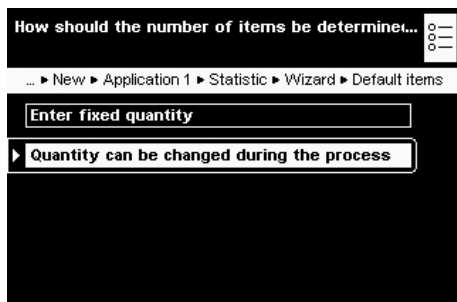
(none, 10, 20, ... *100 ... 1000 digits).

Weighing Mode with Automatic Storage:

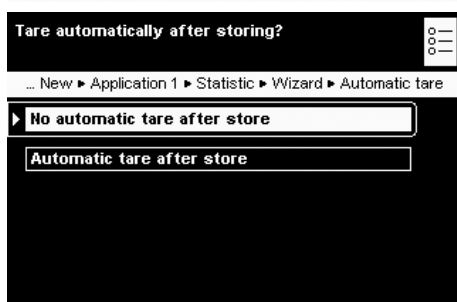
► Select the weighing mode to be used for the weight values. **Weighing in:** Initial weighing of samples in a container.

Final readout: Final weighing of samples in a container.

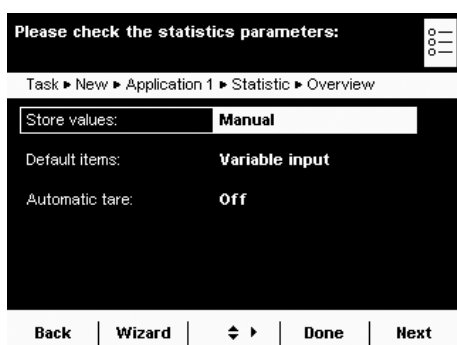




- ▶ Define when the number of measurements (items) will be set.
Enter fixed quantity: The item number is defined beforehand.
Quantity can be changed during the process: Enter the item number when you execute the task.



- ▶ Define whether or not automatic taring should take place after storing the value.



- ▶ An overview of all settings is displayed.
- ▶ Check all settings and change as required.
- ▶ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▶ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.
- ▶ The new task is saved with your settings and displayed in the task list.

Executing a Task: Statistics

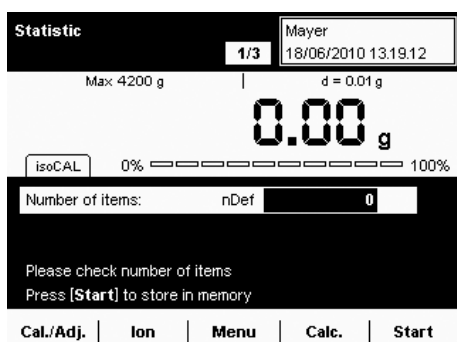


- ▶ If you haven't already done so, go to Task Management.
- ▶ The task selection is displayed.
- ▶ Select the desired task.

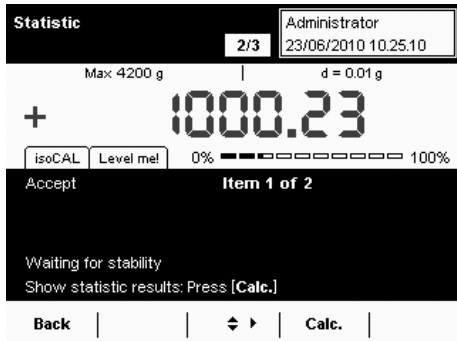
or



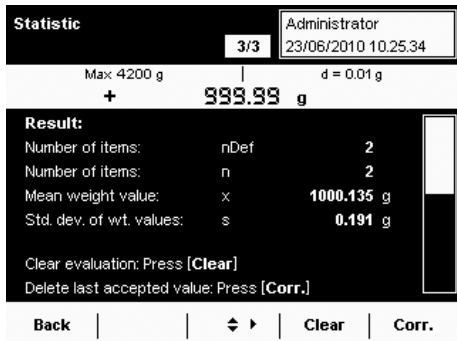
- ▶ If the desired task is already selected, press **Start**.



- ▶ The program switches to operating mode.
- ▶ If required, enter the number of items that you want to analyze.
- ▶ Place the first sample on the weighing pan.
- ▶ To start Statistics, select **Start**.
- ▶ The first weight value is displayed.



- ▶ Place the next sample on the weighing pan and select **Next**.
- ▶ Continue with all other samples in the same way.
- ▶ You can remove each last value from the statistics by selecting **Corr.**
- ▶ During the task, you view the result at any time by selecting **Calc.**



- ▶ Once all intended samples have been weighed, the result is displayed.
- ▶ To delete the results and begin the next task, select **Clear**.

Print example:

```

-----
n                1
Comp            98.8 g
n                2
Comp            56.4 g
:
:
:
n                5
Comp            56.4 g
n                5
Sum             280.3 g
x              56.06 g
s              24.93 g
sRel           44.46 %
Max            98.8 g
Min            37.2 g
Diff           61.6 g
-----
    
```

Calculation

Purpose: This application is used to calculate the weight value using an algebraic formula that you define yourself. You can define a fixed formula or one that you can change while carrying out the task.

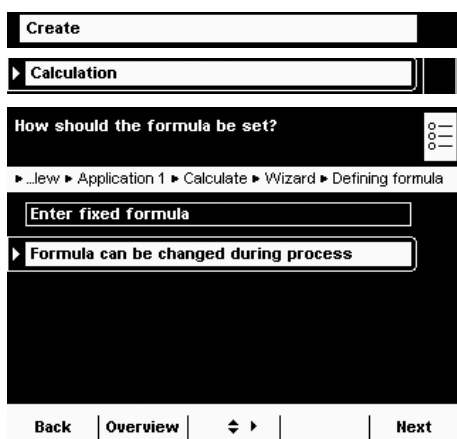


For balances used in legal metrology, follow the directions in Section “Executing Tasks.”

Combination options: Second tare (SQmin function, DKD measurement uncertainty)

Example: You want to determine the area of irregularly cut pieces of paper. The weight per unit area of the respective paper type is known.

Configuring a Task: Calculation



▶ Select whether you want to use a fixed formula or a variable formula.

Enter fixed formula: All calculations are carried out with the formula that you define for this task.

Formula can be changed during process: You can change the formula before each calculation.

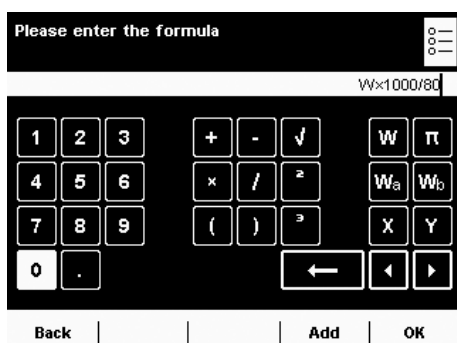
Example: The area of irregular paper samples must be determined. The paper’s weight per unit area in g/cm² is known. The equation for determining the paper area in cm² is:

Paper area = weight value W in g * 10000 / weight per unit area in g/cm².
The formula to be entered for a weight per unit area of 80 g/cm² is:

$$W \times 10000 / 80$$

To analyze different paper types, the formula must be able to be changed before each calculation (e.g., for paper with 80, 90, 100 g/cm²).

Additional formula examples are at the end of this section. Likewise, you can create several tasks, one for each paper type.



▶ If a fixed formula will be used, enter it now.

▶ If you want to work with a variable formula, enter the formula when you carry out the task.

W Dynamic weight value

π Pi = 3.1415926

W_a Applied weight value* a

W_b Applied weight value* b

X **Y** Fixed constant calculated value

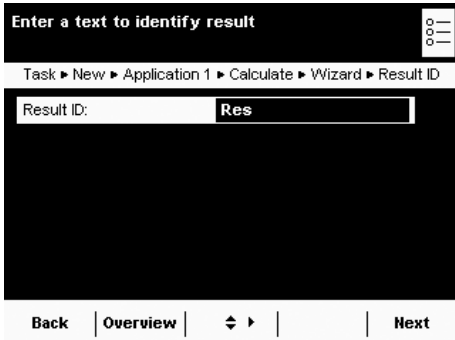
√ Square root**

² Second power**

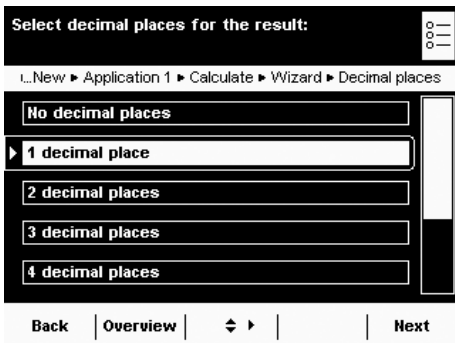
³ Third power**

* for calculation

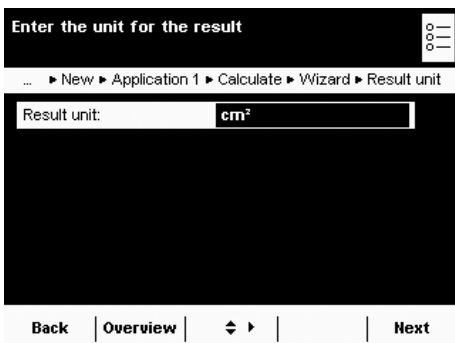
** corresponding to general mathematical characters



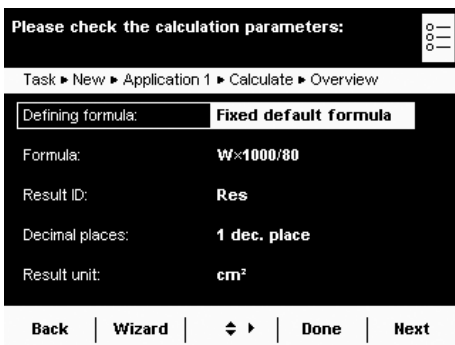
- ▶ Enter a name for the event printout, e. g., “Area” (max. 6 characters).



- ▶ Define how many decimal points should be used for the results:
none, *1... 7 digits



- ▶ Enter the unit to be used for the results (max. six characters, e.g., cm²)

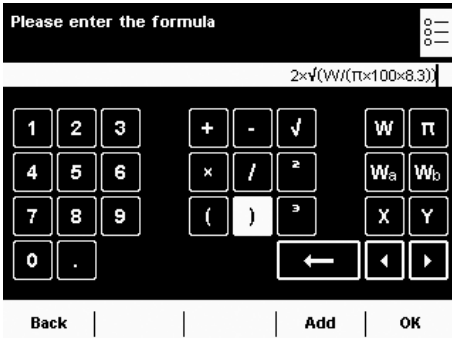


- ▷ An overview of all settings is displayed.
- ▶ Check all settings and change as required.
- ▷ A message asks whether you would like to add another application.
- ▷ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Examples of Calculation Formulae

1) Determination of diameter for cylindrical bodies

Definition: Diameter = $2 * \sqrt{W / (\pi * l * \text{Rho})}$
 with: $\sqrt{\quad}$ = Square root
 W = weight value in g
 π = 3.145
 l = length of sample in cm
 Rho = density of sample in g/cm³ (e.g., 8.30000 g/cm³)

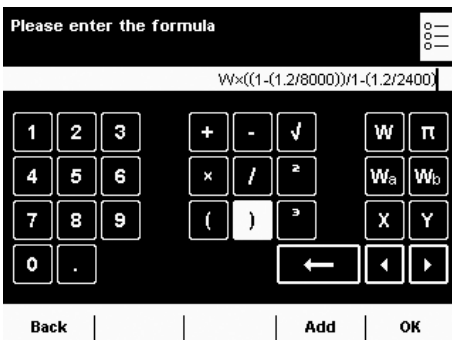


Input: $2 * \sqrt{W / (\pi * 100 * 8.3)}$

2) Determination of mass

1. Definition: $m = W * K$
 with: m = Mass of sample
 W = Weight value
 K = Correction factor

2. Definition: $K = 1 - (\text{Rho}_L / \text{Rho}_{ST}) / 1 - (\text{Rho}_L / \text{Rho}_G)$
 with: Rho_L = Air density (kg/m³), e.g., 1.2 kg/m³
 Rho_{ST} = Density of steel (8000.00000 kg/m³)
 Rho_G = Density of sample (e.g., 2.4000 g/cm³ = 2400 kg/m³)

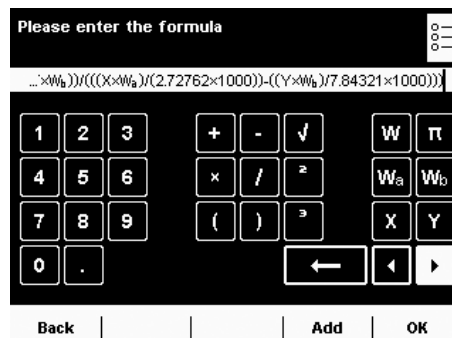


Input: $W * ((1 - (1.2 / 8000)) / (1 - (1.2 / 2400)))$

3) Air density determination with YSS45 air density kit

$$\text{Rho}_L = \frac{m_A * W_{ST} - m_{ST} * W_A}{\frac{m_A * W_{ST}}{\text{Rho}_A * 1000.0} - \frac{m_{ST} * W_A}{\text{Rho}_{ST} * 1000.0}}$$

with:
 Rho_L = Air density [kg/m³]
 Rho_A = Aluminum density [kg/m³] Rho_{ST} = Steel density [kg/m³]
 m_A = Mass of aluminum m_{ST} = Mass of steel
 W_A = Measured value for aluminum W_{ST} = Measured value for steel



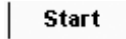
Input: $((X * W_a) - (Y * W_b)) / (((X * W_a) / (2.72762 * 1000)) - ((Y * W_b) / (7.84321 * 1000)))$

Executing a Task: Calculation



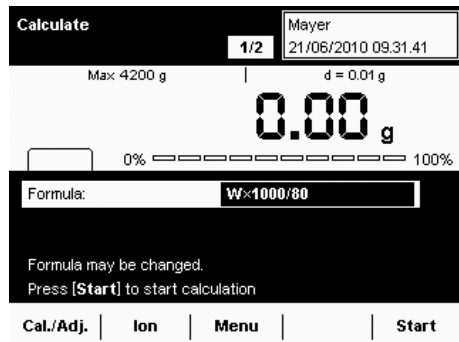
- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or

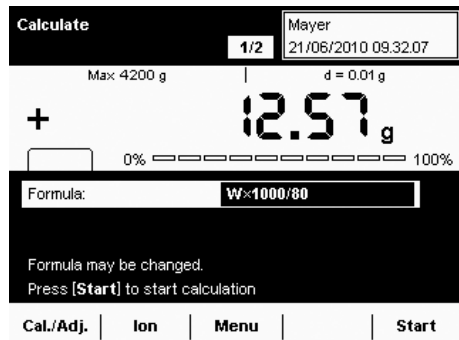


- ▶ If the desired task is already marked, select **Start**.

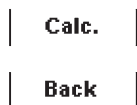
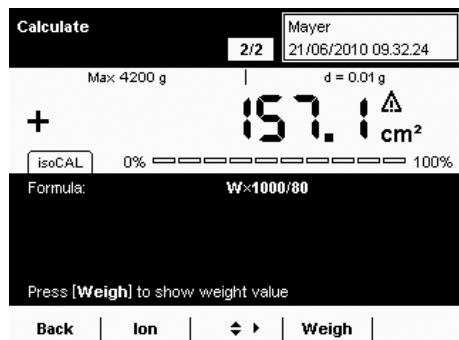
- ▶ If you want to work with a variable formula, you can now enter or change the formula.
- ▶ Place the sample on the balance.



- ▷ The weight value is displayed.
- ▶ To start the calculation, select **Start**.



- ▷ The calculation results are displayed.
- ▶ To return to the weight value display, select **Weigh**.



- ▶ If you want to carry out additional weighing and calculations using the same formula, place the sample on the balance and then select **Calc.**
- ▶ If you want to carry out additional weighing using a different formula, select **Back.**
- ▶ You can now change the formula and then proceed as described above.

Averaging

Purpose: This application is used for moving samples (e. g., live animals) and for weighing in unstable environments. A measurement cycle is automatically carried out with a defined number of measurements for each object to be weighed. The individual measurements are averaged, and this average is displayed as the result.

M

For balances used in legal metrology, follow the directions in Section “Executing Tasks.”

Options: You can start the measurement manually or it can start automatically as soon as the min. weight is reached. Depending on how strong the unsteadiness of the sample is, you can vary the sensitivity for the measurement. The number of measurements from which the average is taken can also be defined.

Combination options: Checkweighing, timer-controlled functions, totalizing, statistics, formulation, SQmin function, DKD measurement uncertainty, second tare, individual identifiers

(☰) | **Edit** |

Configuring a Task: Averaging

► Select how the application should start.

Start by pressing key: This starts the application manually.

***Automatic start:** The application starts as soon as a pre-defined min. load is exceeded.

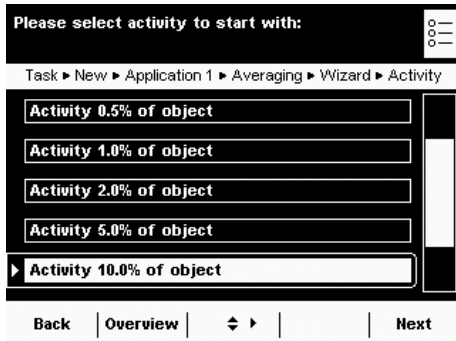
► Define the min. load for the automatic start of the averaging and/or for the release of the result display for the manual start.

none, 10, 20, 50, *100, ... 1000 digits

The number of **digits** depends on the balance resolution (see Display). Example: For a balance with a resolution of $d = 0.1$ (100 mg), 100 digits means a min. load of $100 \times 0.1 = 10$ g. With this setting, the automatic start would be triggered as soon as a min. of 10 g was placed on the balance.

Automatic start only:

► Determine the weighing mode: ***Weighing in** or **Final readout**

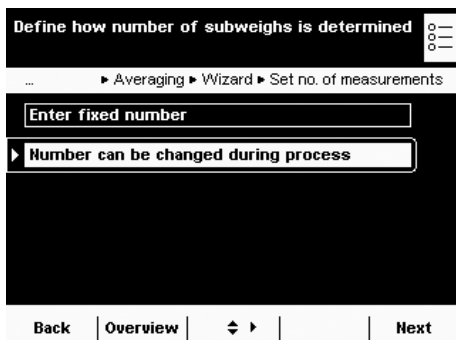
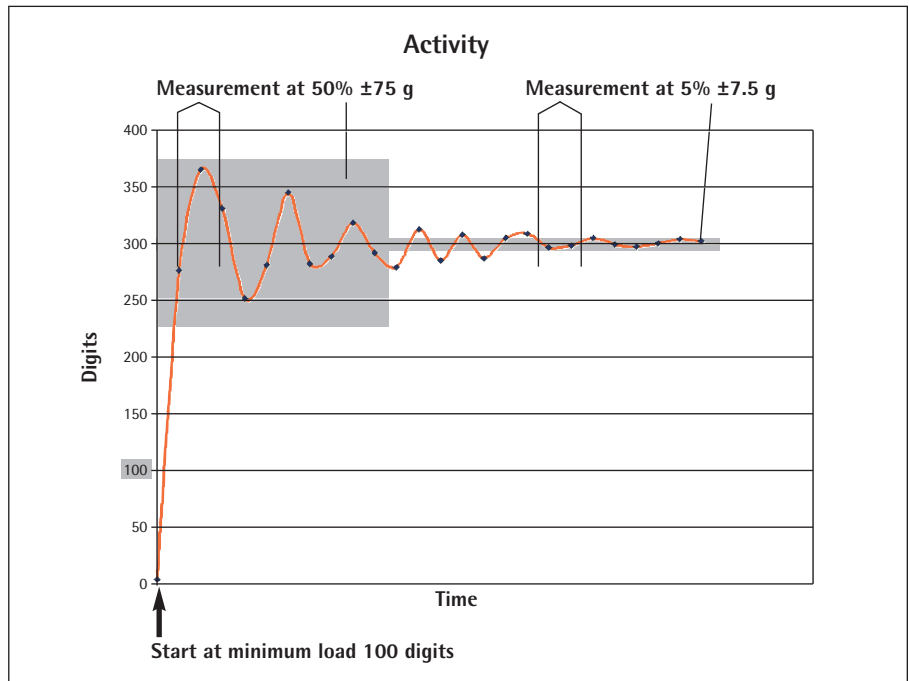


▶ Enter the range of instability for the start of the measurement:
0.1%, 0.2%, 0.5% ... *10% ... 50% from measured object

This entry estimates the strength of the instability that is caused by the activity (e. g., animal movement). You can use the rough estimation or a more detailed estimation using percentages.

The weight value changes with each movement of the weighing pan. As soon as three consecutive measurement values are within the selected instability range, the interval measurement begins.

Example: You are weighing animals with an average weight of approx. 300 g. With the “5.0% of object” setting, the measurement starts when the movements are within a range of 15 g, i.e., ± 7.5 g. With the “50% of object” setting, the interval measurement would start when the weight value was within a range of 150 g, i.e. ± 75 g.



▶ Define the number of measurements to be used for the average value.

Enter fixed number: You must now enter a fixed number.

***Number can be changed during process:** You will define the number when you execute the task.

How should the result calculation factor be set?

Application 1 ▶ Averaging ▶ Wizard ▶ Set calc. factor

No factor

Enter fixed factor

Factor can be changed during process

Back | Overview | ◀ ▶ | Next

- ▶ Define whether or not the weighing results should be calculated with an additional factor and how this factor should be applied.

No factor

Enter fixed factor: You must now enter this factor.

Factor can be changed during process: You must enter this factor when you execute the task.

Example: Each animal should receive a food supplement of 50 mg per kg of body weight. For this, the factor 0.05 can be entered (weight value in g/1000 g × 0.05 g). During the measurement, both the weight value (animal weight, e.g., 285 g) as well as the calculated value (amount of supplement, e.g., 14.25 mg) can be displayed.

Select number of decimal places for calculation

Application 1 ▶ Averaging ▶ Wizard ▶ Decimal places

No decimal places

1 decimal place

2 decimal places

3 decimal places

4 decimal places

Back | Overview | ◀ ▶ | Next

If you chose to conduct the calculation:

- ▶ Define the number of decimal places to be used for the calculation.

none, 1, *2, ... 6 digits

Emit acoustic signal at end of measurement?

Application 1 ▶ Averaging ▶ Wizard ▶ Acoustic signal

Result beep, off

Result beep, on

Back | Overview | ◀ ▶ | Next

- ▶ Define whether or not the end of the measurement (and if necessary the calculation) should have an acoustic signal.

***Result beep, off or Result beep, on**

Please check the averaging parameters:

Task ▶ New ▶ Application 1 ▶ Averaging ▶ Overview

Start method:	Automatic
Min.load:	100 digits
Weighing mode:	Weighing in
Activity:	10.0%
Set no. of measurements:	Variable num. (input)

Back | Wizard | ◀ ▶ | Done | Next

- ▶ An overview of all settings is displayed.
- ▶ Check all settings and change as required.
- ▶ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▶ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Executing a Task: Averaging with Manual Start



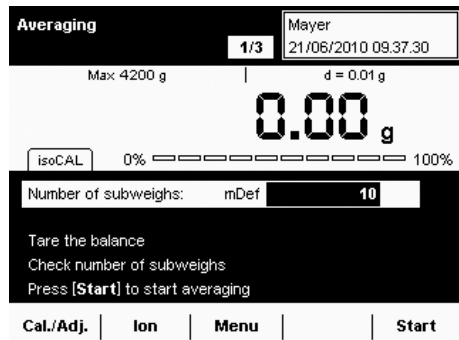
- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or

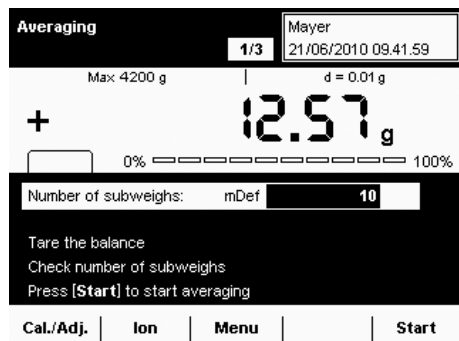


- ▶ If the desired task is already marked, select **Start**.

- ▶ If you are using a variable number of measurements, enter the desired number.
- ▶ If you are weighing live animals, place the container (cage) on the weighing pan and tare the balance.
- ▶ Place the animal in the container.

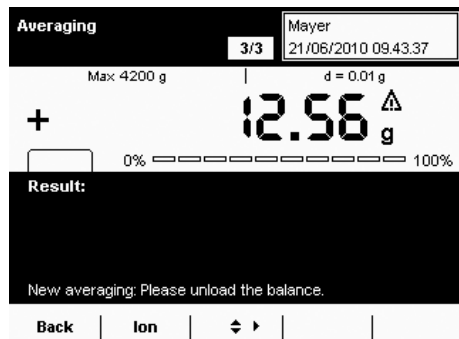


- ▶ To begin weighing, select **Start**.



- ▷ The defined number of measurements is carried out and the average is displayed.

- ▶ To start the calculation, select **Start**.



- ▷ The results calculated with the entered factor are displayed.

- ▶ To display the average weight value, select **Result**.



- ▶ To view the calculated value on the display again, select **Calc.**

Executing a Task: Averaging with Automatic Start

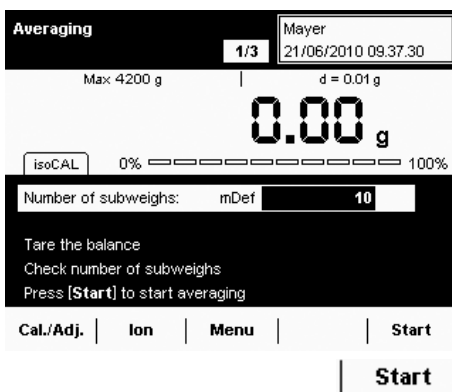


- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or

Start

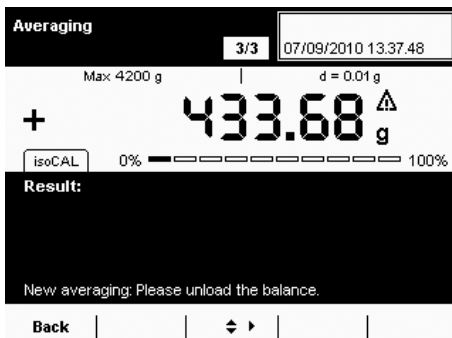
- ▶ If the desired task is already marked, select **Start**.



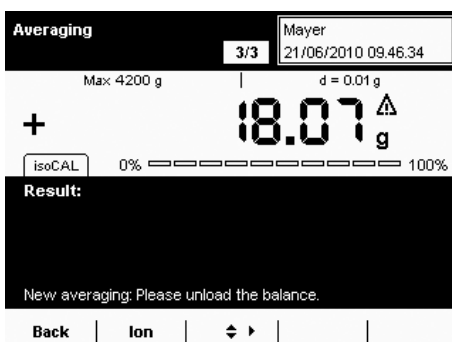
- ▶ If you are using a variable number of measurements, enter the desired number.
- ▶ If you are weighing live animals, place the container (cage) on the weighing pan and tare the balance.

Start

- ▶ Press **Start** to begin the task.



- ▶ Place the animal in the container.



- ▷ The measurement starts automatically; the defined number of measurements and averaging is carried out.
- ▷ The calculated results are displayed.

Result

- ▶ To display the average weight value, select **Result**.

Calc.

- ▶ To view the calculated value on the display again, select **Calc.**

Formulation

Purpose: This application is used to weigh while adding several components consecutively. The balance is tared automatically after each component. The weight values of all individual components as well as the total weighing results are recorded and can be logged. You can save a maximum of 65,535 components.

Combination options: Mass unit conversion, second tare memory and individual identifiers (SQmin function, DKD measurement uncertainty)

Options: The program allows seven different formulations.

1) Fixed formulation in grams: Number of components and the weight portion of each component (in g) are fixed.

2) Fixed formulation in % with total = 100%, total weight is entered: Number of components and the percentage of each component (in g) are fixed. The total weight is entered when the task is started. If the percentages do not add up to 100, the individual values are converted to 100%.

Example: Number of components nDef = 3; component 1 = 25%, component 2 = 30%, component 3 = 10%; components, total = 65% is set equal to 100%.
Component 1: $25\%/65\% * 100 = 38.46\%$; Component 2: $30\%/65\% * 100 = 46.15\%$;
Component 3: $10\%/65\% * 100 = 15.38\%$

3) Fixed formulation in % with total = 100%, total weight is calculated according to the first component: Number of components and the percentage of each component (in g) are fixed. If the percentages do not add up to 100, the individual values are converted to 100% (cf. Formulation 2) After weighing the first component, the total weight (100%) is calculated.

4) Fixed formulation in % with total <> 100%, total weight is entered: Number of components and the percentage of each component (in g) are fixed. If the total of percentages does not equal 100, the individual values are **not** converted. The total weight is entered, for each component, the user-defined weight and the percentage are displayed before weighing.

5) Fixed formulation in % with total = 100%, total weight is calculated according to the first component: Number of components and the percentage of each component (in g) are fixed. If the percentages do not add up to 100, the individual values are converted to 100%. For the first component, the user-defined weight is displayed before weighing in percent. After weighing the first component, the total weight (100%) is calculated. Before weighing any other component, the respective user-defined weight is displayed in g and %.

6) Variable formulation in grams, component count are in a fixed order: Before weighing the first component, you can change the number of components; before weighing each component you can change its name.

7) Variable formulation in grams, component count are in a fixed order: Before weighing the first component, you can zero the number of components; before weighing each component you can change its name.

For all formulations, the following applies:

- The individual components can be stored manually or automatically (first reproducible value).
- If automatic storage of values was selected, the minimum load is determined when the task is created.
- After weighing the first component, the **Calc.** option is displayed. That way, you can change the display to show the intermediate result.
- Once the intermediate result is displayed, you can delete the value of the last weighed component by selecting **Corr.** and it will be removed from the calculation. This allows you to delete all components step-by-step in reverse order. Deletion is **irreversible!**
- Use **Back** to toggle the display and continue the task.
- After the defined number of components has been weighed, the evaluation is displayed. Here too, you can still delete the components (beginning with the last component) and weigh them again.

Note: For the seventh formulation, there is no automatic evaluation because the defined number of components is zero. You have to evaluate the measurement manually by selecting **Calc.**

(☰) | **Edit** |

Create

Formulation

Please select the storage function:

... ▶ New ▶ Application 1 ▶ Formul. ▶ Wizard ▶ Store values

Manually

Automatically: first value at stability

Back | Overview | ⇄ ▶ | Next

Define when the no. of components is determined

... ▶ New ▶ Application 1 ▶ Formul. ▶ Wizard ▶ Default items

Enter fixed quantity

Quantity can be changed during the process

Back | Overview | ⇄ ▶ | Next

Configuring a Task: Formulation

* = factory setting

- ▶ Define how the weight values will be applied.

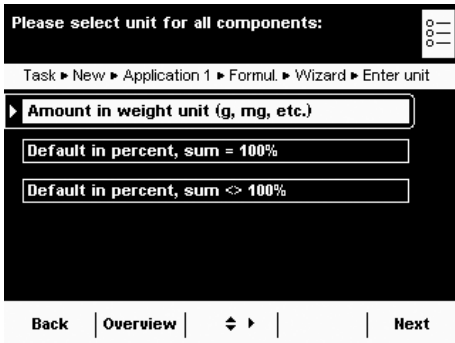
***Manually:** The weight value is applied as soon as the corresponding softkey is pressed.

Automatically: first value at stability: The weight value is applied automatically as soon as the balance has stabilized. You must now select the minimum load to be applied (**10, 20, ... *100 ... 1000 digits**).

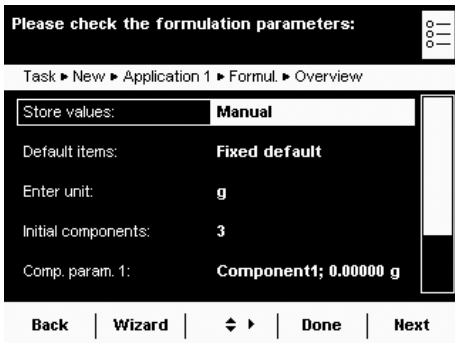
- ▶ Set when the number of components will be defined.

Enter fixed quantity: The number of components is defined beforehand.

***Quantity can be changed during process:** Enter the number of components only when you execute the task (Formulations 6 and 7).



- ▶ Once you configure the components, define the unit:
 - ***Amount in weight unit** (Formulation 1)
 - Default in percent, sum = 100%** (Formulations 2 and 3)
 - Default in percent, sum <> 100%** (Formulations 4 and 5)
- ▶ Select **Next**.
- ▶ Enter the number of components.



- ▷ An overview of all settings is displayed (here, Formulation 2 as an example).
- ▶ Check all settings and change as required.
- ▷ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▷ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Executing a Task: Formulation

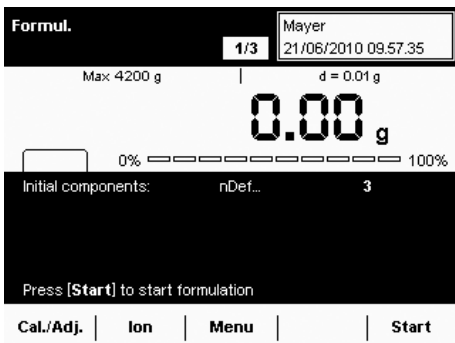


- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

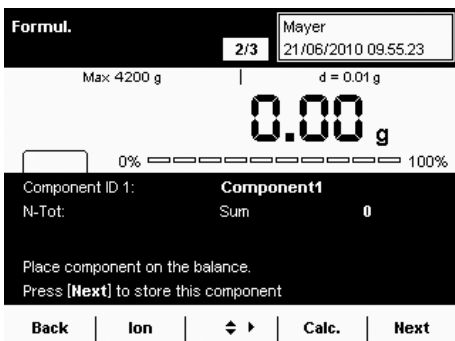
or



- ▶ If the desired task is already marked, select **Start**.

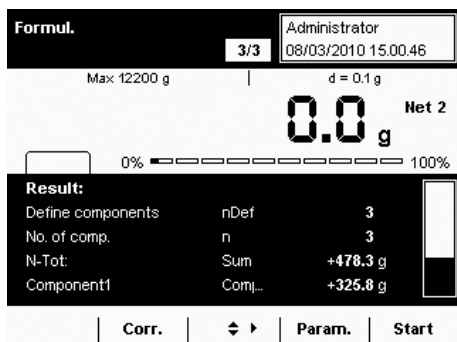


- ▶ If required, enter the number of components that you want to weigh while adding them.
- ▶ To start the formulation, select **Start**.



- ▶ If required, enter the name of components.

Please note that you will be able to scroll through the lines with the cursor softkeys as soon as a scroll bar appears to the right of the display.



- ▶ The evaluation is displayed as soon as all components of the formulation have been added and weighed.

