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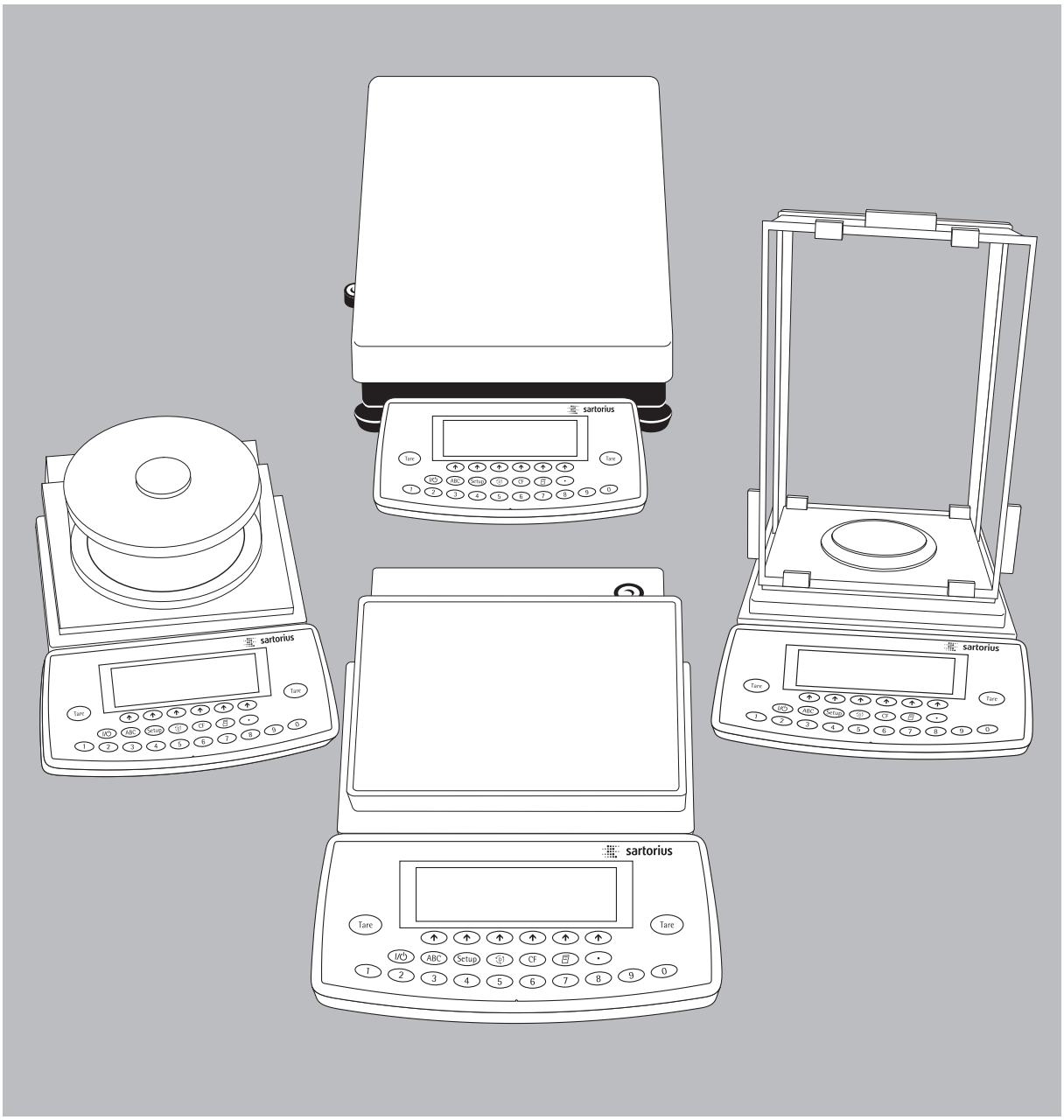
sartorius

Operating Instructions

Sartorius LA Reference

LA Models
Electronic Analytical and Precision Balances



98648-007-59

Intended Use

The LA Reference Series from Sartorius offers precision balances for measurement of mass (weight). The balances in this series have capacities ranging from 0.1 mg to 64 kg.

A broad range of special performance features make the LA Reference balances ideal for use as measuring and test equipment in ISO or GLP quality management systems.
These features include:

- The fully automatic self-calibrating and adjustment function, isoCAL (time- and temperature-dependent)

- reproTEST for quick determination of the standard deviation to check the reproducibility of results

- ISO/GLP-compliant recording capability for printouts

- Password-protected menu lock

LA Reference balances meet the highest requirements on the accuracy and reliability of weighing results through the following features:
- Efficient filtering-out of vibration
- Stable and reproducible results
- Excellent readability under any lighting conditions
- Rugged, durable weighing system

LA Reference balances save work and speed up simple routine applications through:
- Ultrafast response times
- Built-in application programs, including
  Application 1:
  - Toggling between two weight units
  - Counting
  - Weighing in percent
  - Animal weighing
  - Recalculation
  - Calculation
  - Density determination
  - Differential weighing
  - Air buoyancy correction
  - Diameter determination

  Application 2:
- Checkweighing
- Time-controlled functions

  Application 3:
- Totalizing
- Formulation
- Statistics

  with the following additional functions:
  - Second tare memory
  - Identification codes
  - Product data memory
  - SQmin function
  - Manual data storage in application level 3
  - DKD uncertainty of measurement

- Automatic initialization when you switch on the balance
- Easy input of alphanumeric sample, lot and balance IDs
- Flexible, easy-to-use display and control unit
- Optional connectivity for control through an on-line computer

Hotline:
For advice on the use of these applications, just call or fax your local Sartorius office. For the address, please visit our Internet website at: www.sartorius.com

Contents

Safety Precautions

This balance has been constructed in accordance with the European Directives as well as international regulations and standards for operation of electrical equipment, electromagnetic compatibility, and stipulated safety requirements. Improper use or handling, however, can result in damage and/or injury.

Read these operating instructions thoroughly before using your balance to prevent damage to the equipment. Keep these instructions in a safe place.

Follow the instructions below to ensure safe and trouble-free operation of your balance:

⚠ Do not use this balance in a hazardous area/location

⚠ Make sure that the voltage rating printed on the AC adapter is identical to your local line voltage

– The only way to switch the power off completely is to disconnect the AC adapter

– Type of protection for the housing:
  – Balances with a readability ≤ 0.1 mg comply with IP42
  – LA64001S, LA34001S, LA16001S, LA34001P and LA34000 meet IP44 requirements
  – Additional balances with a readability ≤ 1 mg comply with IP54
  – AC adapters meet IP20 requirements
– Protect the AC adapter from contact with liquid.
  – Connect only Sartorius accessories and options, as these are optimally designed for use with your LA Reference balance.

When cleaning your balance, make sure that no liquid enters the balance housing; use only a slightly moistened cloth to clean 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.

In case you have any problems with your balance:

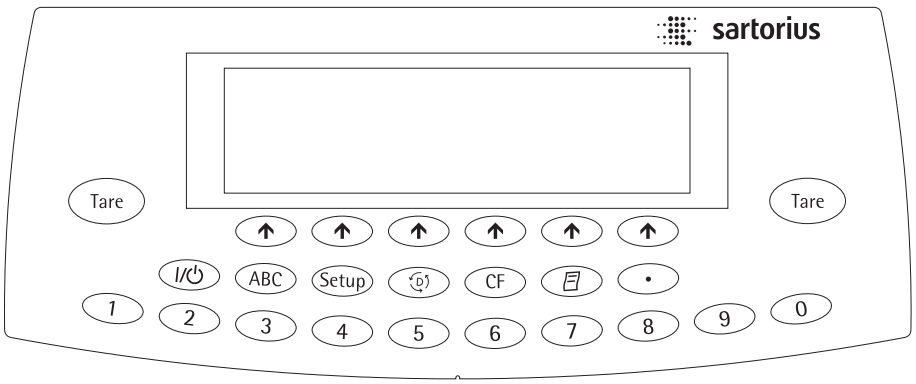
○ contact your local Sartorius office, dealer or service center

Operating Design
The balances in the LA Reference Series consist of a weighing cell and a display and control unit. In addition to the choice of power supply (via AC adapter or external rechargeable battery pack), your balance also has an interface port for connecting a printer, computer or universal remote control switch.

The display and control unit and the weighing cell can be set up separately. Operation of LA Reference balances follows a uniform "philosophy" which is described in this manual.
Where not expressly indicated otherwise, the uses described in this manual apply to verified and verifiable balance versions (indicated by the suffix "-0CE" in the model number), as well as the standard version.

Combination of Several Applications
You can combine the use of various application programs to meet your more complicated requirements.
To select application programs one after the other, press (D) (toggle function).

Keys
Your LA Reference balance is operated either by using the keys on the display and control unit or via a connected PC. Operation by means of the balance keys is described in the following.



Meaning

(ABC) Alphabetic keys
Please see section on "Text Input"

(I/⏻) On | off key
Turns the balance on and off or switches it to the standby mode

(Setup) Menu settings
Accesses and exits the Setup menu

(D) Toggles to the next application program

(CF) Clear function
Deletes keypad input
Interrupts a calibration and adjustment routine in progress
Quits application programs

(🖹) Print key
Outputs displayed values or data logs to the serial communications and | or printer port

(·) Enters a decimal point

(1) ... (9) (0) keys
See the section on "Numeric Input"

(Tare) Tares the balance

Numeric Input
To enter numbers:
press (1) ... (9) (0) (·)

To store numbers entered: press the corresponding function key directly below the soft key label

To delete an entire numeric input digit by digit: press the (CF) key

Text Input
● To enter numbers:
see the section on "Numeric Input"

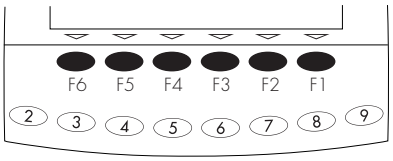
● To enter letters or characters:
press the (ABC) key
> Letters are displayed in the bottom line for selection
● To select a different letter: press the corresponding soft key to change the letter shown
● To select the letter | character shown: press the corresponding function key below the soft key label
> The selected letter is shown on the display
○ Enter the next letter | character, if desired, as described above
○ To exit the letter input mode (e.g., if the last character entered is a letter): press the (ABC) key
● To store a word: press the corresponding function key (soft key), such as ID
● To delete an input character by character: press the (CF) key
● To delete user data: enter (·) or a space and save

Operating Design

Function Keys (Soft Keys)
The current function of soft keys is indicated in the bottom line of the display (footer).

Texts (abbreviations) or symbols can be displayed.

Texts (Examples)
`Cal`: Start calibration | adjustment
`S ID`: Save ID



The function keys are numbered from right (F1) to left (F6).

Symbols
The bottom line shows the following symbols:
`<<` Back to the initial state (in the Setup menu: exit Setup)

`<` Go to the higher selection level

`>` Show sub-items under the active item

`^` Move upward in the input | output window

`v` Move downward in the input | output window

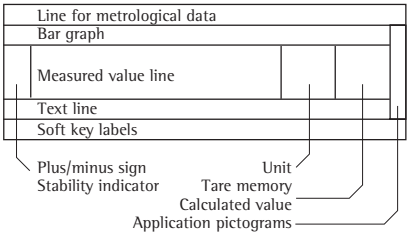
↵ Set the selected menu parameter

Labeled Keys
These keys always have the function indicated, but are not available at all times. Availability of these functions depends on the current operating status and menu settings.

There are two fundamentally different types of display:
- display for weights and calculated values
- display for menu parameter settings (setup)

Operation

Display for Weights and Calculated Values
This display is subdivided into 9 areas.



Line for Metrological Data:
When the balance is used in legal metrology, the following metrological specifications of the balance are shown here:

`Max` Maximum capacity (upper range limit) of the balance

`Min` Minimum capacity (lower range limit) of the balance

`R1` to `R4` Display when e = d

`e` Verification scale interval

`d` Readability | scale interval

On standard balances, only `Max` and `d` are displayed.

Bar Graph:
The bar graph indicates how much of the balance's capacity is "used up" by the current load; during checkweighing, it indicates the control limits.

Bar Graph:
The bar graph indicates how much of the balance's capacity is "used up" by the current load; during checkweighing, it indicates the control limits.

The following symbols may be displayed:

`0%` Lower load limit

`100%` Upper load limit

Bar graph showing 10% intervals

`–` Minimum for checkweighing

`=` Target for checkweighing

`+` Maximum for checkweighing

Plus/Minus Sign, Stability Symbol:
A plus or minus sign (`+` or `–`) is shown here for a weight (or a calculated value, such as that for counting), or the `o` symbol indicating that a verified balance[1]) has been zeroed or tared.

Line for Measured Values:
This area shows the weighed or calculated value and the alphanumeric input.

Note Concerning Verified Balances Approved for Use as Legal Measuring Instruments in the EU*:
For verified balances that have a verification scale interval `e` which is greater than the scale interval `d`, the last digit on the display is bordered.

Unit and Stability:
When the balance reaches stability, the weight unit or calculated unit is displayed here.

When the ⚠ symbol is displayed here, the value indicated in the readout cannot be used in legal metrology.

* including the Signatories of the Agreement on the European Economic Area

[1]) Verification scale interval "e" is equal to scale interval "d"

Tare Memory, Calculated Values:
The symbols displayed here indicate when there is a value in one of the tare memories or when the value shown is a result of calculation rather than direct measurement.

These symbols are as follows:

⚠ Calculated value

NET1 Net value | tare memory

NET2 used by an application program (e.g., formulation, second tare memory)

Application Pictograms:
The pictograms displayed here indicate the application(s) selected. The pictogram is displayed inversely (white on a black background) when the corresponding application is active.

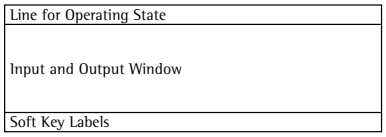
For example, the following symbols may be displayed simultaneously:

- The counting application is active
- Checkweighing is also active
- Print
- Data record

Text Line:
Additional information is displayed here (e.g., operator guidance prompts, name of the active program, etc.)

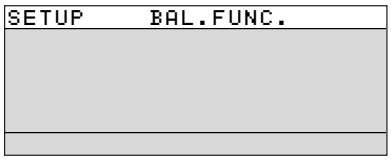
Soft Key Labels:
The current functions of the soft keys above the function keys (arrow keys) are indicated here; during calibration | adjustment, this line shows up- and down-arrows (^ and v) for selecting calibration and adjustment functions.

Display for Menu Parameter Settings (Setup)
This display is divided into three sections.



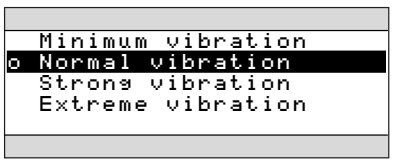
Status Line:
The status line of shows the function of the display screen page. In the Setup menu, the current menu "path" is shown here.

Setup Menu Example: "Balance/scale functions":



Input and Output Window
This window contains either detailed information (e.g., on the active application) or a pick list. A selected item is displayed inversely (white characters on a black background). You can also enter information in an active field in this window using the alphabetic and numeric keys.

Setup Menu Example,
"Device parameters, Adapt filter":



The following symbol may be displayed in the input and output window:

o this symbol marks the saved menu setting

Soft Key Labels
See the description "Function Keys (Soft Keys)" on the previous page

To set a parameter:
- Press the ^ or v soft key repeatedly until the desired setting is selected (displayed inversely)

- Confirm your selection: press the ↵ soft key

To change the numeric value of a parameter:
- Press the ^ or v soft key repeatedly, if necessary, until the desired setting is selected (displayed inversely)

- Enter a new value or character: use the (0) (1) ... (9) (.) keys or the (ABC) key and enter the desired letters

- Confirm your selection: press the ↵ soft key

To exit Setup: press the << soft key

Input

Bar Code Scanner or Keyboard Input
You can use a bar code scanner or an external keyboard to input alphanumeric values. These inputs are processed in the same manner as keypad inputs on the display and control unit of the balance. Bar code and keyboard inputs are only displayed; they cannot activate any function.

To assign a bar code scanner or keyboard input to a function, press one of the following soft keys:
- Lot
- Samples
- Measured values
- Sample number
- Tare value
- Initial weight
- Backweighed value
- Sample ID

Foot or Hand Switch Input
You can connect a foot switch or a hand switch to the balance to have this device perform a keypad function (such as (CF) or (Tare)).

PC Input
You can use a computer to control the functions of the weighing cell and display and control unit via the communications port (see the "Data Output Function" section in the chapter entitled "Operation").

Data Output

Your LA Reference balance is equipped with an interface port for connecting your choice of the following:

- Printer
- Peripheral device (e.g., computer)
- Universal remote control switch

Printer
You can configure the print functions to meet your individual requirements by selecting the corresponding menu code.

You can have printouts generated automatically, or by pressing (F); dependent on or independent of the stability or time parameters; with or without IDs; and as standard or ISO/GLP-compliant printouts.

ISO: International Organization for Standardization

GLP: Good Laboratory Practice

See the section on "Data Output Functions" in the chapter entitled "Operation" for a detailed description of data output options.

Interface Port
Instead of a printer, you may choose to connect a different peripheral device, e.g. a computer (PC). With an on-line PC you can control both the weighing cell and the display unit of the LA Reference balance.

Request messages are sent via the interface to initiate functions in the weighing cell and in the display unit. Some of the functions generate response messages.

See the chapter entitled "Operation" under the section on "Data Output" for a detailed description of the interface port.

Error Codes
If you press a key that has no function, or which is blocked at a certain point in an application program, this error is indicated as follows:

- a double-beep is sounded as an acoustic signal if the key has no function
- a double-beep is sounded and a message is displayed for 2 seconds in the text line if the key function is not available at that time

The response to an operator error is identical in all models of the LA Reference series. See the chapter entitled "Error Codes" for a detailed description.

Storing Settings

Storing Parameter Settings
The settings configured are stored in the balance's non-volatile memory. The most recent parameter settings are active when you switch on the balance.

Saving Parameter Settings
You can assign passwords in order to block access to:

- Weighing parameters
- Device parameters
- Application parameters
- Factory settings

Getting Started

Storage and Shipping Conditions

– Do not expose the balance to extreme temperatures, jolts, impacts, vibration or moisture.

Unpacking the Balance

● After unpacking the balance, check it immediately for any visible damage as a result of rough handling during shipment.

○ If this is the case, proceed as directed in the chapter entitled "Care and Maintenance," under the section on "Safety Inspection."

It is a good idea to save the box and all parts of the packaging until you have successfully installed your balance. Only the original packaging provides the best protection for shipment. Before packing your balance, unplug all connected cables to prevent damage.

Important Note Concerning Verified Balances Approved for Use as Legal Measuring Instruments in the EU*:
Provided that an official seal is required for the verified balance, a control seal is affixed to the balance. This seal will be irreparably damaged if you attempt remove it. If the seal is broken, the validity of the verification will become void and you must have your balance re-verified.