You can also see the complete list here using the cursorsoftkeys.

- ▶ To delete the last component, select **Corr.**
- ▶ To go to the parameter page, select **Param.**
- ▶ To restart the formulation (with changed parameters), select **Start**.

Print example:

```

-----
IdCm1      Component1
Comp1 +    39.2 g
IdCm2      Component2
Comp2 +    23.3 g
:
:
:
IdCm5      Component5
Comp5 +    32.4 g
nDef       5
Sum +     117.6 g
-----

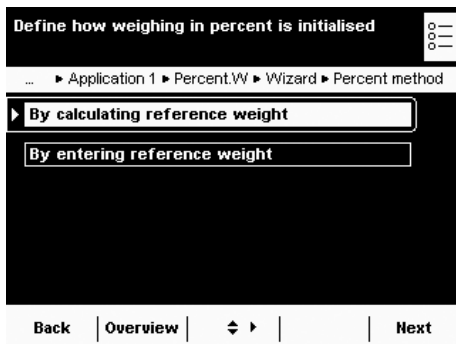
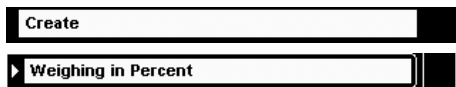
```

Weighing in Percent

- Purpose:** This application is used to determine the percentage share or the percentage difference of the sample related to a reference weight.
- Options:** You can enter a fixed reference weight or a reference percentage.
- Combination options:** Checkweighing, timer-controlled functions, totalizing, statistics, formulation, second tare, individual identifiers (SQmin function, DKD measurement uncertainty)

Configuring a Task: Weighing in Percent

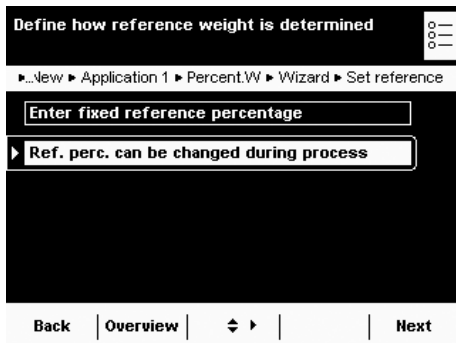
() | **Edit** |



- ▶ Define how the weighing in percent will be initiated.

***By calculating reference weight:** The reference weight is determined by weighing a reference object.

***By entering reference weight:** The reference weight is entered as a numerical value.

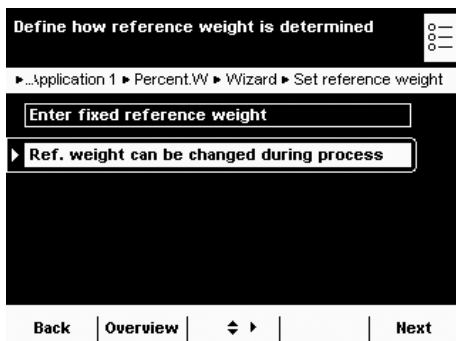


If the reference weight **should be** calculated:

- ▶ Define whether the reference percentage should be fixed or variable.

Enter fixed reference percentage: You must now enter this.

***Reference percentage can be changed during process:** You can enter this when carrying out the task.



If the reference weight **should be** fixed:

Enter fixed reference weight: You must enter this now.

***Reference weight can be changed during process:** You can enter this when carrying out the task.

Define which calculated percentage is displayed

... ▶ Application 1 ▶ Percent.W ▶ Wizard ▶ Displayed value

Residue

Loss

Ratio 1 (DR)

Ratio 2 (OR)

Back | Overview | ◀ ▶ | Next

- ▶ Define which percent calculation should be used.
- Example:** Weight value = 10 g, reference weight = 50 g

***Residue:** The result is the percentage share of the weight value of the reference weight (residue: weight value / reference weight * 100%; in this example: 20%)

Loss: The result is the percentage loss between the weight value and the reference weight (loss: weight value - reference weight / reference weight * 100%; in this example: -80%)

Ratio 1 (DR): The result is the percentage ratio of the difference to the weight value (ratio 1: reference weight - weight value / weight value * 100%; in this example: 400%)

Ratio 2 (OR): The result is the percentage ratio of the reference weight to the weight value (ratio 2: reference weight / weight value * 100%; in the example: 500%)

Select the number of decimal places:

...ew ▶ Application 1 ▶ Percent.W ▶ Wizard ▶ Decimal places

No decimal places

1 decimal place

2 decimal places

3 decimal places

4 decimal places

Back | Overview | ◀ ▶ | Next

- ▶ Define the number of decimal places to be used for the display of the percentage.

none ... 1, *2, 3, 4

Select accuracy (resolution) for storing value:

... ▶ New ▶ Application 1 ▶ Percent.W ▶ Wizard ▶ Accuracy

Normal resolution

10-fold (+1 dec. place)

100-fold (+2 dec. places)

Back | Overview | ◀ ▶ | Next

- ▶ Define the accuracy to be used to store the weight value for the reference weight.

***Normal resolution (display)**

10-fold (+ 1 dec. place)

100-fold (+2 dec. places)

Please check the percent weighing parameters:

Task ▶ New ▶ Application 1 ▶ Percent.W ▶ Overview

Percent method: Enter ref. weight

Set reference weight: Variable ref. weight

Displayed value: Residue

Decimal places: 2 dec. place

Accuracy: Normal accuracy

Back | Wizard | ◀ ▶ | Done | Next

- ▶ An overview of all settings is displayed.
- ▶ Check all settings and change as required.
- ▶ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▶ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Executing a Task: Weighing in Percent



- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or



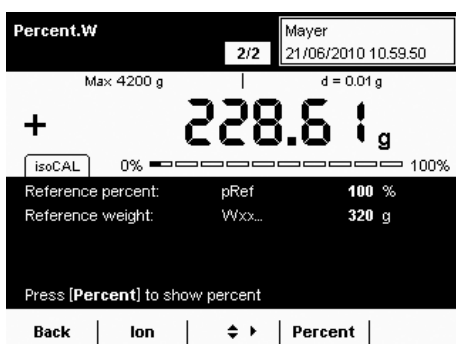
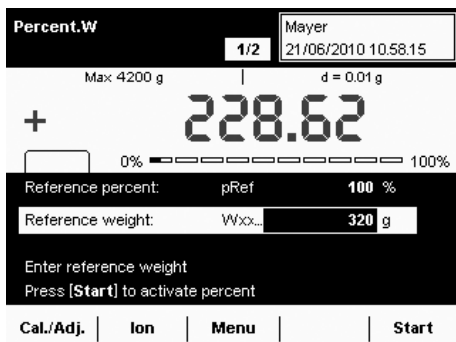
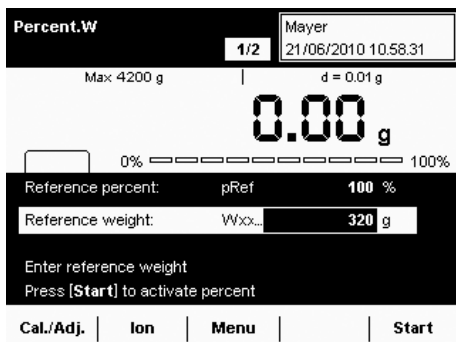
- ▶ If the desired task is already marked, select **Start**.

- ▶ If required, enter the reference percentage (e. g., 100%) or the reference weight.
- ▶ Place the sample on the weighing pan.
In the example it is the reference sample.

- ▷ The weight value of the reference is displayed.
- ▶ To start weighing in percent, select **Start**.

- ▷ The values for the reference percentage and the reference weight are displayed.
- ▶ Place the next sample on the weighing pan and select **Weigh**.

- ▷ The weight value is displayed.
- ▶ To toggle between the display of weight and percent, select **Percent** or **Weigh**.



Timer-controlled Functions

- Purpose:** This application is used to trigger individual balance functions automatically at a specific time or after specific time intervals. The trigger time or interval must occur within 24 hours (1 day).
- Options:** You can select the following functions:
- Acoustic signal
 - Hold display (freeze)
 - Automatic printout of the display value
 - Transfer of components for totalizing, formulation, or statistics
- Example:** In order to determine the amount of evaporation of a sample over time, you can place the sample on the weighing pan and print out the weight value at fixed intervals (e. g., every two minutes).
- Combination options:** Totalizing, statistics, formulation, mass unit conversion, second tare memory, individual identifiers (SQmin function, DKD measurement uncertainty)

Configuring a Task: Timer-controlled Functions

(☰) | **Edit** |

Create

▶ **Timer-Controlled Functions**

Check the timer-controlled functions parameters: ☰

Task ▶ New ▶ Application 1 ▶ Timer Ctr. ▶ Overview

Timer function: **Acoustic signal**

Timer mode: **interv. time**

Time setting: **Variable input**

Autom. restart: **Off**

Back | Wizard | ⚡▶ | Done | Next

Please select the timer mode: ☰

... ▶ New ▶ Application 1 ▶ Timer Ctr. ▶ Wizard ▶ Timer mode

▶ **Timer set to intervals**

Timer set to a specific time

Back | Overview | ⚡▶ | Next

Please select the time input: ☰

... ▶ New ▶ Application 1 ▶ Timer Ctr. ▶ Wizard ▶ Time setting

Enter fixed time

▶ **Time can be changed during process**

Back | Overview | ⚡▶ | Next

- ▶ Define which function should be timer-controlled.

***Acoustic signal (beep tone):** The balance makes a beeping sound.

***Lock in readout (hold display):** The measured weight value remains on the display for the defined time period.

***Automatic printout of values:** The displayed value is printed at the defined time.

- ▶ Select the mode.

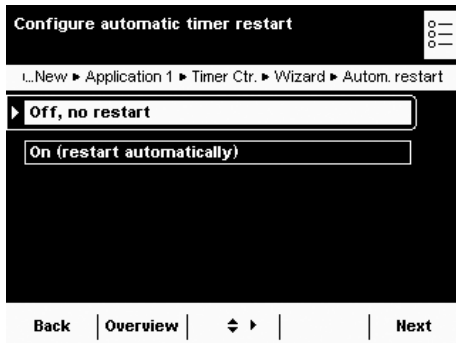
***Timer set to intervals:** The function is triggered at regular intervals (e.g., every 30 sec.)

***Timer set to a specific time:** The function is triggered at the fixed time (after the start of the application) (e.g., at 08:00:00).

- ▶ Specify when the time and/or interval should be entered.

***Enter fixed time:** You must enter this time and/or interval now.

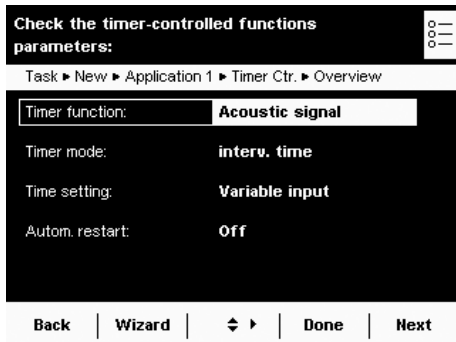
***Time setting can be changed during process:** The time and/or interval is only entered when the task is carried out.



► Specify whether or not there should be an automatic restart after the timer-controlled function has been triggered.

***Off, no restart**

On (restart automatically): The timer is restarted as soon as the timer-controlled function has been carried out.



- ▷ An overview of all settings is displayed.
- ▷ Check all settings and change as required.

- ▷ A message asks whether you would like to add another application.
- ▷ If required, select additional applications to be combined.

- ▷ Now you will be prompted to configure the weighing and printing functions.
- ▷ Check all settings and change as required.
- ▷ Enter a short name and a description for the new task.
- ▷ To save the new task, select **Save**.

Executing a Task: Timer-controlled Functions



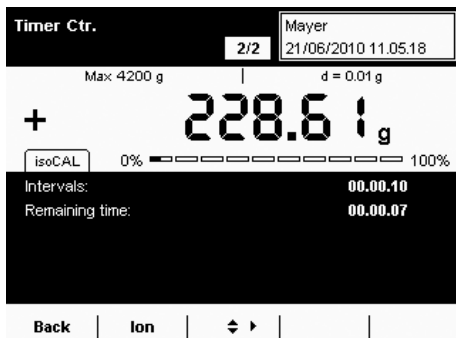
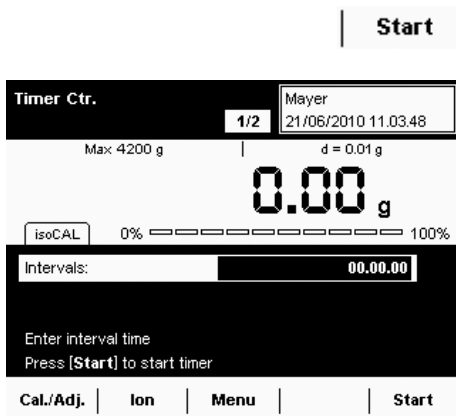
- If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- Select the desired task.

or

- If the desired task is already marked, select **Start**.

- If required, enter the time or interval (hh:mm:ss, e. g., 00:00:30 for an interval of 30 seconds).

- Follow the instructions on the display.



Totalizing

- Purpose:** Adding up weight values and calculating values. The weight values of all individual components are recorded and can be logged.
- Options:** You can save a maximum of 65,535 components.
- User rights:** All settings for the “Totalizing” application are saved under the active user profile. Each user can make their own settings for this application. For this reason, make sure that the desired user profile is selected before you start.
- Results:** When a user creates a local totalizing task, the results are only saved locally for that user. The results of global tasks, however, are available to all users and the administrator.
- Combination options:** Calculation, averaging, weighing in percent, parts counting, checkweighing, mass unit conversion, second tare memory, individual identifiers (SQmin function, DKD measurement uncertainty)

Configuring a Task: Totalizing

(☰) | Edit |

Create

▶ Totalizing

Please select the storage function:

... ▶ New ▶ Application 1 ▶ Totalising ▶ Wizard ▶ Store values

▶ Manually

Automatically: first value at stability

Automatically: last value at stability

Back | Overview | ◀ ▶ | Next

(* = factory setting)

▶ Define how the weight value will be stored.

***Manually:** The weight value is stored as soon as the corresponding cursor softkey is pressed.

Automatically: first value at stability: The weight value is applied automatically as soon as the balance has stabilized after filling and the value exceeds the minimum load.

Automatically: last value at stability: The last weight value with stability is applied automatically, as soon as the balance is unloaded and the value falls short of the minimum load. If stability was reached repeatedly between measurements, the last stable weight value will be stored.

You must now select the minimum load to be applied:
(**none, 10, 20, ...*100 .. 1000 digits**).

Weighing Mode with Automatic Storage:

▶ Select the weighing mode to be used for the weight values.

Weighing in: Initial weighing of samples in a container.

Final readout: Final weighing of samples in a container.

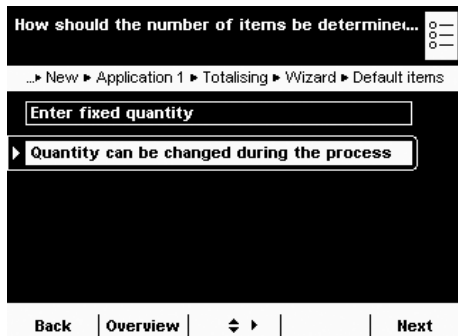
Please select the weighing mode:

... ▶ New ▶ Application 1 ▶ Totalising ▶ Wizard ▶ Weighing mode

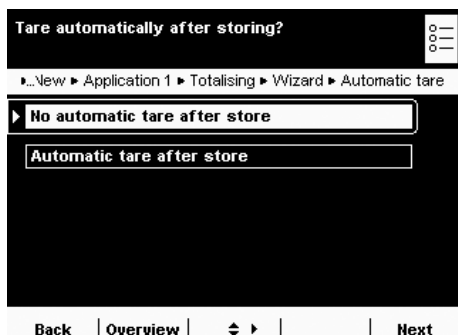
▶ Weighing in

Final readout

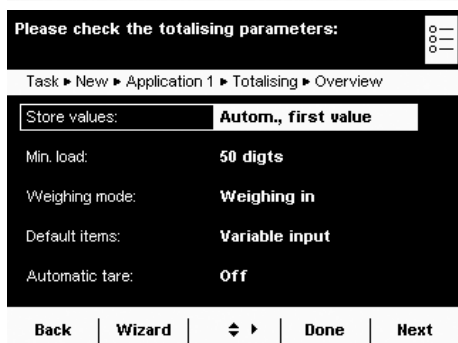
Back | Overview | ◀ ▶ | Next



- ▶ Define when the number of measurements (items) will be set.
- ▶ **Enter fixed quantity:** The quantity of items is defined beforehand.
- ▶ **Quantity can be changed during the process:** Enter the quantity of items when you execute the task.



- ▶ Define whether or not automatic taring should take place after storing the value.



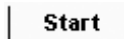
- ▶ An overview of all settings is displayed.
- ▶ Check all settings and change as required.
- ▶ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▶ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

Executing a Task: Totalizing

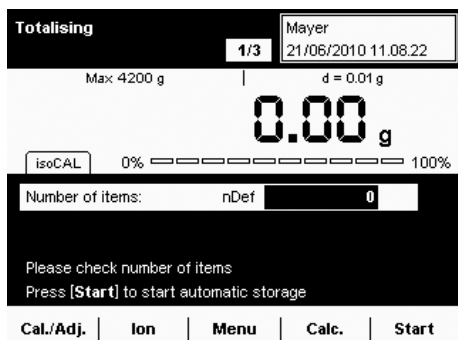


- ▶ If you haven't already done so, go to Task Management.
- ▶ The task selection is displayed.
- ▶ Select the desired task.

or



- ▶ If the desired task is already marked, select **Start**.



- ▶ If required, enter the number of items that you want to add up.
- ▶ Place the first sample on the weighing pan.
- ▶ To start totalizing, select **Start**.
- ▶ During the task, you can view the results of previous measurements at any time by selecting **Calc.**

DKD Measurement Uncertainty

- Purpose:** This application is used to ensure that the measurement uncertainty is displayed dynamically so that it conforms to the data documented on the DKD calibration certificate.
- Requirements:** The function can only be used when the balance has been prepared for this beforehand by a service technician. The service technician determines the measurement uncertainty of the balance via an onsite DKD calibration. The technician records the measurements and the measurement uncertainty for weighing in the DKD calibration certificate. He also saves the calculated data in the balance.
- Options:** The measurement uncertainty can be displayed as an absolute value (U), a relative value (U*), or as process accuracy (PA).
- Combination options:** Mass unit conversion, second tare memory, individual identifiers (SQmin function)

Configuring a Task: DKD Measurement Uncertainty

(☰) | Edit |

Create

DKD Uncert. of Measurment.

Select the measurement uncertainty display mode:

... Application 1 ▶ DKDMeas ▶ Wizard ▶ Result display mode

Display absolute uncertainty

Display relative uncertainty

Display process accuracy

Back | Overview | ⏪ | Next

Please enter the process accuracy factor:

... ▶ New ▶ Application 1 ▶ DKDMeas ▶ Wizard ▶ Pa factor

Pa factor: P fact 1.000000

Back | Overview | ⏪ | Next

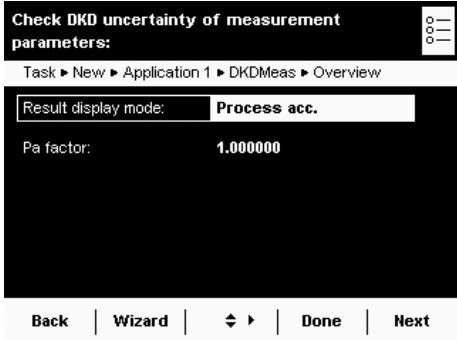
- ▶ Select the measurement uncertainty display mode in terms of the maximum capacity.

Display absolute uncertainty: Absolute value (e. g., 12.00 g)

Display relative uncertainty: Relative value (e. g., 0.000045%)

Display process accuracy: e.g., 0.00013%

- ▶ If you have selected **process accuracy**, enter the process accuracy factor now.



- ▷ An overview of all settings is displayed.
- ▷ Check all settings and change as required.

- ▷ A message asks whether you would like to add another application.
- ▷ If required, select additional applications to be combined.

- ▷ Now you will be prompted to configure the weighing and printing functions.
- ▷ Check all settings and change as required.
- ▷ Enter a short name and a description for the new task.
- ▷ To save the new task, select **Save**.

Executing a Task: DKD Measurement Uncertainty

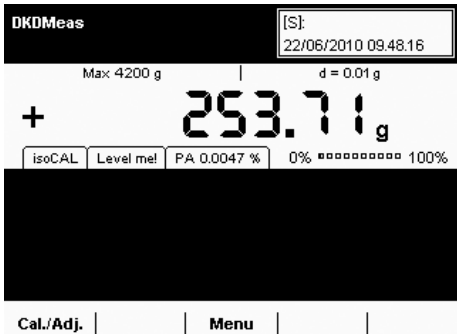


- ▷ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▷ Select the desired task.

or



- ▷ If the desired task is already marked, select **Start**.



- ▷ If you have selected **absolute uncertainty**, the uncertainty of the weight value is displayed in a tab (e. g., U 12.01 g). This value is based on the DKD value set by a service technician.



- ▷ If you have selected **relative uncertainty**, the relative uncertainty of the measurement is displayed in a tab as a percentage of the weight value.

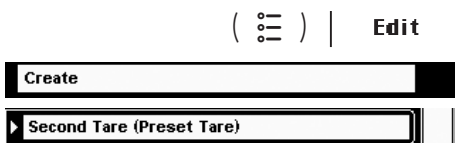


- ▷ If you have selected **process accuracy**, the process accuracy is displayed in a tab in percent.

Second Tare Memory (Preset Tare)


- Purpose:** This application is used to define the second tare value. As soon as a second tare value is used, **Net1** appears on the display for the respective net value.
- Options:** You can either use a weight value or enter a numerical value as a second tare value.
- Combination options:** Mass unit conversion, individual identifiers (SQmin function, DKD measurement uncertainty)

Configuring a Task: Second Tare Memory




- ▶ No pre-settings are required for this application.
- ▶ Now you will be prompted to configure the weighing and printing functions.
 - ▶ Check all settings and change as required.
 - ▶ Enter a short name and a description for the new task.
 - ▶ To save the new task, select **Save**.

Executing a Task: Second Tare Memory (Preset Tare)

- ()
- ▶ If you haven't already done so, go to Application Management.
 - ▶ The task selection is displayed.
 - ▶ Select the desired task.

or

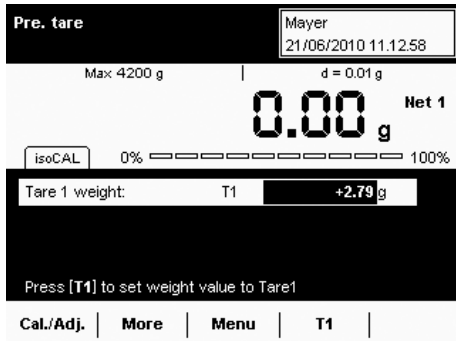
-  **Start**
- ▶ If the desired task is already marked, select **Start**.
 - ▶ You have two options for defining the second tare.

Using a Weight Value as a Second Tare

- ▶ Place the object (container) on the balance whose weight value you want to use as the second tare.



-  **T1**
- ▶ To set the weight value as a second tare, select **T1**.

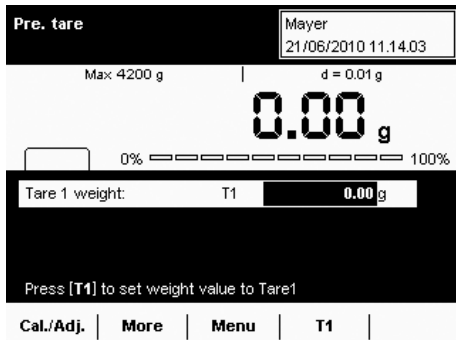


- ▶ The stored weight value is displayed as the second tare value. **Net 1** is also displayed next to the current weight value.

| **Clr T1** |

- ▶ To delete the tare memory, select **Clr T1**.

Entering a Numerical Value as a Second Tare



- ▶ Enter the tare value for T1 (e.g., 20).

| **T1** |

- ▶ To set this value as a second tare, select **T1**.



- ▶ The tare value is displayed.

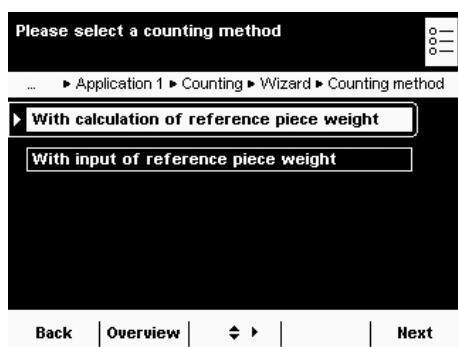
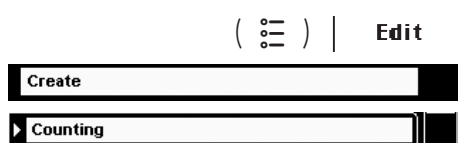
| **Clr T1** |

- ▶ To delete the tare memory, select **Clr T1**.

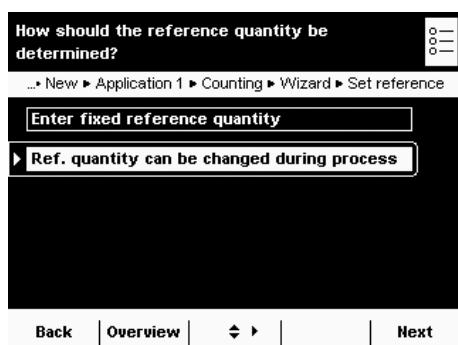
Parts Counting

- Purpose:** This application is used to determine the number of objects which each have approximately equal weight. This saves you from having to count individual parts.
- Options:** You can calculate or enter the piece weight of individual objects.
- Combination options:** Checkweighing, timer-controlled functions, totalizing, statistics, formulation, mass unit conversion, second tare memory, individual identifiers (SQmin function, DKD measurement uncertainty)

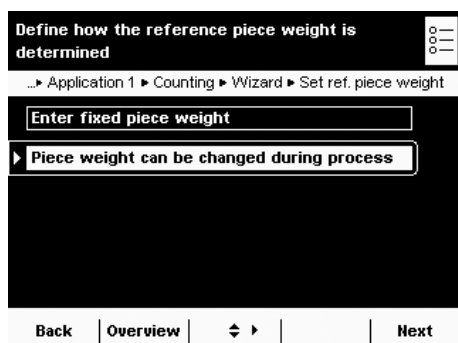
Configuring a Task: Parts Counting



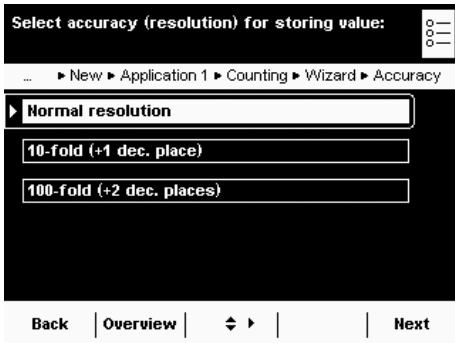
- ▶ Select the method that you want to use.
- ***With calculation of reference piece weight:** The piece weight is determined by weighing a known reference piece quantity.
- ***With input of reference piece weight:** The piece weight is entered as a numerical value.



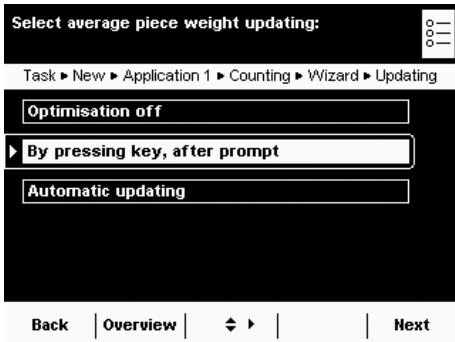
- ▶ With calculation of the reference piece weight:
- ▶ Define how the reference piece count should be entered.
- ***Enter fixed reference quantity:** You must enter this reference piece count **nRef** now.
- ***Reference quantity can be changed during process:** The reference piece count is entered when the task is executed.



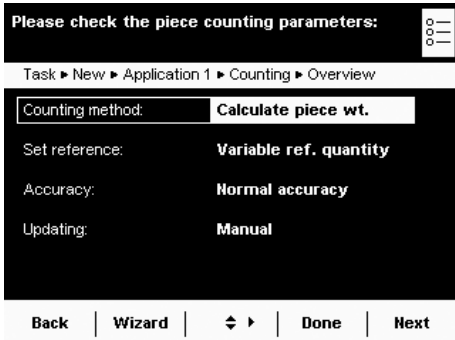
- ▶ When entering the piece count:
- ▶ Define how the piece weight should be entered.
- ***Enter fixed piece weight:** You must enter this piece weight **wRef** now.
- ***Piece weight can be changed during process:** The piece weight is entered when the task is carried out.



- ▶ Define the accuracy to be used for the weight value.
- ***Normal resolution:** As displayed
- 10-fold (+ 1 dec. place):** With one decimal place more than on the display
- 100-fold (+2 dec. places):** With two decimal places more than on the display



- ▶ Only with **calculation of reference piece weight:**
- ▶ Define whether or not the piece weight should be updated when counting.
- Optimization off**
- ***By pressing key, after prompt**
- Automatic updating**

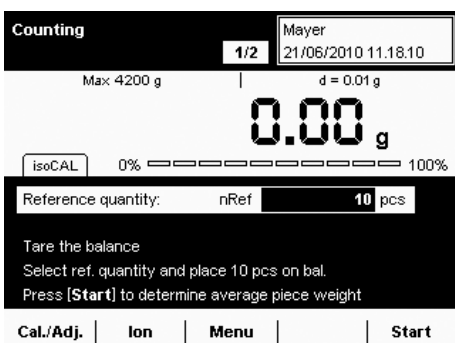


- ▶ An overview of all settings is displayed.
- ▶ Check all settings and change as required.
- ▶ A message asks whether you would like to add another application.
- ▶ If required, select additional applications to be combined.
- ▶ Now you will be prompted to configure the weighing and printing functions.
- ▶ Check all settings and change as required.
- ▶ Enter a short name and a description for the new task.
- ▶ To save the new task, select **Save**.

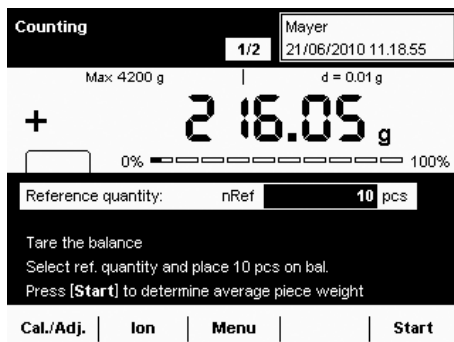
Executing a Task: Parts Counting with Reference Piece Weight Calculation



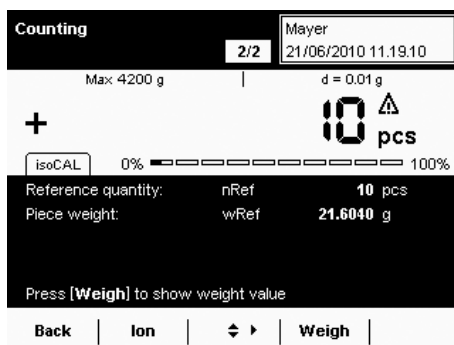
- ▶ If you haven't already done so, go to Application Management.
- ▶ The task selection is displayed.
- ▶ Select the desired task.
- or
- ▶ If the desired task is already marked, select **Start**.



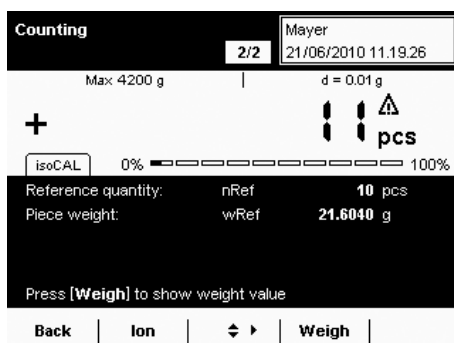
- ▶ The last used reference piece quantity **nRef** is displayed.
- ▶ If you are working with a variable reference piece quantity, you must enter or change this now.
- ▶ Place this exact amount (nRef) of the objects to be counted on the weighing pan.



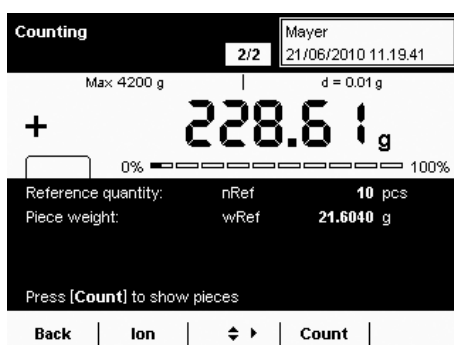
- ▷ The weight value for the reference objects is displayed.
- ▶ To determine the average piece weight, select **Start**.



- ▷ The reference piece count and the average piece weight are displayed. You can now begin with the parts counting of unknown amounts.



- ▶ Place any amount of the objects on the weighing pan.
- ▷ The determined piece count is displayed.
- ▶ To display the weight value of this amount, select **Weigh**.



- ▷ The weighing results and all parameters are displayed.
- ▶ To count the next unknown amount, empty the weighing pan and place the next amount of objects onto it.
- ▷ The calculated piece count and the weighing results are immediately updated.

Executing a Task: Parts Counting by Entering the Piece Weight



- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or



- ▶ If the desired task is already marked, select **Start**.

- ▷ The last used piece weight **wRef** is displayed.

- ▶ Use the cursor softkeys to select the input field for the piece weight.
- ▶ Enter the piece weight of the reference object (e. g., 50 g).

- ▷ The reference piece quantity and the entered piece weight are displayed.

- ▶ Place the sample with the objects to be counted on the weighing pan.

- ▷ The calculated piece count is displayed.

- ▶ To display the weight of this sample, select **Weigh**.

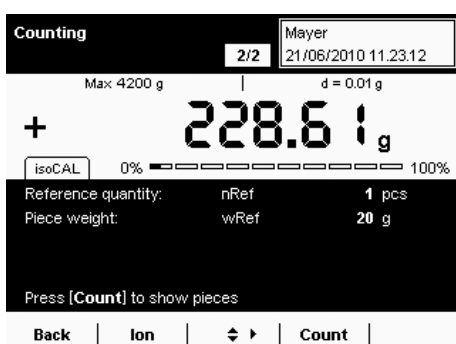
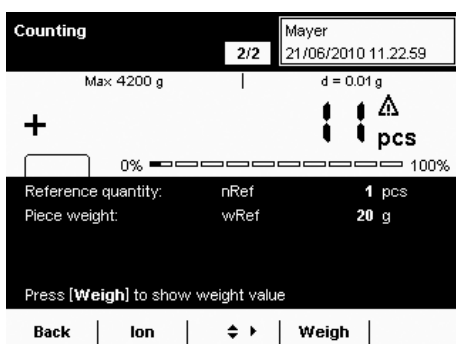
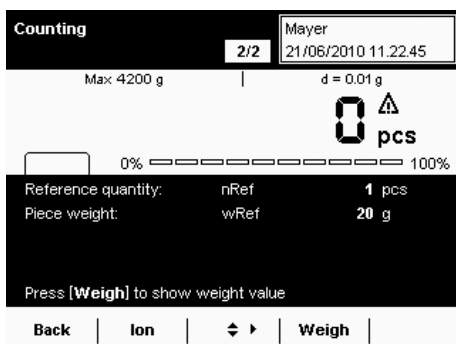
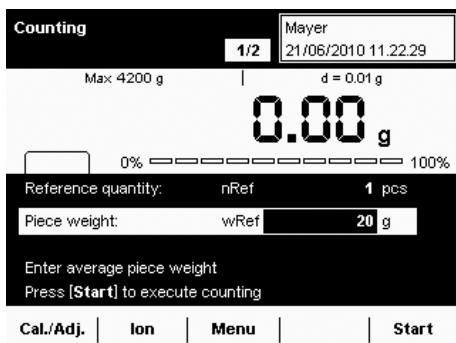
- ▷ The weight of the sample is displayed.