Equipment Supplied
The equipment supplied includes the components listed below:

LA balances with a readability of 0.1 mg
- Balance with display and control unit
- AC adapter
- Dust cover
- Bushing
- Shield plate
- Shield disk
- Weighing pan
- USB interface cable

LA balances with a readability of 1 mg
- Balance with display and control unit
- AC adapter
- Dust cover
- Shield disk
- Pan support
- Weighing pan
- Glass draft shield cylinder
- Draft shield cover
- USB interface cable

LA8200S, LA8200P, LA 6200S, LA 4200S, LA 2200S, LA 820, LA 420, LA 2200P, LA 5200P
- Balance with display and control unit
- AC adapter
- Dust cover
- Pan draft shield
- Weighing pan
- USB interface cable

LA 12000S, LA 6200, LA 4200, LA 2200, LA 12000P
- Balance with display and control unit
- AC adapter
- Dust cover
- Weighing pan
- USB interface cable

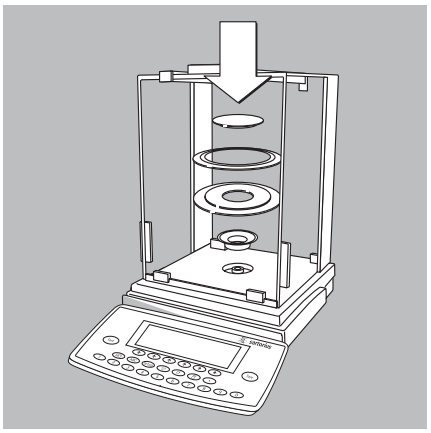
LA balances with a capacity ≥ 16 kg
- Balance with display and control unit
- AC adapter
- Dust cover
- Weighing pan
- Dust cover for the display and control unit
- USB interface cable

Installation Instructions
When choosing a location to set up your balance, observe the following so that you will be able to work with added speed and accuracy:
- Avoid placing the balance in close proximity to a heater or otherwise exposing the balance to heat or direct sunlight
- Protect the balance from drafts hat come from open windows or doors
- Do not expose the balance to extreme moisture over long periods
- Avoid exposing the balance to extreme vibrations during weighing
- Set up the balance on a stable, even surface
- Protect the balance from aggressive chemical vapors

Conditioning the Balance
Moisture in the air can condense on the surfaces of a cold balance whenever it is brought into a substantially warmer place. If you transfer the balance to a warmer area, make sure to condition it for about 2 hours at room temperature, leaving it unplugged from AC power.

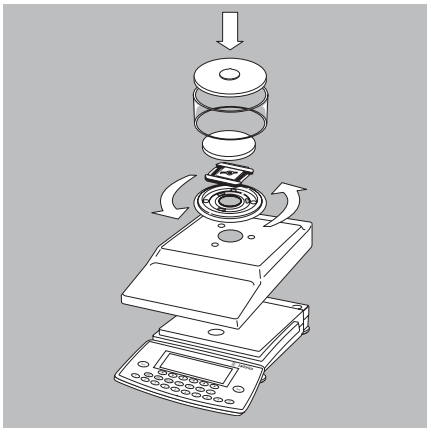
* including the Signatories of the Agreement on the European Economic Area

Setting up the Balance



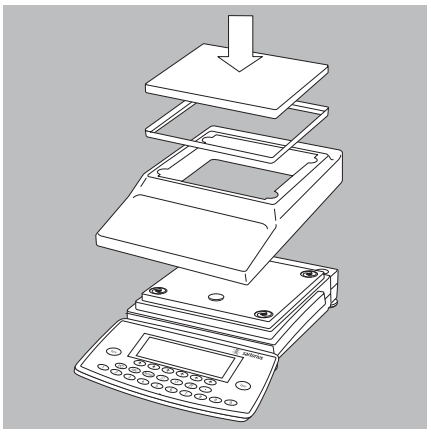
Preparing Balances with Analytical Draft Shield Chambers

- Place the components listed below on the balance in the order given:
- Bushing (pan adapter)
- Shield plate
- Shield disk
- Weighing pan



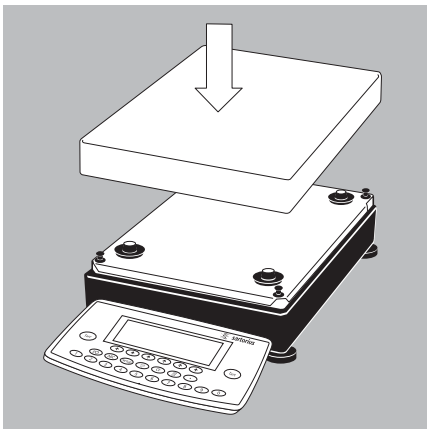
Preparing Balances with a Round Glass Draft Shield

- Place the components listed below on the balance in the order given:
- Dust cover
- Protective disk; turn counter-clockwise until it stops and is secure
- Pan support
- Weighing pan
- Glass draft shield cylinder
- Draft shield cover



Preparing Balances with a Rectangular Weighing Pan and a Weighing Capacity ≤ 12 kg

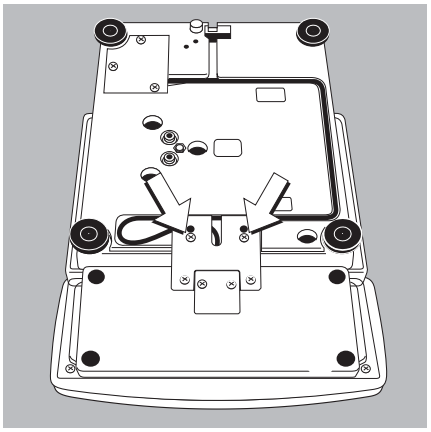
- Place the components listed below on the balance in the order given:
- Dust cover
- Weighing pan draft shield (only for balances with a readability of 0.01 g)
- Weighing pan



Preparing Balances with a Rectangular Weighing Pan and a Weighing Capacity ≥ 16 kg

- Place the weighing pan on the balance

Separate Operation of the Display Unit



● Turn the balance on its side and lay it on a padded surface to avoid damage to the weighing system

● Use a screwdriver to remove the 2 screws from the display unit retainer

● Remove the display unit

> Cable lengths
  – LA balances with a weighing capacity ≤ 12 kg: 55 cm
  – LA balances with a weighing capacity > 12 kg: 80 cm

○ See the chapter entitled “Accessories” for information on longer cables

○ If you wish to use a longer cable, it must be installed by an authorized Sartorius service technician

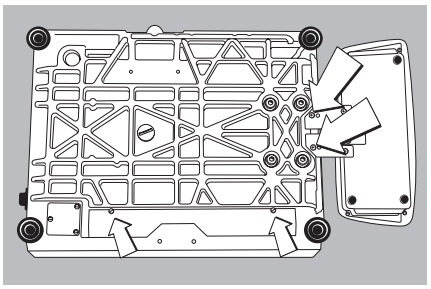
Options for Mounting the Display Unit for LA Balances with a Weighing Capacity ≥ 16 kg

The display unit can be mounted as follows:

– on the short side of the weighing cell (factory mounting)

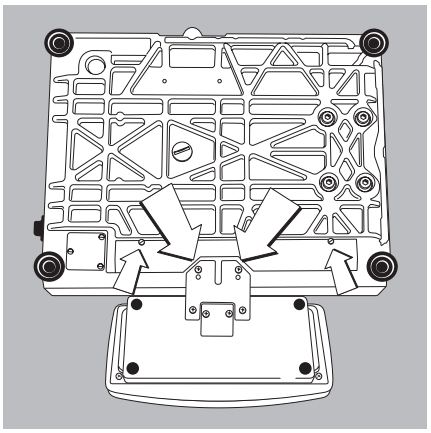
– on the back (long side) of the of the weighing cell

● Turn the weighing cell over



● Remove the fastening screws from the display unit retainer

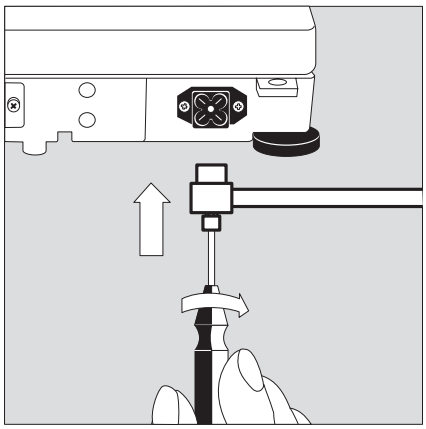
● Remove the fastening screws from the plate that covers the cable raceway (channel) and remove the plate



● Fasten the display retainer onto the back of the weighing cell with the 2 Allen screws

● Thread the cable through the raceway and replace the cover plate

Connecting the Balance to AC Power

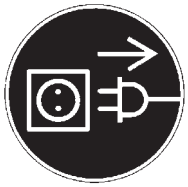


● Check the voltage rating and the plug design
– If they do not match the rating or standard you use, contact your Sartorius office or dealer
Use only
– Original Sartorius AC adapters
– AC adapters with a registered approval rating from a national testing laboratory
○ To use a main feeder cable from the ceiling or to mount a CEE plug, you will have to make arrangements
○ See the chapter entitled “Accessories” for information on using an IP65-protected industrial AC adapter or an external rechargeable battery pack with your balance
● Insert the right-angle plug into the jack and then tighten the screws
● Then insert the plug of the AC adapter into a wall outlet (mains)

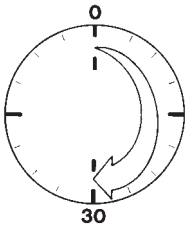
Charging the Rechargeable Battery for Saving Data:
All data is saved in the battery-backed memory. When initially operating the balance, leave it connected to AC power for one day to charge the battery. When the balance is disconnected from AC power, the balance-generated data will remain stored for approximately three months. In the standby mode, data is retained in the memory via the power supply. Be sure to print out data before storing your balance for a relatively long period.

Safety Precautions
The AC adapter rated to Class 2 can be plugged into any wall outlet without requiring any additional safety precautions. The ground or earth terminal is connected to the balance housing, which can be additionally grounded, if required. The data interface is also electrically connected to the balance housing (ground).

Note:
This equipment has been tested and found to comply with the limits pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications.
For information on the specific limits and class of this equipment, please refer to the Declaration of Conformity. Depending on the particular class, you are either required or requested to correct the interference.
If you have a Class A digital device, you need to comply with the FCC statement as follows: “Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.”
If you have a Class B digital device, please read and follow the FCC information given below: 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.
Before you operate this equipment, check which FCC class (Class A or Class B) it has according to the Declaration of Conformity included. Be sure to observe the information of this Declaration.

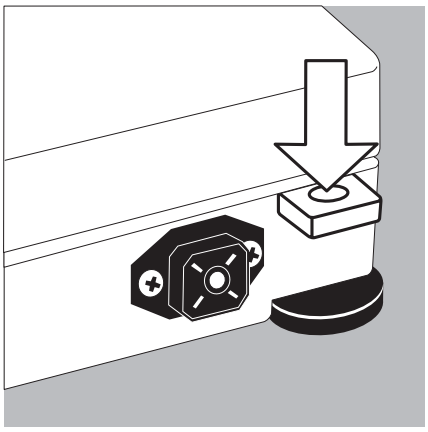


Connecting Electronic Peripheral Devices
● Make absolutely sure to unplug the balance from AC power before you connect or disconnect a peripheral device (printer or PC) to or from the interface port.



Warmup Time
To ensure accurate results, the balance must warm up for at least 30 minutes the first time it has been connected to AC power and each time after it has been unplugged from AC power and reconnected. Only after this time will the instrument have reached the required operating temperature.
Using Verified Balances Approved for Use as Legal Measuring Instruments in the EU*:
● The balance must warm up for at least 24 hours after initial connection to AC power or after a relatively long power outage. It needs to warm up for at least 30 minutes each time after it has been disconnected from AC power.
○ For balances with a readability of ≤ 0.1 mg: wait until the automatic calibration/adjustment routine has ended. Requirements: see page 47

* including the Signatories of the Agreement on the European Economic Area

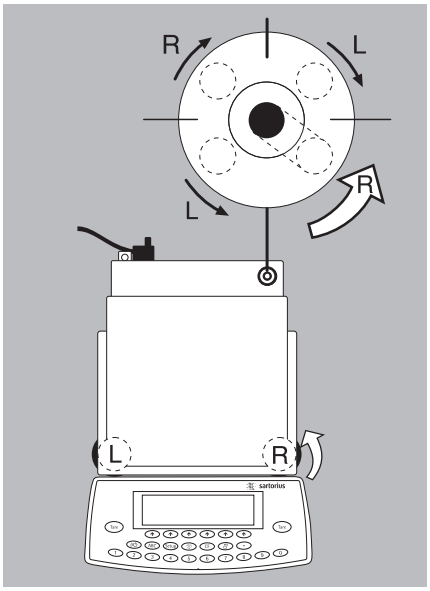


Fastening an Antitheft Locking Device: Balances with a Weighing Capacity ≤ 12 kg
To fasten an antitheft locking device, use the lug located on the rear panel of the balance.

- Secure the balance at the place of installation, e.g., with a chain or a lock.

Leveling the Balance
Purpose:
- To compensate for unevenness at the place of installation
- To achieve perfectly horizontal positioning of the balance for consistent reproducibility

Always level the balance again any time it is moved

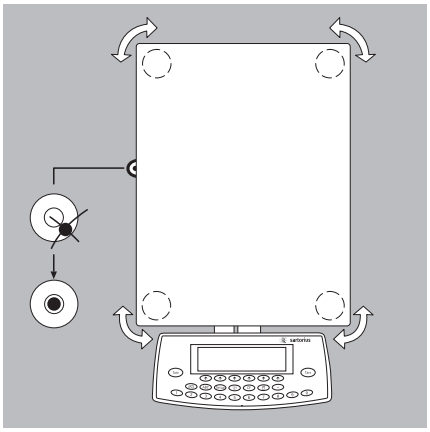


Leveling Balances with a Weighing Capacity ≤ 12 kg
Only the 2 front feet are used for leveling.

- Retract the 2 rear feet (only for models with rectangular weighing pan)
- Turn the 2 front feet as shown in the illustration until the air bubble is centered within the circle of the level indicator

> Several leveling steps are usually required.

- When weighing heavy samples (or when the YDH 01 LP display arm is attached): Extend the 2 rear feet until they touch the surface on which the balance rests



Leveling Balances with a Weighing Capacity ≥ 16 kg
- Adjust the four leveling feet until the air bubble is centered within the circle of the level indicator

Setting the Language
> See the “Setting the Language” section in the chapter entitled “Configuration”

Setting the Date and Time
> See the “Entering Date and Time” section in the chapter entitled “Configuration”

Configuration

Purpose
You can configure the balance to meet individual requirements by entering user data and setting parameters in the Setup program.

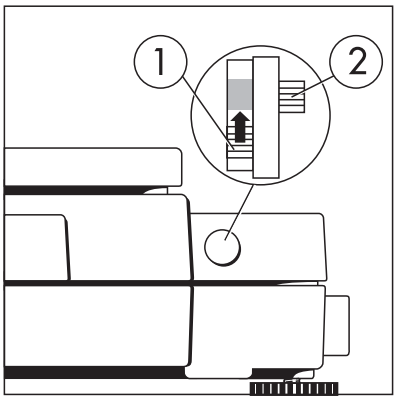
The Setup menu contains the following submenus:
- Balance functions
- Device parameters
- Application parameters
- Printout functions
- Device information
- Language
- Factory settings

Setting the Language
You can choose from 5 languages for the information display:
- German
- English (factory setting)
- English with U.S. date | time format
- French
- Italian
- Spanish

Configuring the Balance for Use in Legal Metrology
Set the menu access switch as described below to configure the following functions for use of the balance in legal metrology:

- Display: Verification scale interval: `e`; lower limit of the weighing capacity: `Min`
- External calibration blocked

Preparation:
- Remove the cap from the back of the balance housing
- Move the switch (1) upwards



> When the switch is in the upper position, the Setup menu is locked and the balance can be used in legal metrology

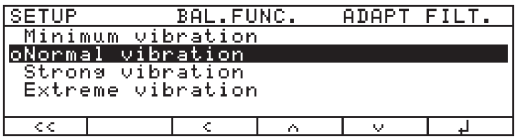
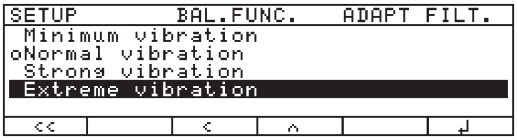
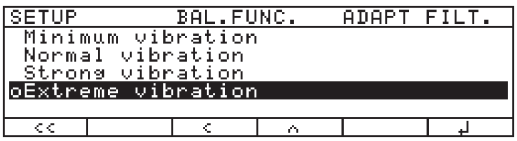
When the switch is in the lower position, the menu is accessible

> Note:
Do not move Switch 2

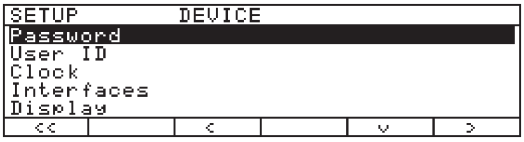
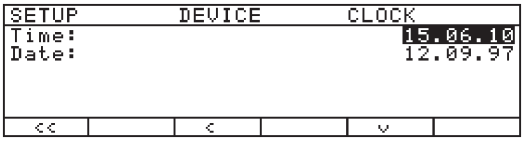
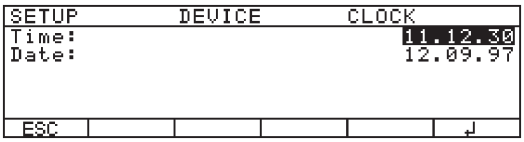
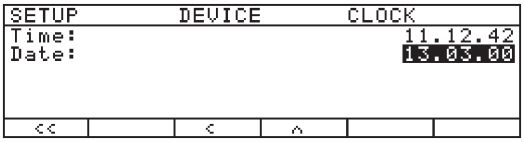
Example: Setting the Language to "U.S. Mode"

Step	Press key (or follow instructions)	Display/Output
1. Select "Setup" menu	Setup	SETUP Balance/scale functions Device parameters Application parameters Printout Info << | | | | v | >
2. Select "Language" and confirm	Repeatedly press v soft key, then > soft key	SETUP LANGUAGE Deutsch oEnglish U.S.-Mode Français Italiano << | | < | | v | ↵
3. Select "U.S. mode"	v soft key	SETUP SPRACHE oDeutsch English U.S.-Mode Français Italiano << | | < | | v | ↵
4. Save language	↵ soft key	SETUP LANGUAGE Deutsch oEnglish U.S.-Mode Français Italiano << | | < | ^ | v | ↵
5. Exit the Setup menu	<< soft key	Max 6200g d= 0.01g 0% 100% 0.00 g Cal | | | | |

Navigating in the Setup Menu (Examples):
Example: Adapting the balance to “Extreme vibration”

Step	Press key(s) (or follow instructions)	Display/Output
1. Select Setup menu	(Setup)	
2. Confirm “Balance/scale functions”	> soft key	
3. Select menu item “Adapt filter” and confirm	∨, then > soft key	
4. Select menu item “Extreme vibration”	∨ soft key	
5. Confirm menu item “Extreme vibration”	↲ soft key	
6. If required, select further menu items	< ∨ ∧ > soft keys	
7. Save setting and exit Setup Menu	<< soft key	

Example: Entering date and time

Step	Press key(s) (or follow instructions)	Display/Output
1. Select Setup menu; select “Device parameters“	(Setup), then ˅ soft key and ˃ soft key	
2. Set clock	press ˅ repeatedly, then press ˃	
3. Enter the time	1 1 · 1 2 · 3 0	
4. Set the time according to your local clock	↲ soft key	
5. Enter the date	1 3 · 0 3 · 3 0	
6. Store the date	↲ soft key	
7. Enter other data, if desired	˂ ˅ ˄ ˃ soft keys	
8. Exit Setup menu	˂˂ soft key	

Setting the Balance Functions (BAL.FUNC.)

Purpose
This menu item enables you to configure the balance functions, i.e., to meet individual requirements by selecting predefined parameters in the Setup menu. You can block access to the menu by assigning a password.

Features
The balance functions are combined in the following groups (1st menu level):

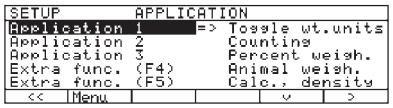
- Calibration/adjustment
- Adapt filter
- Application filter
- Stability range
- Taring
- Auto zero
- Weight unit 1
- Tare/zero at power on
- Factory settings: `only wgh. param.` (only the balance functions)

Factory Settings
Parameters: The factory settings are identified by the symbol “o” in the list starting on the next page.

Preparation
Show available balance functions:

● Select Setup menu: press the (Setup) key

> SETUP is displayed



● Select “Balance/scale functions”: press the > soft key

If you already assigned a password:

> The password prompt is displayed

○ If access is blocked by a password: enter the password using the numeric/alphabetic keys.