- ▶ To toggle between the display of weight value and piece count, select **Count** or **Weigh**.

- ▶ To count the next quantity of objects, empty the weighing pan and place the next sample onto it.

- ▷ The weighing result is updated immediately.

- ▶ To display the piece count of this sample, select **Count**.



Checkweighing

Purpose: This application is used to check a weight value using preset control values.

Options: Control values can be exact target values or tolerance range limit values within which the check value must lie.

The check results are shown on the display. They can also be used for further electronic editing by activating the control ports at the data output.

Combination options: Totalizing, statistics, formulation, mass unit conversion, second tare memory, individual identifiers (SQmin function, DKD measurement uncertainty)

Configuring a Task: Checkweighing

(☰) | Edit |

Create

▶ Checkweighing

Select the set of values to be entered

▶ Application 1 ▶ Checkwgh. ▶ Wizard ▶ Checkweighing input

▶ Target, min., max. weight

Minimum and maximum weights

Target; minimum and maximum in %

Back | Overview | ◀ ▶ | Next

Define how checkweighing values are set

▶ Application 1 ▶ Checkwgh. ▶ Wizard ▶ Set checkwgh. values

Enter fixed limits

▶ Variable values (input)

Back | Overview | ◀ ▶ | Next

Please select the weight display mode

▶ New ▶ Application 1 ▶ Checkwgh. ▶ Wizard ▶ Display mode

▶ Absolute value

Difference betw. target and actual

Back | Overview | ◀ ▶ | Next

▶ Define which values are to be used for checkweighing.

***Target, min., max. weight:** The target value and a tolerance range in absolute values

Minimum and maximum weights: Only a tolerance range in absolute values

Target; minimum and maximum in %: The target value and a tolerance range as a percentage

▶ Define how the control values will be entered.

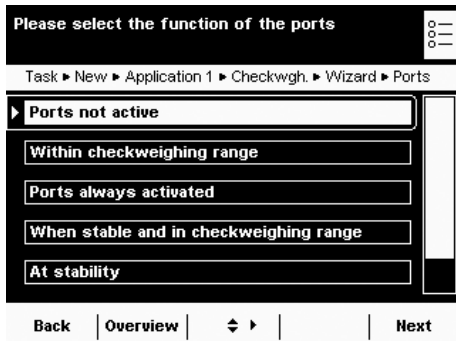
Enter fixed limits: You must enter these values now.

***Variable values (input):** The check values can be entered now, but can still be changed later when the task is carried out.

▶ Select the display mode for the results.

***Absolute value:** Displays the absolute value.

Difference betw. target and actual: The deviation from the target value is then displayed.



► Define how the ports should be activated depending on the check results

***Ports not active**

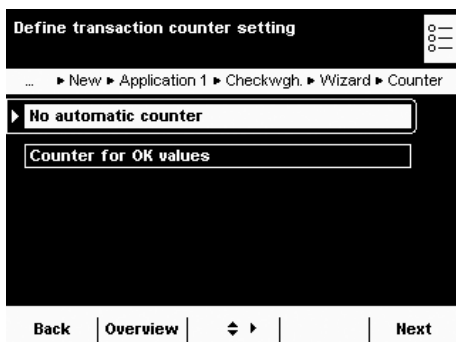
Within checkweighing range: Ports are only activated when the results are within the checkweighing range.

Ports always activated: The ports are always activated with each weight value.

When stable and in checkweighing range: The ports are only activated as soon as the balance becomes stable and the results are in the checkweighing range.

At stability: The ports are always activated as soon as the balance has stabilized.

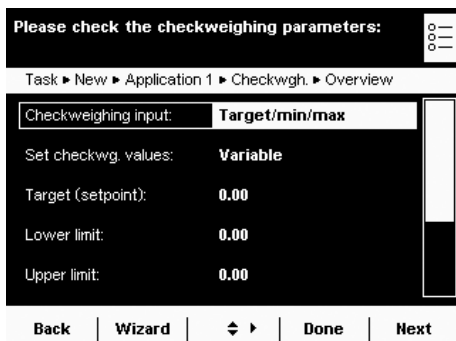
Once at stability and in the checkweighing range: The ports are activated on a one-time basis (not dynamically) as soon as the balance has stabilized and the results are in the checkweighing range; effective until the balance has been unloaded.



► Define whether or not the automatic counter for positive results should be activated.

***No automatic counter**

Counter for OK values: All positive checked results are counted.



- An overview of all settings is displayed.
- Check all settings and change as required.

- A message asks whether you would like to add another application.
- If required, select additional applications to be combined.

- Now you will be prompted to configure the weighing and printing functions.
- Check all settings and change as required.
- Enter a short name and a description for the new task.
- To save the new task, select **Save**.

Executing a Task: Checkweighing

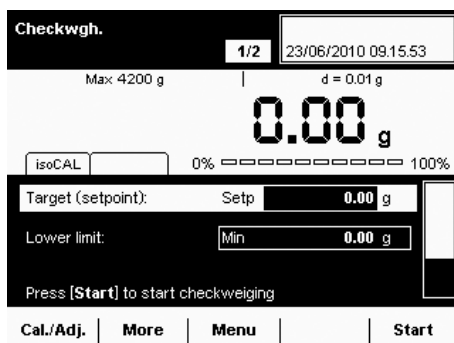


- ▶ If you haven't already done so, go to Application Management.
- ▷ The task selection is displayed.
- ▶ Select the desired task.

or

Start

- ▶ If the desired task is already marked, select **Start**.



Define check values **by entry**:

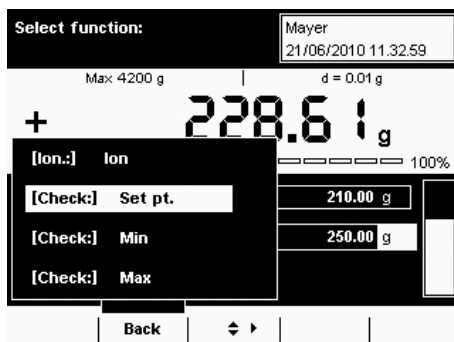
- ▶ Select the input field Setp and enter the target.
- ▶ Select the input field Min or Max and enter the minimum or maximum check values.

or

More

Define check values **with current load**:

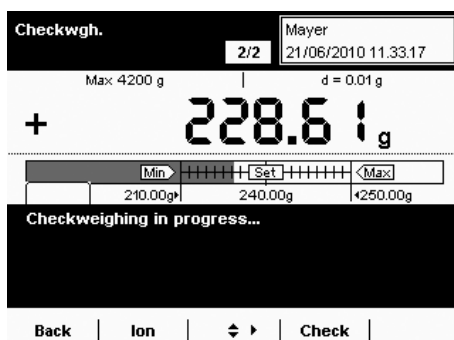
- ▶ Place the weight on the weighing pan.
- ▶ Select **More**.



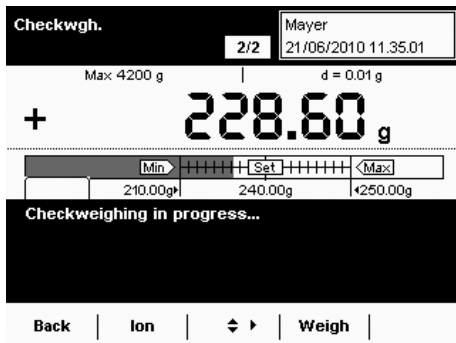
- ▶ Select the field of the check value with the current weight value you want to use.
- ▶ If required, repeat the process with additional weights for the other check values.
- ▶ To exit the input mode **without saving the value**, select **Back**.

Start

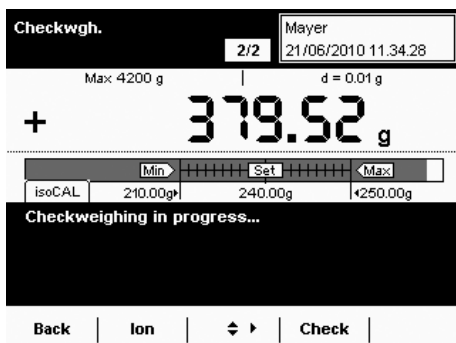
- ▶ To start checkweighing, select **Start**.



- ▷ The entered check values are displayed graphically.
- ▶ Place the object to be checked on the weighing pan.

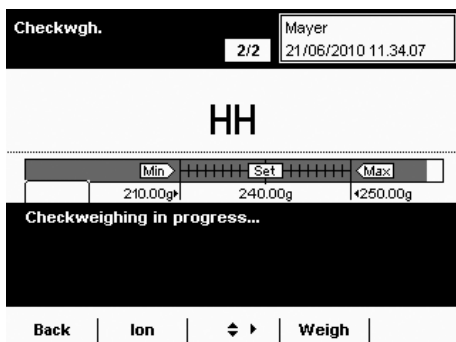


- ▷ The weighing result is displayed.
- ▷ It is also possible to see the weighing result on a graphic scale for a set target range.



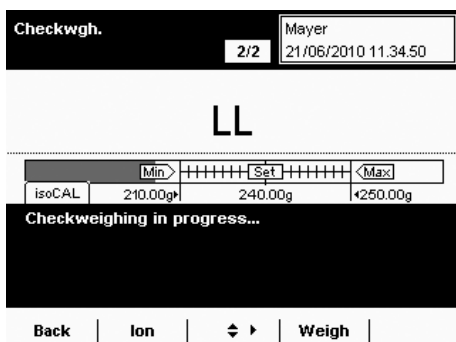
It can be seen immediately on the graphic scale if the result is outside of the tolerance.

- ▶ To switch the display to check mode, select **Check**.



- ▷ The display will now show whether the weighing result has gone over upper limit (**HH**) or under the lower limit (**LL**).

- ▶ To check additional objects, empty the weighing pan and place the next object on it.
- ▷ The display is updated dynamically.
- ▶ You can toggle between weighing and checkweighing at any time by selecting **Weigh** or **Check**.

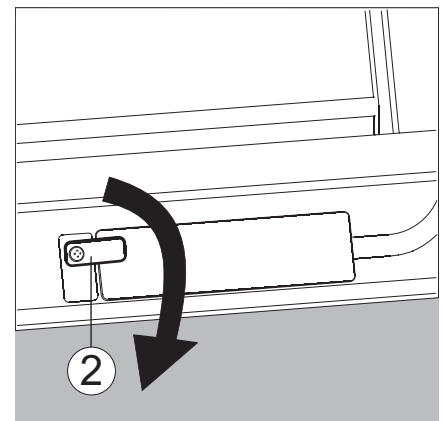
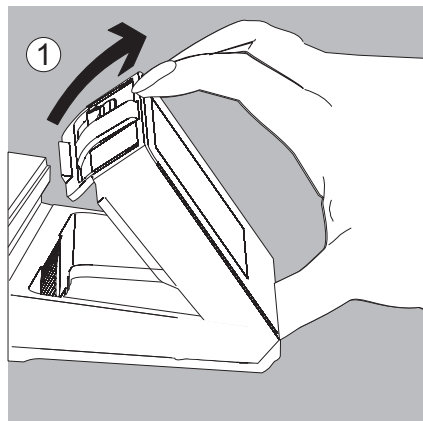


Importing/Exporting Data

You can use an SD memory card to move and exchange data (import/export). This card is required when you want to save data externally or when you want to exchange data with other balances. For example, you can easily copy user profiles to several balances.

Inserting Memory Cards into the Display and Control Unit

The slot for the SD card is located at the back of the display and control unit.



1. Tilt the control unit until it is nearly vertical.
2. Swivel the cover of the card slot to the front. Align the SD card so that the contacts are facing down.
3. Insert the card into the slot as far as it will go.
 - ▶ To remove the card, press it against the resistance in the direction of the slot so that the card springs out.
4. Press the position retainer and swivel the display and operating unit back into the desired position.

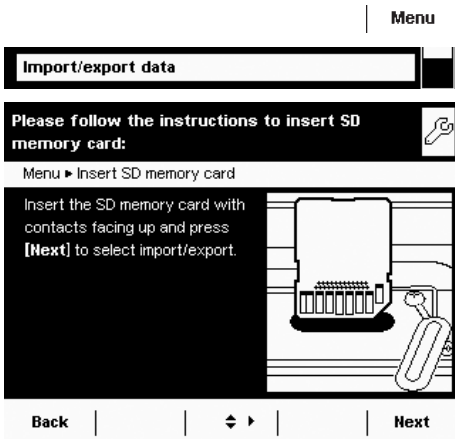
Importing/Exporting Data

The following data can be imported or exported via the SD card:

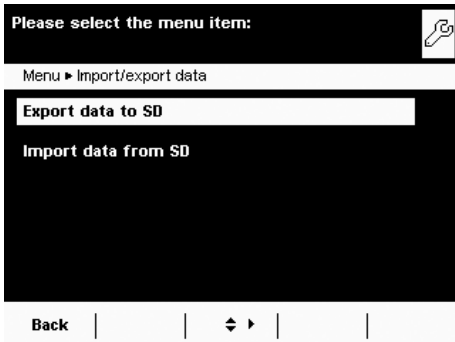
- Global tasks and separate tasks
- User profiles with their separate tasks
- Menu parameters
- Alibi memory
- Audit trail
- Calibration and adjustment data
- Individual, customer-specific applications “Q-Apps”



You can view the data from the alibi memory (xml files) with any web browser and import them to Microsoft Excel as well.

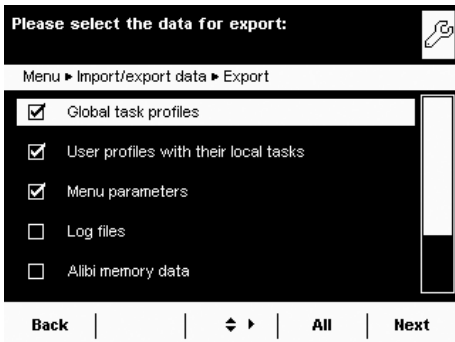


- ▶ Select the **Import/export data** menu item.
- ▶ Insert the SD card into the slot as shown in the picture.

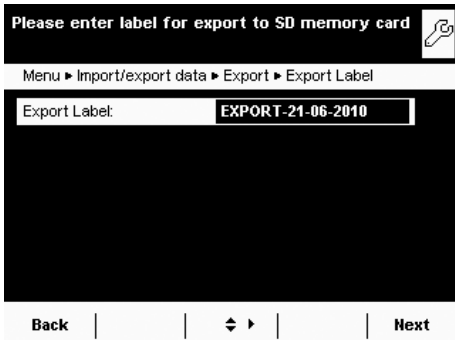


- ▶ Select whether you wish to export or import data.

Export



- ▶ Mark the data you wish to export and select **Next**.

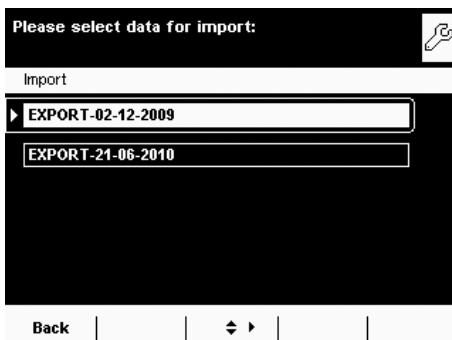


- ▶ Edit the name of the export folder, if desired, and select **Next**.
- ▷ The data is copied to the SD card.
- ▷ An icon is shown on the display during the data transfer. The device cannot be operated during this time.

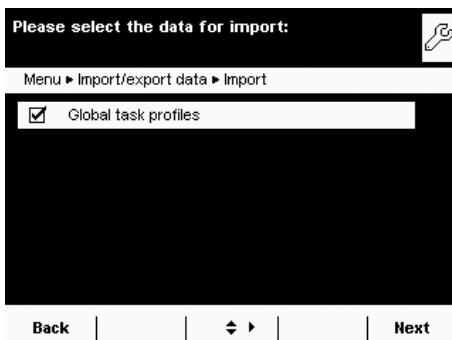
Import

In order for the data to be detected by the balance when importing them, always copy the entire subdirectory rather than individual files.

- data
 - all
 - EXPORT-dd-mm-yyyy
 - task
 - language



- ▶ Select the folder on the SD card from which you want to import data.



- ▶ Mark the data you wish to import and select **Next**.
- ▶ The data will be imported from the SD card.
- ▶ An icon is shown on the display during the data transfer. The device cannot be operated during this time.

If the following error message appears:

Wrong XML version. Please check the data.

- ▶ Select **Next**.
- ▶ All previous data will be saved in the new format.
- ▶ Check your settings after importing the data (Menu, TASK, and USER).
- ▶ If the XML files continue to cause problems, contact your local Sartorius Service Center.

Calibration and Adjustment

Background During **calibration**, a calibration weight is used to determine how much the displayed value deviates from the actual measurement value. This deviation is compared with an entered target value and is then eliminated by a subsequent **adjustment** of the balance. During the **Linearization**, the deviation of the values from the ideal characteristic curve is cleared.

M

Not all functions/settings can be selected on balances used as legal measuring instruments.

When and how often

Calibration/adjustment should be carried out on a **regular** basis, e. g., daily after the balance is turned on. In addition, it should be done **after each leveling** and always when the ambient conditions have changed (temperature, humidity, or air pressure), and when the balance has been set up in another location.

isoCal

All Cubis® balances are equipped with the automatic calibration function **isoCal** (time and temperature-controlled). You can adapt this function according to your requirements. You can set up a **memory function** that triggers a prompt for calibration/adjustment at specified intervals.

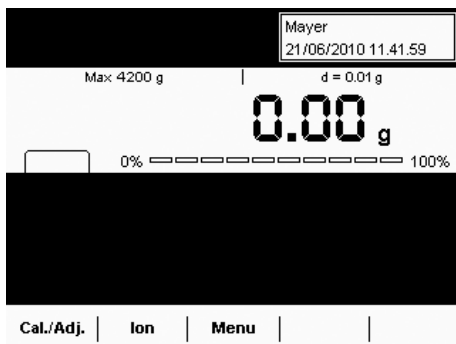
i

The process for the calibration/adjustment function may differ depending on the preset configuration (see System Settings > Calibration/Adjustment Data). The factory settings have not been changed for the procedure described here.

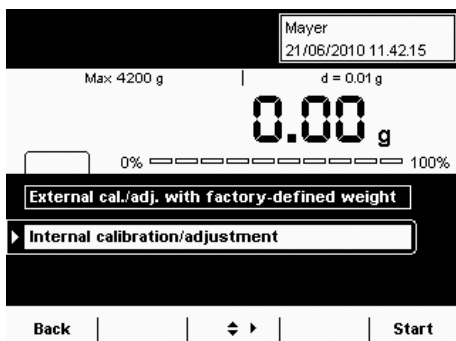
Calibration/Adjustment Using Internal Calibration Weight

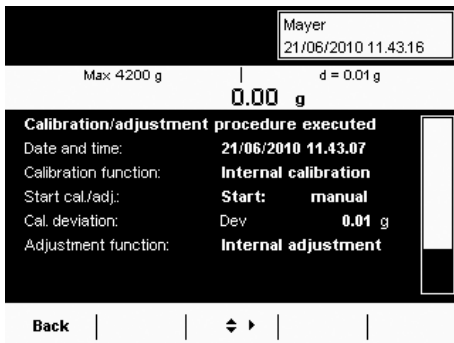
(**TARE**)

- ▶ If required, switch to operating mode.
- ▶ Make sure that the weighing pan is empty.
- ▶ Press **TARE** to tare the balance.
- ▶ Select **Cal./Adj.**



- ▶ Select **Internal calibration/adjustment** or, if this option is already marked, select **Start**.





- ▷ The procedure will be executed.
- ▶ Wait until calibration/adjustment has been completed.
- ▷ The results are displayed after the procedure is completed.
- ▶ To return to operating mode, select **Back**.

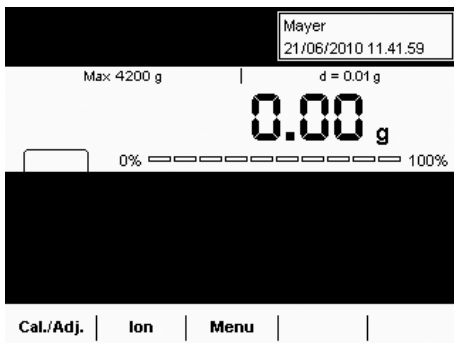
Calibration/Adjustment Using External Calibration Weight



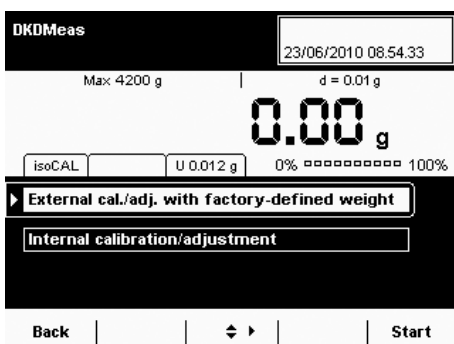
An external calibration weight is required for this function. Please note the tolerance of the calibration weight being used.

- ▶ If required, switch to operating mode.
- ▶ Make sure that the weighing pan is empty.
- ▶ Press **TARE** to tare the balance.
- ▶ Select **Cal./Adj.**

(TARE)

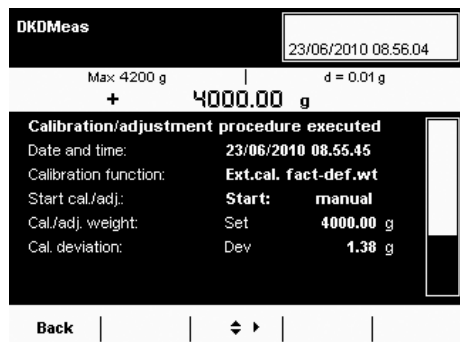


- ▶ Place the calibration weight on the balance.
- ▶ Select **External cal./adj. with factory-defined weight** or, if this option is already marked, select **Start**.



- ▷ Calibration is carried out (approx. 15 to 20 sec.)
- ▷ After calibration, the determined deviation is displayed.
- ▶ To adjust the balance, select **Adjust**.
- ▶ To complete calibration without adjustment, select **Exit**.





▷ Lastly, the results are shown on the display.

▶ To return to operating mode, select **Back**.

User Management



You can configure the following settings in this menu:

- Creating new user profiles (only possible as administrator)
- Editing user profiles (modify, copy, delete, change and delete passwords, depending on user rights)
- Activating users

User Management

The user administration allows for defining of users with distinct sets of rights: the administrator and multiple users.

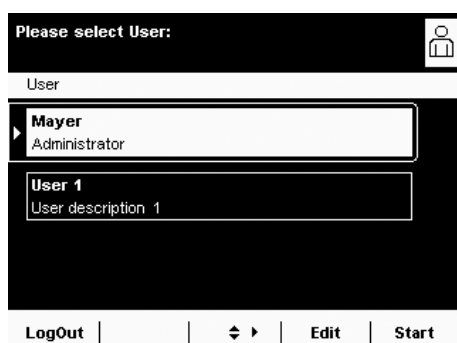
The **administrator** can use all functions (except those in service) and he/she has all user rights. Only he/she can create new user profiles and assign individual rights. There is only one administrator.

A **user**, on the other hand, cannot use all functions. He/she has limited rights, which are defined in the user profile. A max. of 15 user profiles can be created.

When the balance is first delivered, there are no user profiles, all settings can be carried out. The first user profile that is created is automatically an administrator. This person can then create additional user profiles.

() ▶ To open the User Management menu, select the USER () key.

▶ The menu opens and the selection of user profiles is displayed.



Creating User Profiles



This function is only available to an administrator.

The following settings can be made in the user profile and are only valid for that user:

- Language
- Display settings (color, brightness)
- Volume and acoustic signal on/off
- User rights
- Password protection
- User name and description.

(👤) | **Edit** |

▶ To create a new user profile, select **Edit**.

USER (👤)

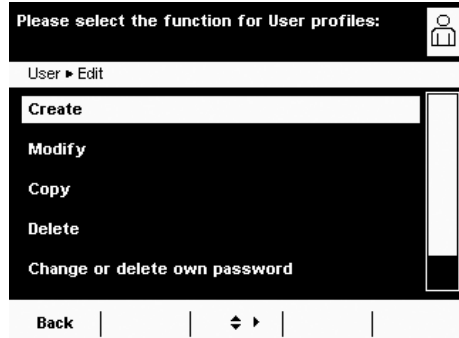
▶ Select **Create**.

The program now automatically guides you through the menu. Make your selections by selecting the desired option with the cursor softkeys. The program then takes you to the next prompt.

or

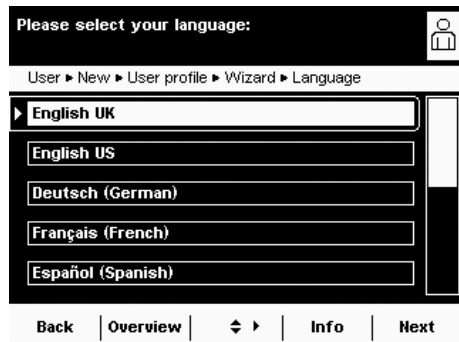
If the desired option is already selected (highlighted), select **Next** to reach the next prompt.

If more than one option can be selected for a single setting, press **Next** after making your selection(s) to proceed to the next prompt.



Step 1: Select Language

▶ Select the desired language.



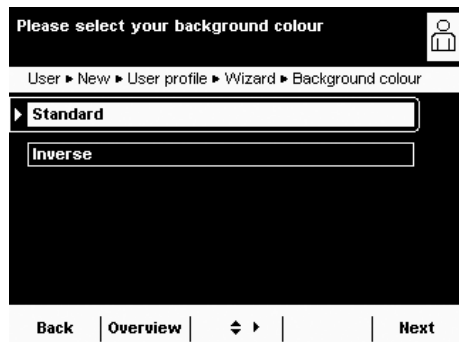
Steps 2 to 4: Set Background, Brightness, and Acoustic Signal

As a default the **background** is black with white text. The inverse setting is exactly the opposite, i.e. a white background with black text.

▶ Select the desired setting.

- ▷ The display changes to the **brightness** setting.
- ▶ Select the desired brightness for the display.

- ▷ The display changes to the **acoustic signal** setting.
- ▶ Select the desired volume or switch off the signal.



Step 5: Assign User Rights

▶ Select the corresponding options to define which functions the user can access.

The following rights can be assigned individually:

- Creating, copying, modifying, and deleting tasks
 - Importing data
 - Modifying the calibration and adjustment settings
 - Modifying the balance settings
 - Creating, modifying, and deleting timer-controlled actions
- Administrators can access all functions.

▶ To move to the next menu item, select **Next**.



Do you wish to protect this user profile with password?

User ▶ New ▶ User profile ▶ Wizard ▶ Password

No, no password protection

Yes, password protection

Back | Overview | | Next

Step 6: Configure Password Protection

If you assign a password, this profile cannot be used until the password has been entered.

- ▶ Select the corresponding option to define whether the user profile is password-protected or not.

The password will be defined in the step after next.

Only the administrator can open the user profile without the password (for example, if the user forgets the password) and assign a different password. The administrator can remove the password protection so that a new password can be set, if desired. If the administrator forgets the password, please contact your Sartorius Service Center.

Please check the user parameters:

User ▶ New ▶ User profile ▶ Overview

Language:

Background colour:

Brightness:

Acoustic signal:

User rights:

Back | Wizard | | Next

Step 7: Check All Settings

- ▶ To see all settings, page down with the cursor softkeys.
- ▶ To modify a setting, press the corresponding button. This opens a screen showing the options for that setting.
- ▶ If the settings are correct, select **Next**.

Please enter your password twice

User ▶ New ▶ User profile ▶ Overview

Password:

Repeat password:

Back | | Enter

Step 8: Define the Password (if Password Protection Enabled)

- ▶ If you selected the option for password protection, you are now prompted to enter the desired password twice.
- ▶ Select the upper button.
- ▶ Enter the desired password (minimum 4 characters, maximum 8; only numbers and uppercase letters are permitted).
- ▶ Press the lower button, and enter the password again.
- ▶ Select **Next**.

Change profile name here if desired:

User ▶ New ▶ Title

User Profile Name:

User Description:

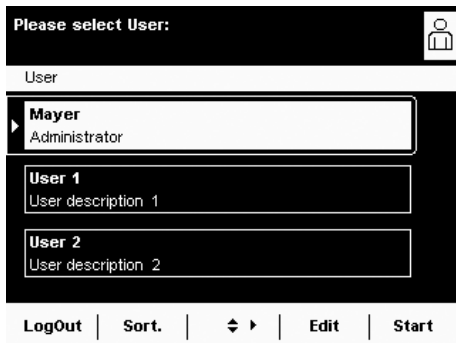
Back | Cancel | | Save

Step 9: Enter User Names and Descriptions

- ▶ To enter a name for the user profile, select the **User Profile Name** button. The user name is shown on the top right of the display during operation as long as the respective user profile is active.
- ▶ Enter the name (max. 40 characters) and select **OK**.
- ▶ To enter a description for the user profile, select the **User Description** button.

The user description can be viewed at any time during operation of the balance by pressing the user info area on the display (see “Display”).

- ▶ Enter the description and select **OK**.
- ▶ To complete the process, select **Save**.



- ▷ The program switches to user selection. The newly created user profile is placed at the end of the list.
 - ▷ If you would like to activate the new user profile, select it here.
 - ▷ The program switches to the operating mode and the selected user is activated.
- or
- ▷ To create additional user profiles, select **Edit** and repeat the procedure as described above.
- or
- ▷ If you want to switch to operating mode without switching the user, select **Start**.

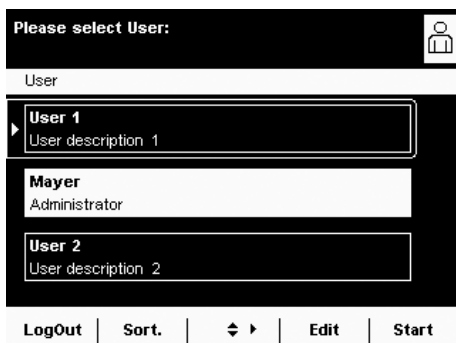
Activating Users



When the balance is in operating mode, the active user profile is displayed in the user field at the top right of the screen. To activate another user, you must switch to the **User Management** menu.




- ▷ Press the USER key ().

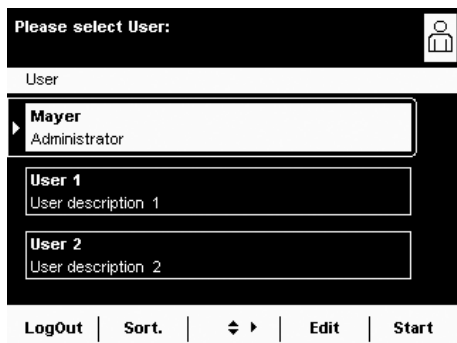


- ▷ The user list is displayed. The current, active user can be recognized by the small arrow and the dark background.
- ▷ Select the user profile you would like to activate.
- ▷ If the user is password-protected, enter the password and confirm the entry.
- ▷ The program switches back to operating mode with the selected user activated and displayed at the top right of the user field.

Editing User Profiles

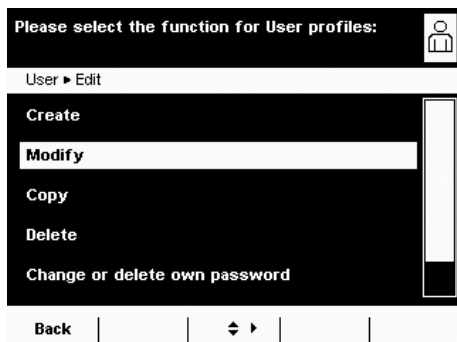


- ▶ If you have not already done so, open the User Management menu by touching the USER () key.
- ▶ To open the menu for editing profiles, select **Edit** from the user selection screen.
- ▶ The selection of edit functions is displayed.



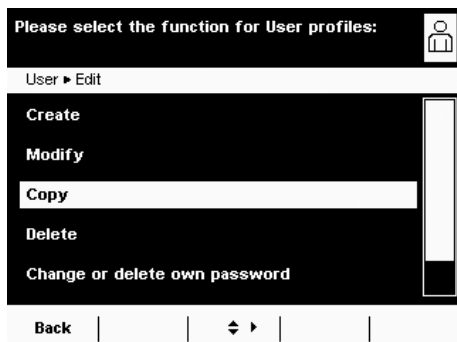
- i** Which options for editing user profiles are available depends on whether or not you have administrator rights. The following table shows who can carry out which changes to user profiles. Accordingly, the displays shown in this section may differ from your screen because the administrator view is always shown here.

Option	Administrator	User
Change own profile	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Change other profile	<input checked="" type="checkbox"/>	
Copy profile	<input checked="" type="checkbox"/>	
Delete profile	<input checked="" type="checkbox"/>	
Change or delete own password	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Change or delete other user passwords	<input checked="" type="checkbox"/>	



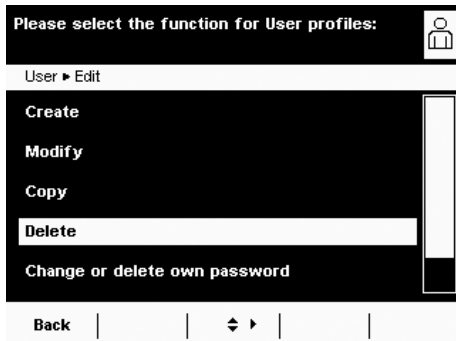
Changing User Profiles

- ▶ Select **Modify**.
- ▶ If you are logged in as an administrator, you must select the profile you would like to change and then select **Next**.
- ▶ The overview of all settings for this profile is displayed. You can now select and change the parameters one by one.
 - or
 - ▶ To have the program guide you through all settings step by step, select **Wizard**. Now all setting options will be displayed one by one to be changed.
- ▶ Select **Next**.
- ▶ If required, change the user name and description.
- ▶ Select **Save**.
- ▶ The user profile has been changed. The display changes to the user selection.