○ If the last character of the password is a letter: conclude input by pressing (ABC)

● Confirm your password and have the balance functions displayed: Press the ↵ soft key.

> Balance functions are displayed:

○ To select the next group: press the v soft key (down arrow)

○ To select the previous item of a group: press the ^ soft key (up arrow)

○ To select the next sub-item within a group: press the > soft key (right arrow)

○ To select the previous group: press the < soft key (left arrow)

○ To confirm: press the ↵ soft key

Extra Functions

● Exit the Setup menu: press the << soft key
> Restart your application

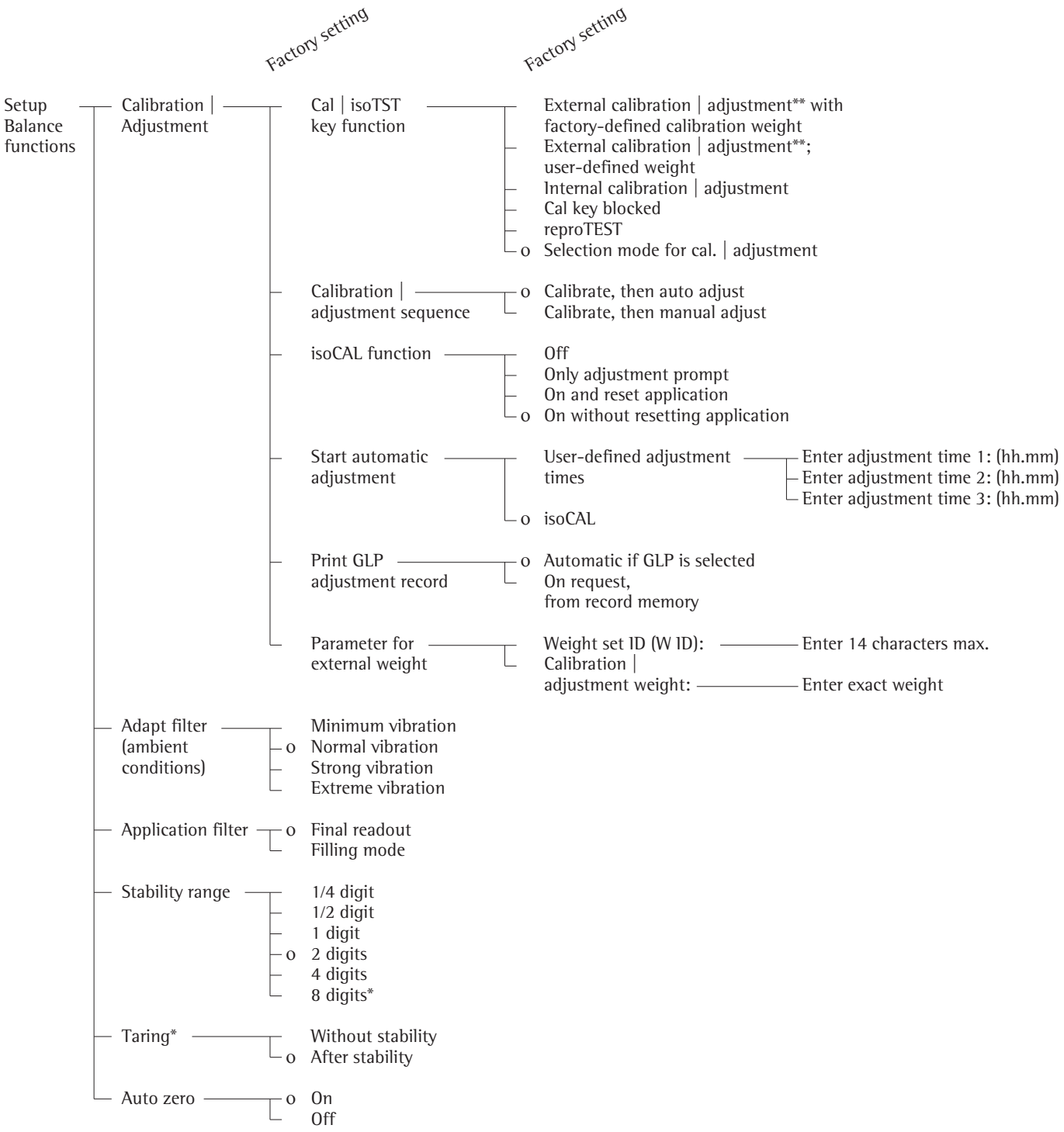
● Print parameter settings:
– When the balance functions are displayed, press (F)
> Printout (example)
Texts with more than 20 characters are cut off

```
SETUP
     BAL.FUNC.
--------------------
Calibration/adjustm
  CAL/iso TST key fun
  Internal cal./adju
  Cal/adjustm seq
Cal. with adjustm au
.
  isoCAL-function
                  Off
  Start autom. adjus
              isoCAL
  Print GLP/GMP adju
Automatic if GLP is
selected
  Parameter for exte
   Wt. ID (W ID):

    Cal./adjust.-wt:
          5000.00 g
 Adapt filter
     Normal vibration
 Application filter
          Filling mode
 Stability range
   2 digits
 Taring
     After stability
Auto zero
                  Off
 Weight unit 1
            Grams /g
```

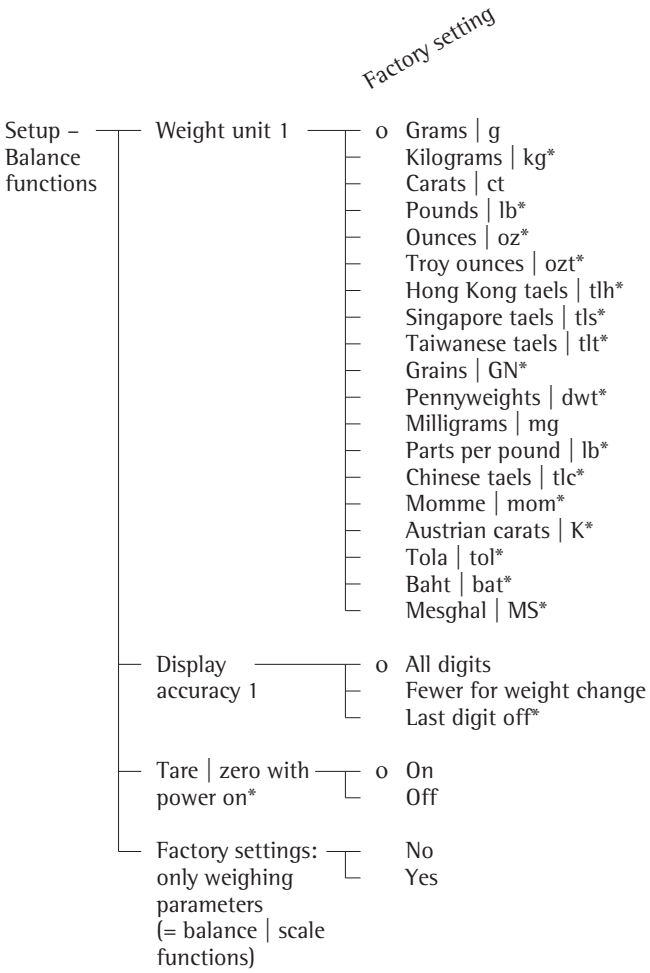
etc.

Balance Functions (Overview)

o factory setting
√ user-defined setting(s)



* = not applicable to verified balances
** = only external calibration is possible for verified balances



* = not applicable to verified balances

Setting the Device Parameters (DEVICE)

Purpose
This menu item enables you to configure the balance to meet individual requirements by selecting predefined menu parameters in the Setup menu. You can block access to the menu by assigning a password.

Features
The device parameters are combined in the following groups (1st menu level):

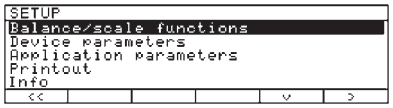
- Password
- User ID
- Clock
- Interfaces
- Display
- Keys
- Extra functions
- Factory settings: only device parameters

Factory Settings
Parameters: The factory settings are identified by the symbol “o” in the list starting on the page after next.

Preparation
Display available device parameters

● Select the Setup menu: press (Setup)

> SETUP is displayed:



● Select “Device parameters”: use the v and > soft keys

If no password has been assigned, anyone can access the Setup menu device parameters

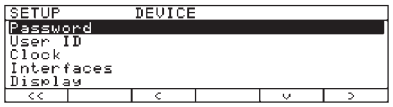
If a password has already been assigned:
> The password prompt is displayed

○ If access is blocked by a password: enter the password using the numeric and/or alphabetic keys

○ If the last character of the password is a letter: conclude input by pressing the (ABC) key

● Press ↵ to confirm the password

> Device parameters are now displayed:



○ To select the next group: press the v soft key (down arrow)

○ To select the previous menu item of a group: press ^ soft key (up arrow)

○ To select the next sub-item within a group: press the > soft key (right arrow)

○ To select the previous group: press the < soft key (left arrow)

○ Press ↵ soft key to confirm the selected menu item

Entering or Changing a Password

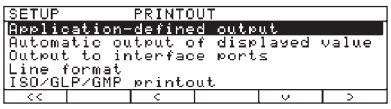
– Let’s assume that a password with 8 characters max. has already been assigned to access the Setup device parameters

● Select the Setup menu: press

> SETUP is displayed

● Select parameters: Use the v and > soft keys

> The password prompt is displayed:



○ Enter the password

○ Press the ↵ soft key to confirm your password and view the device parameters

● Write down your password here for easy reference:
Password = ...
If you assign a password and then forget what the word is:

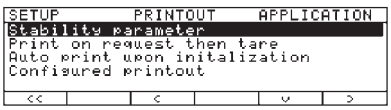
○ Enter the General Password (see Appendix)

○ Press the ↵ soft key to confirm and display the password

> The parameters are displayed

● Select the device parameter “Password”: If necessary, repeatedly press v or ^ , until you see

> Password: and any existing password



● New password: Enter the numbers and/or letters for the new password (8 characters max.)
If “none” is displayed, this means no password has been assigned to delete the user password: Press · and confirm

● To confirm: press the ↵ soft key

● Exit the Setup menu:
press the ≤≤ soft key

> Restart the application

Extra Functions

● Exit the Setup menu:
press the ≤≤ soft key

> Restart the application

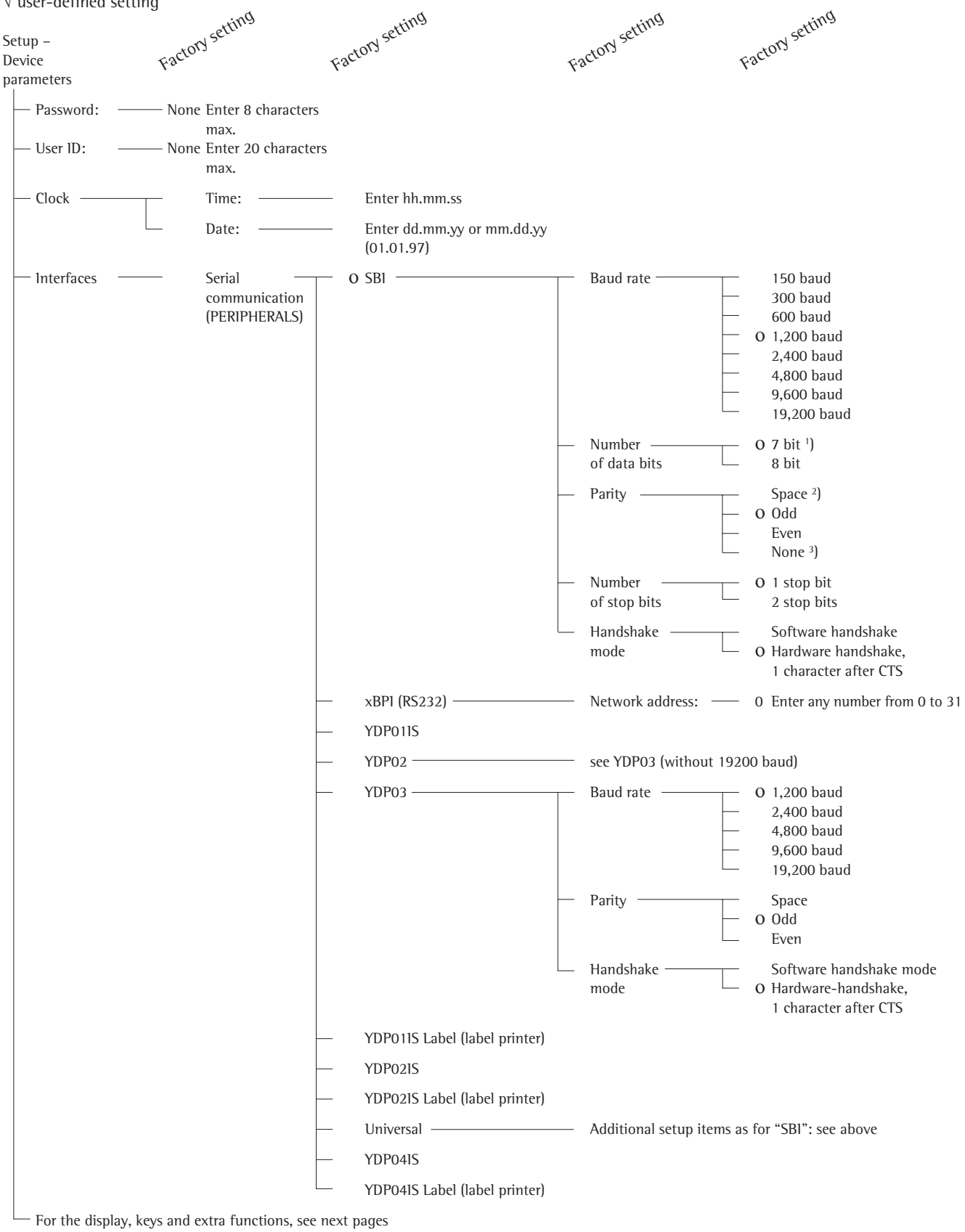
● Print the parameter settings:
– If the device parameters are displayed:
press 🖹

> Printout (example)

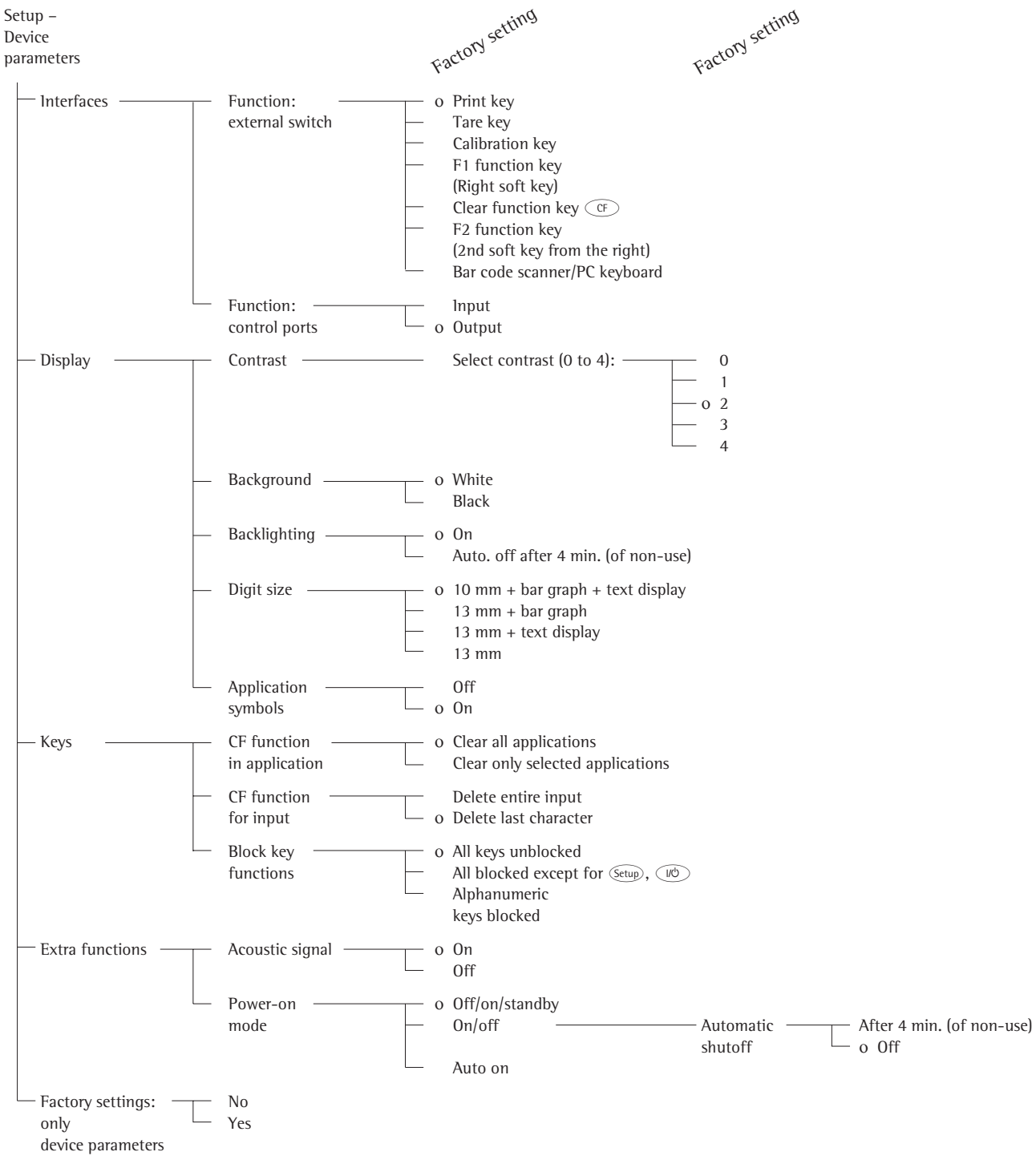
```
SETUP
       DEVICE
--------------------
 User ID
  User ID:

 Interfaces
  Serial communicati
   SBI
    Baud rate
           1200 baud
    Number of data b
          7 data bits
    Parity
                 Odd
    Number of stop b
           1 stop bit
    Handshake-mode
  Hardware handshake
  after 1 char
   Function external
         Print key
  Function control
             Output
 Display
  Contrast
                   2
  Background
                White
  Digit size
10mm + bar graph
+text display
  Application symbo
                 On
 Keys
  CF function in ap
Clear all applicati
  CF function for i
Delete last charact
  Block key functio
  All keys unblocke
```

etc.

Device Parameters (Overview)
o factory setting
√ user-defined setting



[1]) not if "None" is selected for parity
[2]) only if 7 data bits selected
[3]) only if 8 data bits selected


Setup –
Device
parameters
Factory setting
Factory setting
Interfaces
Function:
external switch
o Print key
Tare key
Calibration key
F1 function key
(Right soft key)
Clear function key CF
F2 function key
(2nd soft key from the right)
Bar code scanner/PC keyboard
Function:
control ports
Input
o Output
Display
Contrast
Select contrast (0 to 4):
0
1
o 2
3
4
Background
o White
Black
Backlighting
o On
Auto. off after 4 min. (of non-use)
Digit size
o 10 mm + bar graph + text display
13 mm + bar graph
13 mm + text display
13 mm
Application
symbols
Off
o On
Keys
CF function
in application
o Clear all applications
Clear only selected applications
CF function
for input
Delete entire input
o Delete last character
Block key
functions
o All keys unblocked
All blocked except for Setup, I/⏻
Alphanumeric
keys blocked
Extra functions
Acoustic signal
o On
Off
Power-on
mode
o Off/on/standby
On/off
Automatic
shutoff
After 4 min. (of non-use)
o Off
Auto on
Factory settings:
only
device parameters
No
Yes

Setting the Application Parameters (Application)

Purpose
This menu item enables you to configure the balance, i.e., adapt the balance to your individual requirements by selecting from a list of parameter options in a menu. You can block access to this menu by assigning a password.

Features
The simple weighing function is available at all times. You can select one from each of the following application groups. This means a number of combinations are possible.