Copying User Profiles

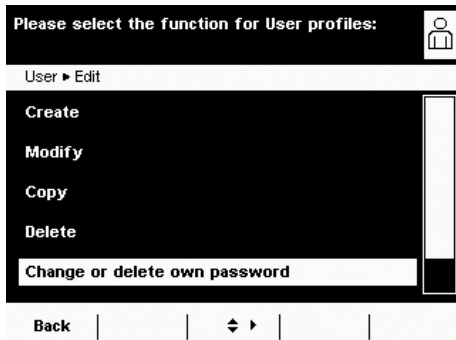
- i** This function can only be carried out by an administrator.
- i** When you copy a user profile with password protection, the password is not transferred to the copy, but is deleted instead.
 - ▶ Select **Copy**.
 - ▶ All available user profiles are displayed.
 - ▶ Select the profile that you want to copy.
 - ▶ Select **Next**.
 - ▶ Enter a new name and description for the copied user profile.
 - ▶ Select **Save**.
 - ▶ The display switches to the user selection in which the new profile is displayed.



Deleting User Profiles

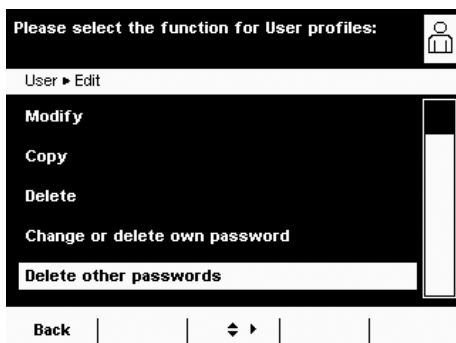
i This function can only be carried out by an administrator.

- ▶ Select **Delete**.
- ▷ All available user profiles are displayed.
- ▶ Mark each profile that you wish to delete and select **Next**.
- or
- ▶ To delete all profiles, select **All**.
- ▷ All profiles selected for deletion are displayed in a security prompt.
- ▶ If you wish to modify the selection, select **No**.
- or
- ▶ Confirm the deletion with **Yes**.



Changing or Deleting Own Password

- ▶ If you haven't already done so, activate your own user profile.
- ▶ Select **Edit** in the user selection.
- ▶ Select **Change or delete own password**.
- ▶ To **change** the password, select **Yes**.
- ▶ Touch both buttons one after the other and enter the new password twice.
- or
- ▶ To **delete** the password, select **No**.
- ▶ Select **Next**.
- ▷ The display switches to the selection of change functions.



Deleting Other User Passwords

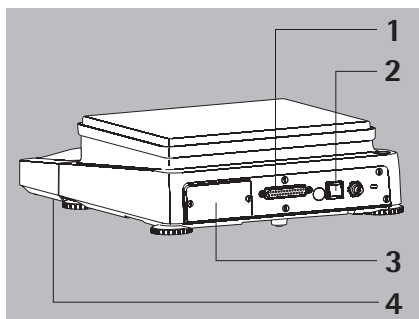
i This function is only available to an administrator.

- ▶ Activate your own profile.
- ▶ Select **Edit** in the user selection.
- ▶ Select **Delete other passwords**.
- ▷ An overview of all users with passwords is displayed.
- ▶ Mark each user whose password you wish to delete and select **Next**.
- or
- ▶ To delete all passwords, select **All**.
- ▷ All users whose passwords you selected are displayed in a security prompt.
- ▶ If you wish to modify the selection, select **No**.
- or
- ▶ Confirm the deletion with **Yes**.
- ▷ The display switches to the overview of user settings.

Interfaces

Purpose Interfaces are used to exchange data with ported peripheral devices: Measured values and calculated values can be output to a printer, PC, or control display; conversely, control commands and data inputs can be sent to ported devices (PC, keyboard, foot switch, barcode scanner). Except for PS2, each interface has to be configured according to the peripheral device and desired function. No error messages are generated when no devices are connected to an interface port (open data port).

Features Cubis® series balances have at least three interfaces:



- 1 Peripheral port (25-pin interface), **Com A**
- 2 USB interface for a PC connection, **Com B**
- 3 The slot may contain other ports (**Com C**):
 - 25-pin interface (YD001MS-R)
 - 9-pin interface with PS2 port (YD001MS-P)
 - Bluetooth® Module (YD001MS-B)
- 4 Ethernet interface (on the bottom of the display unit), **Com D**

Data exchange protocols For data exchange, the interfaces are configured with the following protocols:

- **Printer output**
- **SBI** (Sartorius Balance Interface): Sartorius standard protocol for output to a PC or control unit. This simple ASCII-based protocol allows you to use ESC commands from your PC to control the basic weighing functions.
- **xBPI** (eXtended Balance Processor Interface, also called X-Bus): binary protocol with extended command volume. This protocol lets you control numerous weighing functions. For further information on this, please contact Sartorius.
- **SICS** (Standard Interface Common Set): This interface protocol enables operation and control of the balance via a connected PC. You can read out measurement data, enter weighing commands, and activate all operating functions.

To use the protocols, application software must be installed on the PC, e. g., SartoTerminal.

Synchronization During data communication between balance and PC, messages consisting of ASCII or binary characters are transmitted via the interface. For error-free data exchange, parameters for baud rate, parity, handshake mode, and character format must be identical for both units.

You can configure the respective settings in System Settings (menu). In addition to these settings, data output for the balance can also be made dependent on several conditions that are defined in the individual tasks. These conditions are described under each of the tasks.

USB Port (PC)

Purpose Any Cubis® balance can be connected to a PC equipped with a USB port. A virtual serial interface (virtual COM port) is set up as a device type at the USB port. This virtual serial interface is identified and operated by the application program. The protocols xBPI, SBI, and SICS can be transmitted via the USB port.



The USB port is designed for the laboratory environment and is not suitable for use in purely industrial environments. Full IP protection is only guaranteed when the USB cover is closed.

- System Requirements**
- Computer (PC) with Windows 98SE®, Windows ME®, Windows 2000®, Windows XP®, Windows Vista®, or Windows 7®
 - Available USB port on the PC
 - USB cable

Software Driver and Installation Guides

Models MSU116P, MSU66S, MSU66P, MSU36S, MSU36P:
The USB driver for the virtual, serial interface is Microsoft-listed and available online via the Microsoft Update Service: USB CDC serial port emulation

All remaining models:
The VCP driver, used to set up the virtual interface on the computer, can be downloaded from the internet:
<http://www.ftdichip.com/FTDrivers.htm>

The installation guides for the drivers can be found at
<http://www.ftdichip.com/Documents/InstallGuides.htm>

Connecting the Balance via USB



The current USB port for the computer is established when the software driver is being installed. The driver must be re-installed every time you wish to change the port.

Therefore, choose one USB port that can permanently or regularly be used to connect the balance.

- ▶ Switch off the balance.
- ▶ Unplug the balance from the mains.
- ▶ Connect the USB cable to the balance and to the USB port on the computer.
- ▶ Plug the balance into the mains again and switch it on.
- ▷ Windows detects the device connected to the USB port. If the device is being connected for the first time, the Windows Installation Wizard will run.

Installing Software Drivers

- ▶ Run the Installation Wizard for the driver.
- ▶ Follow the instructions that appear.
- ▶ To complete the installation, click on **Finish**.
- ▷ The virtual interface is now ready for operation.

Windows® usually adds the virtual port in the position following your highest-numbered COM port.

Example: For a PC with up to 4 COM ports, the new virtual port would then be COM5 (see Device Manager).

Changing the Port Number

Installation Guides for Windows XP®, Windows Vista®, and Windows 7®

If you use the USB interface with a program that limits the number of COM port designations (e. g., COM1, 2, 3, 4 only), you may have to assign one of these port numbers to the new virtual port.

- ▶ Open the setting for the **USB serial port** in the Windows® Control Panel:
 - START > My Computer > Control Panel
 - System > Hardware > Device Manager
- ▶ Open the **Connections** submenu.
- ▶ Double-click on **USB Serial Port**.
- ▶ Select **Port Settings > Advanced**.

Changing Latency Time

- ▶ Open the settings for the USB serial port, following the above instructions.
- ▶ For a faster rate of communication, change the setting for the **latency timer** to 1 msec.

Plug & Play Mode in Autoprint (SBI)

- ▶ Open the settings for the USB serial port, following the above instructions.
- ▶ Stop the **Plug & Play mode** from running.

Uninstalling the Driver

The software driver for the USB connection can be uninstalled with the Windows® Uninstaller.

PS2 Interfaces for Barcode Scanner or Keyboard

Via the PS2 port you can connect a barcode scanner or a PC keyboard to enter data and operate the balance.

Installation
Connecting the Device

- The interface installation is described in the installation instructions supplied.
- ▶ Plug the connector plug into the PS2 port on the balance.
 - ▷ The input device is operational; no further settings are required.

Using the Input Device

You can input entries directly via the keyboard or barcode scanner whenever an input field is open on the display of the balance.

Cal./Adj.	Param.	Menu	Calc.	Start
F1	F2	F3	F4	F5

Key Assignment for the PC Keyboard

The five context-dependent buttons located at the bottom edge of the display are operated via the **Function keys F1 to F5** on the PC keyboard.

| **Back** |
Esc

If the last button on the right is assigned with the function **Back**, this function can also be activated using the **Esc**key on the keyboard.

() **F9**

The **TASK** key is operated via **F9** (Open Task menu).

() **F10**

The **USER** key is operated via **F10** (Open User menu).

 **Print**

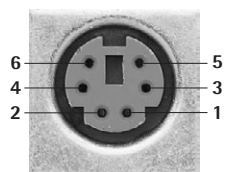
The **PRINT** key is operated via the print key on the keyboard.

Shift F1

Use Shift F1 to select the **first entry** in a menu.

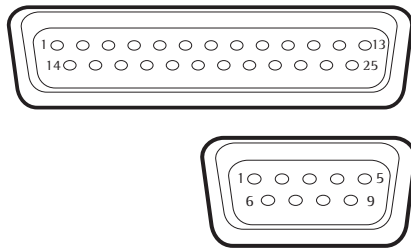
Shift F2

Use Shift F2 to select the **second entry** in a menu.
etc.



Pin Assignment PS2

- Pin 1: Keyboard_DATA (universal)
- Pin 2: Not assigned (larger)
- Pin 3: Internal ground (GND)
- Pin 4: +5 V
- Pin 5: Keyboard_CLK (Set)
- Pin 6: Not assigned (smaller)



Interfaces (RS-232) 25-pin and 9-pin

The balance is standard-equipped with a 25-pin interface (**peripheral port**) where different Sartorius peripheral devices can be connected, e. g., hand or foot switch. This interface is also used for the control lines for the **Checkweighing** application.

A 9-pin interface can be optionally installed. This port is intended for connecting a PC.



When Using Pre-wired RS-232 Connecting Cables for the 25-pin Interface:

RS-232 cables purchased from other manufacturers often have incorrect pin assignments for use with Sartorius devices. Failure to do so may damage or destroy your weighing system and/or peripheral devices!

- ▶ Be sure to check the pin assignments before you connect cables purchased from other manufacturers.
- ▶ Disconnect any lines assigned differently (e. g., Pin 6).

Features (* = factory settings)

Type of interface:	Serial port				
Interface operating mode:	Full duplex				
Level:	RS-232				
Interface connector:	D-SUB connector, 25-pin or 9-pin				
Transmission rate:	600, 1200, 2400, 4800, *9600, and 19200 baud (selectable)				
Parity:	*Even, odd, none; blank spaces (selectable)				
Character transmission:	Start bit, 7/8* bit ASCII, parity, *1 or 2 stop bits (selectable)				
Handshake (selectable):	<table border="0"> <tr> <td>25-pin</td> <td>For 2-wire interface: Software (XON/XOFF) For 4-wire interface: *Hardware (CTS/DTR)</td> </tr> <tr> <td>9-pin</td> <td>Hardware (CTS/RTS)</td> </tr> </table>	25-pin	For 2-wire interface: Software (XON/XOFF) For 4-wire interface: *Hardware (CTS/DTR)	9-pin	Hardware (CTS/RTS)
25-pin	For 2-wire interface: Software (XON/XOFF) For 4-wire interface: *Hardware (CTS/DTR)				
9-pin	Hardware (CTS/RTS)				
Operating mode:	*SBI, xBPI, printer, SICS, 2nd display				
Manual print mode:	Without stability, *after stability				
Auto print mode:	*Without stability, at stability, after load change				
Cancel automatic printing:	Not possible				
Time-dependent automatic printout:	After 1 display update				
Data output of balance:	16 or *22 characters				
Tare after individual printout:	Off				
Basic values, application:	Off				

Connectable Peripherals

The following devices can be ported to the interface:

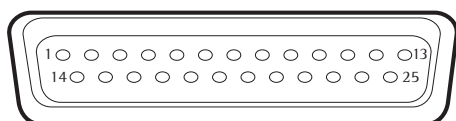
- Verifiable data printer YDP03-OCE, YDP10-OCE, YDP20-OCE
- Verifiable data printer with Bluetooth data transmission YDP10BT-OCE (module required)
- Universal (serial printer)
- Strip/label printer YDP04IS-OCEUV
- Hand switch YHS01
- Foot switch YFS01, YPE01RC
- External control display YRD11Z
- Second display YRD03Z

Pin Assignment Chart for Connecting Peripherals

Purpose: For Sartorius peripheral devices

Female Interface Connector: 25-pin D-Sub (DB25S) with screw connection

Required Male Connector (Recommended): 25-pin D-Sub, DB25S, with integrated shielded cable clamp and shield plate assembly (Amp type 826 985-1C) and fastening screws (Amp type 164 868-1)



Pin assignment 25-pin socket, RS-232:

Pin 1: Signal ground	Pin 14: Internal ground (GND)
Pin 2: Data output (TxD)	Pin 15: Control input/output 1 ²⁾
Pin 3: Data input (RxD)	Pin 16: Control input/output 2 ²⁾
Pin 4: Signal GND	Pin 17: Control input/output 3 ²⁾
Pin 5: Clear to send (CTS)	Pin 18: Control input/output 4 ²⁾
Pin 6: Not used	Pin 19: Control input/output 5 ²⁾
Pin 7: Internal ground (GND)	Pin 20: Data terminal ready (DTR)
Pin 8: Internal ground (GND)	Pin 21: Not used
Pin 9: Not used	Pin 22: Not used
Pin 10: Not used	Pin 23: Not used
Pin 11: + 12 V output	Pin 24: Not used
Pin 12: Reset _ Out ¹⁾	Pin 25: +5 V output
Pin 13: + 5 V output	

¹⁾ = Peripherals restart

²⁾ = Assignment of control inputs/outputs can be configured in each menu (see below)

Control Inputs/Outputs

Data Output / Setting	Pin 15	Pin 16	Pin 17	Pin 18	Pin 19
Infrared sensor YHS01MS	Input 1: **"PRINT" key	Output 2: ***"Smaller"	Output 3: ***"Equal"	Output 4: ***"Larger"	Output 5: ***"Setp"
Hand switch YHS02	Input 1: **"PRINT" key	Output 2: ***"Smaller"	Output 3: ***"Equal"	Output 4: ***"Larger"	Output 5: ***"Setp"
Foot switch YFS01	Input 1: **"PRINT" key	Output 2: ***"Smaller"	Output 3: ***"Equal"	Output 4: ***"Larger"	Output 5: ***"Setp"
Triple foot switch YPE01RC	Input 1: Left **"PRINT" key	Input 2: Right *Left Shieldpl.key	No function (disabled)	No function (disabled)	Input 5: Center **"TARE" key
Control display YRD11Z	Output 1: Currently no function	Output 2: ***"Smaller"	Output 3: ***"Equal"	Output 4: ***"Larger"	Output 5: ***"Setp"
Control inputs	Input 1: **"PRINT" key	Input 2: *Left Shieldpl.key	Input 3: *no function	Input 4: *no function	Input 5: **"TARE" key
Control outputs	Output 1: Currently no function	Output 2: ***"Smaller"	Output 3: ***"Equal"	Output 4: ***"Larger"	Output 5: ***"Setp"

* Default assignment of input, otherwise configurable

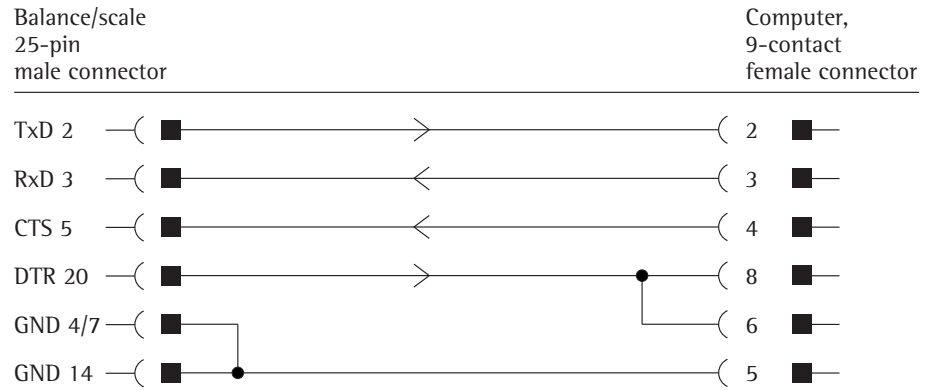
** Assignment of output for checkweigher

Wiring Diagram for 25-pin Interface

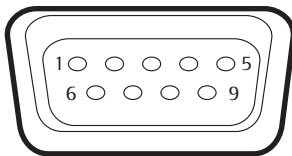
Diagram for connecting a computer or other peripheral device to the balance using the RS-232/V24 standard and cables up to 15 m (50 ft.) long



Do not connect any other pins to the cable connector of the balance!



Cable type: AWG 2 specification

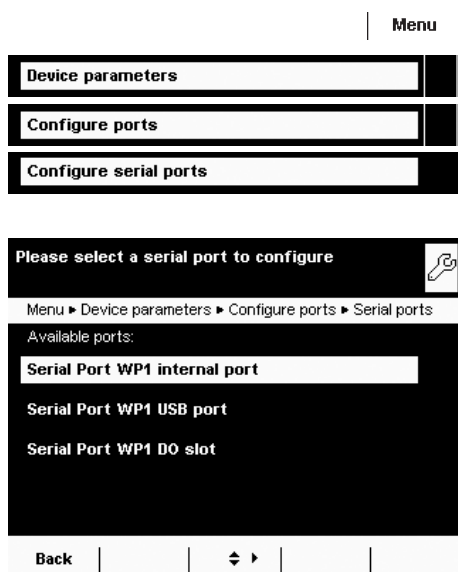


Pin assignment 9-pin socket, RS-232:

- Pin 1: Not used
- Pin 2: Data output (TxD)
- Pin 3: Data input (RxD)
- Pin 4: Not used
- Pin 5: Internal ground (GND)
- Pin 6: Not used
- Pin 7: Clear to send (CTS)
- Pin 8: Request to Send (RTS)
- Pin 9: Not used

Establish a connection via a conventional RS-232 cable.

Configuring Serial Ports



- ▷ The available ports are displayed.
- ▶ Select the port you want to configure.
- ▶ Configure all settings for this port.
- ▶ To save the settings, select **Save**.

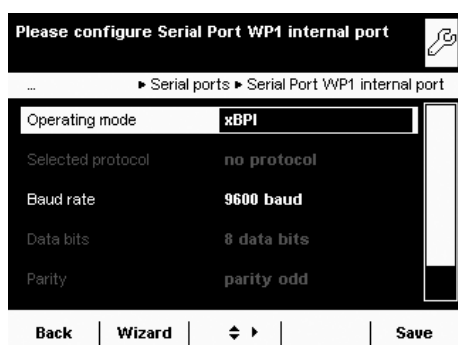
Configuration Options for the Serial Ports

The following **operating modes** are available for this port:

- No function; the interface is blocked
- xBPI
- SBI
- Second display (SBI)
- Printer output
- SICS



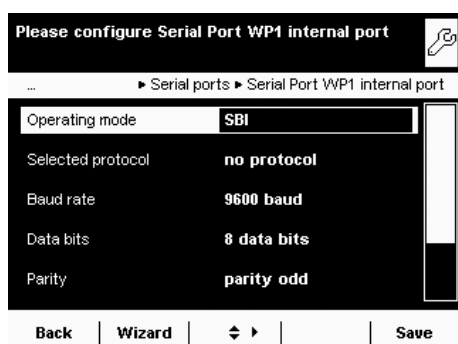
Factory settings are marked with an asterisk (*).



Configuration Options for xBPI Operating Mode

For this operating mode, you can only configure baud rate and number of stop bits.

- Selected protocol: No protocol (fixed setting)
- Baud rate: ***9600 to 115200 baud**
- Data bits: 8 (fixed setting)
- Parity: Odd (fixed setting)
- Stop bits: ***1 or 2** stop bits



Configuration Options for SBI Operating Mode and Second Display

You can change all settings for this operating mode.

- Selected protocol: **No protocol / Software handshake XON; XOFF / *Hardware handshake RTS; CTS**
- Baud rate: **300 to 19200 baud** (to 115200 baud for second display), *9600
- Data bits: **7 or *8**
- Parity: **None / *Odd / Even**
- Stop bits: ***1 or 2** stop bits
- Log data: ***Turn off / Turn on**

Configuration Options for Printer Output Operating Mode

You can modify all settings for this operating mode depending on the configured printer type.

- Printer type: **YDP10-0CE/YDP20-0CE/YDP03-0CE/Universal/YDP04IS-0CEUV**
- Selected protocol: **Hardware handshake**
- Baud rate: **300 to 19200 baud (*9600)**
- Data bits: **7 or *8**
- Parity: **None / *Odd / Even**
- Stop bits: ***1 or 2 stop bits**
- Log data: ***Turn off / Turn on**

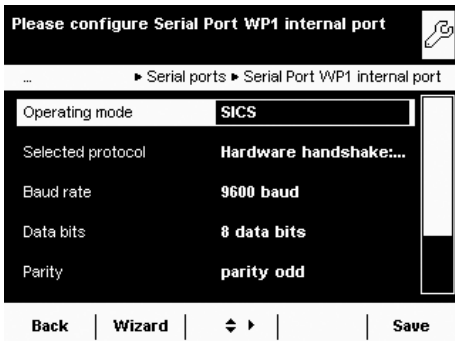
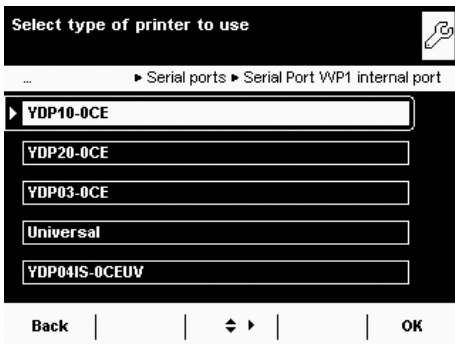
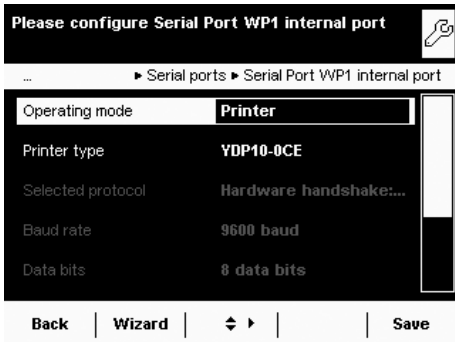
The following setting options are available for the **printer types**:

- **YDP10-0CE**: No setting option; all parameters are permanently defined
- **YDP20-0CE**: All can be configured except stop bits
- **YDP03-0CE**: All can be configured except data bits and stop bits
- **Universal**: All can be configured
- **YDP04IS-0CEUV**: No setting option; all parameters are permanently defined
- **YDP10BT-0CE** (for optional Bluetooth module only, Com C): No setting option; all parameters are permanently defined

Configuration Options for SICS Operating Mode

You can change all settings for this operating mode.

- Selected protocol: **No protocol / Software handshake XON; XOFF / *Hardware handshake RTS; CTS**
- Baud rate: **300 to 115200 Baud, *9600**
- Data bits: **7 or *8**
- Parity: **None / *Odd / Even**
- Stop bits: ***1 or 2 stop bits**
- Log data: ***Turn off/Turn on**



Explanations for the Setting Parameters

Selected Protocol/Handshake

The SBI (Sartorius Balance Interface) has transmit and receive buffers. Data transmission can be operated with a hardware or software handshake.

- Hardware Handshake (CTS/DTR): With a hardware handshake (4-wire interface) protocol, the handshake is controlled via the CTS and DTR lines.
- Software Handshake (XON, XOFF): The software handshake is controlled via the XON and XOFF control commands. When the device is switched on, XON must be transmitted to enable any connected device to communicate.

Data transmission:

```

Balance          --- byte --->  PC
(transmitting    --- byte --->  (receiving device)
 device)
                --- byte --->
                --- byte --->
                <--XOFF ---
                --- byte --->
                --- byte --->
                ...
                (Break)
                ...
                <--XON ---
                --- byte --->
                --- byte --->
                --- byte --->
                --- byte --->
  
```

Transmitting Device: Once XOFF has been received, it prevents further transmission of characters. Once XON has been received it re-enables the transmitting device to send data.

Receiving Device: To prevent too many control commands from being received at one time, XON is not transmitted until the buffer is almost empty.

Bluetooth® Interface (COM C, Optional)

How to install the Bluetooth® module is described in the supplied installation instructions.

In order to transmit data via the Bluetooth module, the interface must first be configured.

Configuring the Bluetooth® Interface

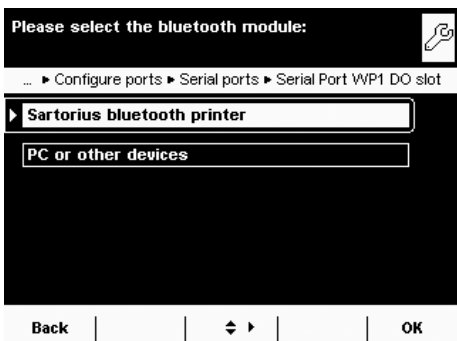
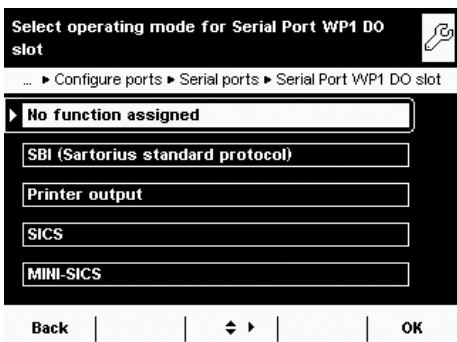
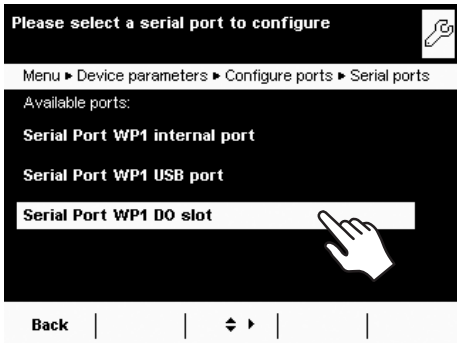
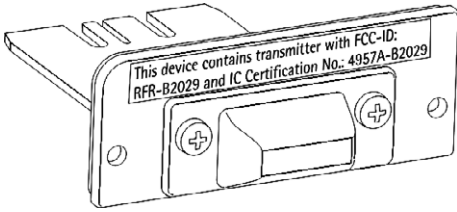
- ▶ If appropriate, toggle to the System Settings menu.
- ▶ Select the **Device parameters** submenu.
- ▶ Select **Configure ports**.
- ▶ Open the **Serial ports** submenu.
- ▶ Select **Available ports**.

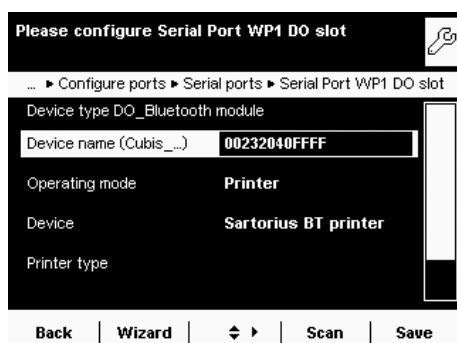
The following **operating modes** are available for this port:

- No function
- SBI (data exchange with PC or notebook)
- Printer output
- SICS protocol (data exchange with PC or notebook)
- ▶ Select the desired operating mode.

Bluetooth Printer Output Operating Mode

- ▶ If required, you can change the device name (only with Bluetooth modules from Version 04-10-01).
- ▶ To connect a PC/notebook, select **PC or other devices**.



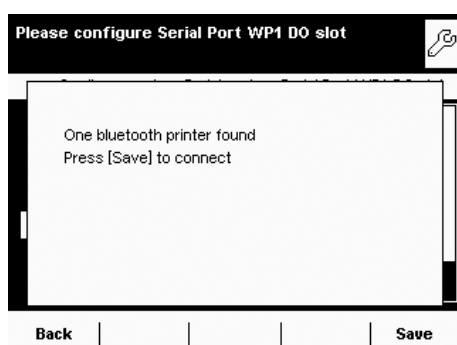


Establishing a Radio Connection with the Bluetooth Printer

- ▶ Make sure that the printer to which you wish to connect is ready to operate.
- ▶ Select the **Sartorius BT printer** as the device.

- ▶ To establish the connection, select **Scan**.

- ▶ The balance will now search for the Bluetooth device. This process may take time. Wait for the next message to appear on the display.



- ▶ A message will appear to confirm whether the printer has been found.

- ▶ To save the settings, select **Save**.

- ▶ The connection will initially be terminated after saving. The LED on the printer will continue to flash blue/red.
- ▶ As soon as the configuration menu is exited, the connection will be re-established. The LED on the printer will then illuminate permanently (blue).

Network Interface (Ethernet)

Purpose This interface lets you integrate your balance into a TCP/IP-based network.

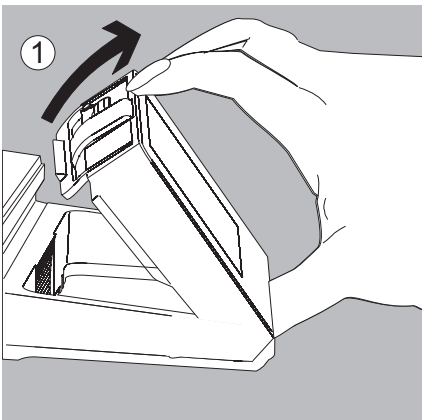
System Requirements The person configuring the Ethernet interface should have basic knowledge of TCP/IP-base networks and network technologies in general.
The Ethernet interface is connected to the local network via the RJ45 slot.

Features

Transfer rate:	10 Mbs/sec (10BASE-T, Ethernet) and 100 Mbs/sec (100BASE-TX, Fast Ethernet), auto-recognition (10/100, HalfDX/FullDX)
Connection type:	Network protocol: TCP
Transport:	TCP/IP or UDP /IP
HMS certificates:	Compatible with the TCP standard, industry-compatible as per CE, UL, cUL
Cable:	Twisted pair, shielded, CAT-5 or higher, 1:1, UTP / STP, male connector RJ45; e. g., patch cable CAT5 depending on application (straight/crossover)
Cable impedance:	150 ohm
Cable length to HUB:	Max. 30 m

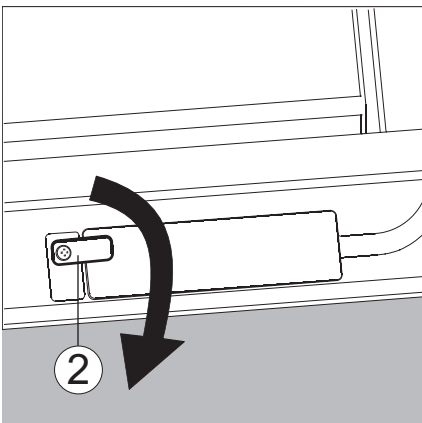
Connecting Network Cables

The slot for the network port is located at the back of the control unit.

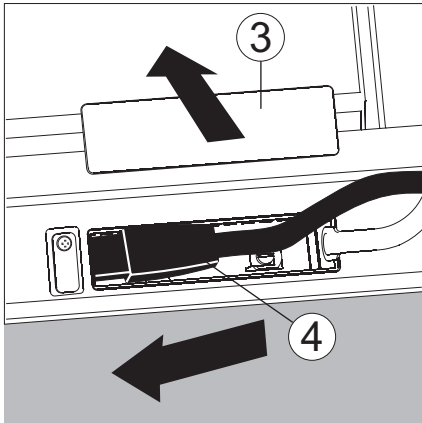


- ▶ Tilt the control unit (1) until it is nearly vertical.

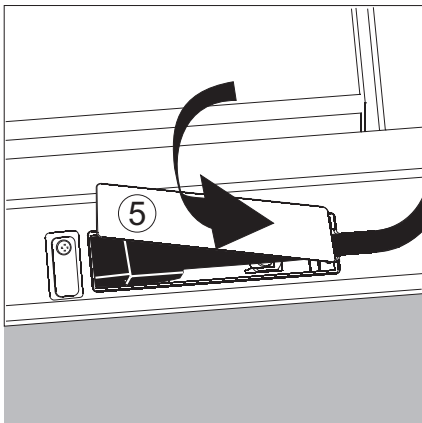
On the bottom panel of the display unit:



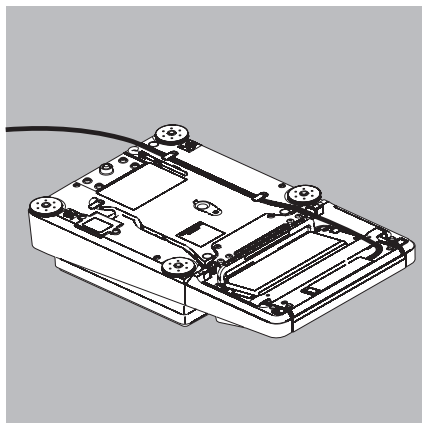
- ▶ Turn the locking lever (2) 90°.



- ▶ Remove the cover plate (3).
- ▶ Insert the Ethernet cable plug (4) so that it clicks audibly into place.



- ▶ Reattach the cover plate (5).
- ▶ Turn the locking lever back to its locked position.



Exercise caution to avoid glass breakage for models with a draft shield.

- ▶ Turn over the balance and place it on a soft surface.
- ▶ Lay the Ethernet cable (6) through the cable channel of the weighing module.

Configuring Network Operation (Ethernet)

Preparation: Before you can start with the configuration, you will require some information about your network. Please contact your network administrator. The important question is whether your network supports DHCP or not.

DHCP With DHCP, you can automatically link a (new) balance to an existing network without having to configure it manually. Normally, the balance (client) only requires the automatic acquisition setting for IP address (factory setting).

DHCP is supported
DHCP is not supported

In this case, no additional information is required.
In this case, you need the following information from the network administrator:

- IP address
- Subnet mask
- Default gateway address
- Device name (host name): This name can be changed if required.
This name is used to select the balance in the network.

Selecting Network Setting (Fixed Setting)

- ▶ If appropriate, toggle to the System Settings menu.
- ▶ Select the **Device parameters** submenu and slide the right scroll bar down.
- ▶ Select **Configure ports**.
- ▶ Open the **Network settings (Ethernet)** submenu.

- ▶ To change the IP settings, select the input field behind **Network configuration**.

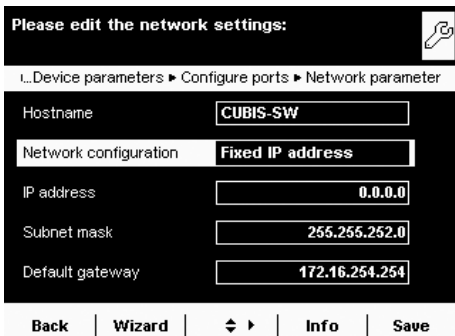
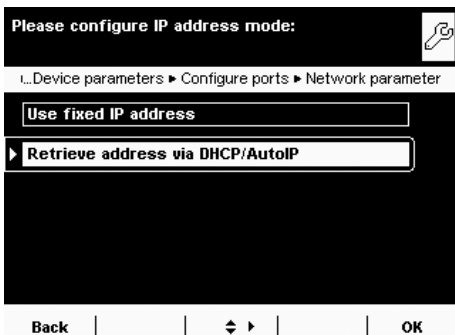
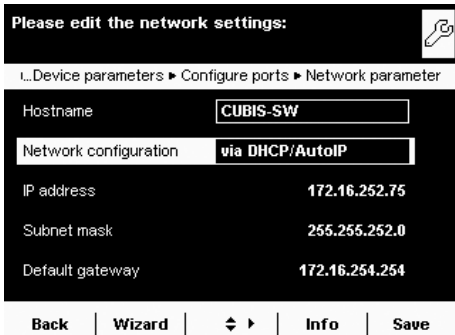
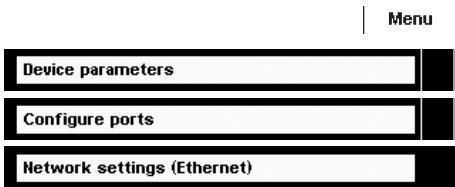
- ▶ Select **Use fixed IP address** and confirm with **OK**.

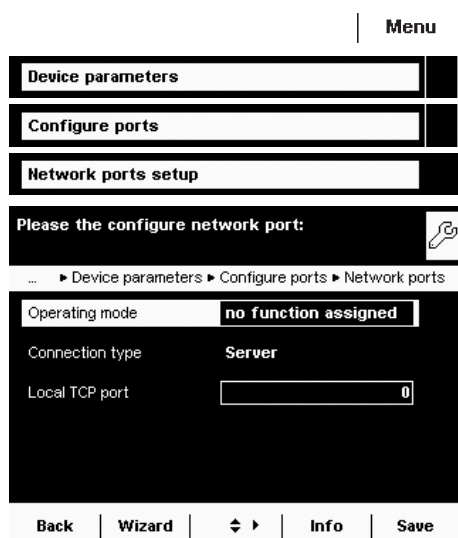
- ▶ In the overview, check all settings and change as required.

Device name (host name): You can select this name freely.
This name is used to select the balance in the network.

- ▶ If you then want to establish an Ethernet connection, write down the IP address now.

- ▶ To save the network settings, select **Save**.
- ▶ The “Configure ports” submenu is displayed.





Configuring Network Interface (Com D)

- ▶ If appropriate, toggle to the System Settings menu.
- ▶ Select the **Device parameters** submenu and slide the right scroll bar down.
- ▶ Select **Configure ports**.
- ▶ Open the **Network ports setup** submenu.

- ▶ Define the operating mode and, depending on the connection type, either server port and address or the local TCP port.

Operating mode: **No function assigned / XBPI / SBI / Printer output / SICS protocol**

Connection type (of the balance): **Server / Client**

- ▶ To save the settings, select **Save**.

Examples:

For the connection type **Balance = Server** you only need to enter the local TCP port (e. g., for working with the Sartorius **SartoCollect** software for data communication). For the connection type **Balance = Client**, you have to enter the server TCP port and the server IP address (e. g., for working with **"Virtual serial port emulator"** as the server for all previous serial PC applications with the balance or for printing on a network printer server).

Remote Control of the Balance from a PC via Ethernet

System Requirements

- PC with Internet browser
- Operating systems Windows, Mac OS, Linux, Unix, and Solaris.

Installation

- ▶ Connect the balance to your network via the Ethernet interface.
- ▶ Enter the IP address of the balance in the address field of your Windows browser.

The IP address of your balance is listed under Menu > Device Information > Display device information.

Port Release

- If you are having problems with the connection, you must configure your firewall to release the right TCP/IP UDP port.
- If you are using a router and want to access your computer via the Internet using your IP address, the port must also be set in the router's virtual server settings. This means that you must forward the port to the IP address of the server.
- If you still have problems, you may have to deactivate your firewall temporarily while using a browser connection.





Selecting Functions

- ▶ Click on the desired function in the browser.
- ▶ To exit a function, click on >>Back or on the Go back key of your browser.

Remote configuration (VNC): Use this function for remote control of the balance. The display screen on the balance is reproduced in the browser, you can operate the balance now by using the mouse and keyboard of your PC
Software version: You can view the version of the balance, control unit and application software.

Screenshot: You can print the current screen or save it as a GIF file.

Browse alibi memory: View the Alibi memory. This function can also be deactivated by Sartorius Service.

Show settings: You can view the following settings:

- Task profiles
- User profiles
- System settings (menu)
- Service information (service)
- Interface information (ports)
- Timer controlled actions

Show log files: You can view the respective log files.

Web Services: The balance has a “Web Services” communication function. This standardized communications technology allows external software systems like LIMS, ELN, etc., to display and use information, entry fields, menus or complex operations on the touch screen of the balance. Bidirectional data transfer is enabled without complicated driver software. This eliminates the need to install PCs, laptops or terminals in the area directly around the balance.

QWeb “Cubis® individual”: Download Q-Apps to your Cubis® laboratory balance and test them free for 30 days.

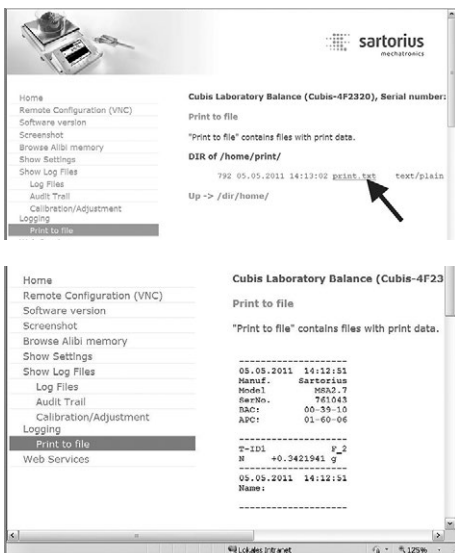
Viewing a Print File Directly in an Internet Browser

Requirements:

Preferences can be found in the Chapter “System Settings (Menu)”: Configuring “Print to file” Select the following file format for viewing directly in an Internet browser: Print to TXT file.


- ▶ In the browser, click on “Show Log Files” and then “Print to File.”
- ▶ To view the printout directly in the Internet browser, click on “print.txt.”


▷ The printout is displayed in the Internet browser.



Data Output

You can define the data output parameter so that output is activated either when a print command is received or automatically synchronized with the display or at defined intervals (see application programs and autoprint settings).

Data Output by Print Command The print command can be transmitted by pressing () or by a software command (Esc P).

Automatic Data Output In **autoprint** mode, data is output to the data interface port without an extra print command. You can have synchronized data output automatically at defined display update intervals, with or without the stability parameter. The interval time depends on the balance operating status and balance type. For Autoprint for the fasted display result, set additional software handshake or no handshake. If the automatic data output is activated in the Device Configuration, it starts immediately after the balance is turned on. You can also configure whether the automatic data output can be stopped and started by pressing the () key.

Output rate The max. output rate of the data interfaces depends on the selected menu settings.

Data Output Formats

You can output the value displayed in the measured value line and the weight unit, with or without a data ID code. Configure this output parameter in the Device Parameters menu (Menu > Device parameters > Configure data output > Line format).

Example: Output Without an ID Code + 253 pcs 16 characters are printed

Example: Output Without an ID Code Q n t + 253 pcs 22 characters are printed

Data Output Format with 16 Characters

Display segments that are not activated are printed as spaces.

Display values without a decimal point are printed without a decimal point.

The type of character that can be printed depends on the character's position.

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8 characters +	A	A	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
9 characters +	A	A	A	A	A	A	A	A	A	A	A	E	E	E	CR	LF
or	-	.	.	.	.	.	.	.	.	.	.	*	*	*
or		*	*	*	*	*	*	*	*	*	*					

*: Spaces

A: Displayed characters

E: Symbol for the unit, or “!” as a warning symbol for calculated values

CR: Carriage return

LF: Line feed

Special Outputs

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	-	-	*	*	*	*	*	*	CR	LF
or*		*	*	*	*	*	A	*	*	*	*	*	*	*	CR	LF
or*		*	*	*	*	*	A	B	*	*	*	*	*	*	CR	LF

and only upon request with ESC w0 (no print command):

		*	*	*	*	*	W	*	X	X	X	Y	Y	Y	CR	LF
or*		*	*	*	*	*	l	*	X	X	X	*	*	*	CR	LF

*: Space
 AB = - -: Final readout
 A = H: Overload
 AB = H H: Overload in checkweighing
 A = L: Underweight
 AB = L L: Underweight in checkweighing
 A = C: Calibration/Adjustment
 W: Draft shield status (optional):
 l: Ionizer (optional)
 Y,Y,Y = Draft shield doors
 XXX = Decimal value calculated from binary data

Decimal value	Binary value	Control information
1	Bit0 = 0: Bit0 = 1:	No error/ionizer off Draft shield error/ionizer on
2	Bit1 = 0: Bit1 = 1:	Draft shield motors off Draft shield in motion
8	Bit3 = 0: Bit3 = 1:	Learning function off Learning function on
16	Bit4 = 0: Bit4 = 1:	At least one draft shield door open All draft shield doors closed
64	Bit6 = 0: Bit6 = 1:	Motorized draft shield operation Manual draft shield operation

R,M,L = COO: **R**ight door closed (**C**losed), **M**iddle and **L**eft doors open (**O**pen)
 R,M,L = OCC: **R**ight door open (**O**pen), **M**iddle and **L**eft doors closed (**C**losed)

Error Message

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	E	r	r	*	*/#	#	#	*	*	*	*	CR	LF

*: Space # # #: Error code number

Example: Output of the weight value + 111.255 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8 characters	*	*	*	1	1	1	.	2	5	5	*	g	*	*	CR	LF
9 characters	*	1	1	1	.	2	5	5	4	3	2	g	*	*	CR	LF

Position 1: Plus +, or minus - or space
 Position 2: Space or weight value
 Position 3 – 10: Weight value with decimal point; leading zeros are output as spaces.
 Position 11: Space
 Position 12 – 14: Characters for unit of measure or space
 Position 15: Carriage return
 Position 16: Line feed

Data Output Format with 22 Characters

When data is output in this format, ID codes with 6 characters will precede data with a 16-character format. These six characters identify the subsequent value.

Normal Operation

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
K	K	K	K	K	K	+	A	A	A	A	A	A	A	A	A	*	E	E	E	CR	LF
*	*	*	*	*	*	-	*	*	*	*		
							*	*	*	*	*	*	*	*	*						

- K: ID code character¹⁾
- E: Unit symbol character¹⁾
- *: Space
- See Section “Mass Unit Conversion”
- A: Displayed characters
- CR: Carriage return
- LF: Line feed

Special Outputs

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	*	*	*	-	-	*	*	*	*	*	*	CR	LF
												H	H								
												L	L								
												C									

- *: Space
- L: Underweight
- -: Final readout
- L L: Underweight in checkweighing
- H: Overload
- C: Calibration/Adjustment
- H H: Overload in checkweighing
- Draft shield and ionizer status similar to data output format with 16 characters

Error Message

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S	t	a	t	*	*	*	*	*	E	r	r	*	#	#	#	*	*	*	*	CR	LF

*: Space # # #: Error code number

Print Format for Climate Data

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A	i	r	*	t	e	m	p	e	r	a	t	u	r	e	*	C	1	*	*	*	*
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	.	5	7	'	C

*: Space

ID Code Character K

i The ID is based on model type, e. g., not all units and IDs are available for balances used in legal metrology.

Device Information, Basic Data

Manuf .	Manufacturer
Model	Model
SerNo .	Serial number
BAC :	Balance version
APC :	Display version

Print Function

Name	Name
-------------	------

Task Profiles

Task	Task name
TaskDes	Task description

User Profiles

User	User name
UserDes	User description

Data Memory

MemNo .	Memory number
MemID	Memory ID

Basic Weighing

G#	Gross weight 2
N	Net weight
N1	Net weight (T1?0)
T	Tare weight
T1	Tare weight 1
T2	Tare weight 2

Calibration/Adjustment

Set	Target weight
Stat	Status
Dev	Deviation weight
s =	Result ReproTEST

Leveling

LevRes	Leveling result
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SQmin Function

SQmin	Minimum weight
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Individual Identifiers

P-ID1	Print ID1
T-ID1	Task start ID1
I-ID1	Initialization ID1
R-ID1	Result output ID1
C-ID1	Component ID1
E-ID1	Evaluation ID1
X-ID1	Task end ID1

Density Determination

ID-Dk	Name of density determination kit
n	No. of wires
d	Wire diameter
D	Vessel diameter
Id-Liq	Name of liquid
RefFL	Density of liquid
b	Coefficient of expansion of the liquid
LA	Correction for air density
PL.vol	Volume of glass plummet
Temp	Temperature of liquid
RhoFL	Density of liquid
Corr	Correction factor of the density determination kit
Wa	Weight of sample in air
WfL	Weight of sample in liquid or weight of liquid
Wt	Residual liquid
Wr	Sample plus weight of liquid
Rho	Density of sample
Vol	Volume of sample

Statistics

nDef	Default number of items
n	Transaction counter
x	Average value of the weight values
s	Standard deviation of the weight values
sRel	Variation coefficient of the weight values
Sum	Total of all weight values
Max	Highest weight value
Min	Lowest weight value
Dif	Difference between highest and lowest weight value

ID Code Character K (Continued)

Calculation

F o r m	Formula
R e s	Results using equations
X	Variable X
Y	Variable Y
a	Variable a
b	Variable b

Animal Weighing

m D e f	Target value
M u l	Calculation factor
m A c t	Actual number
x - N e t	Results
x - R e s	Calculated result

Formulation

I D C m 1	Id Component 1
T C m p 1	Reference weight Comp. 1
P C m p 1	Reference percentage weight Comp. 1
C o m p 1	Weight value Comp.1
W D 1	Difference Weight 1
P D 1	Difference Percent 1
W g h M o d	Mode for inputting initial weight
n D e f	Default number of components
T o t a l	Total of weight values
R S u m	Total reference
n	Transaction counter
I n i W g t	Default total weight

Weighing in Percent

p R e f	Percentage of reference
W x x %	Reference percentage weight
P r c	Percent
D	Percent loss
D R	Ratio in percent 1
O R	Ratio in percent 2

Timer-controlled Functions

I n v T i m	Interval
F i x T i m	Fixed point in time
R e s T i m	Remaining time
H o l d	Display blocked

Totalizing

n D e f	Default number of items
C o m p	Weight value start
C o m p	Current weight value
n	Number of the item
C o m p C	Weight value start: calculated components
C o m p C	Current weight value: calculated components
S u m	Total of all weight values

DKD Measurement Uncertainty

a 1	Addend a1
b 1	Factor b1
b 1 e -	Exponent b1
a 2	Addend a2
b 2	Factor b2
b 2 e -	Exponent b2
P f a c t	Pa Factor
U	Absolute process inaccuracy
U *	Relative process inaccuracy
P A	Process inaccuracy

Parts Counting

w R e f	Reference piece weight
n R e f	Reference sample quantity
Q n t	Piece count

Checkweighing

S e t p	Target value
M i n	Min. tolerance for checkw.
M a x	Upper tolerance for checkw.
L i m -	Lower percentage
L i m +	Upper percentage
C o u n t	Counter for correct values
C o u n t L L	Counter for too small values
C o u n t H H	Counter for too large values
D i f f	Check result measure

Motorized Draft Shield

W P C	Draft shield version
S t a t	Draft shield status

Ionizer

S t a t	Ionizer status
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Data Input

SBI Commands (Data Input Format)

The computer connected via the data port can send control commands to the balance to control balance and application program functions.

These control commands may have different formats and contain up to 26 characters. Each of these characters must be sent based on the setup configuration for data transmission.

Formats for Control Commands

Format 1: Esc ! CR LF

Format 2: Esc ! # _ CR LF

Format 3: Esc ! # &t (max. 20 &t) &t _ CR LF

Esc: Escape

!: Command character

#: Number

&t: Number or letter

_ : Underline (ASCII: 95)

CR: Carriage return (optional)

LF: Line feed (optional)

max: Depends on command character (parameters): The entry is truncated after the max. length and not rejected as when entered via the keyboard.

Examples:

Format 1: Esc P

Format 2: Esc x1_

Format 3: Esc t Article1_

Format 4: Esc e!{MESSAGE.SHOW_ERROR "Weight too low!}_

Esc e?{DEVICE.CLMOD_MEAS_TEMP}

ESC e?{DEVICE.CLMOD_MEAS_PRESS} (e.g. Query climate data)

Esc ea{Art.413}_

(Determine weight and tare values and save to the alibi memory together with the label)

Overview of SBI Commands

Format	Command	Action/Function	Comments
1	ESC P	Print to the interface where the prompt originated	Corresp. to menu, with/without stability
1	ESC T	“TARE“ key taring and zeroing	
1	ESC K	Filter “Very stable conditions”	
1	ESC L	Filter “Stable conditions”	
1	ESC M	Filter “Unstable conditions”	
1	ESC N	Filter “Very unstable conditions”	
1	ESC O	Block keys	
1	ESC Q	Acoustic signal	
1	ESC R	Unblock keys	
1	ESC S	Restart	
1	ESC Z	Internal calibration/adjustment	Depending on menu, 1/2 step increments
1	ESC U	Tare	
1	ESC V	Zero key	
1	ESC W	Ext. Adjustment with default weight	Depending on menu, 1/2 step increments
2	ESC f3_	Zero	
2	ESC f4_	Tare (without zeroing)	
2	ESC f5_	Left draft shield key (closing and opening as learned or default)	Only if available
2	ESC f6_	Right draft shield key (closing and opening as learned or default)	Only if available
2	ESC kF1_	Softkey 1, first from right	Depends on application
2	ESC kF2_	Softkey 2, second from right	Depends on application
2	ESC kF3_	Softkey 3, third from right	Depends on application
2	ESC kF4_	Softkey 4, fourth from right	Depends on application
2	ESC kF5_	Softkey 5, fifth from right	Depends on application
2	ESC kF7_	“Menu” softkey	
2	ESC kF9_	“TASK” key	
2	ESC kF10_	“USER” key	
2	ESC kP_	Print as with “PRINT” key (e.g., to several interfaces)	
2	ESC m0_	Ionizer status	Only if available
2	ESC m1_	Ionizer on, with preset time	Only if available
2	ESC m2_	Ionizer off	Only if available
2	ESC s3_	Back, exit, cancel	
		Models with the analytical draft shield	Models with the rotation draft shield
2	ESC w0_	Draft shield status	Draft shield status
2	ESC w1_	Open left door	Open draft shield 100% to the left
2	ESC w2_	Close all doors	Close draft shield
2	ESC w3_	Open upper door	Open draft shield to saved position
2	ESC w4_	Open right door	Open draft shield 100% to the right
2	ESC w5_	Open left and upper door	-
2	ESC w6_	Open left and right door	-
2	ESC w7_	Open right and upper door	-
2	ESC w8_	Open all doors	Only if available
2	ESC x0_	Perform internal calibration	
2	ESC x1_	Print weigher type	
2	ESC x2_	Print serial number	
2	ESC x3_	Print balance software version	
2	ESC x4_	Print softw. version of display and control unit	
2	ESC x5_	Print user/device ID	
2	ESC x6_	Print cal./adjust. weight ID	
2	ESC x7_	Print batch ID	
3	ESC txxx_	Input text	
3	ESC txxx_ESC f5_		Entry of opening angle xxx in degrees for left key
3	ESC txxx_ESC f6_		Entry of opening angle xxx in degrees for right key
3	ESC z5xxx_	Entry device ID	
3	ESC z6xxx_	Entry cal./adj. device ID	
3	ESC z7xxx_	Entry measurement series ID	
4	ESC e! {xxx}_	Execute application command, {xxx} = Task ID	
4	ESC e? {Xxx}_	Query parameter, {xxx} = Parameter ID	
4	ESC ea {xxx}_	Save weight value to alibi memory (with optional label), {x...x} = Memory ID	

Microbalances with a weighing range greater than 30 g:**Print formats**

The following functions can be output in 1 or 2 lines.

Output "1-line" print format

Select the following system setting: Interfaces: ...: SBI operating mode

Output "2-line" print format

Select the following system setting: Interfaces: ...: "Printer" operating mode

Format	Command (input)	Climate data: Action/Function
4	ESC c {DEVICE.CLMOD_MEAS_TEMP:0}_	Temperature measurement value
4	ESC c {DEVICE.CLMOD_MEAS_HUMID:0}_	Humidity measurement value
4	ESC c {DEVICE.CLMOD_MEAS_PRESS:0}_	Pressure measurement value
4	ESC c {DEVICE.CLMOD_MEAS_AIR_DENS:0}_	Air density measurement value
4	ESC c {DEVICE.CLMOD_UNC_TEMP:0}_	Uncertainty temperature value
4	ESC c {DEVICE.CLMOD_UNC_HUMID:0}_	Uncertainty humidity value
4	ESC c {DEVICE.CLMOD_UNC_PRESS:0}_	Uncertainty pressure value
4	ESC c {DEVICE.CLMOD_UNC_AIR_DENS:0}_	Uncertainty air density
4	ESC c {DEVICE.CLMOD_SERIAL_NO:0}_	Serial number
4	ESC c {DEVICE.CLMOD_MODEL_NO:0}_	Model
4	ESC c {DEVICE.CLMOD_VERSION:0}_	Version
4	ESC c {DEVICE.CLMOD_CAL_LAB_TEMP:0}_	Calibration lab temperature sensor
4	ESC c {DEVICE.CLMOD_CAL_CER_TEMP:0}_	Calibration certificate temperature sensor
4	ESC c {DEVICE.CLMOD_CAL_DAT_TEMP:0}_	Calibration certificate temperature sensor
4	ESC c {DEVICE.CLMOD_CAL_LAB_HUMID:0}_	Calibration lab humidity sensor
4	ESC c {DEVICE.CLMOD_CAL_CER_HUMID:0}_	Calibration certificate humidity sensor
4	ESC c {DEVICE.CLMOD_CAL_DAT_HUMID:0}_	Calibration certificate humidity sensor
4	ESC c {DEVICE.CLMOD_CAL_LAB_PRESS:0}_	Calibration lab pressure sensor
4	ESC c {DEVICE.CLMOD_CAL_CER_PRESS:0}_	Calibration certificate pressure sensor
4	ESC c {DEVICE.CLMOD_CAL_DAT_PRESS:0}_	Calibration date pressure sensor

Select climate module or temp. sensor:

"0" internal climate module, 1 = Ext. climate module or 2 = Ext. temp. sensor

Only for internal climate module:

Format	Command (input)	Action/Function
2	ESC ca1_	Temperature measurement value
2	ESC ca2_	Humidity measurement value
2	ESC ca3_	Pressure measurement value
2	ESC ca5_	Air density measurement value
2	ESC ca6_	Uncertainty temperature value
2	ESC ca7_	Uncertainty humidity value
2	ESC ca8_	Uncertainty pressure value
2	ESC ca10_	Uncertainty air density
2	ESC ca11_	Serial number
2	ESC ca12_	Model
2	ESC ca13_	Version
2	ESC ca14_	Calibration lab temperature sensor
2	ESC ca15_	Calibration certificate temperature sensor
2	ESC ca16_	Calibration certificate temperature sensor
2	ESC ca17_	Calibration lab humidity sensor
2	ESC ca18_	Calibration certificate humidity sensor
2	ESC ca19_	Calibration certificate humidity sensor
2	ESC ca20_	Calibration lab pressure sensor
2	ESC ca21_	Calibration certificate pressure sensor
2	ESC ca22_	Calibration date pressure sensor

Example of the internal climate module, temperature measurement value:

ESC ca1_

or

ESC c {DEVICE.CLMOD_MEAS_TEMP:0}_

SICS and Mini-SICS Commands

The computer connected via the data port can send control commands to the balance to control balance and application program functions.



Please consult the separate SICS documentation for a description of the syntax.

¹⁾ Some labeled commands can also be mini-SICS commands.

Command	Action/Function
Level 0 Version 2.3x	
@	Reset all SICS commands
I 0	List all available commands
I 1	Send information about the level and its versions
I 2	Balance model prompt
I 3	Prompt for input of software version of balance (BAC)
I 4	Prompt for balance serial number
I 5	Prompt for software version of display (APC)
S ¹⁾	Send weight value at stability
S I ¹⁾	Send weight value without stability
S I R ¹⁾	Send automatic weight values at and without stability
Z	Zero the balance at stability
Z I	Zero the balance without stability
Level 1 Version 2.2x	
T ¹⁾	Tare the balance at stability
T I ¹⁾	Tare the balance without stability
D	Write text in display
DW	Delete text from display
K	Key control
TA	Prompt for and allocate tare memory
TAC	Delete tare memory
SR	Send weight value if weight changes
Level 2	
SU	Send weight value at stability with current weight unit (with motorized draft shield)
WS	Query door position of motorized draft shield / Open or close door
PWR	Turn balance on/off (standby)
I 1 0	Query/set the balance ID
I 1 1	Query balance type
I 1 4	Query balance components
M 0 1	Query/set application filter
M 0 2	Query/set filter adjustment
M 0 3	Query/set automatic zeroing
M 0 4	Query/set I/O inputs
M 0 7	Query/activate/deactivate automatic draft shield
M 1 2	Acoustic signal (beep)
M 1 3	Activate/deactivate touch screen softkeys
M 2 1	Query/set unit of weight
M 2 4	Query/deactivate "Print" key / Print the stable or unstable weight values
M 3 9	Query/activate bar graph display in working environment
P 1 0 0	Send text line to printer
C 1	Execute calibration/adjustment (as set in menu)

Remote control (remote)

P112	Write text in selected line on display
P113	Delete text from selected line in display
P114	Overwrite task or user names
P120	Turn off bar graph in checkweigher
P121	Turn on bar graph in checkweigher
RM20	Activate/deactivate user input
RM30	Assign new function to softkeys
RM32	Assign new order to softkeys
RM34	Create a dynamic parameter
RM35	Immediately change softkey designations
RM36	Assign/prompt for function of multiple softkey lines
RM37	Prepare preset softkey designations for display
RM38	Activate RM36-assigned softkey lines
RM39	Activate/deactivate RM30-assigned softkey functions
RM44	Query/set input with barcode scanner
RM48	Change order of standard keys
RM49	Activate/deactivate message
RM51	Activate/deactivate selection window
RM52	Define properties for a window with info text
RM53	Activate/deactivate window with info text
RM54	Activate / deactivate info window

Additional Sartorius Commands

SA	Send weight value at stability and store in alibi memory (with optional label)
CMD	Execute application command
PAR	Query parameter
MN36	Assign a description to several menus
MN38	Activate/deactivate MN36-assigned menus
TX36	Assign texts to several text pages
TX37	Overwrite a line of a text page
TX38	Activate/deactivate TX38-assigned text pages

Updating the Software

Purpose: To better serve our customers, Sartorius constantly improves its balance software. Sartorius makes the latest software versions available online so that you can quickly and easily remain up-to-date. Sartorius, however, makes no guarantee regarding the use of this software.
The software should only be updated by an administrator.

M

On verified balances, observe the Audit Trail instructions under (3) Upload the Software Update to the Balance.



Before updating the software, save all data (see Section **Exporting Data**).

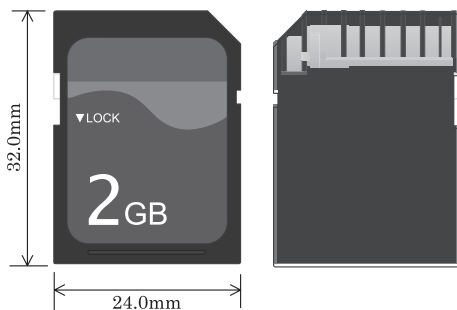


If you are working with User Management (user profiles are defined), the software can only be updated by the administrator.

1) Download the Software Update from the Internet

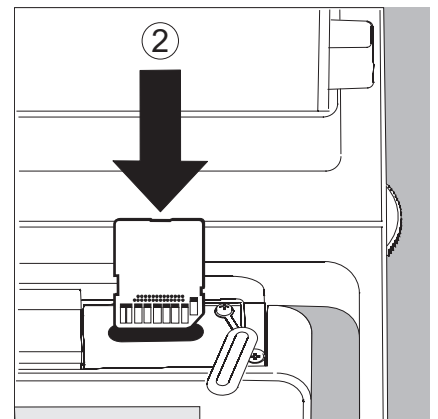
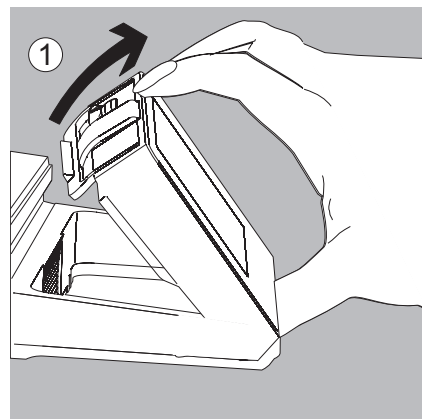
The first step is to download the software to your computer:

- ▶ In your browser, go to “www.sartorius.com/downloads” and click on the “Software” link.
- ▶ Select the update package for your balance.
- ▶ Enter the information required for registration.
- ▶ Download the software package to your computer.
- ▶ Unzip the file.
- ▶ Copy the software update to an SD card (32 × 24 × 2.1 mm).



2) Insert the Memory Card into the Control Unit

The slot for the SD card is located at the back of the control unit.



1. Tilt the display and control unit.
 2. Swivel the cover of the card slot to the front.
Align the SD card so that the contacts are facing forward.
 3. Insert the card into the slot as far as it will go.
- ▶ To remove the card, press it down into the slot so that the card springs out.

3) Upload the Software Update to the Balance

- ▶ If you are working with User Management (user profiles are defined), the software can only be updated by the administrator.
- ▶ Toggle to the System Settings menu.
- ▶ Open the **Update software** submenu.

- ▷ You are asked if you want to delete the existing profiles.
- ▶ Select No or Yes.

- ▶ Once the SD card with the current software is inserted, select **Next**.

If the following error message appears:

Wrong XML version. Please check the data.

- ▶ Touch **Next**.
- ▷ All previous data will be saved in the new format.
- ▶ After updating your software, check your settings (Menu, TASK and USER).
- ▶ If the XML files continue to cause problems, contact your local Sartorius Service Center.

- ▷ After a version check is run, the versions of the current and the new software are displayed.

- ▶ To start the update, select **Continue**.


- ▷ An acoustic signal will sound when the update is complete, and the balance then carries out a self test.

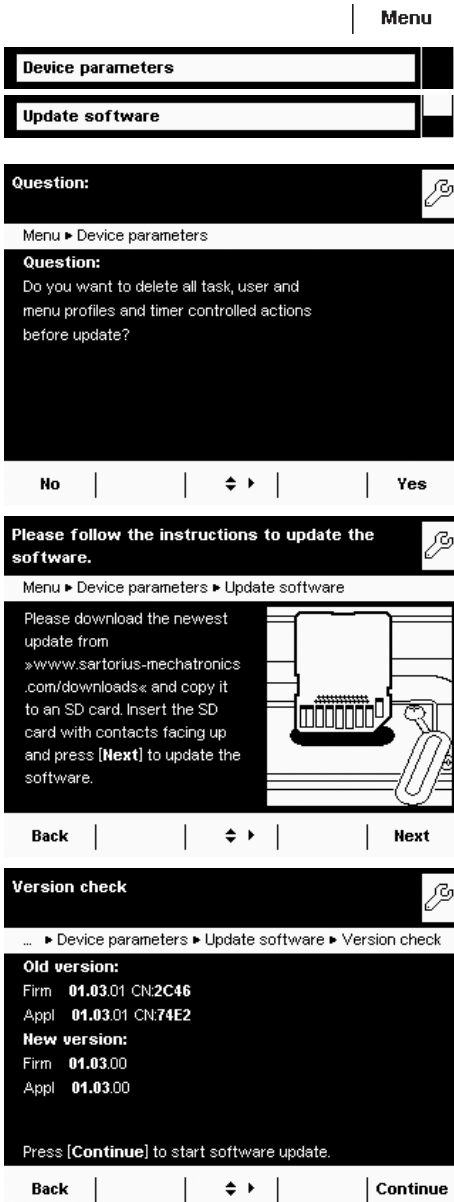
Audit Trail for Software Download on Models Verified for Legal Metrology

Software Status of the Balance

Models verified for use in legal metrology are assigned an authorized software status when the balance is shipped for delivery. This can be indicated on the display. If something concerning the software or the legal regulations changes, the software status must be updated.

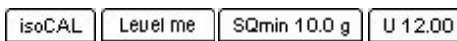
Displaying the Audit Trail of the Balance Software

- ▶ Turn off the balance and disconnect it from the power supply.
- ▶ Hold down () and reconnect the balance to the power supply.
- ▷ The “Bios” menu is displayed.
- ▶ Press the “Show settings” menu item.
- ▶ Select the “Audit trail of software updates” menu item.
- ▶ Select “Show audit trail.”
- ▷ The Audit Trail with modification date, name, new and old software, and version number are indicated on the display.



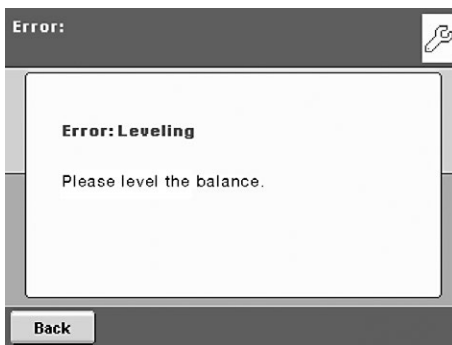
Error and Status Messages

Error messages appear directly in the respective active application, usually with descriptive text on how to correct it. Warning and reminder functions are displayed with a fixed 3-level action hierarchy:

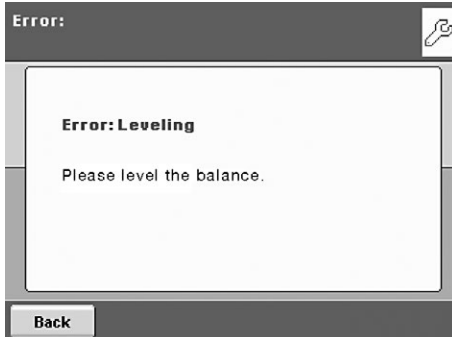


Status Display (Tab):

The available status displays and their meanings are described in the “Display” section.