Application 1 (basic settings)
- Toggle weight units
- Counting
- Weighing in percent
- Animal weighing (averaging)
- Calculation
- Recalculation
- Density determination
- Differential weighing
- Air buoyancy correction and air density determination
- Diameter determination

Application 2 (control functions)
- Checkweighing
- Time-controlled functions

Application 3 (data records)
- Totalizing
- Formulation
- Statistics

In addition, you can assign 2 extra functions to each of the soft keys, in some cases (depending on the Setup configuration):
- Second tare memory
- Identification codes
- Manual storage in app. 3 memory (M+ key)
- Product data memory
- SQmin function*
- DKD uncertainty of measurement*

Auto-start application when the balance is switched on

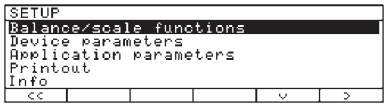
Factory settings:
only application parameters

Factory Settings for the Parameters
The factory settings are identified by the symbol “o” in the list starting on page 23.

Preparation
Display available application parameters:

● Select the Setup menu: press the (Setup) key

> SETUP is displayed



● Select parameters: repeatedly press the v and > soft keys

If you have already assigned a password:

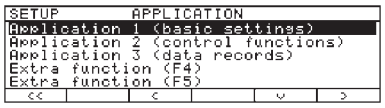
> The password prompt is displayed:

○ If access is blocked by a password: enter the password using the numeric/alphabetic keys

○ If the last character of the password is a letter: conclude input by pressing (ABC)

● Confirm your password and have the application parameters displayed: press the ↵ soft key

> The application menu is displayed:



○ To select the next group: press the v soft key (down arrow)

○ To select the previous item of a group: press the ^ soft key (up arrow)

○ To select the next sub-item within a group: press the > soft key (right arrow)

○ To select the previous group: press the < soft key (left arrow)

○ To confirm: press the ↵ soft key

Extra Functions

● Exit the Setup menu: press the << soft key

> Restart your application

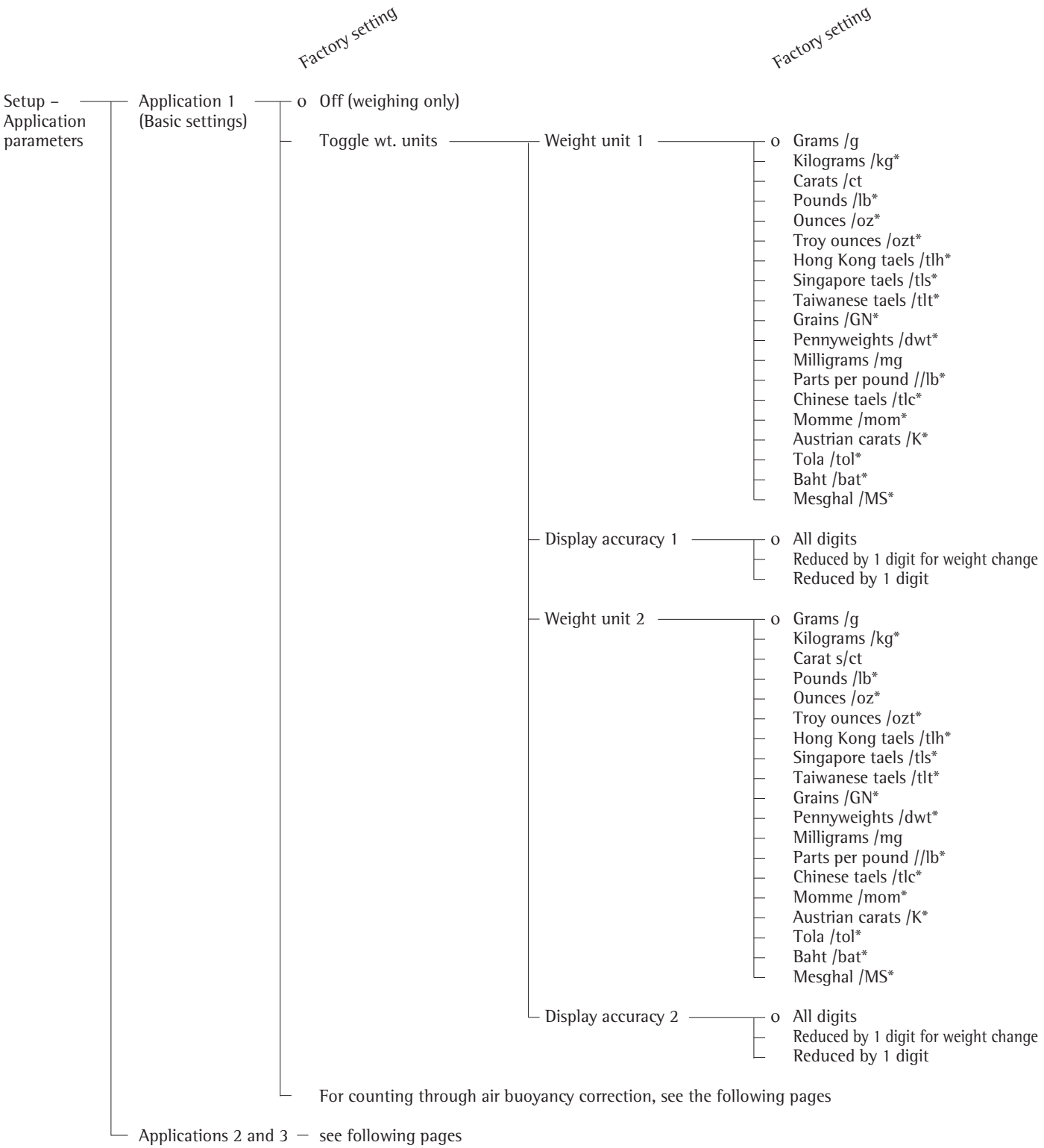
● Print parameter settings:
– When the balance/scale functions are displayed, press (🖹)

> Printout (example)
Texts with more than 20 characters are truncated

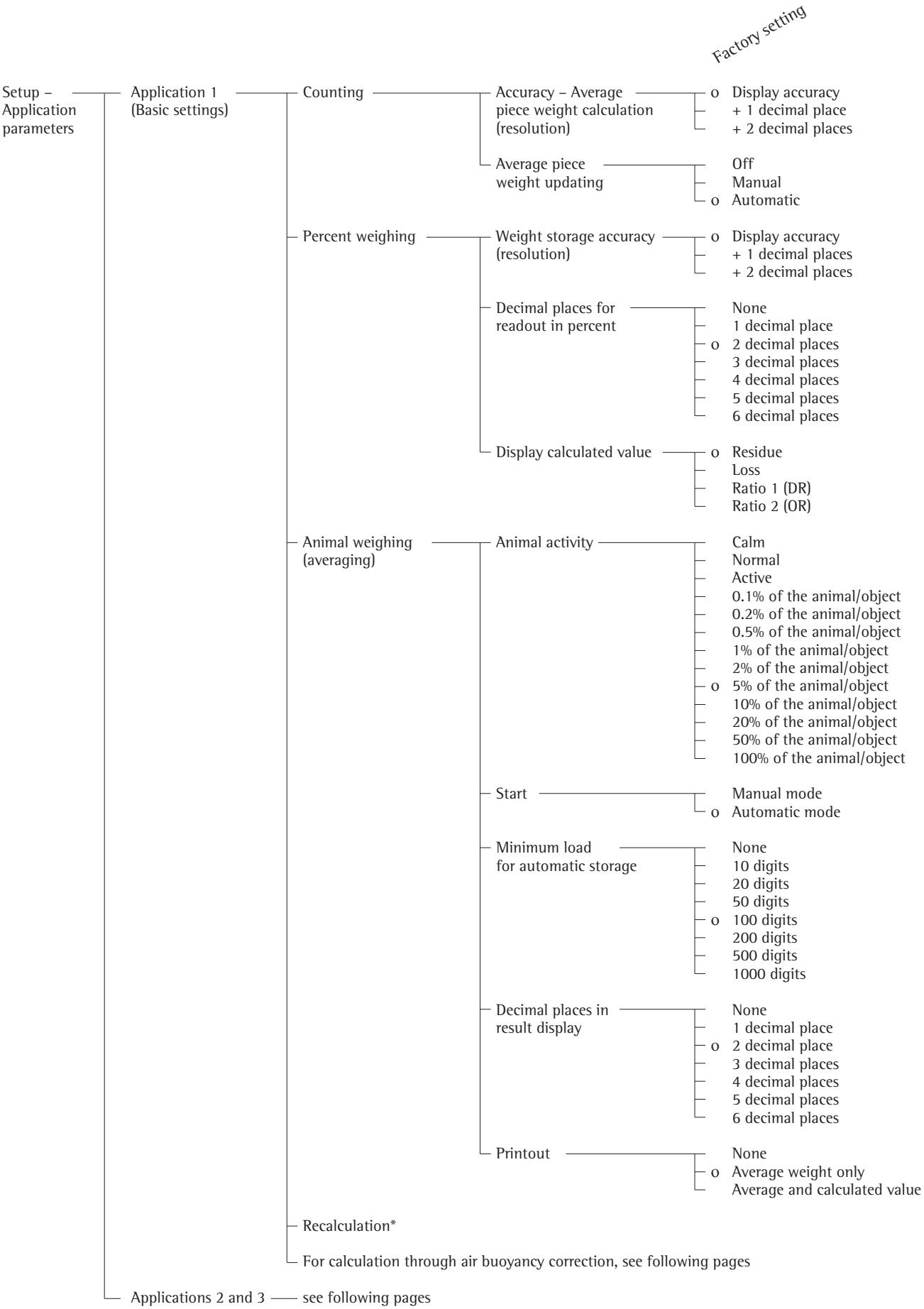
```
SETUP
      Application
--------------------
 Application 1 (basi
                  Off
 Application 2 (cont
                  Off
 Application 3 (data
                  Off
 Extra function (F4)
                  Off
 Extra function (F5)
                  Off
 Auto-start app. whe
                  Off
--------------------
```

* must be activated by service technician

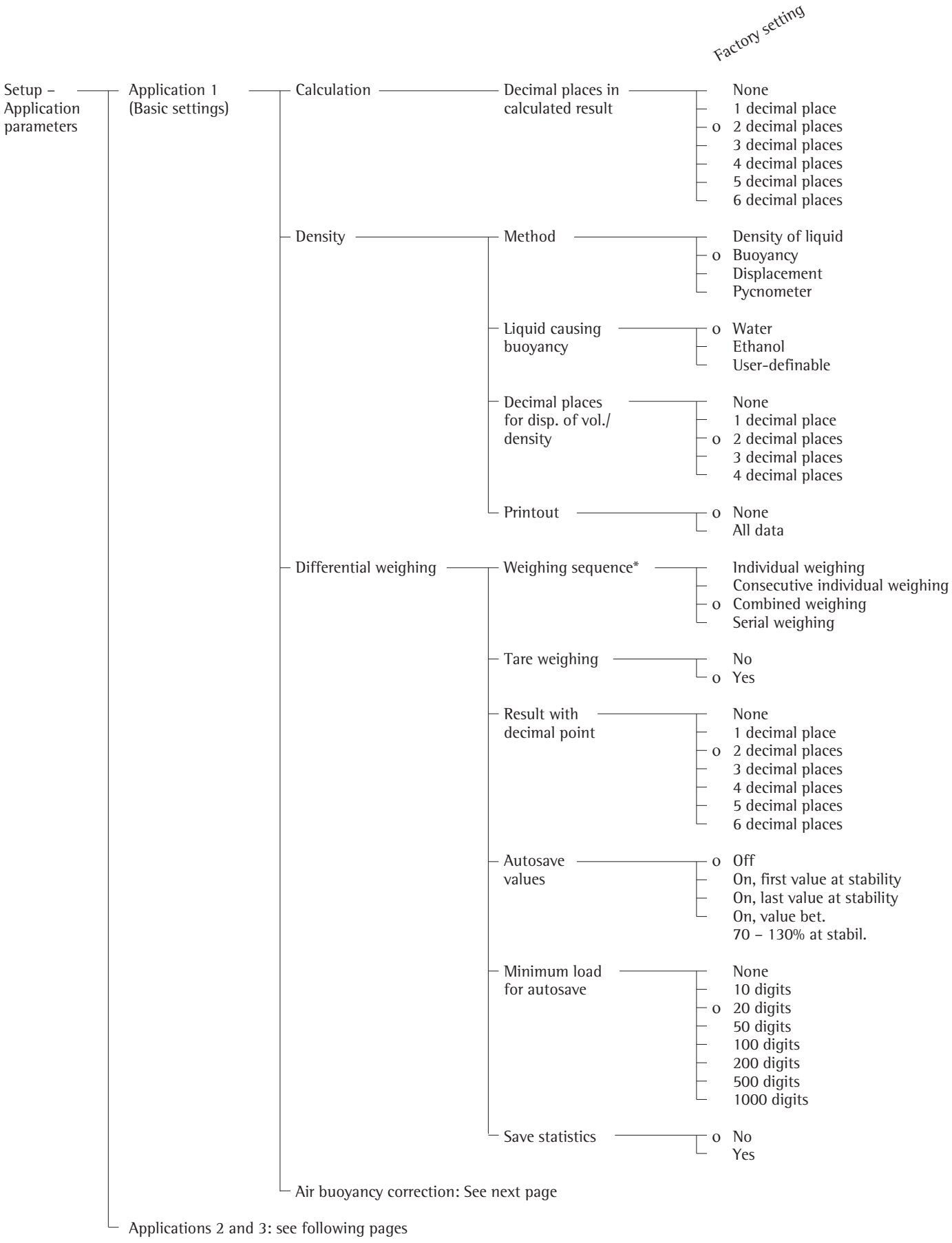
Application Parameters (Overview)
o factory settings
√ user-defined setting(s)



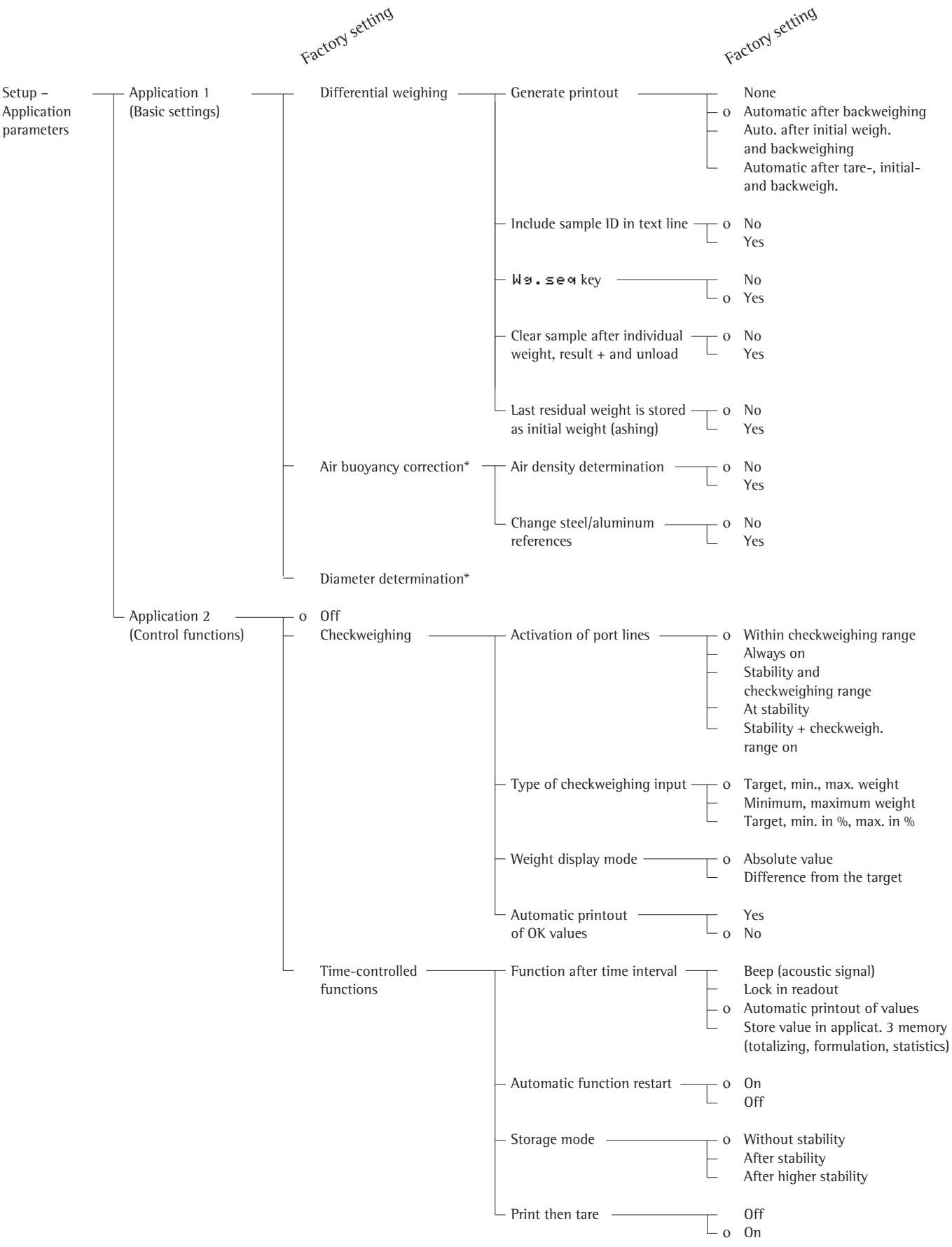
* not applicable to verified balances



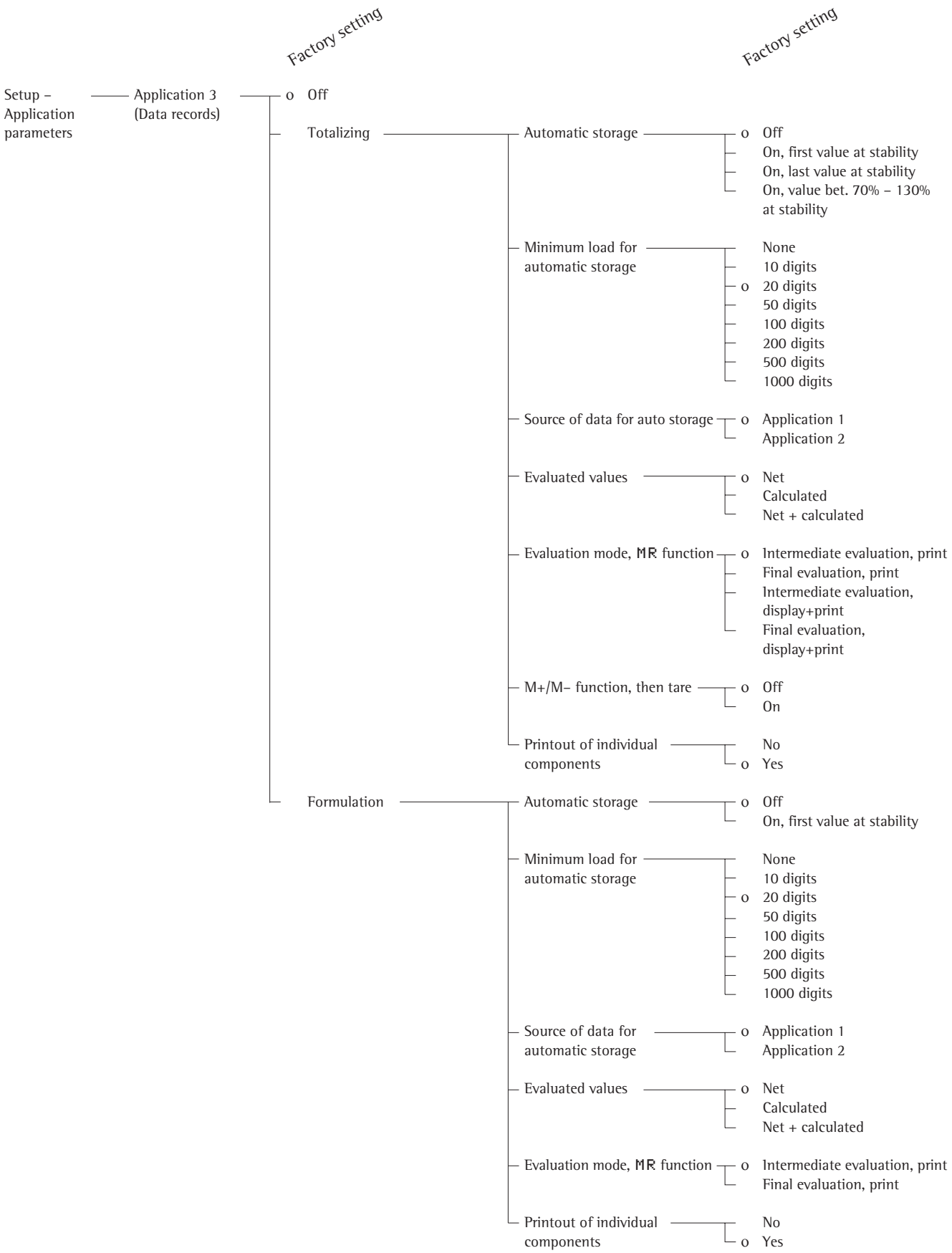
* = How to run this application is described in detail in our Factory "FC...." Installation and Operating Instructions. Request your copy directly from Sartorius or download it from the Internet (www.sartorius.com; see "download")