Warning Text with a Repeated Reminder



Error Text with Mandatory Prompt for Troubleshooting

You cannot proceed until you have eliminated the error.

Ineffective Key Commands or Entries

If you press a key that has no function or is not allowed, this error is indicated as follows:

- An error message indicates invalid input.
- An error code or error message indicates incorrect operation.

Error messages are shown on the display for two seconds or must be acknowledged by pressing a key. The error text provides direct suggestions on how to proceed. If the error cannot be resolved by following the suggestions, please contact Sartorius customer service.

GPL License

Devices of the Cubis® series also contain “free software” in the firmware that is licensed under the GNU General Public License (GPL) Version 2, June 1991 and the GNU Lesser General Public License (LGPL) Version 2.1, February 1999. This third-party developed “free software” is copyrighted and is provided free of charge.

The licensing conditions of the Free Software Foundation, Inc. are available in English on the included CD-ROM.

You can purchase the GPL source text from Sartorius on CD under the VF no. VF 4043 for a shipping cost of € 20.00.

Care and Maintenance

Service

Regular servicing by a Sartorius technician will extend the service life of your balance and ensure its continued weighing accuracy. Sartorius offers its customers service contracts with regular maintenance intervals ranging from 1 month to 2 years. The frequency of the maintenance intervals depends on the operating conditions and user's tolerance requirements.

Repairs

Repair work must only be carried out by trained service technicians. Repairs performed by untrained persons may result in considerable hazards for the user.



The device must be unplugged during repair work.
Unplug the power cord from the outlet.
Repair work must only be performed by Sartorius-trained service technicians.
If required: Please contact your Sartorius dealer!

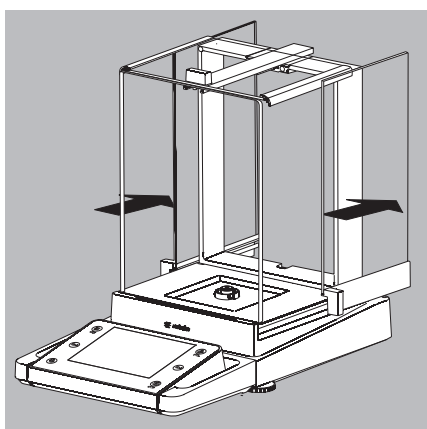
Cleaning the Balance



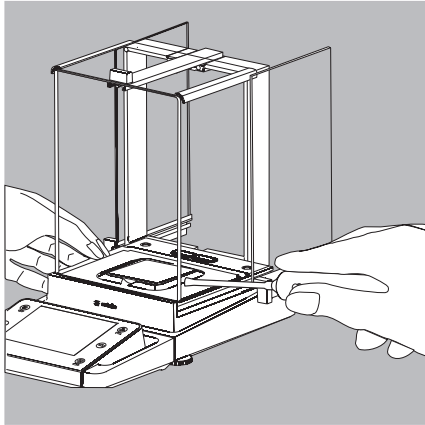
Ensure that no dust or liquid enters the balance weighing system.

Do not use aggressive cleaning agents (solvents or similar).

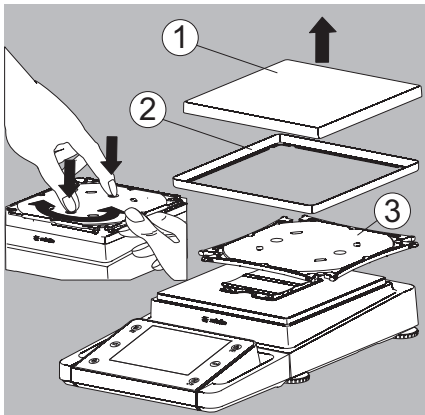
Isolate from supply voltage: Unplug the power cord from the wall outlet and unplug any data cables connected to the balance.



- ▶ Open the panels of the analytical draft shield completely.
- ▶ Clean the housing and interior of the balance with a cloth lightly moistened with a soap solution.
- ▶ Dry all parts with a soft, dry cloth or use blotting paper to absorb dampness. Then replace all dried parts.
- ▶ Remove panels from the analytical draft shield and clean them with commercially available glass cleaner. Dry the panels. Then reinstall them to the balance.

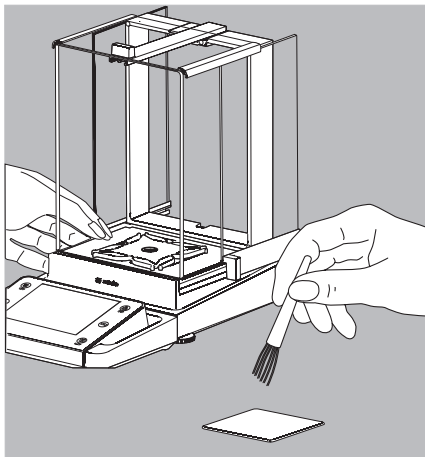


- ▶ Carefully remove any sample residue/spilled powder using a brush or hand-held vacuum cleaner.



- ▶ If necessary, remove the weighing pan, shield plate, and pan support.

1. Weighing pan
2. Shield plate/Draft shield
3. Pan support



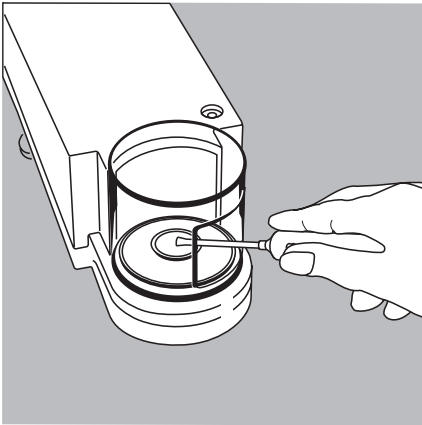
- ▶ Clean parts with a cloth or brush. Then replace the parts.

Cleaning the Stainless Steel Weighing Pan

All stainless steel parts should be cleaned at regular intervals.

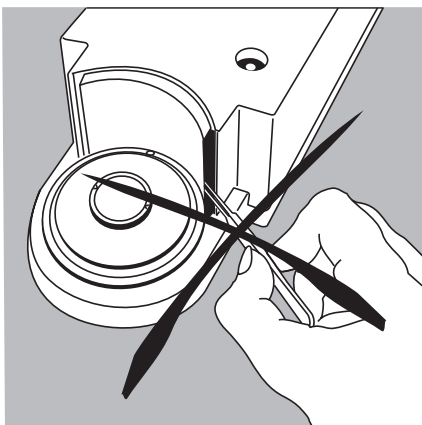
Use a damp cloth or sponge to clean stainless steel parts on the balance. Only use conventional household cleaning agents which are suitable for stainless steel (e.g. Stahlfix). After this, let the device dry. For additional protection, protective oil may be applied.

Remove the stainless steel weighing pan and thoroughly clean it separately. Only use solvents for cleaning stainless steel parts. The stainless steel weighing pan should be cleaned simply by rubbing. After this, rinse the equipment thoroughly until all residue is removed. No protective oil should be applied to the stainless steel weighing pan.



Cleaning the Weighing Chamber of Balances with a readability of $\leq 1 \mu\text{g}$

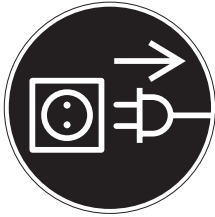
- ▶ Carefully remove any powdered sample material from beneath the shield disk using a small car vacuum cleaner with a mini-hose attached.
- ▶ Use blotting paper to remove any liquid sample material.



Do not insert forceps or similar utensils behind the draft shield plate.

Note: The weighing system is hermetically separated from the area of the draft shield plate. This prevents spillage or other impurities from entering.

Safety Inspection



If there is any indication that safe operation of the balance is no longer warranted:

- ▶ Disconnect from the supply voltage: Unplug the power cord from the outlet.
- ▶ Secure the AC adapter and cord so that they cannot be used.

Safe operation of the AC adapter is no longer ensured:

- When the AC adapter or the power cord shows visible damage.
 - When the AC adapter no longer functions properly.
 - Following extended storage in adverse conditions.
- In this case, notify the Sartorius Service Center.

Maintenance and repair work may be performed only by authorized service technicians who have access to the required maintenance manuals and instructions and who have received the necessary training.

We recommend that the AC adapter be inspected by a qualified service technician with regard to the following:

- Leakage current: <0.25 mA measured with a properly calibrated multimeter.
- Insulation resistance >7 M Ω as measured with a constant voltage of at least 500 volts at a 500 k Ω load.

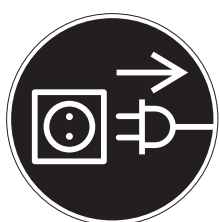
The duration and number of checks should be determined by a qualified Sartorius service technician on site based on specific ambient and operating conditions (once a year as a minimum).

Storage and Shipping

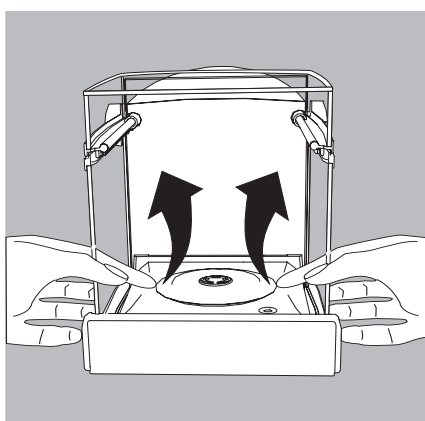
Storage and Shipping Conditions

- Permitted storage and shipping temperature: -10 to +60°C
 - Unpacked devices can lose their precision if subjected to extreme vibrations.
 - Excessive vibrations may compromise the safety of the equipment.
- Save the packaging for any future storage or shipment of the balance.
- Only the original packaging provides optimum protection for the equipment.
- Follow all warnings and safety precautions.

Transporting or Shipping the Device over Long Distances



- ▶ Switch the device to standby mode.
- ▶ Disconnect the device from the power supply.
- ▶ Disconnect any data cables from the device.

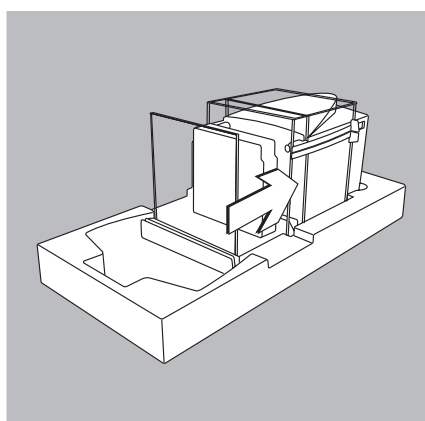


Models MSU116P, MSU66, MSU36:

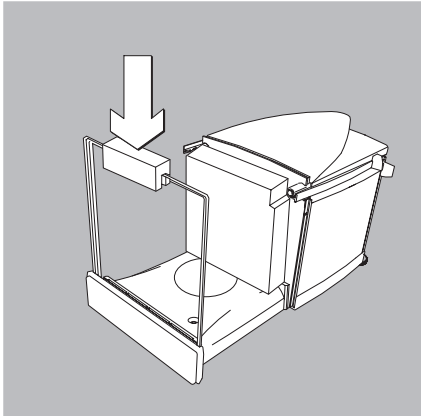
Always use the complete original packaging:

- When the device is to be transported over long distances or shipped.
- If you are unsure whether or not the device will be transported upright.

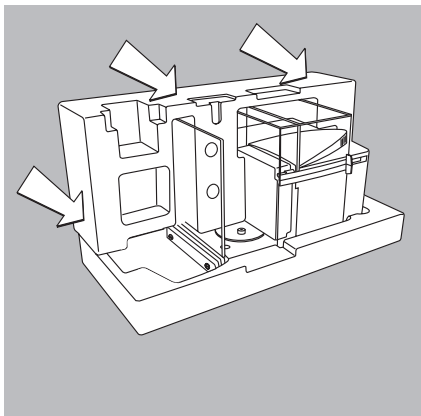
- ▶ Remove the following parts:
 - Inner draft shield
 - Shield disk
 - Weighing pan and shield plate:
 - Reach beneath the shield plate and lift it up carefully in a vertical position together with the weighing pan to avoid damaging the weighing system.



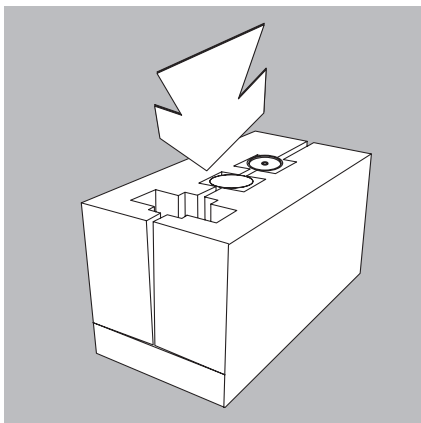
- ▶ Open the draft shield doors and carefully position the device in the lower packaging padding.
- ▶ Push the inner foam padding against the housing.



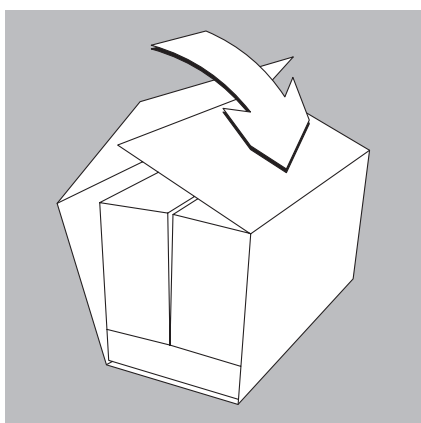
- ▶ Attach the retainers to the panel.
- ▶ Place the shield disk into a bag.



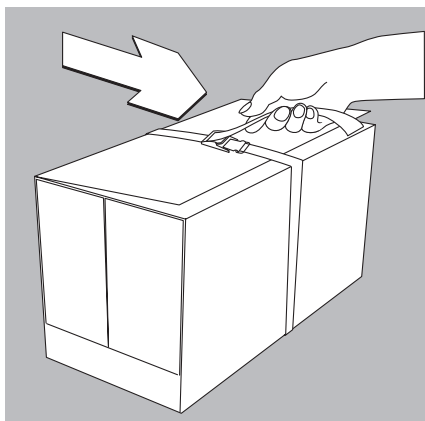
- ▶ Position the lateral packaging padding around the device and press inward.



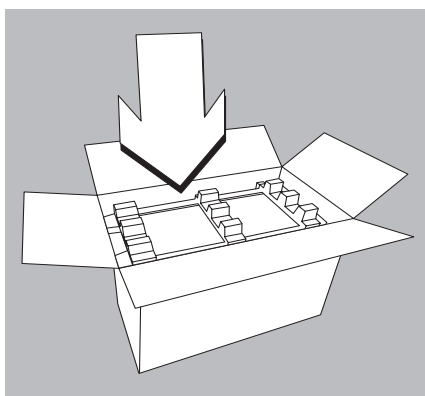
- ▶ Place the following parts in the recessed spaces:
 - Shield plate
 - Weighing pan
 - Inner draft shield



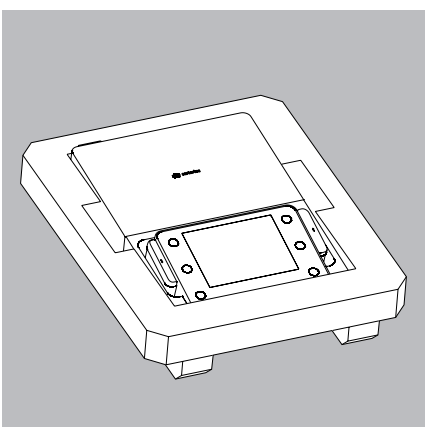
- ▶ Wrap the cardboard sleeve around the inner packaging.



- ▶ Place the holding strap around the cardboard sleeve and pull it tight.
- ▶ Lift the packaged device by the strap and place it in the shipping box in the bottom packaging padding.

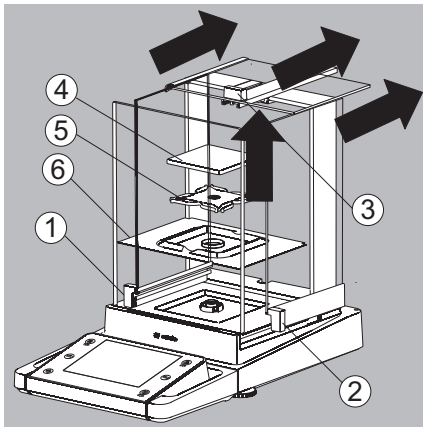


- ▶ Place the upper packaging padding on top.
- ▶ Close the outside shipping box and seal it appropriately.



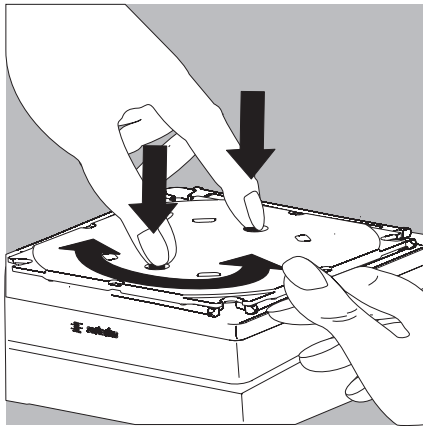
Box:

- ▶ Place the control unit into the bottom packaging padding.
- ▶ Place the upper packaging padding on top.
- ▶ Pack the display unit into the small cardboard box.
- ▶ Pack the weigh cell cardboard box and the display unit cardboard box into the large outside box.
- ▶ Ship the packaged device.

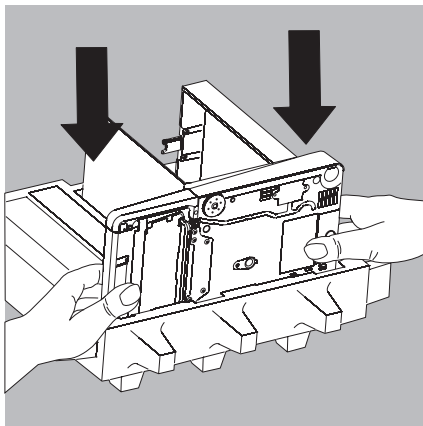


Models with the Analytical Draft Shield:

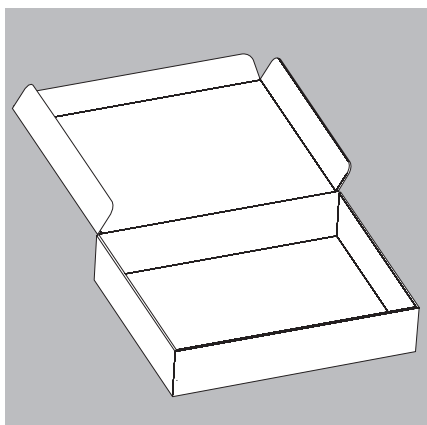
- ▶ Remove all items (such as weights, sensors, etc.) from the weighing chamber.
- 1) Remove one side draft shield panel
- 2) Remove the other side draft shield panel
- 3) Remove the upper draft shield panel
- 4) Remove the weighing pan
- 5) Remove the pan support (not for MSU225.../MSU125... models)
- 6) Remove the shield plate/draft shield



- ▶ On models without a draft shield: press down on the two pan support fasteners.
- ▶ Rotate and remove the pan support.

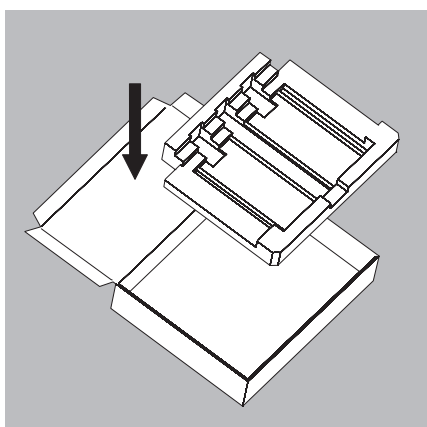


- ▶ Place the balance in the lower part of the packaging.

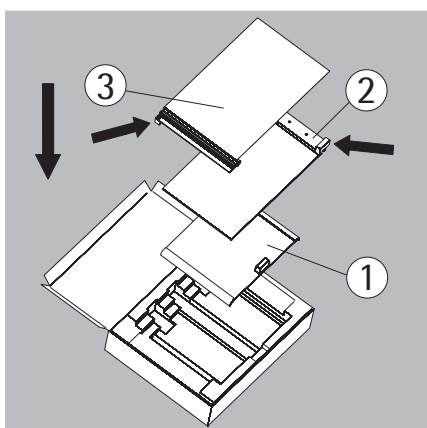


Transporting the Parts (Large Analytical Draft Shield)

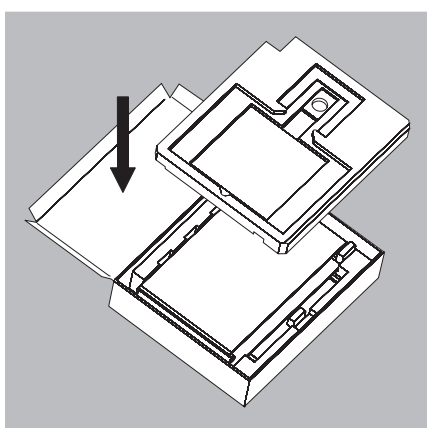
- ▶ Get the box for the individual parts of the balance ready.



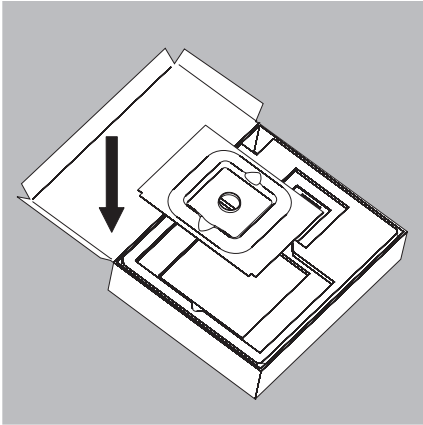
- ▶ Place the bottom foam piece in the box.



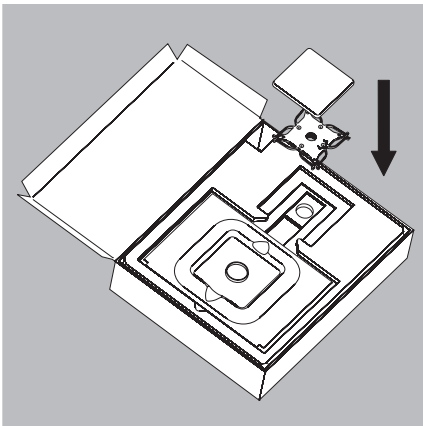
- ▶ Place the panels in the packaging:
 - 1) Place the upper draft shield panel into the packaging (handle upwards).
 - 2) Place the side draft shield panel into the packaging (handle upwards).
 - 3) Place the other side panel into the packaging (handle downwards).



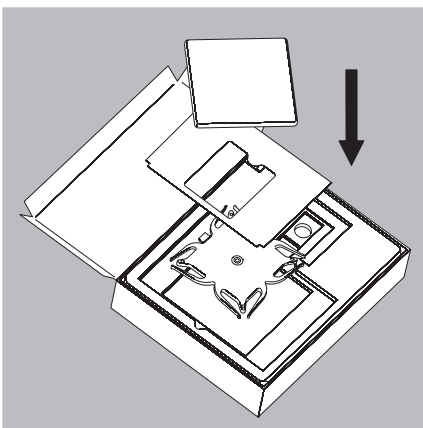
- ▶ Then place the top foam piece in the box.



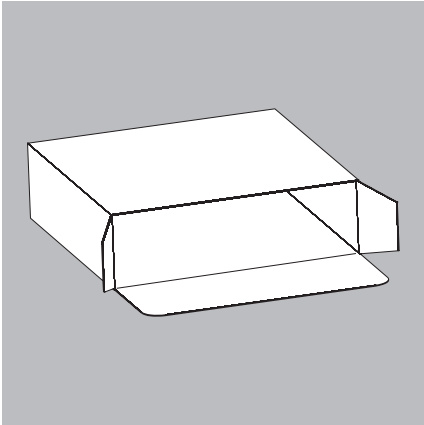
- For a small weighing pan:
- ▶ Place the shield plate into the box.



- ▶ Place the pan support and weighing pan into the opening.
- ▶ Close the box.

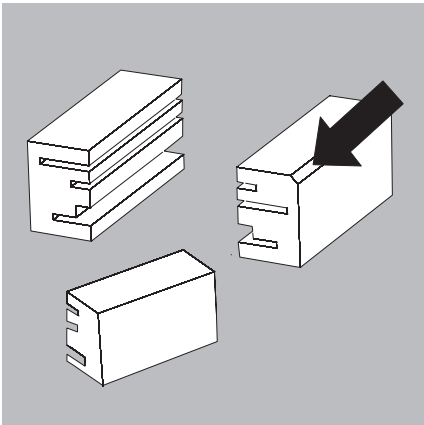


- For a large weighing pan:
- ▶ Place the following parts into the foam piece in the order given:
 - 1) Shield plate
 - 2) Pan support
 - 3) Weighing pan
 - ▶ Close the box.

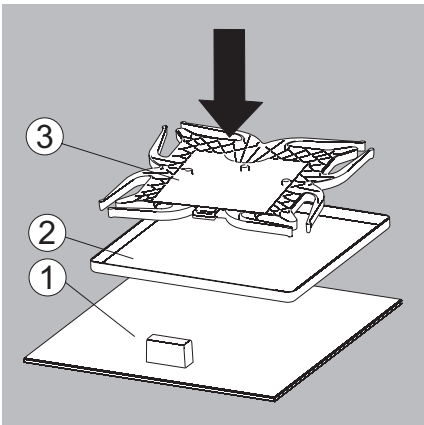


Transporting the Parts (Small Analytical Draft Shield)

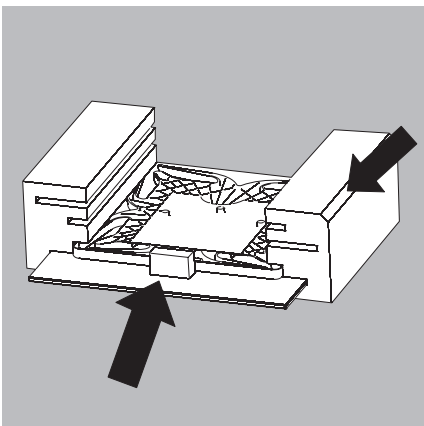
- ▶ Get the box ready for the individual parts of the balance.



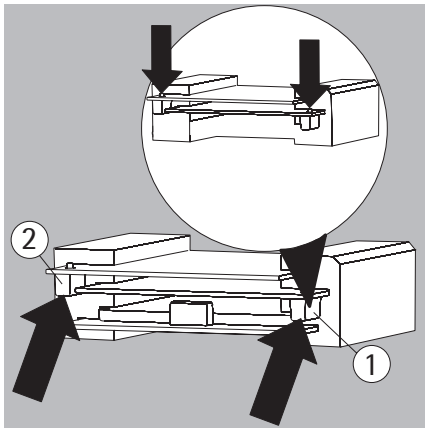
- ▶ Get the foam pieces ready.



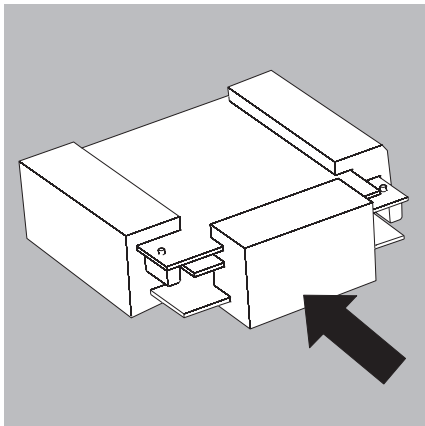
- ▶ Place the balance parts on top of each other
 - 1) Upper draft shield panel
 - 2) Shield plate/draft shield
 - 3) Pan support



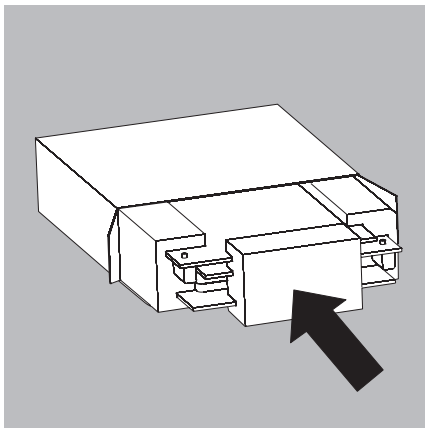
- ▶ Slide the parts into the foam.



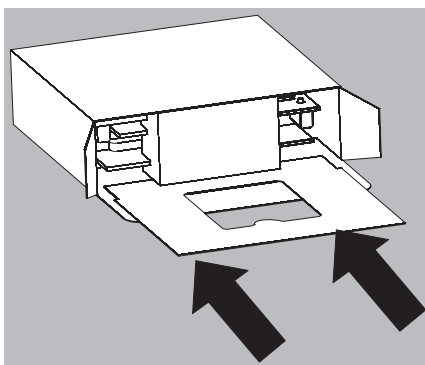
- ▶ Place the panels in the packaging.
- 1) Place the side draft shield panel into the packaging (handle downwards).
- 2) Place the side draft shield panel into the packaging (handle downwards).



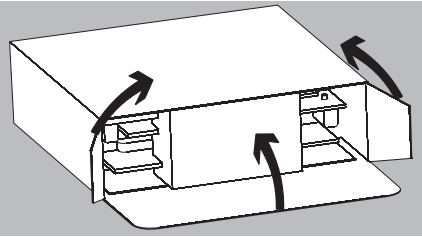
- ▶ Place the foam piece in front of the parts.



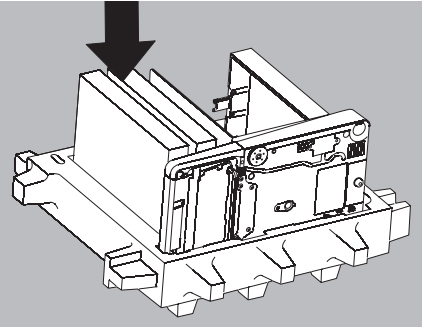
- ▶ Place the package into the box.



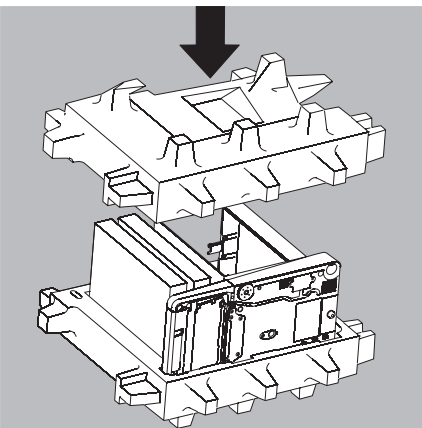
- ▶ Slide the shield plate into the packaging.



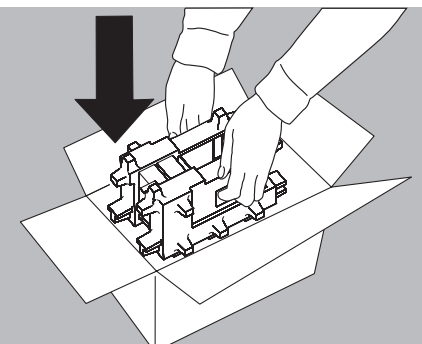
▶ Close the box.



▶ Place the box into the packaging.



▶ Place the top part on to the packaging.



▶ Insert the balance into the box with cushioning.

▶ Send the packaged balance.

Disposal



Information on Decontamination

The device does not contain any hazardous materials that would necessitate special disposal measures. The contaminated samples used in the process are potentially hazardous substances that can cause biological or chemical hazards.

If the device has come into contact with hazardous substances: Measures must be carried out to properly decontaminate and declare such devices. The operator is responsible for adhering to local legislation on the proper declaration of transportation and disposal and the proper disposal of the device.

WARNING

Danger of injury due to contaminated equipment!

Devices contaminated with hazardous materials (ABC contamination) will not be accepted by Sartorius for repair or disposal.

Disposing of Device and Parts

Information on Disposal

The device and its accessories do not belong in regular household waste, since they are made of high-grade materials that can be recycled and reused. All parts must be disposed of properly by disposal facilities.

A lithium cell battery is installed inside the device. Batteries do not belong in regular household waste since they are made of high-grade materials that can be recycled and reused. Batteries must be disposed of properly by disposal facilities. The packaging consists of environmentally friendly materials that can be used as secondary raw materials.

Disposal

Requirements

The device has been decontaminated.

Procedure

Dispose of the device. Follow the disposal instructions on our website (www.sartorius.com). Inform the disposal facility that a lithium cell battery is installed in the device. Dispose of the packaging in accordance with local government regulations.

Technical Data

General Data

Sartorius power supply	Model 1000022148
Primary	100 – 240 V~, -15%/+10%, 50–60 Hz, 1.0 A
Secondary	15 V, ± 5%, 2.66 A (max.), protected electronically against short circuit
Other data	Protection class II as per EN/IEC 60950-1 | up to 3000 m above sea level | IP40 as per EN 60529/IEC 60529
Power supply connection cable	Two-sided plug with a 3-pin country-specific power plug and 3-pin socket (IEC/EN60320-1/C14) for connection to the power supply
Other data	See the power supply label
Balance	
Power supply	Only via Sartorius adaptor 1000022148
Input voltage	15 VDC, ± 5%
Power consumption	7 W (max.)
IP protection for models with a readability of ≥ 10 mg	IP54 as per EN 60529/IEC 60529
Ambient Conditions	
Environment	For indoor use only
Storage and shipping temperature	-10 °C to +60 °C
Ambient temperature, operation*	+5 °C to +40 °C
Height	Up to 2000 m above sea level
Maximum relative humidity**	80 % for temperatures up to 31 °C, decreasing linearly up to 50% relative humidity at 40 °C
Safety of Electrical Equipment	According to EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
Electromagnetic Compatibility	as per EN 61326-1:2013 Electrical equipment for measurement, control, and laboratory use EMC requirements – Part 1: General requirements
Interference resistance	Suitable for use in industrial areas
Interference emission	Class B: (Suitable for use in residential areas and areas that are connected to a low voltage network that also supplies residential buildings).

M

-.CE model balances verified for use in legal metrology comply with the requirements of Council Directive No. 2014/31/EU with EN 45501:2015 and OIML R76:2006.

M

* For -.CE model balances verified for use in legal metrology, refer to the information on the balance.
** For -.CE model balances verified for use in legal metrology, the legal regulations apply.

Model-specific Data

Microbalances 0.001mg

Model		MSU6.6S	MSU6.6S-F	MSU3.6P
Readability	mg	0.001	0.001	0.001/0.002/0.005
Weighing capacity	g	6.1	6.1	1.1/2.1/3.1
Tare range (subtractive)	g	-6.1	-6.1	-3.1
Repeatability	≤±mg	0.001	0.001	0.003/0.004/0.005
Linearity	≤±mg	0.004	0.004	0.004
Corner load (test load [g])	mg	4 (2 g)	4 (2 g)*	5 (1 g)
Min. initial weight	mg	2	-	4
Sensitivity drift between +10...+30°C	±ppm/K	1	1	1
Typical stabilization time	s	≤ 5	≤ 5	≤ 5
Typical measurement time	s	≤ 8	≤ 8	≤ 8
External standard calibration value (min. accuracy class)	g	5 (E2)	5 (E2)	3 (E2)
Display result (depending on the set filter level)		0.1 – 0.4	0.1 – 0.4	0.1 – 0.4
Weighing pan size Ø	mm	30	50	30
Weighing chamber height	mm	70	-	70
Protection		Protected against dust and water		

Ultra-Microbalances 0.0001mg

Model		MSU2.7S	MSU2.7S-F
Readability	mg	0,0001	0,0001
Weighing capacity	g	2.1	2.1
Tare range (subtractive)	g	-2.1	-2.1
Repeatability	≤±mg	0.00025	0.00025
Linearity	≤±mg	0.0009	0.0009
Corner load (test load [g]) ¹⁾	mg	2.5 (1)	2.5 (1)
Min. initial weight	mg	1	-
Sensitivity drift between zw. +10...+30°C	±ppm/K	1	1
Typical stabilization time	s	≤ 7	
Typical measurement time	s	≤ 10	
External standard calibration value (min. accuracy class)	g	2 (E2)	2 (E2)
Display result (depending on the set filter level)		0.1 – 0.4	0.1 – 0.4
Weighing pan size Ø	mm	20	50
Weighing chamber height	mm	70	15
Protection		Protected against dust and water	

¹⁾ = Standard pan

²⁾ Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

High-capacity microbalances

Models		MSU66S	MSU66P	MSU36S	MSU36P	MSU116P
Readability	mg	0.001	0.001/0.01	0.001	0.001/0.01	0.002/0.01
Weighing capacity	g	61	12/61	31	31/6	12/111
Tare range (subtractive)	g	61	61	31	31	111
Reproducibility (100 g/5 g)	<±mg	-	-	-	-	0.01/0.004
Reproducibility (50 g/2 g)	<±mg	0.004/0.0015	0.010/0.002	-	-	-
Reproducibility (20 g/1 g)	<±mg	-	-	0.002/0.0015	0.008/0.0015	-
Linearity	<±mg	0.02	0.02	0.015	0.015	0.02
Corner load (test load [g])	mg	0.02 (20)	0.02 (20)	0.015 (10)	0.015 (10)	0.03 (50)
Optimal min. initial weight	mg	0.82	0.82	0.82	0.82	1.64
Sensitivity drift between +10 to +30°C	±ppm/K	1	1	1	1	1
Typical stabilization time	s	3.5	3.5	3.5	3.5	3.5
Typical measurement time	s	10	10	10	10	10
External standard calibration value (min. accuracy class)	g	50 (E2)	50 (E2)	20 (E2)	20 (E2)	100 (E2)
Display result (depending on the set filter level)	s	0.2 – 0.4	0.2 – 0.4	0.2 – 0.4	0.2 – 0.4	0.2 – 0.4
Weighing pan size Ø	mm	30/50*	30/50*	30*	30*	50**
Weighing chamber height	mm	181	181	181	181	240
Protection		Protected against dust and water				

* = The technical weighing specifications refer to the weighing pan with Ø = 30 mm.

** = The technical weighing specifications refer to the weighing pan with Ø = 50 mm.

Semi-microbalances 0.01 mg

Model		MSU225S	MSU225P	MSU125P
Readability	mg	0.01	0.01/0.02/0.05	0.01/0.1
Weighing capacity	g	220	60/120/220	60/120
Tare range (subtractive)	g	- 220	- 220	- 120
Repeatability	≤±mg	0 to 6 g: 0.015 60 to 220g: 0.025	0 to 6 g: 0.015 60 to 220g: 0.04	0 to 6 g: 0.015 60 to 120g: 0.06
Linearity	≤±mg	0.1	0.15	0.15
Corner load (test load [g])	mg	0.15 (100)	0.2 (100)	0.15 (50)
Min. initial weight*	mg	20	20	20
Sensitivity drift between +10 to +30°C	±ppm/K	1	1	1
Typical stabilization time	s	≤ 2	≤ 2	≤ 2
Typical measurement time	s	≤ 6	≤ 6	≤ 6
External standard calibration value (min. accuracy class)	g	200 (E2)	200 (E2)	100 (E2)
Display result (depending on the set filter level)		0.2 – 0.4		
Weighing pan size (W×D)	mm	85×85		
Weighing chamber height (draft shield DU)	mm	261		
Protection		Protected against dust and water		

* = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

Analytical balances 0.1 mg

Model		MSU524S	MSU524P	MSU324S	MSU224S	MSU324P	MSU124S
Readability	mg	0.1	0.1/0.2/0.5	0.1	0.1	0.1/0.2/0.5	0.1
Weighing capacity	g	520	120/240/520	320	220	80/160/320	120
Tare range (subtractive)	g	- 520	- 520	- 320	- 220	- 320	- 120
Repeatability	<±mg	0.1	0.15/0.2/0.4	0.1	0.07	0.1/0.2/0.4	0.1
Linearity	<±mg	0.4	0.5	0.3	0.2	0.5	0.2
Corner load (test load [g])	mg	0.3 (200)	0.4 (200)	0.3 (200)	0.2 (100)	0.4 (200)	0.2 (50)
Min. initial weight*	mg			120	120	120	120
Sensitivity drift between +10 to +30°C	±ppm/K	1	1	1	1	1	1
Typical stabilization time	s	< 1	< 1	< 1	< 1	< 1	< 1
Typical measurement time	s	< 3	< 3	< 3	< 3	< 3	< 3
External standard calibration value (min. accuracy class)	g	500	500	200+100 (E2)	200 (E2)	200+100 (E2)	100 (E2)
Display result (depending on the set filter level)		0.1 – 0.4					
Weighing pan size (W×D)	mm	85×85					
Weighing chamber height (draft shield DU)	mm	261					
Protection		Protected against dust and water					

Precision balances

Models		MSU5203S	MSU5203P	MSU3203S	MSU3203P
Readability	mg	1	1/2/5	1	1/10
Weighing capacity	g	5200	1200/2400/5200	3200	1010/3200
Tare range (subtractive)	g	- 5200	- 5200	- 3200	- 3200
Repeatability	≤±mg	1	1	1	1/6
Linearity	≤±mg	5	5	5	5
Corner load (test load [g])	mg	2 (2000)	2 (2000)	2 (1000)	2 (1000)
Min. initial weight*	g				1.5
Sensitivity drift between +10 to +30°C	±ppm/K	1	1	1	1
Typical stabilization time	s	≤ 1	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 2	≤ 2	≤ 2	≤ 1.5
External standard calibration value (min. accuracy class)	g	5000	5000	2000	2000 (E2)
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W×D)	mm	140×140			
Weighing chamber height (draft shield DE)	mm	172			
Protection		Protected against dust and water			

* = Position according to OIML R76

Model-specific Data

Models		MSU2203S	MSU2203P	MSU1203S
Readability	mg	1	1/10	1
Weighing capacity	g	2200	1010/2200	1200
Tare range (subtractive)	g	- 2200	- 2200	- 1200
Repeatability	≤±mg	1	1/6	0.7
Linearity	≤±mg	3	5	2
Corner load (test load [g])	mg	2 (1000)	3 (1000)	2 (500)
Min. initial weight*	g	1.5	1.5	1.5
Sensitivity drift between +10 to +30°C	±ppm/K	1	1	1.5
Typical stabilization time	s	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 1.5	≤ 1.5	≤ 1.5
External standard calibration value (min. accuracy class)	g	2000 (E2)	1000 (E2)	1000 (E2)
Display result (depending on the set filter level)		0.1 – 0.4		
Weighing pan size (W × D)	mm	140 × 140		
Weighing chamber height (draft shield DE)	mm	172		
Protection		Protected against dust and water		

Precision balances

Models		MSU623S	MSU623P	MSU323S
Readability	mg	1	1/2/5	1
Weighing capacity	g	620	150/300/620	320
Tare range (subtractive)	g	- 620	- 620	- 320
Repeatability	≤±mg	0.7	1/2/4	0.7
Linearity	≤±mg	2	5	2
Corner load (test load [g])	mg	2 (200)	4 (200)	2 (200)
Min. initial weight*	g	1.5	1.5	1.5
Sensitivity drift between +10 to +30°C	±ppm/K	2	2	2
Typical stabilization time	s	≤ 0.8	≤ 0.8	≤ 0.8
Typical measurement time	s	≤ 1	≤ 1	≤ 1
External standard calibration value (min. accuracy class)	g	500 (E2)	500 (F1)	200 (E2)
Display result (depending on the set filter level)		0.1 – 0.4		
Weighing pan size (W × D)	mm	140 × 140		
Weighing chamber height (draft shield DE)	mm	172		
Protection		Protected against dust and water		

* = Position according to OIML R76

Model-specific Data

Models		MSU14202S	MSU14202P	MSU10202S	MSU8202S
Readability	mg	10	10/20/50	10	10
Weighing capacity	g	14,200	3500/7000/14,200	10,200	8200
Tare range (subtractive)	g	- 14,200	- 14,200	- 10,200	- 8200
Repeatability	≤±mg	10	10/20/40	7	7
Linearity	≤±mg	30	50	20	20
Corner load (test load [g])	mg	20 (5000)	40 (5000)	20 (5000)	20 (5000)
Min. initial weight*	g	15	15	12	12
Sensitivity drift between +10 to +30°C	±ppm/K	1.5	1.5	2	2
Typical stabilization time	s	≤ 1	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 1.5	≤ 1.5	≤ 1.5	≤ 1.5
External standard calibration value (min. accuracy class)	kg	10 (E2)	10 (E2)	10 (E2)	5 (E2)
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W×D)	mm	206×206			
Protection		Protected against dust and water			

Precision balances

Models		MSU6202S	MSU6202P	MSU5202S	MSU4202S
Readability	mg	10	10/20/50	10	10
Weighing capacity	g	6200	1500/3000/ 6200	5200	4200
Tare range (subtractive)	g	- 6200	- 6200	- 5200	- 4200
Repeatability	≤±mg	7	7/20/40	6	7
Linearity	≤±mg	20	50	10	20
Corner load (test load [g])	mg	20 (2000)	50 (2000)	10 (2000)	30 (2000)
Min. initial weight*	g	12	12	10	12
Sensitivity drift between +10 to +30°C	±ppm/K	2	2	2	2
Typical stabilization time	s	≤ 1	≤ 1	≤ 0.8	≤ 0.8
Typical measurement time	s	≤ 1.5	≤ 1.5	≤ 1	≤ 1
External standard calibration value (min. accuracy class)	kg	5 (E2)	5 (F1)	5	2 (E2)
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W×D)	mm	206×206	206×206	140×140	206×206
Protection		Protected against dust and water			

* = Position according to OIML R76

Model-specific Data

Precision balances

Models		MSU2202S	MSU1202S	MSU70201S	MSU36201S	MSU36201P
Readability	mg	10	10	100	100	100/1000
Weighing capacity	g	2200	1200	70,200	36,200	10,200/36,200
Tare range (subtractive)	g	- 2200	- 1200	- 70,200	- 36,200	- 36,200
Repeatability	≤±mg	7	7	70	70	70/500
Linearity	≤±mg	20	20	500	200	200
Corner load (test load [g])	mg	20 (1000)	20 (500)	500 (20,000)	300 (10,000)	300 (10,000)
Min. initial weight*	g	12	12	120	120	120
Sensitivity drift between +10 to +30°C	±ppm/K	2	2	3	2	2
Typical stabilization time	s	≤ 0.8	≤ 0.8	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 1	≤ 1	≤ 1,5	≤ 1,5	≤ 1,5
External standard calibration value (min. accuracy class)	kg	2 (F1)	1 (F1)	50 (F1)	20 (F1)	20 (F1)
Display result (depending on the set filter level)		0.1 – 0.4				
Weighing pan size (W × D)	mm	206 × 206	206 × 206	400 × 300	400 × 300	400 × 300
Protection		IP54				

Precision balances

Models		MSU20201S	MSU12201S	MSU8201S	MSU5201S
Readability	mg	100	100	100	100
Weighing capacity	g	20,200	12,200	8200	5200
Tare range (subtractive)	g	- 20,200	- 12,200	- 8200	- 5200
Repeatability	≤±mg	70	50	50	50
Linearity	≤±mg	200	100	100	100
Corner load (test load [g])	mg	300 (5000)	200 (5000)	200 (5000)	200 (2000)
Min. initial weight*	g	120	100	100	100
Sensitivity drift between +10 to +30°C	±ppm/K	2	4	4	4
Typical stabilization time	s	≤ 1	≤ 0.8	≤ 0.8	≤ 0,8
Typical measurement time	s	≤ 1,5	≤ 1	≤ 1	≤ 1
External standard calibration value (min. accuracy class)	kg	20 (F1)	10 (F1)	5 (F2)	5 (F2)
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W × D)	mm	206 × 206			
Protection		IP54			

* = Position according to OIML R76

Model-specific Data

Precision balances

Models		MSU70200S	MSU36200S
Readability	mg	1000	1000
Weighing capacity	g	70,200	36,200
Tare range (subtractive)	g	-70,200	-36,200
Repeatability	≤±mg	500	500
Linearity	≤±mg	1000	1000
Corner load (test load [g])	mg	1000 (20,000)	1000 (10,000)
Min. initial weight*	g	1000	1000
Sensitivity drift between +10 to +30°C	±ppm/K	3	2
Typical stabilization time	s	≤ 0.8	≤ 0.8
Typical measurement time	s	≤ 1	≤ 1
External standard calibration value (min. accuracy class)	kg	50 (F1)	20 (F1)
Display result (depending on the set filter level)		0.1 – 0.4	
Weighing pan size (W×D)	mm	400 × 300	
Protection		IP54	

* = Position according to OIML R76

Verified Models with EC Type Approval Certificate: Micro- and ultramicrobalances

Model		MSU6.6S-0CE	MSU2.7S-0CE	MSU3.6P-0CE
Accuracy class*		Ⓘ	Ⓘ	Ⓘ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX				
Scale interval d*	mg	0.001	0.0001	0.001/0.002/0.005
Weighing capacity Max*	g	6.1	2.1	3.1
Calibration value e*	mg	1	1	1
Min. load Min*	mg	0.1	0.01	0.1
Tare equalization range (subtractive)		≤ 100 % from max. weighing capacity		
Application range according to DIR*	g	0.001 – 6.1	0.001 – 2.1	0.001 – 3.1
Min. initial weight**	mg	2	1	4
Typical stabilization time	s	≤ 5	≤ 7	≤ 5
Typical measurement time	s	≤ 8	≤ 10	≤ 8
External standard calibration value (min. accuracy class)	g	5	2	3
Application range (temperature)		With "isoCAL" function: +5...+40°C | Without "isoCAL" function: +15 ... +25°C		
Display result (depending on the set filter level)		By selection of 1 of 4 optimized filter levels		
Weighing pan size Ø	mm	30	20	30
Weighing chamber height (draft shield DM)	mm	70	70	70
Protection		Protected against dust and water		

* DIR = Directive 2014/31/EU on non-automatic weighing instruments used within the European Economic Area

** = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

Verified Models with EC Type Approval Certificate: High-capacity microbalances

Models		MSU66S- OCE	MSU66P- OCE	MSU36S- OCE	MSU36P- OCE	MSU116P- OCE
Accuracy class*		(I)	(I)	(I)	(I)	(I)
For verified models: EC Type Approval Certificate DE-17-NAWID-PTB021, Type: MSY						
Digits d*	mg	0.001	0.001 / 0.01	0.001	0.001 / 0.01	0.002 / 0.01
Weighing capacity Max*	g	61	12 / 61	31	6 / 31	12 / 111
Verification scale interval e*	mg	1	1	1	1	1
Min. load, Min*	mg	0.1	0.1	0.1	0.1	0.2
Tare equalization range (subtractive)		< 100% from max. weighing capacity				
Application range according to DIR *	g	0.0001 – 61	0.0001 – 61	0.0001 – 31	0.0001 – 31	0.0002 – 111
Min. initial weight**	g	0.82	0.82	0.82	0.82	1.64
Typical stabilization time	s	3.5	3.5	3.5	3.5	3.5
Typical measurement time	s	10	10	10	10	10
Application range (temperature)		with “isoCAL” function: +10 to +30 °C | without “isoCAL” function: +15 to +25 °C				
Display result (depending on the set filter level)		0.2 – 0.4				
Weighing pan size Ø	mm	30/50	30/50	30	30	50/90
IPprotection		Protected against dust and water				

Verified Models with EC Type Approval Certificate: Semimicrobalances 0.01 mg

Model		MSU225S-OCE	MSU225P-OCE	MSU125P-OCE
Accuracy class*		(I)	(I)	(I)
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX				
Digits d*	mg	0.01	0.01/0.02/0.05	0.01/0.1
Weighing capacity Max*	g	220	60/120/220	60/120
Verification scale interval e*	mg	1	1	1
Min. load, Min*	mg	1	1	1
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity		
Application range according to DIR *	g	0.001 – 220	0.001 – 220	0.001 – 120
Min. initial weight**	mg	20	20	20
Typical stabilization time	s	≤ 2	≤ 2	≤ 2
Typical measurement time	s	≤ 6	≤ 6	≤ 6
External standard calibration value (min. accuracy class)	g	200 (E2)	200 (E2)	100 (E2)
Application range (temperature)		with “isoCAL” function: +5 to +40°C | without “isoCAL” function: +15 to +25 °C		
Adaptation to ambient conditions		4 optimized filter levels		
Display result (depending on the set filter level)		0.2 – 0.4		
Weighing pan size (W × D)	mm	85 × 85		
Weighing chamber height (DU draft shield)	mm	261		
Protection		Protected against dust and water		

* DIR = Directive 2014/31/EU on non-automatic weighing instruments used within the European Economic Area

** = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

Verified models with EC Type Approval Certificate: Analytical balances 0.1 mg

Model		MSU524S- OCE	MSU524P- OCE	MSU324S- OCE	MSU224S- OCE	MSU324P- OCE	MSU124S- OCE
Accuracy class*		(I)	(I)	(I)	(I)	(I)	(I)
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX							
Scale interval d*	mg	0.1	0.1/0.2/0.5	0.1	0.1	0.1/0.2/0.5	0,1
Weighing capacity Max*	g	520	120/240/520	320	220	80/160/320	120
Calibration value e*	mg	1	1	1	1	1	1
Min. load Min*	mg	10	10	10	10	10	10
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity					
Application range according to DIR*	g	0.01–520	0.01–520	0.01–320	0.01–220	0.01–320	0.01–120
Min. initial weight**	mg	120	120	120	120	120	120
Typical stabilization time	s	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
External standard calibration value (min. accuracy class)	g	500	500 (E2)	200+100 (E2)	200 (E2)	200 +100 (E2)	100
Application range (temperature)		With “isoCAL” function: +5 to +40 °C | Without “isoCAL” function: +15 to +25 °C					
Display result (depending on the set filter level)		0.1 – 0.4					
Weighing pan size (W×D)	mm	85×85					
Weighing chamber height (draft shield DU)	mm	261					
Protection		Protected against dust and water					

Verified models with EC Type Approval Certificate: Precision balances

Models		MSU5203S-OCE	MSU5203P-OCE	MSU3203S-OCE	MSU3203P-OCE
Accuracy class*		(I)	(I)	(I)	(I)
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX					
Scale interval d*	mg	1	1/2/5	1	1/10
Weighing capacity Max*	g	5200	1200/2400/5200	3200	1010/3200
Calibration value e*	mg	10	10	10	10
Min. load Min*	mg	100	100	100	100
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity			
Application range according to DIR*	g	0.1 – 5200	0.1 – 5200	0.1 – 3200	0.1 – 3200
Min. initial weight**	g	1.5	1.5	1.5	1.5
Typical stabilization time	s	≤ 1	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 2	≤ 2	≤ 2	≤ 1.5
External standard calibration value (min. accuracy class)	g	5000	5000	2000	2000 (E2)
Application range (temperature)		With “isoCAL” function: +5 to +40 °C | Without “isoCAL” function: +15 to +25 °C			
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W×D)	mm	140×140			
Weighing chamber height (draft shield DE)	mm	172			
Protection		Protected against dust and water			

* DIR = Directive 2014/31/EU on non-automatic weighing instruments used within the European Economic Area

** = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

Models		MSU2203S-OCE	MSU2203P-OCE	MSU1203S-OCE
Accuracy class*		Ⓡ	Ⓡ	Ⓡ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX				
Scale interval d*	mg	1	1/10	1
Weighing capacity Max*	g	2200	1010/2200	1200
Calibration value e*	mg	10	10	10
Min. load Min*	mg	100	100	100
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity		
Application range according to DIR*	g	0.1 – 2200	0.1 – 2200	0.1 – 1200
Min. initial weight**	g	1.5	1.5	1.5
Typical stabilization time	s	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 1.5	≤ 1.5	≤ 1.5
External standard calibration value (min. accuracy class)	g	2000 (E2)	1000 (E2)	1000 (E2)
Application range (temperature)		With “isoCAL” function: +5 ... +40 °C Without “isoCAL” function: +15 ... +25 °C		
Display result (depending on the set filter level)		0.1 – 0.4		
Weighing pan size (W×D)	mm	140 × 140		
Weighing chamber height (draft shield DE)	mm	172		
Protection		Protected against dust and water		

Verified models with EC Type Approval Certificate: Precision balances

Models		MSU623S-OCE	MSU623P-OCE	MSU323S-OCE
Accuracy class*		Ⓡ	Ⓡ	Ⓡ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX				
Scale interval d*	mg	1	1/2/5	1
Weighing capacity Max*	g	620	150/300/620	320
Calibration value e*	mg	10	10	10
Min. load Min*	mg	20	20	20
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity		
Application range according to DIR*	g	0.02 – 620	0.02 – 620	0.02 – 320
Min. initial weight**	g	1.5	1.5	1.5
Typical stabilization time	s	≤ 0.8	≤ 0.8	≤ 0.8
Typical measurement time	s	≤ 1	≤ 1	≤ 1
Application range (temperature)		With “isoCAL” function: +5 to +40 °C | Without “isoCAL” function: +10 to +30 °C		
Display result (depending on the set filter level)		0.1 – 0.4		
Weighing pan size (W×D)	mm	140 × 140		
Weighing chamber height (draft shield DE))	mm	172		
Protection		Protected against dust and water		

* DIR = Directive 2014/31/EU on non-automatic weighing instruments used within the European Economic Area

** = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

Models		MSU14202S- OCE	MSU14202P- OCE	MSU10202S- OCE	MSU8202S- OCE
Accuracy class*		Ⓘ	Ⓘ	Ⓜ	Ⓜ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX					
Scale interval d*	g	0.01	0.01/0.02/0.05	0.01	0.01
Weighing capacity Max*	g	14,200	3500/7000/ 14,200	10,200	8200
Calibration value e*	g	0.1	0.1	0.1	0.1
Min. load Min*	g	1	1	1	0.5
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity			
Application range according to DIR*	g	1 – 14,200	1 – 14,200	1 – 10,200	0.5 – 8200
Min. initial weight**	g	15	15	12	12
Typical stabilization time	s	≤ 1	≤ 1	≤ 1	≤ 1
Typical measurement time	s	≤ 1.5	≤ 1.5	≤ 1.5	≤ 1.5
Application range (temperature):					
With "isoCAL" function		+5 to +40 °C	+5 to +40 °C	+5 to +40 °C	+5 to +40 °C
Without "isoCAL" function		+15 to +25 °C	+15 to +25 °C	+15 to +25 °C	+10 to +30 °C
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W×D)	mm	206×206			
Protection		Protected against dust and water			

Verified models with EC Type Approval Certificate: Precision balances

Models		MSU6202S- OCE	MSU6202P- OCE	MSU5202S- OCE	MSU4202S- OCE
Accuracy class*		Ⓜ	Ⓜ	Ⓘ	Ⓜ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX					
Scale interval d*	g	0.01	0.01/0.02/0.05	0.01	0.01
Weighing capacity Max*	g	6200	1500/3000/6200	5200	4200
Calibration value e*	g	0.1	0.1	0.1	0.1
Min. load Min*	g	0.5	0.5	1	0.5
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity			
Application range according to DIR*	g	0.5 – 6200	0.5 – 6200	1 – 5200	0.5 – 4200
Min. initial weight**	g	12	12	10	12
Typical stabilization time	s	≤ 1	≤ 1	≤ 0.8	≤ 0.8
Typical measurement time	s	≤ 1.5	≤ 1.5	≤ 1	≤ 1
Application range (temperature):					
With "isoCAL" function		+5 to +40 °C	+5 to +40 °C	+5 to +40 °C	+5 to +40 °C
Without "isoCAL" function		+10 to +30 °C	+10 to +30 °C	+10 to +25 °C	+10 to +30 °C
Display result (depending on the set filter level)		0.1 – 0.4			
Weighing pan size (W×D)	mm	206×206	206×206	140×140	206×206
Protection		Protected against dust and water			

* DIR = Directive 2014/31/EU on non-automatic weighing instruments used within the European Economic Area

** = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Model-specific Data

Verified models with EC Type Approval Certificate: Precision balances

Models		MSU2202S- OCE	MSU1202S- OCE	MSU36201S- OCE	MSU36201P- OCE	MSU20201S- OCE
Accuracy class*		Ⓔ	Ⓔ	Ⓔ	Ⓔ	Ⓔ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX						
Scale interval d*	mg	10	10	100	100/1000	100
Weighing capacity Max*	g	2200	1200	36,200	10,200 /36,200	20,200
Calibration value e*	g	0.1	0.1	1	1	1
Min. load Min*	g	0.5	0.5	5	5	5
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity				
Application range according to DIR*	g	0,5 – 2200	0,5 – 1200	5 – 36,200	5 – 36,200	5 – 20,200
Min. initial weight**	g	12	12	120	120	120
Typical stabilization time	s	≤ 0.8	≤ 0.8	≤ 1.5	≤ 1.5	≤ 1.5
Typical measurement time	s	≤ 1	≤ 1	≤ 2	≤ 2	≤ 2
Application range (temperature)		With “isoCAL” function: +5 to +40 °C | Without “isoCAL” function: +10 to +30 °C				
Display result (depending on the set filter level)		0,1 – 0,4				
Weighing pan size (W×D)	mm	206 × 206	206 × 206	400 × 300	400 × 300	400 × 300
Protection		IP54				

Verified models with EC Type Approval Certificate: Precision balances

Models		MSU12201S- OCE	MSU8201S- OCE	MSU5201S- OCE	MSU70200S- OCE	MSU36200S- OCE
Accuracy class*		Ⓔ	Ⓔ	Ⓔ	Ⓔ	Ⓔ
For verified models: EC Type-examination Certificate DE-19-NAWID-PTB010, Type: MSX						
Scale interval d*	mg	100	100	100	1000	1000
Weighing capacity Max*	g	12,200	8200	5200	70,200	36,200
Calibration value e*	g	1	1	1	10	1
Min. load Min*	g	5	5	5	50	50
Tare equalization range (subtractive)		≤ 100% from max. weighing capacity				
Application range according to DIR*	g	5 – 12,200	5 – 8200	5 – 5200	50 – 70,200	50 – 36,200
Min. initial weight**	g	100	100	100	1000	1000
Typical stabilization time	s	≤ 0.8	≤ 0.8	≤ 0.8	≤ 1	≤ 1
Typical measurement time	s	≤ 1	≤ 1	≤ 1	≤ 1.2	≤ 1.2
Application range (temperature)		With “isoCAL” function: +5 to +40 °C | Without “isoCAL” function: +10 to +30 °C				
Display result (depending on the set filter level)		0,1 – 0,4				
Weighing pan size (W×D)	mm	206 × 206	206 × 206	400 × 300	400 × 300	400 × 300
Protection		IP54				

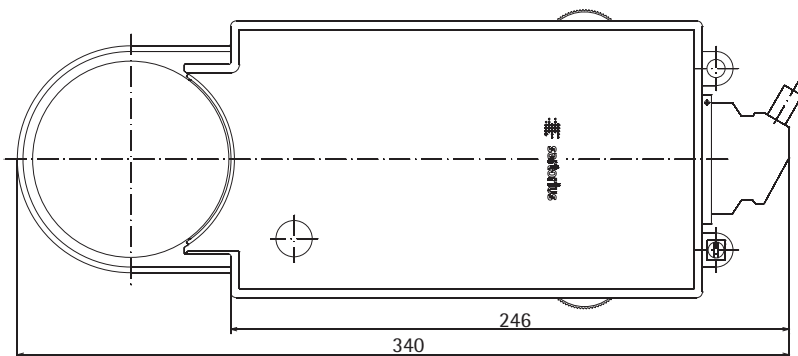
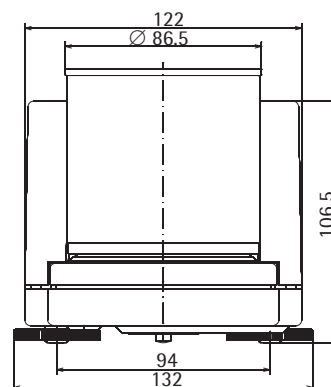
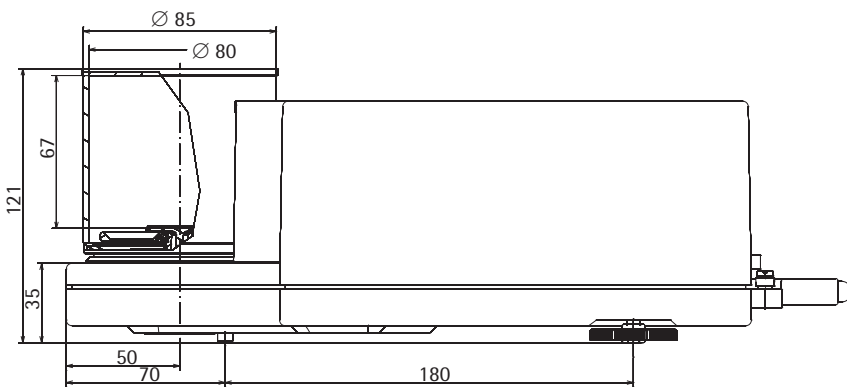
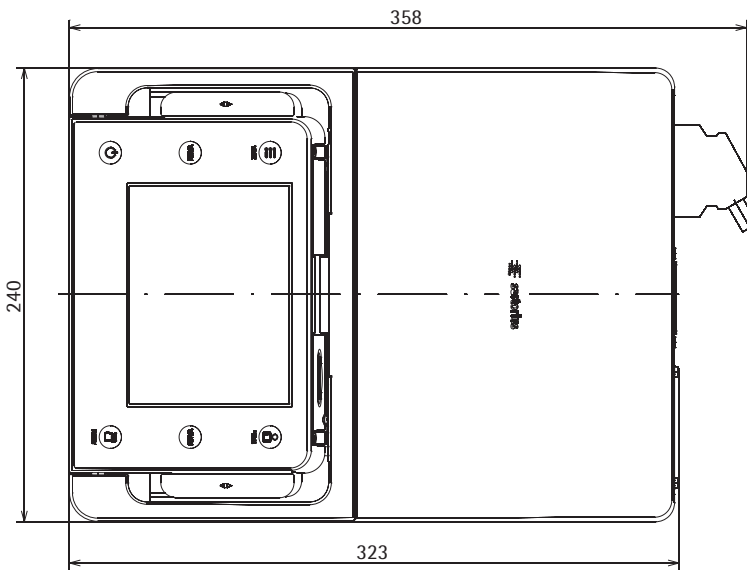
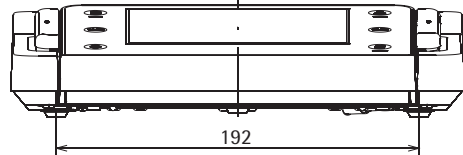
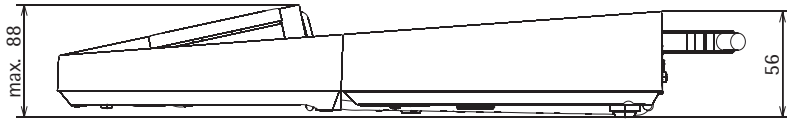
* DIR = Directive 2014/31/EU on non-automatic weighing instruments used within the European Economic Area