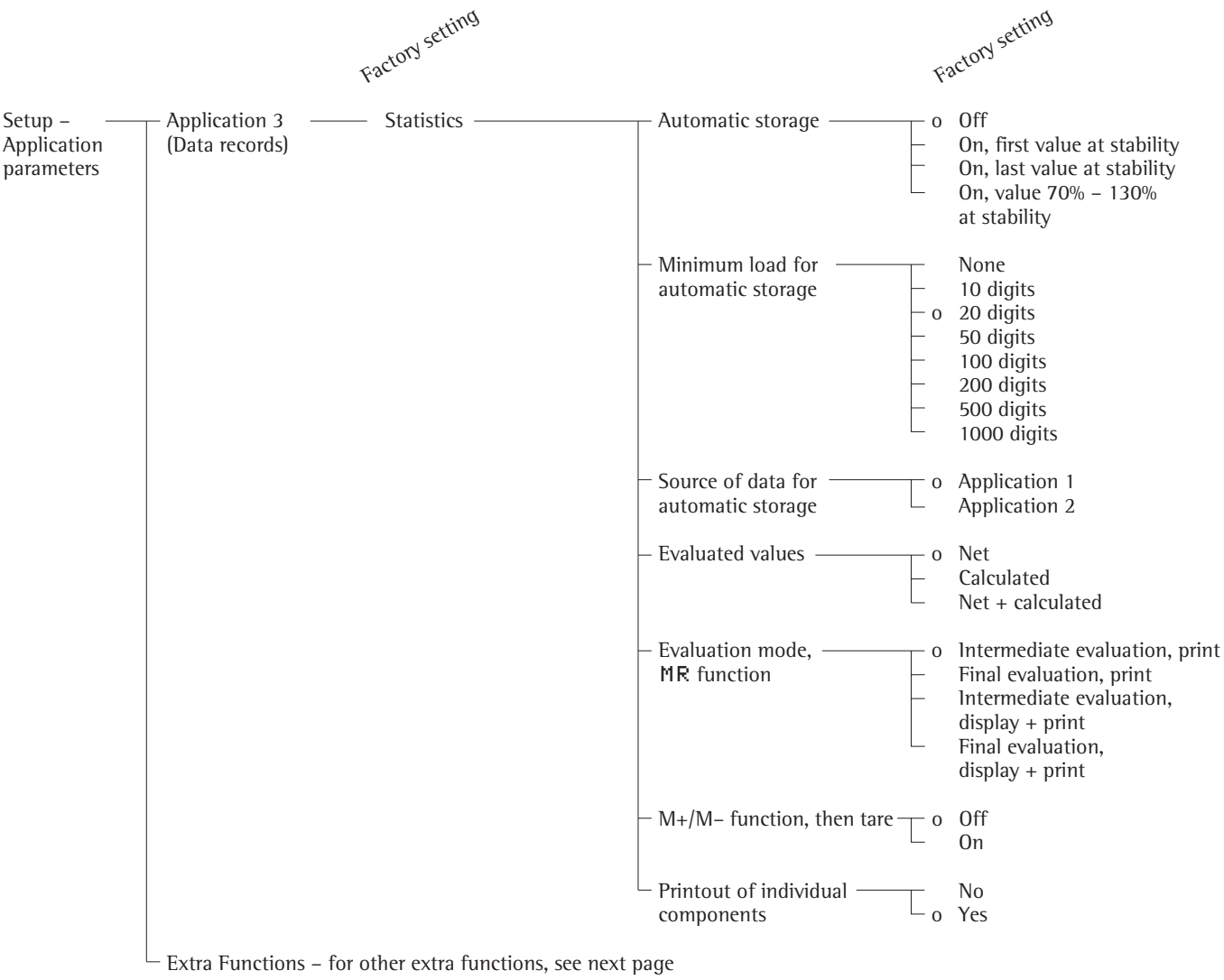


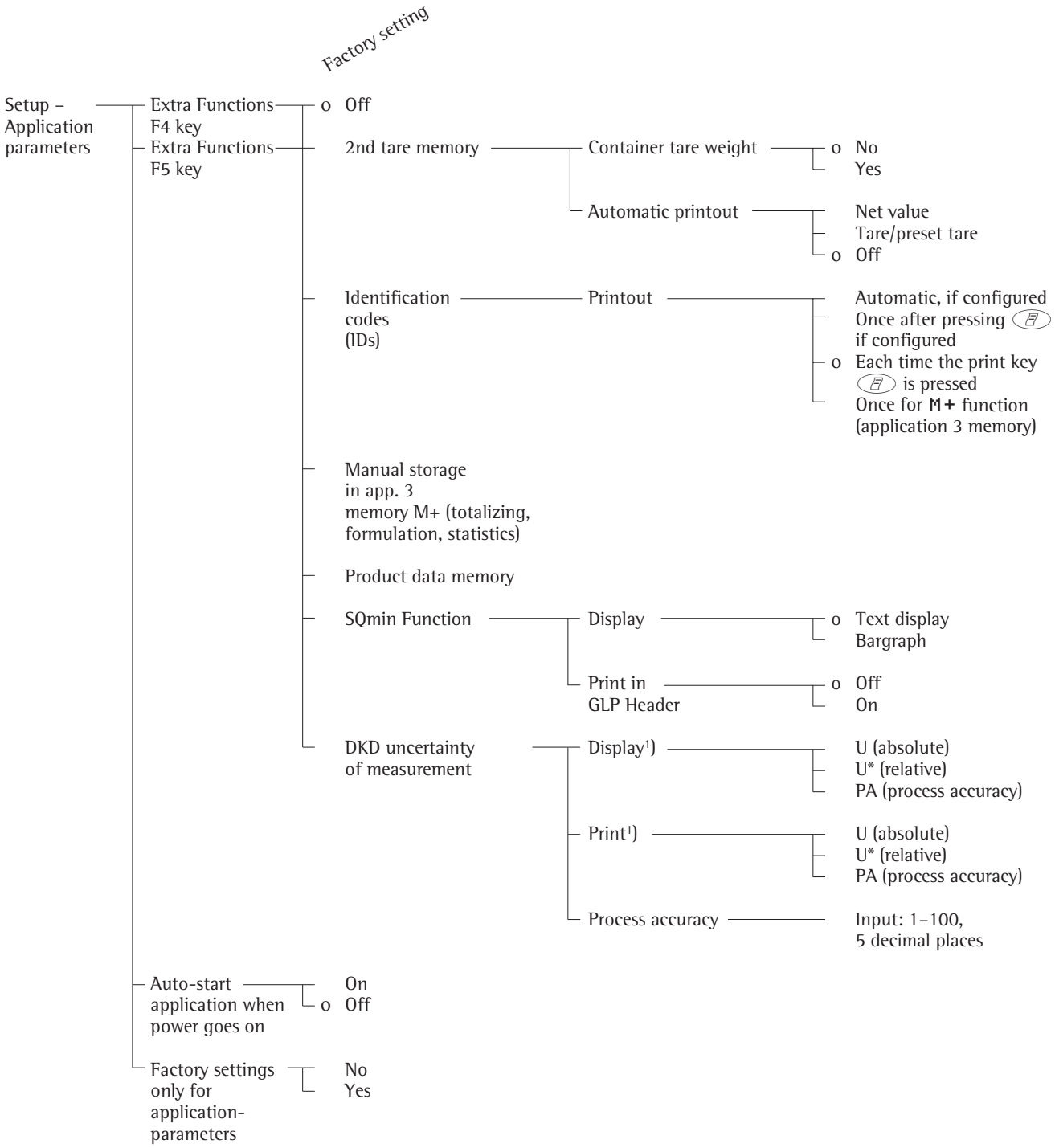
* = Setting can only be changed when the program is initially run and when the Weseq. key option is set to "No"



* = How to run this application is described in detail in our Genius "ME" Installation and Operating Instructions.
Request your copy directly from Sartorius or download it from the Internet (www.sartorius.com; see "download")


Factory setting
Factory setting
Setup – Application parameters
Application 3 (Data records)
o Off
Totalizing
Automatic storage
o Off
On, first value at stability
On, last value at stability
On, value bet. 70% – 130% at stability
Minimum load for automatic storage
None
10 digits
o 20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits
Source of data for auto storage
o Application 1
Application 2
Evaluated values
o Net
Calculated
Net + calculated
Evaluation mode, MR function
o Intermediate evaluation, print
Final evaluation, print
Intermediate evaluation, display+print
Final evaluation, display+print
M+/M– function, then tare
o Off
On
Printout of individual components
No
o Yes
Formulation
Automatic storage
o Off
On, first value at stability
Minimum load for automatic storage
None
10 digits
o 20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits
Source of data for automatic storage
o Application 1
Application 2
Evaluated values
o Net
Calculated
Net + calculated
Evaluation mode, MR function
o Intermediate evaluation, print
Final evaluation, print
Printout of individual components
No
o Yes


Factory setting
Factory setting
Setup – Application parameters
Application 3 (Data records)
Statistics
Automatic storage
o Off
On, first value at stability
On, last value at stability
On, value 70% – 130% at stability
Minimum load for automatic storage
None
10 digits
o 20 digits
50 digits
100 digits
200 digits
500 digits
1000 digits
Source of data for automatic storage
o Application 1
Application 2
Evaluated values
o Net
Calculated
Net + calculated
Evaluation mode, MR function
o Intermediate evaluation, print
Final evaluation, print
Intermediate evaluation, display + print
Final evaluation, display + print
M+/M– function, then tare
o Off
On
Printout of individual components
No
o Yes
Extra Functions – for other extra functions, see next page



[1]) an asterisk (*) indicates an activated menu item. You can select up to 3 items.

Selecting the Printout Function (PRINTOUT)

Purpose
This menu item enables you to configure the printout to meet your individual requirements by selecting predefined menu parameters in the Setup menu. Printouts of weights and other measured or calculated values and IDs enable you to document your data. You can select the particular data you wish to print. To prevent changes to your settings, you can block access to the menu by assigning a password.

Features
The device parameters are combined in the following groups (1st menu level):

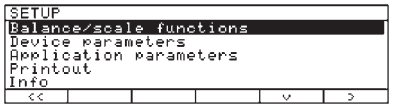
- Application-defined output
  - Configured printout
  - FlexPrint
- Automatic output of displayed values
- Output to interface port
- Line format
- ISO/GLP/GMP printout
- Identification (identifier)
- Factory settings – printout only

Factory Settings
Parameters: The factory settings are identified by the symbol "o" in the list on the next page.

Preparation
Display available printout parameters

● Select the Setup menu: press (Setup)

> SETUP is displayed:



● Select "Printout": use the v and > soft keys

If no password has been assigned, anyone can access the printout parameters in the Setup menu

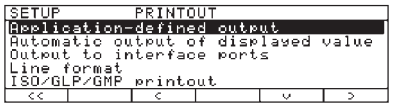
If a password has already been assigned:
> The password prompt is displayed

○ If access is blocked by a password: enter the password using the numeric and/or alphabetic keys

○ If the last character of the password is a letter: conclude input by pressing the (ABC) key

● Press ↵ to confirm the password

> Printout parameters are now displayed:



○ To select the next group: press the v soft key (down arrow)

○ To select the previous item of a group: press the ^ soft key (up arrow)

○ To select the next sub-item within a group: press the > soft key (right arrow)

○ To select the previous group: press the < soft key (left arrow)

○ To confirm: press the ↵ soft key

Extra Functions
● Exit the Setup menu: press the << soft key

> Restart your application

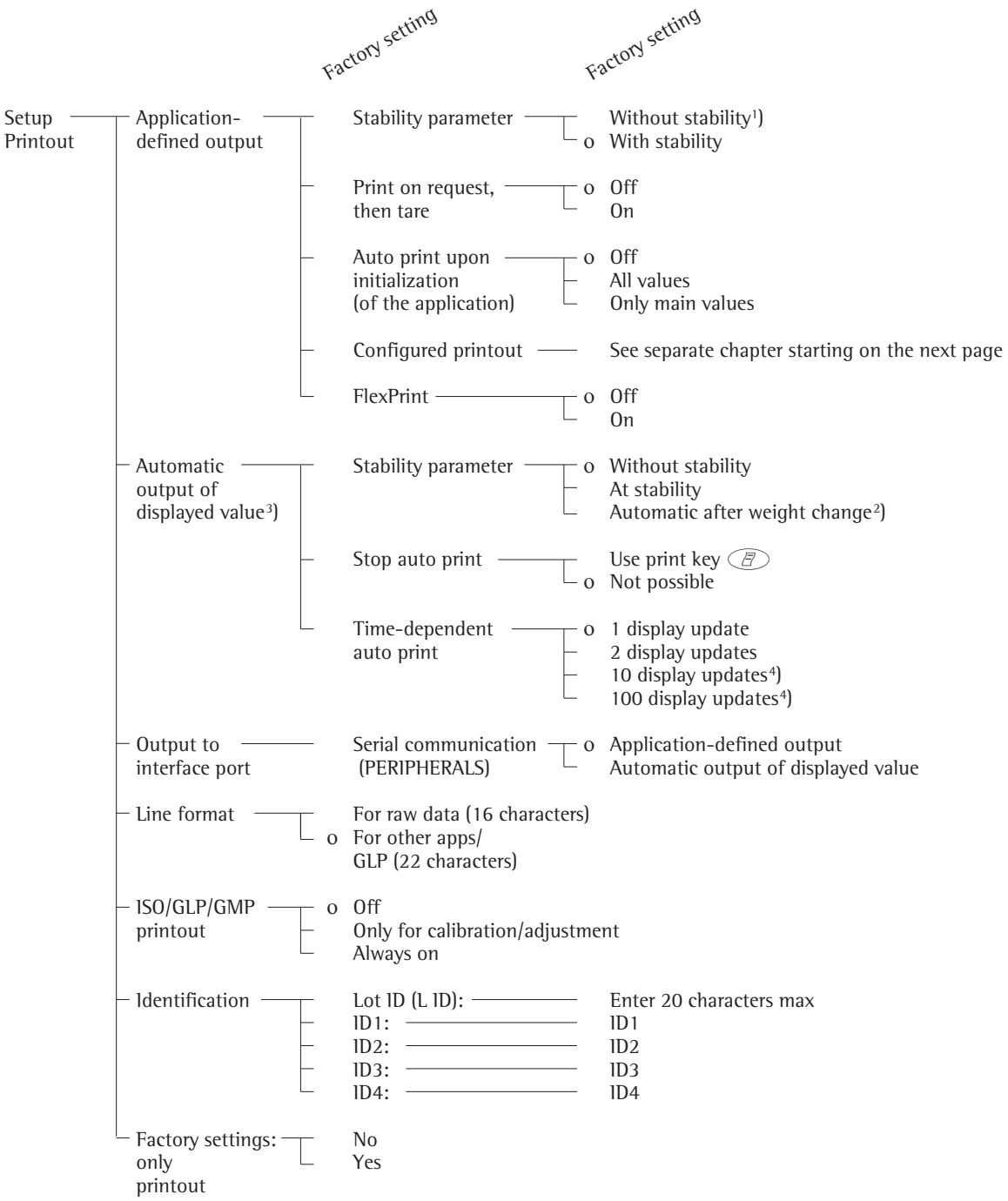
● Print parameter settings:
– When the printout parameters are displayed, press (🖹)

> Printout (Example)

```
SETUP
      PRINTOUT
--------------------
 Application defined
  Stability paramete
     With Stability
  Print on request t
              Off
  Auto print upon in
           All values
  Configured printou
   Indiv.: Printout
   Comp.: Printout
   Total: Printout
  FlexPrint
                  Off
 Automatic Output of
  Stability paramet
     Without stabili
  Stop auto print
       Not possible
  Time-dependent aut
    1 display update
 Output to interface
  Serial communicat:
Application-defined
output
 Line format
For other apps/GLP
 (22 characters)
 ISO/GLP/GMP printou
                  Off
 Identification
  Lot (L ID):

  ID1:
                  ID1
```

etc.

Printout Parameters (Overview)
o factory setting
√ user-defined setting



[1]) = when the balance is used in legal metrology, this setting may be configured for control purposes only; printout of values is not permitted
[2]) = Autoprint when load change is >10 d and stability is reached: no printout until residual difference in load value >5 d
[3]) = to enable automatic output of the displayed value, the corresponding option ("Automatic output of displayed value" must be activated here, under "Stability parameter"
[4]) = These settings may not be changed on verified balances

Printout Configuration

Purpose
This menu item enables you to configure individual printout formats. With the formulation, totalizing and statistics application, you can also define the values to be included on the total printout when the MR key is pressed.

Under “Setup > Printout > Application-defined output > Configured printout”, you can configure individual, component or total data records that contain the items in each application that are available for printouts. Configure these printouts after you have configured the applications, because some entries in the data record depend on the particular application.

Features
- Maximum items in a data record: 60
- Separate configuration of printout formats for individual weights, components, total, backweighing and statistics
- Individual printout generation: press the ⎙ key

  Automatic printout of application data: e.g., results from animal weighing or density application (Setup menu: Application 1: Density: Printout: All data) OK values from checkweighing application, time-controlled printouts, 2nd tare memory
- Component printout: For results from totalizing, formulation or statistics applications, press M+ or M− (Setup: Application 3: ..., Printout of individual components: On)
- Total printout: For totalizing, formulation or statistics applications, press MR
- Backweighing printouts or records: automatically generated after backweighing or manually by pressing the ⎙ key when the result is displayed at the end of backweighing
- Statistics printout or output: To generate, press the ⎙ key when the statistics are displayed

  Printouts for Differential Weighing: These printouts can be generated as standard or configured (user-defined) reports.