** = Typical min. initial weighing according to USP (United States Pharmacopeia), USP31-NF26

Balance Dimensions

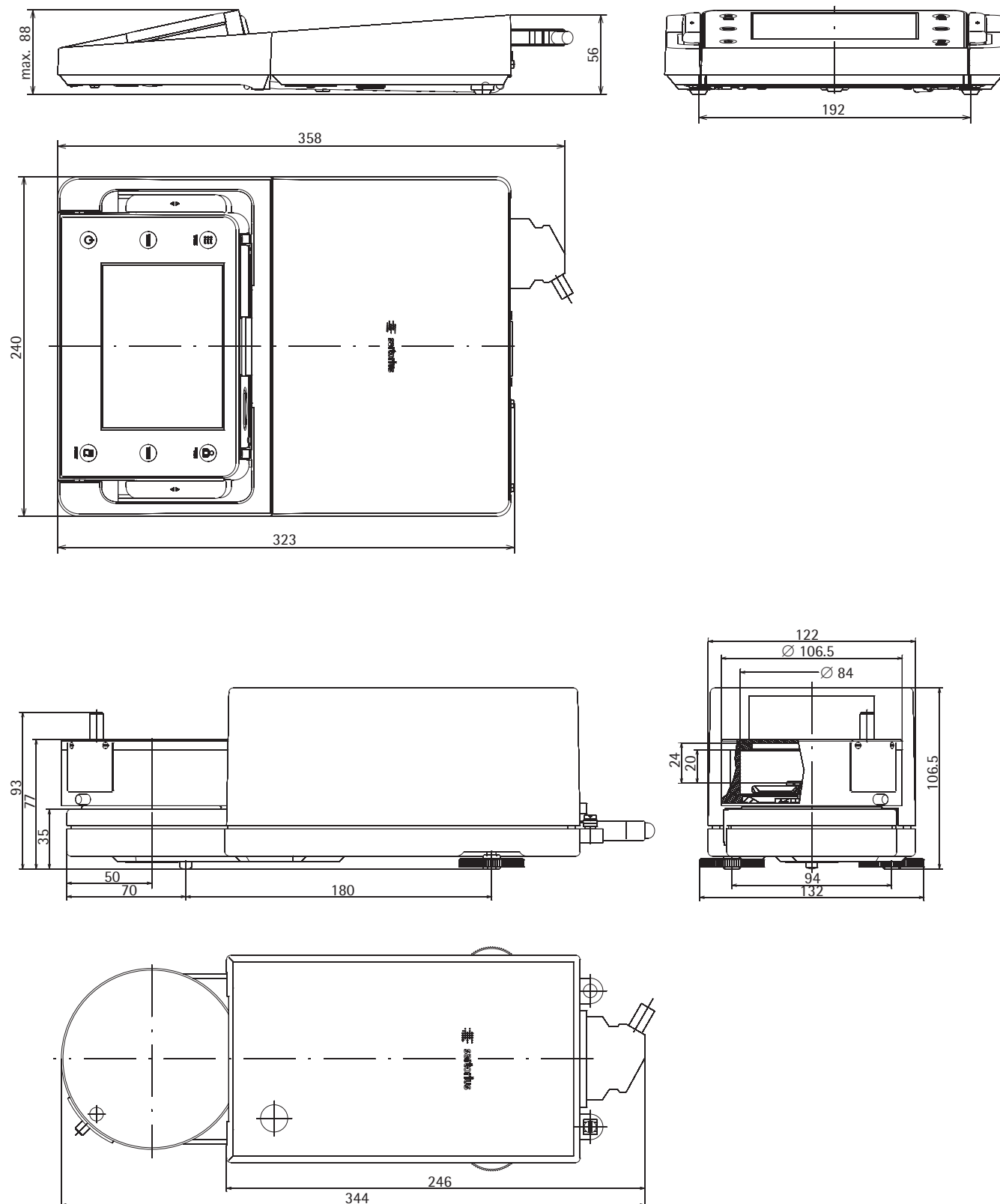
Microbalances

All dimensions are given in millimeters



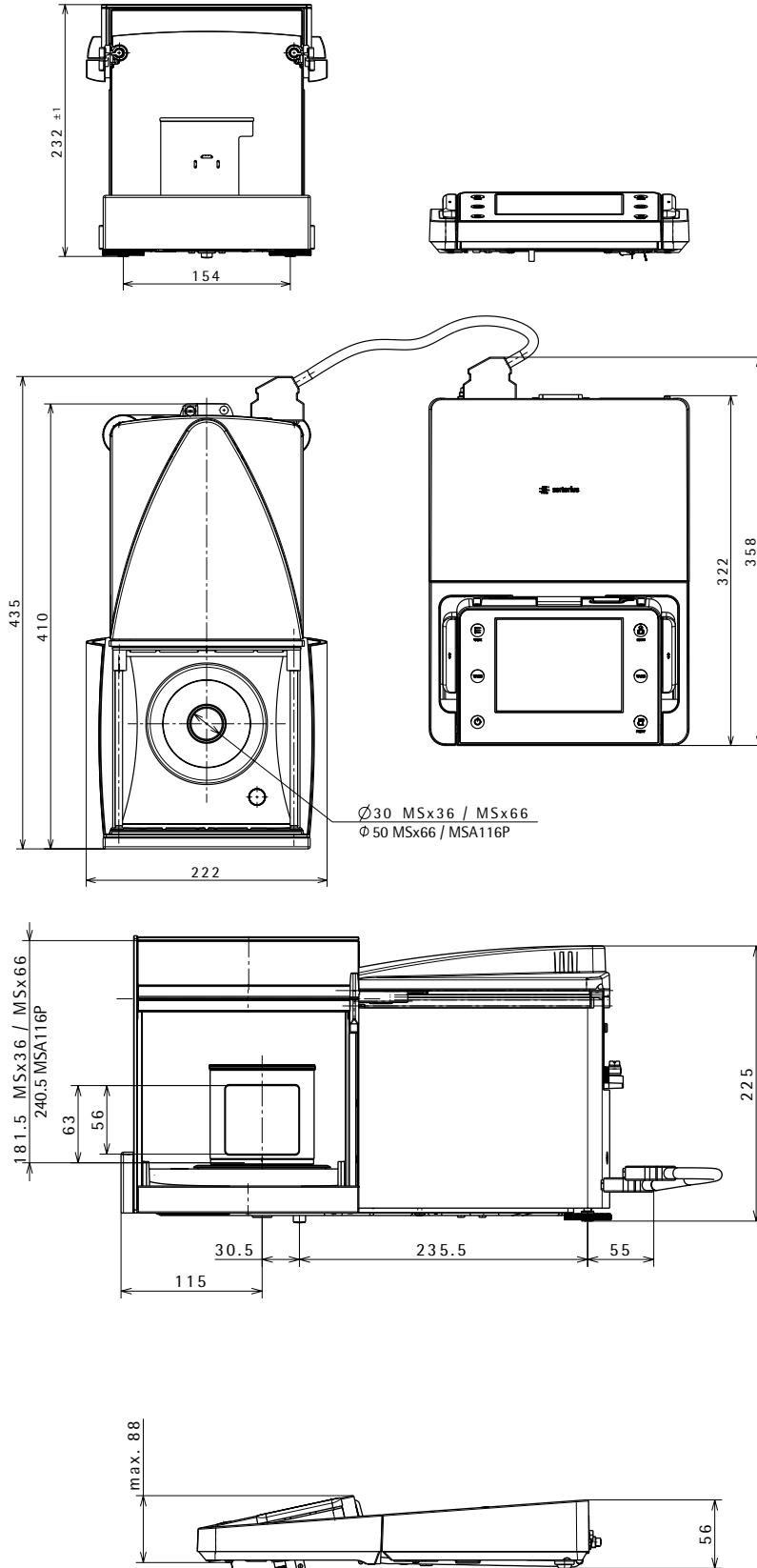
Filter-Microbalances

All dimensions are given in millimeters



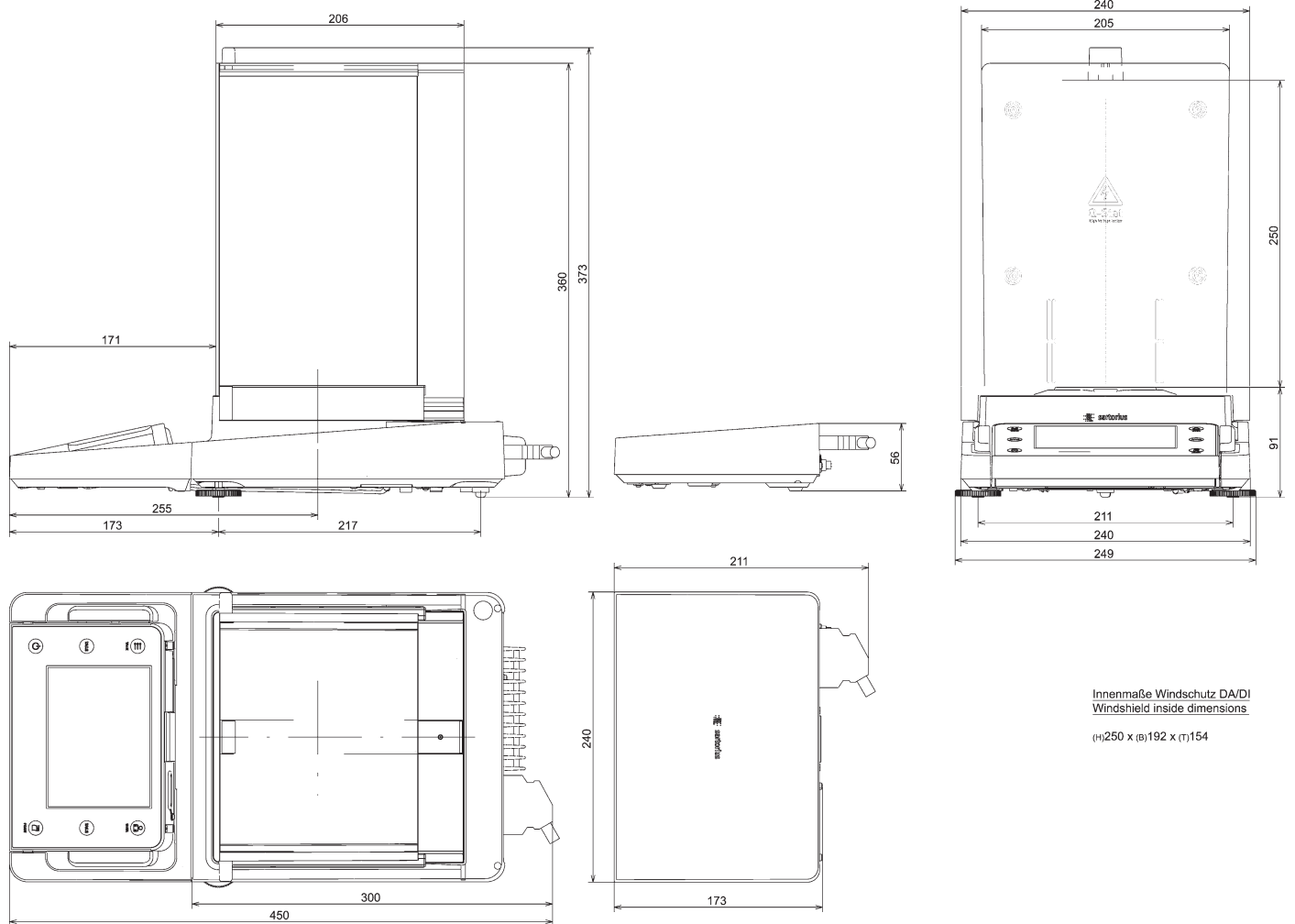
High-capacity Microbalances, Models MSU116P, MSU66S, MSU66P, MSU36S, MSU36P

All dimensions are given in millimeters



Semi-microbalances with Motorized Draft Shield

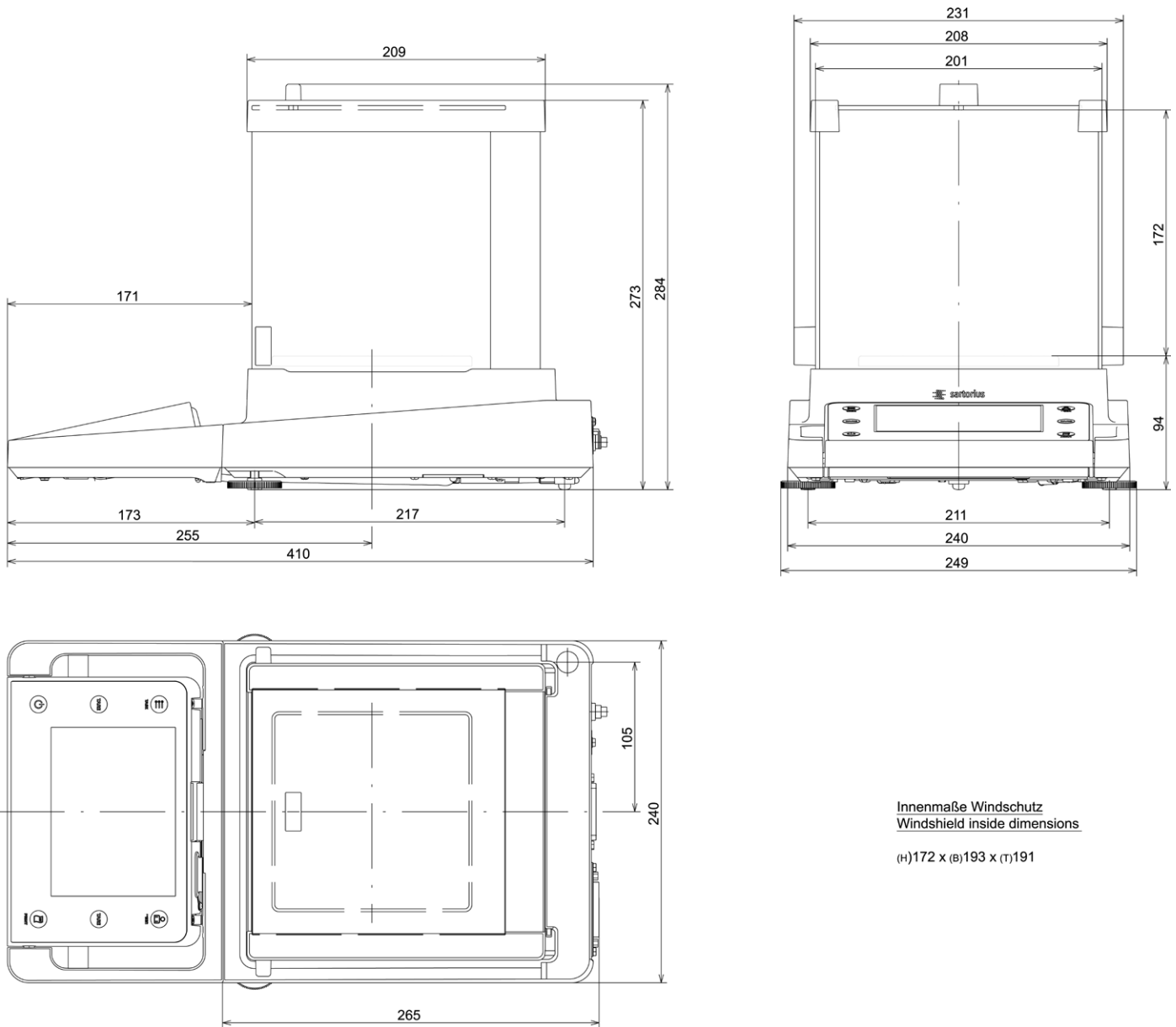
All dimensions are given in millimeters



Innenmaße Windschutz DA/DI
Windshield inside dimensions
(H)250 x (B)192 x (T)154

Semi-microbalances and Analytical Balances with Manual DU Draft Shield

All dimensions are given in millimeters

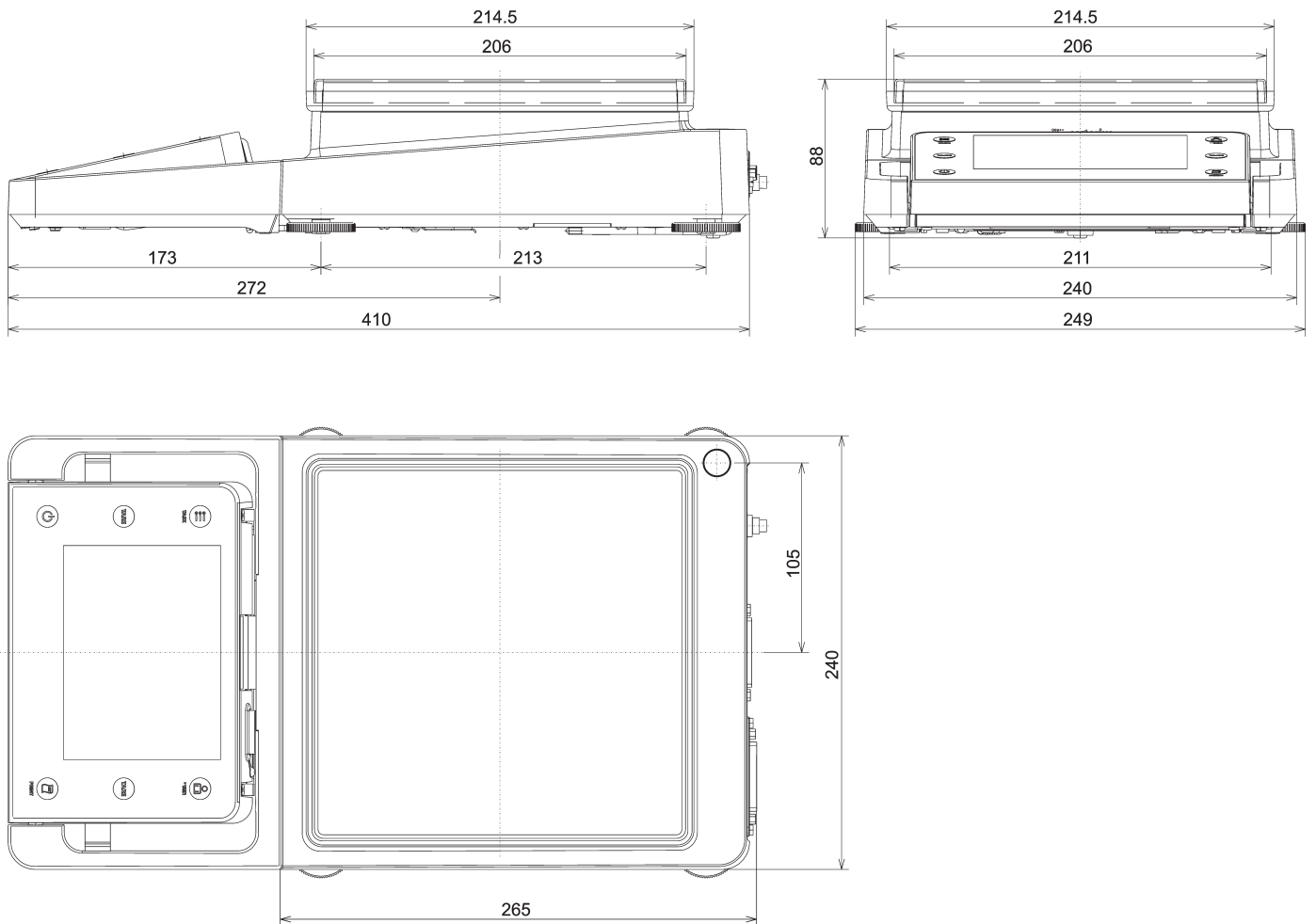


Innenmaße Windschutz
Windshield inside dimensions

(H)172 x (B)193 x (T)191

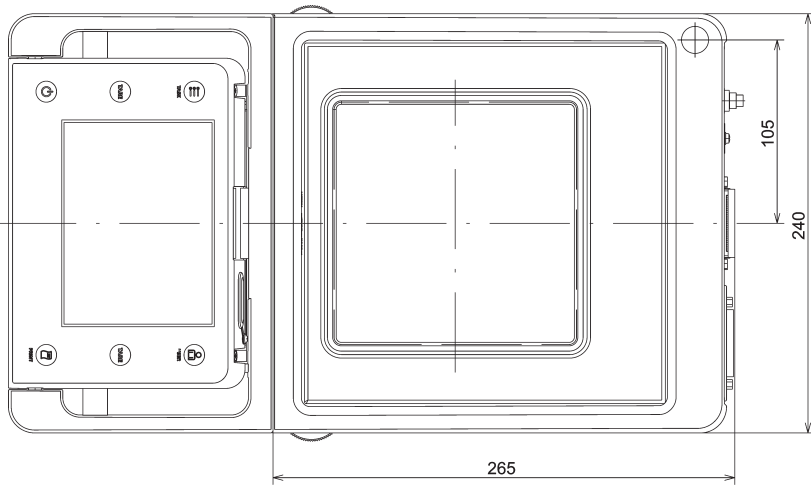
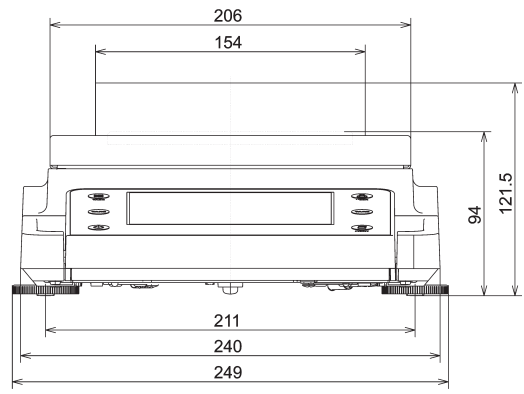
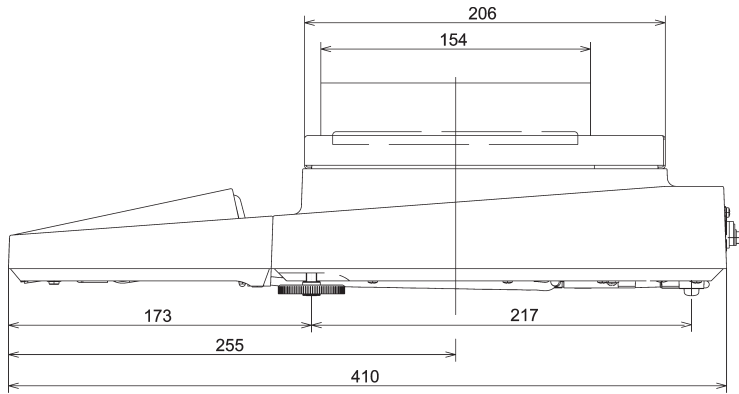
Precision Balances with a Readability of 1 mg and Manual DE Draft Shield

All dimensions are given in millimeters



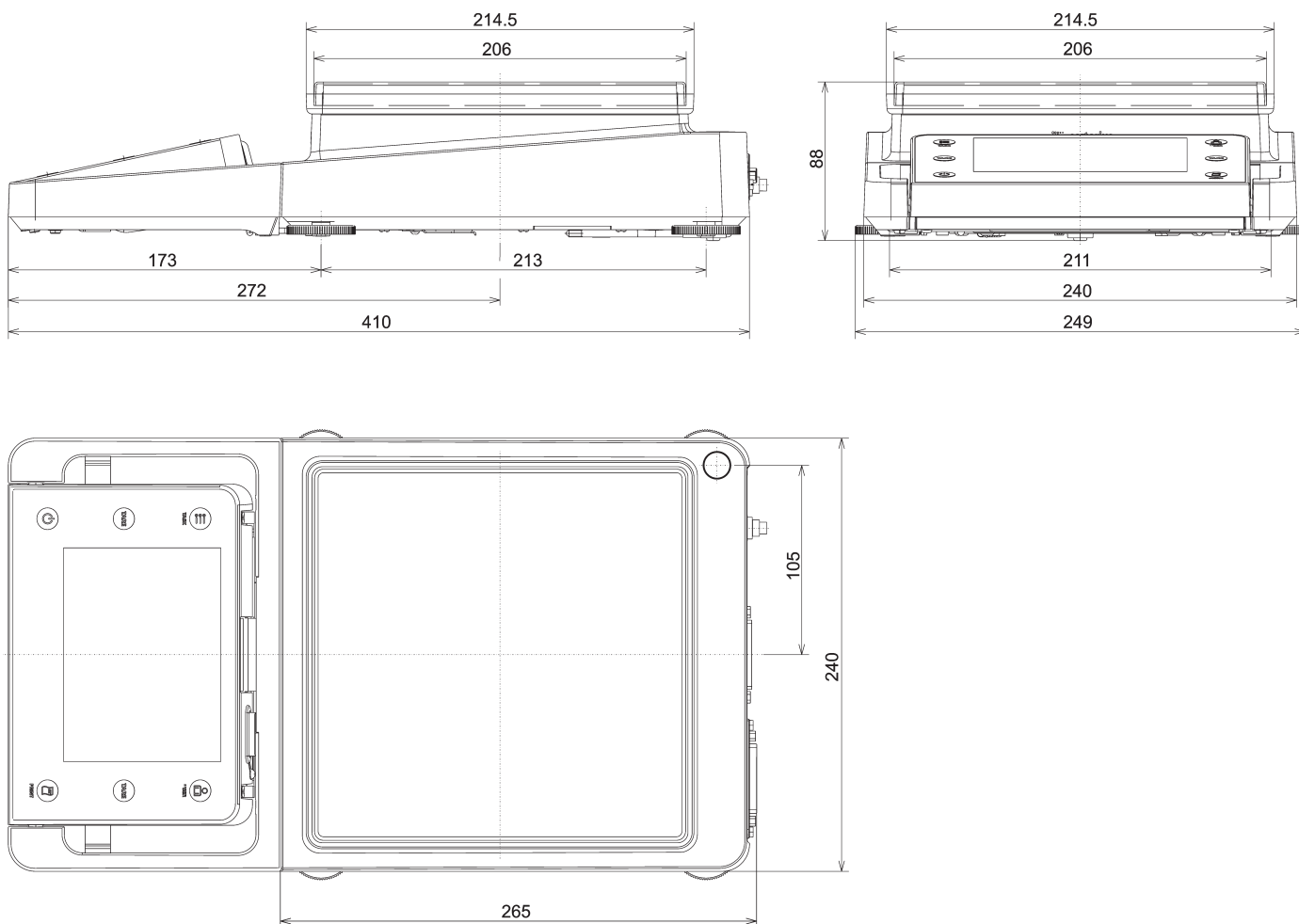
Precision Balances with a Readability of 1 mg and Framed DR Draft Shield

All dimensions are given in millimeters



Precision Balances with no Draft Shield

All dimensions are given in millimeters



Accessories

Cubis® Optional Accessories

Printers and Communication

Verifiable data printer for connection to RS-232, 25-pin accessory interface	YDP10-OCE
Verifiable data printer with <i>Bluetooth</i> ® data transmission (with YD001MS-B or IB option only)	YDP10BT-OCE
Color ribbon for YDP10-OCE and YDP10BT-OCE	6906918
Paper rolls for printer YDP10-OCE; 5 rolls 50 m each	6906937
<i>Bluetooth</i> ® data interface for wireless connection of data printer YDP10BT	YD001MS-B
RS232C data interface, 9-pin including PS/2 for connecting a PC or keyboard	YD001MS-P
RS232C data interface, 25-pin for connection of Cubis® accessories	YD001MS-R
Display cable 3 m for Cubis® MSA and MSU models, for separate setup of display and weighing unit (Installation by Sartorius Service or in factory [order VF4016])	YCC01-MSD3
Cable 3 m between weighing module and electronics module for Cubis® models with 0.01 mg | 0.001 mg | 0.0001 mg readability	YCC01-MSM3
Installation display cable 3 m for Cubis® models, for separate setup of display and weighing unit	VF4016
RS232C connection cable to connect PC with 9-pin COM interface, length 1.5 m	7357314
Sartowedge software for data communication between balance and PC	YSW02
Sartorius OPC Server for connecting all Sartorius Cubis® balances Requires 32-bit Microsoft Windows 2000 or XP with current service packs. (free download of a 30-day trial version from the Sartorius website)	
– Initial license	62890PC
– Each additional license within an order	62890PC-L

Displays and Input | Output Elements

MSA control unit with color TFT graphic display and touch screen	YAC01MSA
MSE display unit with backlit LC display and tactile keys	YAC01MSE
MSU control unit with backlit b | w graphic display and tactile navigation keys	YAC01MSU
Barcode reader with connection cable, 120 mm reading range	YBR03PS2
Foot switch for printing, taring, or using function keys, selection via menu, incl. T connector	YFS01
Infrared sensor for touch-free activation of functions (e.g., draft shield control)	YHS01MS
Hand switch for printing, taring, or using function keys, selection via menu, incl. T connector	YHS02
Foot switch for the draft shield OPEN | CLOSED functions (only in combination with DA and DI draft shield), taring and printing	YPE01RC
Additional display, LCD, figure size 13 mm, backlit	YRD03Z
3-segment control display, red – green – red, for plus | minus measurements, incl. T connector	YRD11Z

Pipette Calibration Hardware and Software

Pipette calibration kit (hardware) for models with 0.1 mg and 0.01 mg readability Consists of moisture trap and all required adapters	YCP04MS
Pipette calibration kit (hardware) for microbalance weighing modules 6.6S and 3.6P Consists of moisture trap and all required adapters	VF988
Pipette Tracker pipette calibration software. Software and user manual in English only.	YCP04-PT
Pipette Tracker Pro pipette calibration software, for use in regulated areas, networkable and validatable, according to the 21 CFR Part 11 regulations. Software and user manual in English only.	YCP04-PTPro
Documentation basis for validation (IQ, OQ) of Pipette Tracker PRO version. All documents are in English only.	YCP04-VTK

Filter Weighing and Antistatic Accessories

Antistatic weighing pan, diameter 130 mm, for weighing modules with a readability of 0.1 mg or 0.01 mg	YWP01MS
Filter weighing pan d 75 mm, for ultramicrobalance or microbalance models (weighing modules 6.6S, 2.7S; only together with DF draft shield)	VF2562
Filter weighing pan d 90 mm, for ultramicrobalance or microbalance models (weighing modules 6.6S, 2.7S; only together with DF draft shield)	VF2880
Ionization blower to eliminate electrostatic charges on sample containers and samples	YIB01-DR
Stat-Pen ionization probe for discharging electrostatically charged samples and filters	YSTP01
Ionizer with U-shaped electrode incl. power supply for 230 V	YIB02-230V
Ionizer with U-shaped electrode incl. power supply for 115 V	YIB02-115V

Special Applications

Density determination kit for solids and liquids for weighing modules with a readability < 1 mg	YDK01MS
Density determination kit for solids and liquids for weighing modules with a readability of 1 mg	YDK02MS
Q-Grip, flexible holder for weigh-in containers and filters up to 120 mm diameter (replaces the original weighing pan, for Cubis® models with 0.01 and 0.1 mg readability)	YFH01MS
Q-Grid grid weighing pan for Cubis® models with a readability of 10 mg or 100 mg for weighing in laboratory hoods, safety weighing cabinets or workbenches (reduced wind attack surface of the weighing pan; replaces the standard weighing pan)	YWP03MS

Weighing Tables

Weighing table made from synthetic stone, with vibration dampening	YWT03
Wall console	YWT04
Weighing table made from wood with synthetic stone for precise, reliable measurements	YWT09

Weighing Accessories

Weighing scoop made from chrome nickel steel, 90 + 32 × 8 mm	641214
Aluminum weighing scoop, 4.5 mg (250 pieces) for ultramicrobalance and microbalance models	6565-250
Aluminum weighing scoop, 52 mg (50 pieces) for ultramicrobalance and microbalance models	6566-50
Support arm for 10/100 mg precision weighing modules for raising the control units MSE, MSU, MSA	YDH01MS
Stand for precision weighing modules with a 100 mg | 1 g readability and weighing capacity > 20 kg for raising the control units	YDH02MS
Hook for below-balance weighing for precision weighing modules with a 100 mg | 1 g readability and weighing capacity > 20 kg (not for models verified for legal use, CE marks)	69EA0040
Adjustable sample holder for high-capacity Cubis® microbalances MSU36x, MSU66x and MSU116P	YSH02
Slotted weighing pan for MSU116P with a 90 mm diameter	YWP10
Slotted weighing pan for high-capacity microbalances (MSU36, MSU66 and MSU116P), diameter 50 mm	YWP09

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Original

EG-/EU-Konformitätserklärung
EC / EU Declaration of Conformity

Hersteller
Manufacturer **Sartorius Lab Instruments GmbH & Co. KG**
37070 Goettingen, Germany

erklärt in alleiniger Verantwortung, dass das Betriebsmittel
declares under sole responsibility that the equipment

Geräteart
Device type **Elektronische Semimikro-, Mikro-, Präzisions- und Analysenwaage**
Electronic Semi-micro, Micro, Precision and Analytical Balance

Baureihe
Type series **MSAvw-xy-z, MSAvwxyz, MSEvwxyz, MSEvw-xy-z, MSUvw-xy-z, MSUvwxyz**
v = 2.7, 3.6, 6.6, 36, 66, 116, 124, 125, 224, 225, 324, 323, 524, 623, 1202, 1203, 2202, 2203, 3203,
4202, 5201, 5202, 5203, 6202, 8201, 8202, 10202, 12201, 14202, 20201, 36200, 36201, 70200, 70201;
w = S, P; x = 0, 1; y = 00, TR; z = DA, DE, DF, DI, DM, DO, DR, DU

in der von uns in Verkehr gebrachten Ausführung allen einschlägigen Bestimmungen der folgenden Europäischen Richtlinien - einschließlich deren zum Zeitpunkt der Erklärung geltenden Änderungen - entspricht und die anwendbaren Anforderungen folgender harmonisierter Europäischer Normen erfüllt:
in the form as delivered fulfils all the relevant provisions of the following European Directives - including any amendments valid at the time this declaration was signed - and meets the applicable requirements of the harmonized European Standards listed below:

2014/30/EU Elektromagnetische Verträglichkeit
Electromagnetic compatibility
EN 61326-1:2013

2006/42/EG
2006/42/EC Maschinen
Machines
EN ISO 12100:2010, EN 61010-1:2010

2011/65/EU Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS)
Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
EN 50581:2012

2014/53/EU Nur für Geräte mit Datenausgang Typ YBT03 | *Only for devices with data output interface type YBT03:*
Funkanlagen und Telekommunikationsendeinrichtungen und die gegenseitige Anerkennung ihrer Konformität
Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity
EN 301489-1 V1.9.2:2011

Die Person, die bevollmächtigt ist, die technischen Unterlagen zusammenzustellen:
The person authorised to compile the technical file: Sartorius Lab Instruments GmbH & Co. KG
International Certification Management
37070 Goettingen, Germany

Jahreszahl der CE-Kennzeichenvergabe | *Year of the CE mark assignment:* **17**

Sartorius Lab Instruments GmbH & Co. KG
Goettingen, 2017-06-27

Dr. Reinhard Baumfalk
Vice President R&D

Dr. Dieter Klausgrete
Head of International Certification Management

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten EG- und EU-Richtlinien, ist jedoch keine Zusicherung von Eigenschaften. Bei einer mit uns nicht abgestimmten Änderung des Produktes verliert diese Erklärung ihre Gültigkeit. Die Sicherheitshinweise der zugehörigen Produktdokumentation sind zu beachten.

This declaration certifies conformity with the above mentioned EC and EU Directives, but does not guarantee product attributes. Unauthorised product modifications make this declaration invalid. The safety information in the associated product documentation must be observed.

Doc: 2009072-03 SLI13CE002-03.de,en 1 / 1 PMF: 2024290 OP-113_fo1_2015.10.12

FCC Supplier's Declaration of Conformity



Device type Electronic Semi-micro, Micro, Precision and Analytical Balance

Type series **MSAvw-xy-z, MSAvwxz, MSEvwxz, MSEvw-xy-z, MSUvw-xy-z, MSUvwxz**

v = 2.7, 3.6, 6.6, 36, 66, 116, 124, 125, 224, 225, 324, 323, 524, 623, 1202, 1203, 2202, 2203, 3203, 4202, 5201, 5202, 5203, 6202, 8201, 8202, 10202, 12201, 14202, 20201, 36200, 36201, 70200, 70201

w = S, P

x = 0, 1

y = 00, TR

z = DA, DE, DF, DI, DM, DO, DR, DU

Party issuing Supplier's Declaration of Conformity / Responsible Party – U.S. Contact Information

Sartorius Corporation
5 Orville Dr Suite 200
11716 Bohemia, NY
USA

Telephone: +1.631.254.4249

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Information to the user

Note: This equipment has been tested and found to comply with the limits for a **class B** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Connections between the device and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits.

Any modifications made to this device that are not approved by Sartorius may void the authority granted to the user by the FCC to operate this equipment.

Doc: 2398992-00 SLI18FCC002-00.en 1 / 1 PMF: 2024290 OP-113_fo1_2015.10.12

Sartorius Lab Instruments GmbH & Co. KG
Otto-Brenner-Strasse 20
37079 Goettingen, Germany

Phone: +49.551.308.0
www.sartorius.com

The information and figures contained in these instructions correspond to the version date specified below.

Sartorius reserves the right to make changes to the technology, features, specifications and design of the equipment without notice.

Masculine or feminine forms are used to facilitate legibility in these instructions and always simultaneously denote the other gender as well.

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07 | 2019