  You can configure the following printouts:
  - Individual printout
  - Backweighing printout
  - Statistics printouts

    Printouts are generated in one of two ways:
  - at the request of the user by pressing the ⎙ key (print on request)
  - automatically, if configured in the Setup menu [Application parameters: Application 1: Differential weighing: Generate printout: Auto]

    You can turn off automatic printout generation in the Setup menu [Application parameters: Application 1: Differential weighing: Generate printout: None]
- Data records are deleted after you haved switched to a different application or activated or de-activated an extra function in the application parameters of the Setup menu
- A new pick list for a data record is created based on the currently active application programs and extra functions
- Printout items can be deleted individually
- No printout is generated when the following setting is configured: Setup: Printout: Line format: For raw data (16 characters)
- Print item “Form feed” for footer: Advance to beginning of next label in the “YDP01IS-Label” and “YDP02IS-Label” [printer] interface mode

Extra Functions
● Exit printout configuration: press << soft key

> Restart application

Printing “Select” and “List” Settings

- LIST: print the currently selected list
  SELECT: printout items that can still be selected

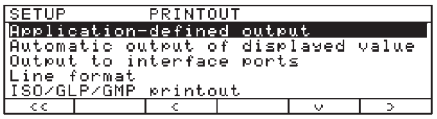
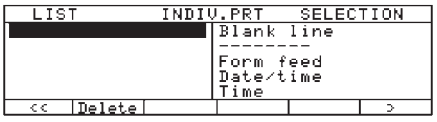
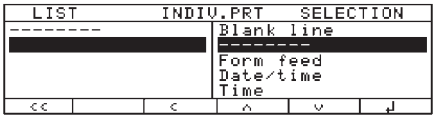
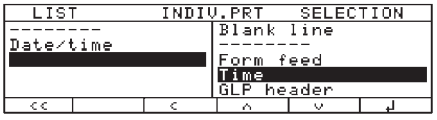
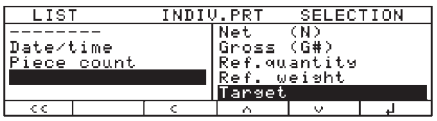
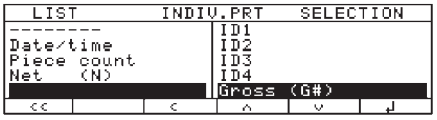
● When the select bar is on LIST or SELECT: press the ⎙ key

> Printout (Example)

```
BACKW. PRINT.LIST
====================
Sample date
Net initial wt.
Backweighed res
Loss in %
====================
```
etc.

Example:
Configure an Individual Printout for Counting Application to Include Dotted Line, Date/Time, Piece Count and Net Weight

Settings (changes in the factory settings required for this example):
Setup: Application parameters: Application 1: Counting
Exit the Setup menu: press the << soft key
Then call Setup again: Printout: Application-defined output: Configured printout

Step	Press key(s) (or follow instructions)	Display/Output
1. Select Setup menu, then "Printout"	(Setup), then ∨ repeatedly and > soft key	
2. Confirm "Application-defined output"	> soft key	
3. Select and confirm "Configured printout"	∨ soft key 3x and > soft key	
4. Confirm "Indiv. printout"	> soft key	
5. Select "Blank line"	>, ∨, ↵ soft keys	
6. Select "Date/time"	∨ soft key twice, then ↵ soft key	
7. Select "Piece count"	∨ soft key repeatedly, then ↵ soft key	
8. Select "Net (N)"	∧ soft key repeatedly, then ↵ soft key	
9. Exit "Printout" configuration	<< soft key	
10. Perform weighing operations, then print	(Print)	---------- 14.01.2000 09:19 Qnt + 598 pcs N + 2003.13 g

Device Information

Purpose
This menu item enables you to have information displayed about the specific balance (“device”), as well as “FlexPrint” information.

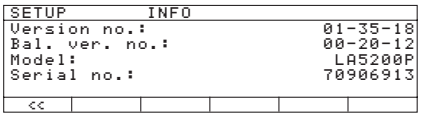
Displaying Device Information

● Select the Setup menu:
press the (Setup) key

> “SETUP” is displayed:

● Select “Info”:
Repeatedly press the v soft key, then press the > soft key

> Device information is displayed:



● Print device information:
Press the (🖹) key

> Printout (Example)

```
--------------------
  23.02.2000      13:02
  Model          LA5200P
  Ser. no.     91205355
  Vers. no.    01-35-18
(Version of the operating program)
  ID           BECKER123
(User-ID)
--------------------
  SETUP
          INFO
                  DEVICE
--------------------
   Version-no.:
                01-35-18
(Version of the operating program)
   Wgh. sys. vers:
                00-20-12
(Version no. of the weighing cell)
   Model:
                 LA5200P
   Serial no.:
                91205355
  Next mainten.:
             01.01.2004
  Service phone:
           00495513080
  SQmin:
               100.00 g
--------------------
```

● Return to SETUP overview:
press the < soft key

● Exit Setup menu:
press the << soft key

> Original settings are restored

Factory Settings
Each parameter category has a factory setting. In the Setup menu, you can restore all factory settings by confirming the selection YES.

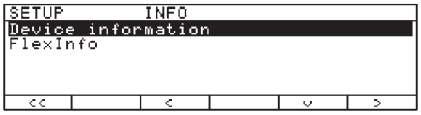
The following settings are not restored:
- Language
- Password
- Display contrast
- Time (clock)

Display Flexprint Information

● Select the Setup menu:
press the (Setup) key

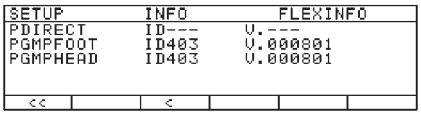
> “SETUP” is displayed:

● Select “Info”:
press the v soft key repeatedly and then the > soft key



● Select “FlexInfo”:
press the v soft key and then the > soft key

> The FlexPrint information is displayed, with print instruction file name, software ID and version number:



○ To select a particular print file name with software ID (for example, ID403), if desired:
press key v or ^ as required

> If the display shows ID--- :
The weight block for legal metrology is not printed by this print file.

> Display of version number:
V.xx.xx.xx
Created by Sartorius:
V.S.xx.xx.xx

● Return to SETUP overview:
press the < soft key

● Exit Setup menu:
press the << soft key

> The device returns to the previous mode

Operation

Basic Weighing Function

Purpose
The basic weighing function is always accessible and can be used alone or in combination with an application program (Toggle between Weight Units, Counting, Weighing in Percent, etc.).

Features
- Taring the balance
- Assigning IDs to weights
- Printing weights
- Printing ID codes for weights

Factory Settings
Tare: `After stability`

Manual/auto print mode:
`Manual with stability`

Line format:
`For other apps/GLP (22 characters)`

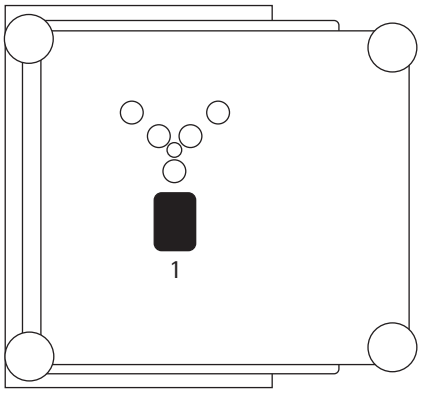
Soft Key Functions

`Cal`	Initiate calibration/ adjustment routine
`isoCAL`	Press to start isoCAL routine
`S ID`	Store ID entered

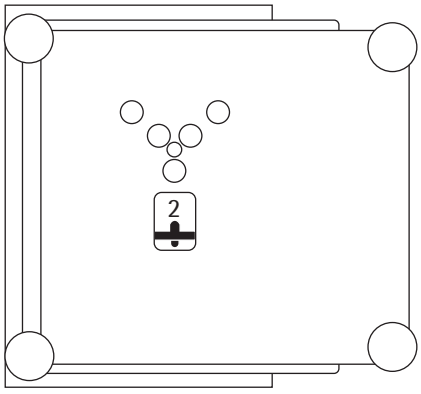
Below-Balance Weighing
A port for a below-balance weighing hanger is located on the bottom of the balance.

Balances with a capacity ≤ 12 kg:

● Open cover plate **(1)** on the bottom of the balance



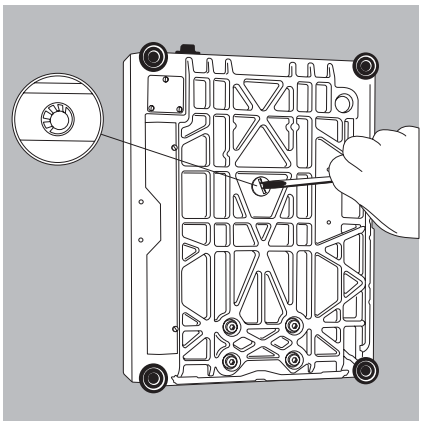
● Attach the sample (e.g., using a suspension wire) to the hook **(2)**.



○ If necessary, install a shield for protection against drafts

Balances with a weighing capacity ≥ 16 kg:

● Use a screwdriver to open the cover plate on the bottom of the balance



● Attach the hook ordered directly from Sartorius

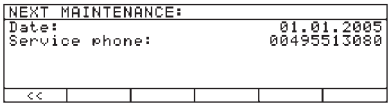
○ If necessary, install a shield for protection against drafts

Important Note Concerning Verified Balances Approved for Use as Legal Measuring Instruments in the EU*:
The below-balance weighing port may not be opened or used when an approved balance is being operated as a legal measuring instrument.

Preparation
● Turn on the balance:
Press (I/⏻)

> The Sartorius logo is displayed

○ If it is time for the next maintenance, the following appears:



To exit this screen: press the `<<` soft key

○ Call your nearest Sartorius Service Center to schedule a maintenance appointment

○ To tare the balance, if desired:
Press (Tare)

> The ⏼ symbol is displayed when a verified balance is tared or zeroed (± 0.25 digits).

Important Note Concerning Verified Balances Approved for Use as Legal Measuring Instruments in the EU*:
The type-approval certificate for verification applies only to non-automatic weighing instruments; for automatic operation with or without auxiliary measuring devices, you must comply with the regulations of your country applicable to the place of installation of your balance.

○ The temperature range indicated on the verification ID label must not be exceeded during operation

Example:
MD BF 100
(1) 0...+40 °C

* including the Signatories of the Agreement on the European Economic Area

Additional Functions
In addition to the functions:

- alphanumeric input
- taring (not during alphanumeric input)
- printing

you can also access the following functions from the weighing application:

- calibration (not during alphanumeric input)
- setup
- turning off the balance

Calibration

● Press **Cal**

> See the section on "Calibration/Adjustment" for further instructions.

Important Note Concerning Verified Balances of Accuracy Class (I):

To avoid measuring errors, the respective air density must be allowed for.
The following formula is used to calculate the mass of the sample:

$$m = n_w \frac{1 - \rho_L/8000\ \text{kg m}^{-3}}{1 - \rho_L/\rho}$$

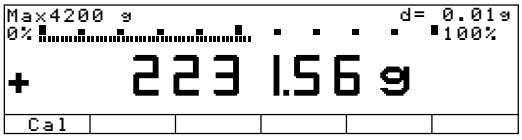
m = mass of the sample

n_w = weight readout

ρ_L = air density during weighing

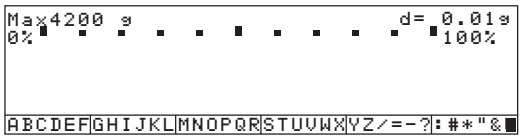
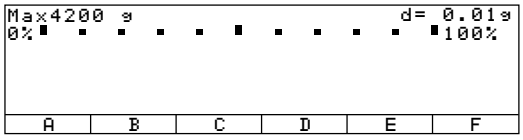
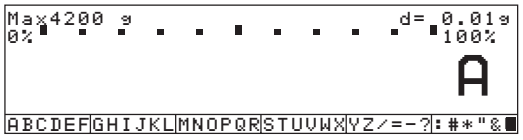
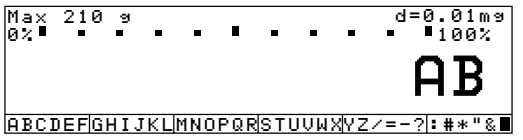
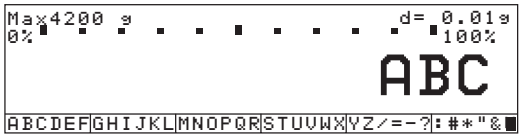
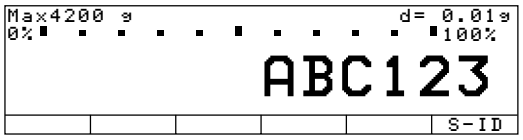
ρ = density of the sample

Practical Examples
Example W1: Simple weighing

Step	Key (or instruction)	Display/Output
1. If necessary, tare the balance (O symbol: balance is tared, – verified balances only)	(Tare)	
2. Enter sample ID	see Example W2	
3. Determine sample weight (Example)	Place load on balance	
4. Print weight value	(Print)	S ID ABC123 N + 2231.56 g

Example W2
Enter “ABC123” as sample ID

Note:
– The sample ID generally applies to one weighing operation only
– The ID is deleted after data output

Step	Key (or instruction)	Display/Output
Initial status (balance unloaded) (ID can also be entered while balance is loaded)		
1. Select alphabetic input	(ABC)	
2. Select the required letter group	**ABCDEF** soft key	
3. Enter the letter “A” (To delete a letter:	**A** soft key (CF))	
4. Select the letter group and enter “B”	**ABCDEF** soft key **B** soft key	
5. Select the letter group and enter “C” (If only letters are entered, conclude input:	**ABCDEF** soft key **C** soft key (ABC))	
6. Enter the numbers 1, 2 and 3	(1) (2) (3)	
7. Store the ID (max. 20 characters) – The next printout will include the sample ID	**S ID** soft key	

Device Parameters

Password
You can enter a password to block access to the operating menu and to the functions for ID code input and exact calibration weight input.

For details, see “Setting the Device Parameters” in the chapter entitled “Configuration”.

User ID
You can enter your own personal password (20 characters max.)

Clock
ISO/GLP/GMP printouts in particular must be generated with the date and time stamp of the specific measurement. This date and time stamp is optional on other printouts.

For details, see “Setting the Device Parameters” in the chapter entitled “Configuration”.

Interface

Purpose
This item enables you to set the parameters for the following interfaces:

- Serial interface port

- External switch function

Serial communications port
You can set the serial communications port to use for the following modes:
- SBI
- XBPI
- YDP01IS
- YDP02
- YDP03
- YDP01IS-Label
- YDP02IS
- YDP02IS-Label
- Universal
- YDP04IS
- YDP04IS-Label

Universal Remote Switch
You can connect an external universal remote switch (foot switch) to one of the two serial ports. Then you can assign one of the following functions to be performed when the switch is activated:
- Print key
- Tare key
- Cal key
- F1 function key
- CF key
- F2 function key
- Bar code scanner, PC keyboard
(Special adapter necessary/ Order no. YCC01-0024M01)

“PC Keyboard” Functions
The alphanumeric key codes implemented are for a German keyboard layout only (“Z” in the first row instead of “Y”, for example).
Some of alphanumeric keys are used with the [Shift] key:
a-z, A-Z, 0-9, Space,„„.\+#<>!”$@% &t/();=:_?*”

Function key:

PC keyboard	Balance
F1	(Tare) key
F2	(Setup) key
F3	Soft key 6
F4	Soft key 5
F5	Soft key 4
F6	Soft key 3
F7	Soft key 2
F8	Soft key 1
F9	Display
F10	Escape
F11	(⎙) key (print)
F12	(Tare) key
Return	Soft key 1
Backspace	Escape
Up Cursor	Soft key 3
Left Cursor	Soft key 4
Down Cursor	Soft key 2
Right Cursor	Soft key 1
POS1 (HOME)	Soft key 6
ESC	Escape
PRINT	(⎙) key

The “Num Lock” und “Caps Lock” keys are not supported. There is no country-specific option for switching these keys to a different function.

Control Port Function
You can connect either a checkweighing display or an external universal switch to the serial communications port on the balance (factory setting).

To do so, you need to configure the interface for input or output.

Pin Assignment Chart of the Female Interface Connector

Pin	Function: Input
15	(⎙) key; see “Universal switch”
16	(Tare) key
17	Soft key 6 (Cal)
18	Soft key (F1)
19	(CF) key

Pin	Function: Output
15	“External switch” (see above)
16	Control port 1: lighter
17	Control port 2: equal
18	Control port 3: heavier
19	Control port 4: “set”

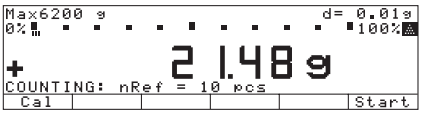
For further information on the pin assignment chart, see the section on “Pin Assignment Charts” in the chapter entitled “Overview”.

Display
You can configure the display for your individual needs.

The contrast can be adjusted in 5 levels:
`Contrast`

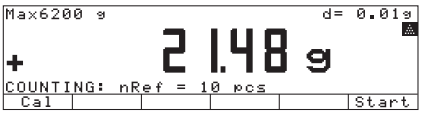
Characters can be displayed in black on white or vice versa: `Background`

You can blank out either the bar graph or the text line or both: `Digit size`



`10mm + bar graph + text display`

`13mm + bar graph`



`13mm + text display`

`13mm`

You can blank out the display of application symbols: `Application symbols`

Keys
You can assign different functions to the (CF) key for deleting input and applications.

When you delete applications, you can delete either the data stored for all applications or just selected data.
`CF function in application`

When you delete input, you can either delete all the data input in a field, or only the last character entered.
`CF function for inputs`

You can block key functions; you can choose whether to block all keys (except (I/⏻) and (Setup), or just the alphanumeric keys.
`Block key functions`

Extra Functions
Acoustic Signal

An acoustic signal is emitted when you press a key. When the key pressed is allowed, the signal is a single beep-tone; when it is not allowed, this is signaled by a double-beep (key does not initiate a function). In the Setup menu, you can configure whether

- the acoustic signal should sound (`On`)
- the acoustic signal should not sound (`Off`)

Power-On Mode
You can configure the balance so that when a power supply is connected,

- the scale is off (`Off/on/standby` or
- the scale switches on automatically (`Auto on`)

You can also configure the scale to go into the standby mode (`Off/on/standby`) when it is turned off.

After you turn on the scale, a self-test of the functions is run (`TEST` is displayed in the text line and the bar graph is shown)

MP8 Interface Emulation

Purpose
With the MP8 interface emulation function, you can connect peripheral devices of the MP8 generation that have separate AC power supplies (such as the 73822... Data Control terminal, a YFC..., or a YDI 50 Z Data Input dedicated keyboard, for example) to your LA balance.

Features
- The balance can be used only to determine weights.
- The interface communicates exclusively in the MP8 binary protocol.
- Select the application program and the program index for MP8, as well as individual application parameters, in the Setup menu.

Preparation
- Activate the MP8 emulation mode*:

● Press (Setup)

● Select the `factory settings` and confirm: press the `v` soft key repeatedly and then the `>` soft key

● Select `Reset to MP8:` press `v` soft key and `>` soft key

● Select `Yes` and press ↵ to confirm

> The balance is restarted

* follow the same procedure to return from MP8 emulation back to factory setting

Factory Settings
Each parameter category has a factory setting. To restore the factory settings, select this item in the Setup menu and select `YES` to confirm.

The following parameters are not restored to factory settings when you activate this function:
- Language
- Password
- Display contrast
- Time (clock)

Calibration/Adjustment

Purpose
Calibration is the determination of the difference between the weight readout and the true weight (mass) of a sample. Calibration does not entail making any changes within the balance.

Adjustment is the correction of this difference between the measured value displayed and the true weight (mass) of the sample, or the reduction of the difference to an allowable level within maximum permissible error limits.

Available Features
You can configure whether the calibration mode
- will be activated according to the specific setting (external/ internal) or
- can be selected by the user after pressing the `Cal` soft key: `Selection mode`.

Your balance can be calibrated externally (Balance menu: CAL key function; menu item `Ext. cal./adj.: factory-def. wt.` or `Ext. cal./adj.: user-defined wt.`) or internally (`Internal cal./ adjustment`).

External calibration can be performed
- with a user-defined weight `Ext. cal./adj.: user-defined wt.`

The adjustment can be performed
- automatically following calibration: `Cal., then auto adjust.` or
- if desired, the adjustment operation can be started manually after calibration: `Cal., then manual adjust`

You can have the balance automatically display an adjustment prompt after a certain time interval has elapsed since the last calibration/adjustment or when the ambient temperature changes by a defined amount.

You can also configure the balance to perform calibration and adjustment automatically (isoCAL) when the pre-set time and/or temperature limit is reached `On and reset application` and `On without resetting app.`.

You can have the calibration/ adjustment results documented in a ISO/GLP/GMP-compliant printout; see page 116.

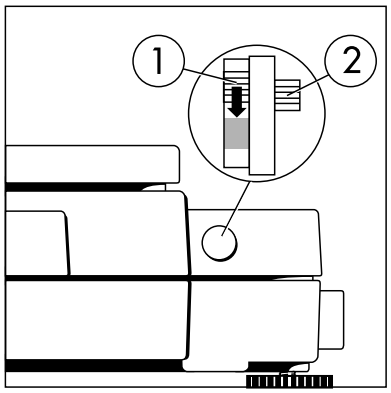
Factory Settings
Calibration/adjustment mode: `Selection mode`
Calibration/adjustment sequence: `Calibrate, then auto adjust`
isoCAL function (automatic initiation of cal./adj. sequence): `On without resetting app.`

Start automatic adjustment: `isoCAL`

Print GLP/GMP calibration/adjustment record: `Automatic if GLP is selected`

Releasing Access to External Calibration in Verified Balances of Accuracy Class Ⓘ

- Remove the covering plate from the back of the balance housing
- Move Switch 1 in the direction of the arrow



> Switch down:
external calibration accessible
Switch up:
external calibration blocked

> Note:
Do not move Switch 2

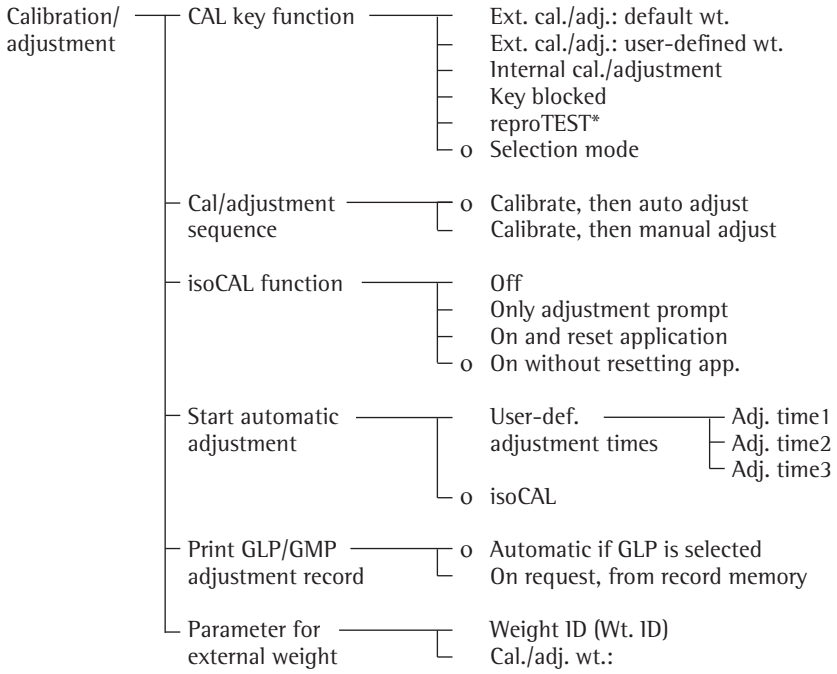
For service technicians only: External Calibration in Verified Balances of Accuracy Class Ⓘ
- External calibration is blocked when the balance is used in legal metrology

> External calibration can only be released after removing the verification control seal, in which case the validity of the verification becomes void and the balance must be re-verified

- External calibration can now be performed

Preparation

- Select the balance function for “calibration/adjustment”: press Setup
- To select the `Balance/scale functions`: press the > soft key
- Select `Calibration/adjustment`: press the > soft key

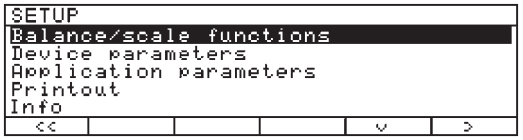
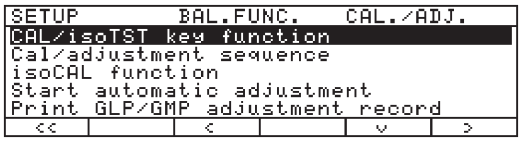
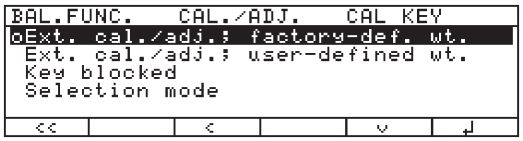
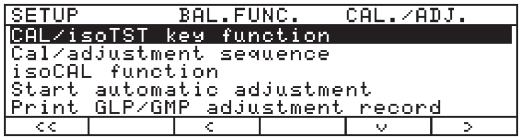
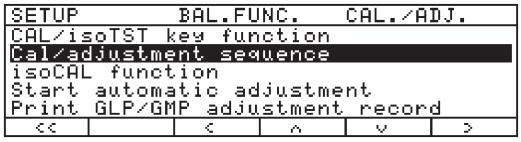


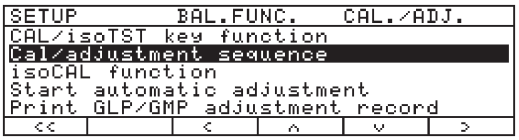
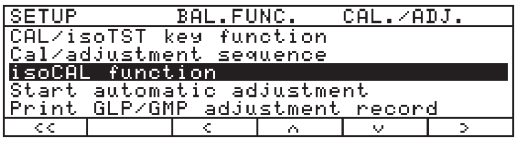
o = factory setting

- Save settings and exit Setup menu: press the << soft key

* = How to run this application is described in detail in our “Genius ME” Installation and Operating Instructions. Request your copy directly from Sartorius or download it from the Internet (www.sartorius.com; see “downloads”)

Preparation
Example:
Set the parameters for calibration and adjustment; e.g., with manual calibration/adjustment, isoCAL off

Step	Press key(s) (or follow instructions)	Display/Output
1. Switch on the balance, if not already on	I/⏻	Sartorius logo and self-test 
2. Select the Setup menu	Setup	
3. Select “Balance/scale functions”	> soft key	
4. Select “Calibration/adjustment”	> soft key	
5. Select CAL key function	> soft key	 o = last setting selected
6. Select desired function and confirm (e.g., “Internal cal./adj.”)	^ soft key, repeatedly, if necessary ↵ soft key	
7. Exit CAL key function	< soft key	
8. Select “Cal./adjustment sequence”	v soft key	

Step	Press key(s) (or follow instructions)	Display/Output
9. Confirm calibration and adjustment sequence	> soft key	
		o = last setting selected
10. Select other settings, if desired and confirm (e.g., Calibration with manual adjustment)	v and ↲ soft keys	
11. Exit Cal./adjustment sequence	< soft key	
12. Select isoCAL function	v soft key	
and confirm	> soft key	
	o = last setting selected	
13. Select other settings, if desired and confirm (e.g., turn off isoCAL function)	^ soft key repeatedly ↲ soft key	
14. Save settings and exit the Setup menu	<< soft key	

Selecting the Calibration/ Adjustment Parameter
The setting `Selection mode` must be selected in the Setup menu under "Balance functions: Calibration/adjustment: CAL key function" (factory setting).

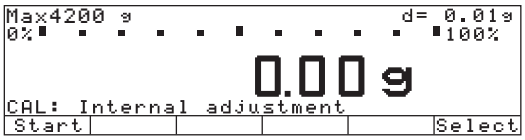
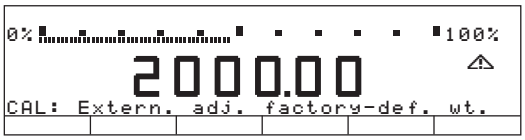
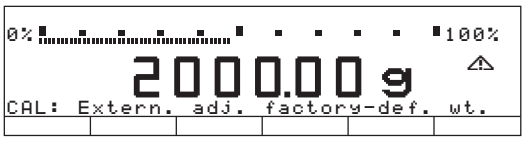
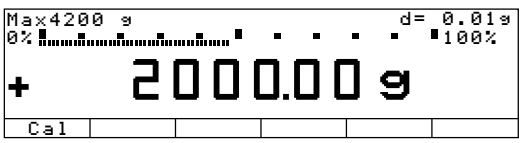
After pressing the `Cal` soft key, you can choose from among the following settings by pressing the `Select` soft key:

- External calibration/adjustment with the preset calibration weight:
  `Ext. cal./adj.: factory-def. wt.`
- External calibration/adjustment with a calibration weight determined by the user: `Ext. cal./adj.: userdefined wt.`
- Internal calibration/adjustment
  `Internal cal./ adjustment`
- Reproducibility test
  `reproTEST`

● Start the desired routine:
Press the `Cal` soft key again

In the selection mode: Perform external calibration followed by automatic adjustment with the factory-set weight

Configuration:
factory settings

Step	Key(s) (or instruction)	Display/Output
1. Select Calibration	`Cal` soft key	
2. Select external calibration/adjustment with factory-defined weight	2 × `Select` soft key	
3. Start external calibration/ adjustment	`Start` soft key	
4. Place the weight on the balance (e.g., 2,000.00 g) Minus sign –: Weight too low Plus sign + Weight too high no plus/minus sign: Weight o.k. This is displayed after calibration, for approx.10 seconds: (on verified balances, the difference between the displayed weight and the true weight (mass) is displayed) After adjustment, the following is displayed:	Place weight on balance	 
5. Unload the balance (ISO/GLP/GMP printout: see page 116)		

Internal Calibration/Adjustment

First set either `Internal cal./ adjustment` or `Selection mode` (factory setting) in the Setup menu under "Balance functions: Calibration/adjustment: CAL key function."

Inside the balance housing is a built-in motorized calibration weight.

The internal calibration/adjustment sequence is as follows:

● Select the calibration function: Press the `Cal` soft key and then the `Start` soft key

> The internal calibration weight is applied automatically

> The balance is calibrated

> If the setting `Calibrate, then auto adjust` is selected in the Balance menu, the balance is now automatically adjusted

> If the setting `Calibrate, then manual adjust` is selected in the Balance menu, you can end "Internal cab/ adjustment" now; to start it, press the `Start` soft key without adjusting the balance (see "Calibration and Adjustment Sequence", next column)

> The internal calibration weight is removed

> (ISO/GLP/GMP printout: see page 116)

Calibration and Adjustment Sequence
In the Setup menu, you can configure the balance so that:

– calibration is always followed automatically by adjustment `Calibrate, then auto adjust` (factory setting) or

– you have the choice of ending the sequence or starting adjustment after calibration `Calibrate, then manual adjust`
If no deviation is determined in calibration, or the deviation is within the tolerance limits dictated by the degree of accuracy you require, it is not necessary to adjust the balance. In this case, you can end the calibration/ adjustment sequence after calibration. There are 2 softkeys active at this point:

– `Start` to start adjustment

– `End` to end the sequence

External Calibration/Adjustment* with a User-Defined Calibration Weight

First set either `Ext. cal./adj.:user-defined wt.` or `Selection mode` (factory setting) in the Setup menu under "Balance functions: Calibration/adjustment: CAL key function."

You can define a weight for calibration/adjustment. External calibration/adjustment must be performed with weights that are traceable to a national standard and that have error limits which are at least 1/3 of the required tolerance of the display accuracy.

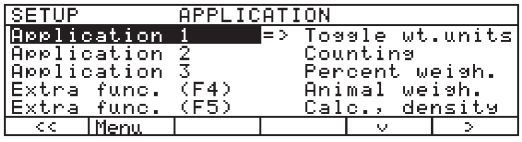
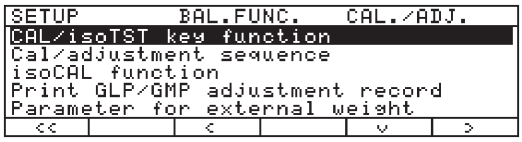
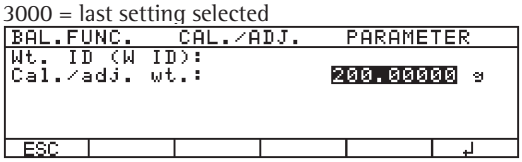
See page 44 for the external calibration/adjustment sequence. For this example, select external calibration/adjustment with a user-defined weight.

The balance has a factory-set weight value (see "Specifications").

To reset a user-defined calibration weight to the original factory setting:

○ Enter the factory-defined value manually (see "Specifications")

Define the Calibration Weight

Step	Press key(s) (or follow instructions)	Display/Output
1. Select Setup menu	(Setup)	
2. Select "Balance/scale functions"	> soft key	
3. Select "Calibration/adjustment"	> soft key	
4. Select parameter for external weight	v soft key 5 × > soft key	
5. Select "Cal./adj. wt."	v soft key	
6. Enter calibration weight (e.g., 5000 g) and save	(5) (0) (0) (0)	3000 = last setting selected 
7. Save the calibration weight	↵ soft key	
8. Exit the Setup menu	<< soft key	

isoCAL:
Automatic Calibration and Adjustment
First set either `On and reset the application` or `On without resetting the app.` (factory setting) in the Setup menu under "Balance functions: Calibration/adjustment: CAL key function". The "isoCAL" display automatically begins flashing if the ambient temperature changes in relation to the temperature at the time of the last calibration/adjustment, or after a defined time interval has elapsed. The balance is telling you that it wants to adjust itself.

This automatic calibration prompt is triggered when:
- The change in temperature or the elapsed time interval is greater than that shown in the table at the right
- The balance status does not correspond to Setup configurations
- No number or letter input is active
- The load has not been changed within the last 2 minutes
- The balance has not been operated within the last 2 minutes
- The load on the balance does not exceed 2% of the maximum capacity
- When you turn on the balance after it had been disconnected from power (only on verified balances with a readability of ≤0.1 mg)

When these requirements are met, `C` is displayed in the measured value line.

If the balance is not operated and the load is not changed, internal calibration and adjustment starts after 15 seconds have elapsed.

Automatic Calibration and Adjustment at Set Times*
In the Setup menu (see p. 41 for the menu path) you can enter up to three different times of day for automatic calibration/adjustment.

When one of these times is reached, the balance will display the flashing calibration prompt ("isoCAL"). Calibration/adjustment is not performed if the balance is off (standby mode) or in the Setup mode at the time set for calibration.

If the balance is being operated at the time set for automatic calibration/adjustment, the calibration/adjustment sequence is prompted afterward. Automatic calibration/adjustment is prompted at set times when:

- The set time is reached
- The balance is not in Setup mode
- No alphanumeric input is active (e.g., equation for calculation)
- The load has not been changed within the last 2 minutes
- The balance has not been operated within the last 2 minutes
- The load on the balance does not exceed 2% of the maximum capacity

In the Setup menu, you can configure the balance so that after calibration and adjustment
- the application program is restarted `On and reset the application`

- the application program remains at its previous status `On without resetting the app.`

Also in Setup, you can configure the balance so that it displays a calibration prompt, but does not perform the calibration/adjustment functions automatically `Only adjustment prompt`

Switching Off the isoCAL Function in Precision Balances with a Readability ≥1 mg Used as Legal Measuring Instruments in the EU*:

Automatic calibration and adjustment is also performed even when `Off` or `Only adjustment prompt` is set in the Setup menu.

Limited temperature range:
- Balances of accuracy class Ⓘ: +15°C to +25°C (59°F to 77°F)
- Balances of accuracy class Ⓘ: +10°C to +30°C (50°C to 86°C)

Standard temperature range:
- 0°C to +40°C (32°F to 104°F)

You can switch off the automatic adjustment function on verified balances with a readability ≥ 1 mg:

- after modification by the Sartorius Customer Service

> Subsequently the balance can only be used when the ambient temperature range is within legally defined limits.

○ The isoCAL function cannot be switched off on balances with a readability ≤0.1 mg

* including the Signatories of the Agreement on the European Economic Area

Fully automatic adjustment is initiated under the following conditions:

Model	when the temperature changes by	after a time interval of
LA310S, LA230S, LA230P, LA120S, LA3200D, LA1200S, LA2000P	1.5°C	4 h
LA620S, LA620P, LA6200S, LA4200S, LA5200P, LA8200S, LA8200P	2°C	6 h
LA220S, LA2200S, LA2200P, LA34001P, LA34001S, LA64001S	4°C	12 h
LA820, LA420, LA16001S, LA12000S, LA12000P, LA6200, LA4200, LA2200, LA34000	4°C	24 h

These values are also factory set in the verified or verifiable models (with the model number suffix -0CE).

* = not applicable to verified balances

Block Printout
You can have the results of a calibration/ adjustment procedure printed out.
You can configure whether the printout is generated as soon as the procedure is completed, or whether a number of calibration/ adjustment procedures (up to 50) are collected for a block printout.

Loading Stored Data:
Data for the block printout are stored in battery-backed memory. These data remain in memory for approx. 3 months after the equipment is disconnected from AC power. Make sure to generate a printout before disconnecting the equipment for a long period of time.

Block Printout of Calibration/Adjustment Data
With the following Setup menu configuration, you can store the data from up to 50 calibration/adjustment procedures and have them printed on request:

- isoCAL printout
  `On request, from record memory`

When the memory contains 50 data records:
- additional records are output automatically

If at least one block printout data record has been configured, the following soft keys are available after you press the `Cal` soft key:

`Info`	The number of records is displayed in the text line
`PrtPro`	Print accumulated records
`DelPro`	Delete accumulated records; records can only be deleted after a printout has been generated. If a password has been assigned in the Setup: Input menu, you must enter either the configured password or the General Password before you can delete the records.

For internal calibration/adjustment, the initialization mode of the procedure is displayed in the `Start` line.

```
--------------------
13.05.1997     09:17
        SARTORIUS
Mod.          LA4200S
Ser. no.     70419914
Ver. no.     01-35-18
ID
--------------------

24.04.1997     12:03
Start:         manual
Diff. +      0.01 g
External calibration
        completed

25.04.1997     12:10
Start:    isoCAL/temp
Diff. +      0.01 g
Internal adjustment
        completed
Diff. +      0.00 g

25.04.1997     18:30
Start:      Adj.time
Diff. +      0.01 g
Internal adjustment
        completed
Diff. +      0.00 g

26.04.1997      9:37
Start:         manual
Diff. +      0.01 g
Internal adjustment
        completed
Diff. +      0.00 g

27.04.1997     11:53
Start:       Ext.cal.
W ID
Nom.   + 2,000.00 g
Diff. +      0.01 g
External calibration
        completed
Diff. +      0.00 g

--------------------
13.05.1997     09:17
Name:

--------------------
```

GLP header

List of Calibration/Adjustment Procedures:

Example 1:
External calibration

Example 2:
isoCAL triggered by difference in temperature

Example 3:
isoCAL at defined time

Example 4:
Internal calibration/adjustment triggered manually

Example 5:
External calibration/adjustment

GLP footer

Soft Key Functions
Start Start application program

Weigh. Toggle to basic weighing functions

Using Verified Balances as Legal Measuring Instruments in the EU*:
All application programs can be selected on balances verified for use in legal metrology.
Calculated values can be indicated as follows:

- Percent = %
- Piece counting (Counting) = pcs
- Computed value = o, ⚠

Auto-Start Application When the Power Goes On
In the Setup menu, you can select whether the last application active before you turn off the power starts automatically when the power is turned on again (Setup: Application parameters: Auto-start app. when power goes on: On)

Toggle between Two Weight Units U1 U2

Purpose
With this application program you can switch the display of a weight value back and forth between two weight units by pressing a soft key.

You can use the "Toggle between Two Weight Units" application in combination with a program chosen from Application 2 (checkweighing, time-controlled functions) and one from Application 3 (totalizing, formulation, statistics) as well as with the extra functions.

Available Features
- Toggling the displayed weight
- Setting the display accuracy
- Other features as for the basic weighing function

Factory Settings
Weight unit 1: Grams g

Display accuracy 1: All digits

Weight unit 2: Grams g

Display accuracy 2: All digits

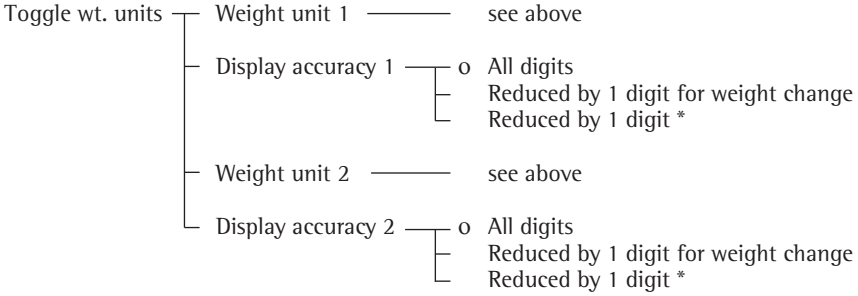
* including the Signatories of the Agreement on the European Economic Area

Preparation
Balances used as legal measuring instruments: grams and kilograms are the only weight units available

Standard balances: The following weight units are available in both ranges:

Unit	Conversion factor	Display/ Printout	Line for metrological data
Grams	1.00000000000	g	g
Kilograms	0.00100000000	kg	kg
Carats	5.00000000000	ct	ct
Pounds	0.00220462260	lb	lb
Ounces	0.03527396200	oz	oz
Troy ounces	0.03215074700	ozt	ozt
Hong Kong taels	0.02671725000	tlh	tlh
Singapore taels	0.02645544638	tls	tls
Taiwanese taels	0.02666666000	tlt	tlt
Grains	15.43235835000	GN	GN
Pennyweights	0.64301493100	dwt	dwt
Milligrams	1000.00000000000	mg	mg
Parts per pound	1.12876677120	/lb	lb
Chinese taels	0.02645547175	tlc	tlc
Mommes	0.26670000000	mom	M
Austrian carats	5.00000000000	K	K
Tola	0.08573333810	tol	tol
Baht	0.06578947437	bat	bat
Mesghal	0.21700000000	MS	MS

- Turn on the balance: Press I/⏻
- Select the Toggle Weight Units application in the Setup menu: press Setup
- Select Application parameters: press the v soft key 2 ×, then the > soft key once
- Application 1 (basic settings): press the > soft key
- Select Toggle wt. units: (repeatedly) press the ^ or v soft key
- Confirm Toggle wt. units: press the > soft key



o = factory setting
* = not for verified balances used as legal measuring instruments

see also "Application Parameters (Overview)" in the chapter entitled "Configuration"

- Save settings and exit the Setup menu: press the << soft key

Additional Functions
In addition to the functions for:

- alphanumeric input,
- taring (not during alphanumeric input),
- printing (NUM print; S ID), you can also access the following functions from this application:

Calibration/Adjustment

● Press the **Cal** soft key

> See “Calibration/Adjustment” for further instructions

Toggling to the Next Application

● Press (⇧01)

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

● Press (Setup)

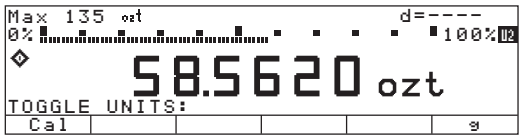
> See “Configuration” for further instructions

Turning Off the Balance

● Press (I/⏻)

> The balance shuts off

Practical Example
Toggle the Display From Grams [g] (1st Unit) to Troy Ounces [ozt] (2nd Unit)
Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Toggle wt. units: Weight unit 2: Troy ounces /ozt

Step	Key (or instruction)	Display/Output
1. Toggle back to weight unit 1, if necessary (**U1**: Weight unit 1)	(CF)	
2. Change weight unit to Troy ounces [ozt] (**U2**: Weight unit 2)	**ozt** soft key	
3. Change weight unit to Grams [g]	**g** soft key	

Counting

Purpose
With the Counting program you can determine the number of pieces of approximately equal weight.

You can use this application program in combination with a program chosen from Application 2 (checkweighing, time-controlled functions) and one from Application3 (totalizing, formulation, statistics) as well as with the extra functions.

Features
- Optional balance configuration in Setup for automatically initializing this application and loading the most recent reference sample quantity “nRef” and average piece weight “wRef” when you switch on the balance (this is the automatic setting when the balance is initialized; Setup menu: Application parameters: Auto-start app. when power goes on: On)
- Reference sample quantity “nRef” entered manually
- Average piece weight “wRef” entered manually
- Storage of the current weight value for the preset reference sample quantity “nRef”, to be loaded when the Counting program is initialized
- Setting the accuracy when the reference sample weight “wRef” is stored for calculating a piece count
- Automatic output of the quantity and sample weight via the data interface port after initialization or reference sample updating while running the Counting program (Select Setup: App: Basic settings: Printout configuration: Auto print upon initialization: All values)
- Toggling between piece count and weight value by pressing the `Count.` or `Weigh.` soft key
- Toggling between counting and additional applications using the key (for example, checkweighing)

Factory Settings
Accuracy when calculating piece weight:
`Display accuracy`

Reference sample updating:
`Automatic`

Soft Key Functions

`nRef`	Store value input as reference sample quantity
`wRef`	Store input value as reference sample weight
`Opt.`	Reference updating criteria met; reference updating can be performed
`Count.`	Toggle to the Counting application
`Weigh.`	Toggle to the weighing mode
`Start`	Store current weight value for the preselected piece count

Preparation

To calculate a piece count, the average weight of one piece must be known.
This average piece weight can be entered into the Counting program in one of three ways:

- Enter the average piece weight using the numeric keys and store it;
- The last reference sample quantity entered is loaded and displayed when you turn on the balance. Place the same number of parts on the balance and initialize the Counting program;
- When the automatic initialization parameter (see previous page), is on (Setup: > Printout: Application-defined output: Autoprint upon initialization: All values; see page 34), the balance goes into the "counting" mode when you turn it on and loads the last average piece weight and corresponding reference sample quantity that were entered or calculated.

Reference Sample Updating

You can have the average piece weight updated during counting (with the piece count displayed) if "AWP update" is set to "manual" or "automatic" in the Setup menu.
Manual updating can only be performed when the **Update** soft key is displayed.
Reference sample updating must be completed before using an application program from Application 3.

The **Opt.** soft key is displayed when:

- the balance has stabilized (stability symbol displayed)
- the current piece count is not more or less than double the original piece count
- the current piece count is less than 100
- the internally calculated piece count (e.g., 17.24) differs from the nearest whole number (in this case: 17) by less than ±0.3

Reference updating can be repeated several times with an approximately doubled piece count.

○ To perform reference updating: press the **Opt.** soft key

○ Turn on the balance: press (I/⏻)

> Sartorius logo is displayed

● Select the Counting application in the Setup menu: press (Setup)
● Select the **Application parameters**: press the **v** key 2×, then the **>** soft key once
● Select **Application 1 (basic settings)**: press the **>** soft key
● Select **Counting**: repeatedly press the **^** or **v** soft key
● Confirm **Counting**: press the **>** soft key

- Counting
  - Average piece weight calculation
    - o Display accuracy
    - +1 decimal place
    - +2 decimal places
  - Average piece weight updating
    - Off
    - Manual
    - o Automatic

o = factory setting

see also the "Application Parameters (Overview)" in the chapter entitled "Configuring the Balance"

● Save settings and exit the Setup menu: press the **<<** soft key

Additional Functions

In addition to the functions for:
- alphanumeric input,
- taring (not during alphanumeric input),
- printing,

you can also access the following functions from this application:

Calibration/Adjustment

● Press the **Cal** soft key

> See "Calibration/Adjustment" for further instructions

Toggling to the Next Application

● Press (☐↑)

> See the section on the corresponding application program for further instructions

Setup (Setting Parameters)

● Press (Setup)

> See "Configuration" for further instructions

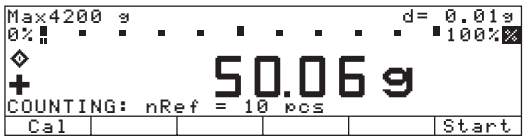
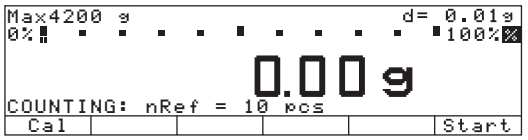
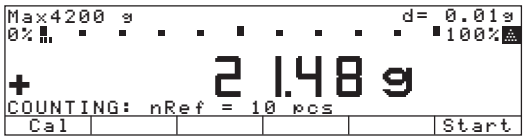
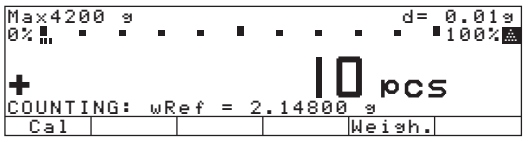
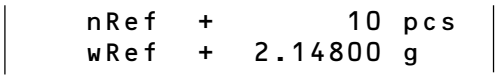
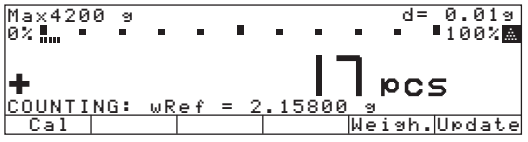
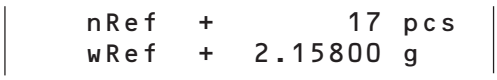
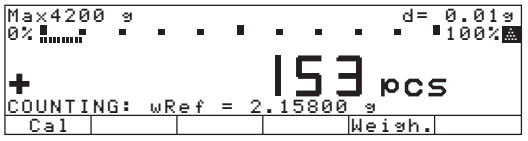
Turning Off the Balance

● Press (I/⏻)

> The balance shuts off

Practical Example
Determining an Unknown Piece Count; Weighing in the Preset Reference Sample Quantity

Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Counting: Average piece weight updating: Manual
Setup: Printout: Application-defined output: All values

Step	Key (or instruction)	Display/Output
1. Delete previous setting if necessary	CF	
2. Prepare a container for the parts to be counted	Place the empty container on the balance	
3. Tare the balance	Tare	
4. Place the reference sample quantity on the balance (example: 10 pcs, each weighing 2.148 g)	Place the displayed number of parts in the container	
5. Determine the average piece weight (number of decimal places displayed depends on the balance model)	Start soft key	 
6. If necessary, increase the number of parts and perform reference sample updating (example: 7 additional pieces)	Place additional parts in the container Opt. soft key	 
7. Weigh uncounted parts	Place parts to be counted in the container	
8. If desired, print total piece count (here: 153 pcs)	P	

Weighing in Percent %

Purpose
This application program allows you to obtain weight readouts in percent which are in proportion to a reference weight.

Alternatively, you can have the value displayed as a difference in percent between the weight on the balance and the reference weight, or as a special ratio1 or ratio2.

You can use the "Weighing in Percent" application in combination with a program chosen from Application 2 (checkweighing, time-controlled functions) and one from Application 3 (totalizing, formulation, statistics) as well as with the extra functions.

Available Features
- Reference percentage "pRef" loaded from long-term memory when you turn on the balance
- Optional balance configuration in Setup for automatically initializing this application and loading the most recent reference percentage "pRef" entered with reference weight "Wxx%" when you turn on the balance (Setup: App: Auto start application when power goes on: On).
- Value displayed as:
  - Residual quantity (portion)
  - Difference (deviation)
  - Ratio1
  - Ratio2

  depending on the selected Setup menu code.
- Reference percentage "pRef" entered manually
- Store the current weight as the reference percentage weight "Wxx%" for initializing the weighing-in-percent application program
- Reference weight "Wxx%" entered manually
- Storage parameter (rounding-off factor) for storing the reference weight "W100%" in percentage calculation can be configured
- Configuration of decimal places displayed with a percentage
- Optional configuration for having the reference weight "Wxx%" and reference percentage automatically output via the data interface port after initialization (print application parameters) (Select Setup: Printout: Application–defined output: Auto print upon initialization: All values)
- Toggle the display between percentage and weight readout by pressing the `Weigh.` or `Perc.` soft key
- Toggle between the weighing-in-percent program and other applications (e.g., checkweighing) by pressing 

Factory Settings
Storage parameter:
`Display accuracy`
Digits displayed with percentage:
`2 digits`
Display calculated value: `Residue`

Soft Key Functions

`pRef`	Store value input as reference percentage
`Wxx%`	Store input value as reference sample weight
`Perc.`	Toggle to the Weighing-in-percent application
`Restar`	Start next weighing operation
`Weigh.`	Toggle to the weighing mode
`Start`	Store current weight value for preselected percentage

Preparation
To calculate a value in percent, the reference percentage must be known. This value can be entered into the weighing-in-percent program in one of three ways:

- The last reference percentage entered is loaded and displayed when you turn on the balance. Place the corresponding weight on the balance and initialize the weighing-in-percent program;
- With automatic initialization switched on (Setup: App: Auto start application when power goes on: On), the balance goes into the "weighing in percent" mode when you turn it on and loads the last reference percentage entered as well as the corresponding reference weight;
- Enter the reference weight using the numeric keys and store it (`Wxx%` soft key).

● Turn on the balance: Press (I/⏻)

> Sartorius logo is displayed

● Select the Weighing in percent application in the Setup menu: Press (Setup)

● Select `Application parameters`: press the `v` soft key 2×, then the `>` soft key once

● Select `Application 1 (basic settings)`: press the `>` soft key

● Select `Percent weigh.`: repeatedly press the `^` or `v` soft key

● Confirm `Percent weigh.`: press the `>` soft key

- Percent weigh.
  - Weight storage accuracy
    - o Display accuracy
    - +1 decimal place
    - +2 decimal places
  - Decimal places for readout in pct.
    - None
    - 1 decimal place
    - o 2 decimal places
    - 3 decimal places
    - 4 decimal places
    - 5 decimal places
    - 6 decimal places
  - Display calculated value
    - o Residue
    - Loss
    - Ratio1 (DR)
    - Ratio2 (OR)

o = factory setting

see also the "Application Parameters (Overview)" in the chapter entitled "Configuration"

● Save settings and exit the Setup menu: press the `<<` soft key

Equations
The following equations are used for the corresponding calculations:

Residue (weighing in percent)	=	Current weight / 100% weight × 100%
Loss (percent-DIFF:)	=	(Current weight – 100% weight) / 100% weight × 100%
Ratio1 (percent-Ratio 1:)	=	(100% weight – current weight) / current weight × 100%
Ratio2 (percent Ratio 2:)	=	100% weight / current weight × 100%

Additional Functions
In addition to the functions for:

- alphanumeric input,
- taring (not during alphanumeric input),
- printing,

you can also access the following functions from this application:

Calibration/Adjustment
● Press the `Cal` soft key
> See "Calibration/Adjustment" for further instructions

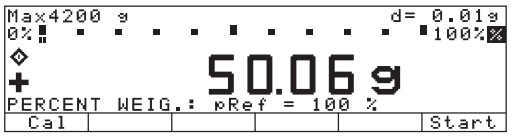
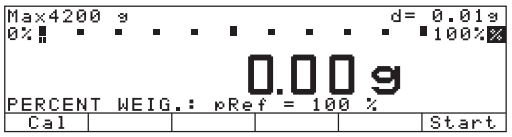
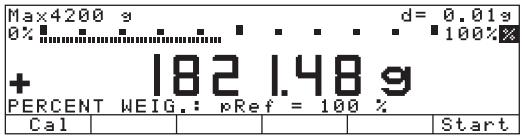
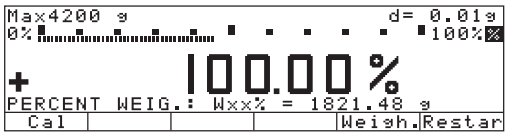
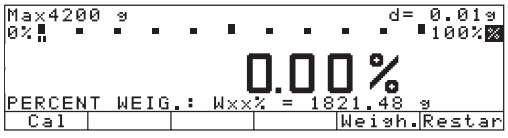
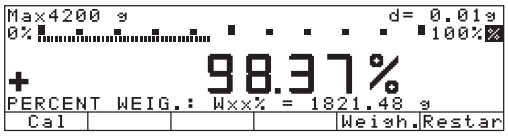
Toggling to the Next Application
● Press (⇧▯)
> See the section on the corresponding application program for further instructions

Setup (setting parameters)
● Press (Setup)
> See "Configuration" for further instructions

Turning Off the Balance
● Press (I/⏻)
> The balance shuts off

Examples
Weighing in Percent with Reference Weight Taken From Weight on Balance

Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Weighing in percent
Setup: App: Printout: Application-defined output: Auto print upon initialization: All values

Step	Key (or instruction)	Display/Output
1. Delete previous setting if necessary	CF	
2. Prepare a container for the parts	Place the empty container on the balance	
3. Tare the balance	Tare	
4. Place the reference weight on the balance (here: 1821.48 g = 100%)	Place weight equal to reference weight in the container	
5. Initialize the balance	Start soft key	 pRef + 100 % Wxx% + 1821.48 g
6. Unload the balance	Remove reference sample from the container	
7. Determine the percentage of an unknown weight	Place sample to be measured in the container	
8. If desired, print percentage (here: 98.37%)		Prc + 98.37 %

Animal Weighing

Purpose
Use this program to determine the weights of unstable samples (e.g., live animals) or to determine weights under unstable ambient conditions. In this program, the balance calculates the weight as the average of a defined number of individual weighing operations. These weighing operations are also known as "subweighing operations."

You can use the "Animal Weighing" application in combination with a program chosen from Application 2 (checkweighing, time-controlled functions) and one from Application 3 (totalizing, formulation, statistics) as well as with the extra functions.

Available Features
- Animal weighing started manually or automatically
- Automatic start:
  - when a defined threshold has been exceeded (Minimum load threshold: 10; 20; ...; 500; 1,000 display increments)
  - when three successive subweights lie within a user-defined tolerance range (calm; normal; active; 0.1%; 0.2%; ...; 50%; 100% of the animal/object)
- Manual start:
  - also possible when the load is under the minimum load threshold
  - when three successive subweights lie within a user-defined tolerance range (calm; normal; active; 0.1.%; 0.2%; ...; 50%; 100% of the animal/object)
- Optional balance configuration in the Setup menu for automatically initializing this application when you turn on the balance
- Number of weighing operations for calculation of an average (`mDef`) can be entered before the beginning of each animal weighing operation
- The factor for calculation of the result can be entered before the beginning of each animal weighing operation
- The number of subweighs remaining to be performed is indicated in the text display during weighing
- Arithmetic average displayed as a result in the pre-set weight unit (identified by the ⚠ symbol).
- Optional multiplication of the arithmetic average by a user-defined factor `Mul`.

  A circle "o" is displayed as weight unit and `Mul = xxx` is shown in the text line
- Toggling between the animal weight and the calculated value by pressing the `xNet` soft key and the `xRes` soft key
- Automatic output of results via the interface port:
  - Number of weighing operations `mDef`
  - Multiplication factor `Mul`
- Automatic output of results (printout) via the interface port:
  - Weighing result `xNet`
  - Calculated result `xRes`

  The following options have to be selected: Setup: Printout: Application-defined output: Auto print upon initialization: All values
- The unload threshold is equal to one-half the minimum balance capacity
- Return to weighing mode by unloading the balance; i.e., when the load is below the unload threshold

Factory Settings
Animal activity:
`5% of the animal/object`

Start: `Automatic`

Minimum load for automatic storage:
`100 display increments`

Decimal places in result display:
`2 decimal places`

Printout:
`Average weight only`

Soft Key Functions

`New` Automatic start:
- Unload balance and weigh next animal, if desired
- Press key to start next subweigh

Manual start:
Start next subweigh

`mDef` Store user-defined number of subweighs for averaging

`Mul` Store user-defined factor as multiplication factor for calculating the arithmetic mean

`xNet` Toggle to the animal weight

`xRes` Toggle to the calculated animal weighing result

Printout for Animal Weighing
Upon completion of the averaging process, you can have the results printed out automatically. You can also have both the weight and the calculated result printed.

```
mDef          10
Mul        0.347
xNet   +  153.00 g
xRes   +   53.91 o
```

mDef: Numbers of subweighing operations for averaging

Mul: Multiplication factor

xNet: Result of averaging

xRes: Calculated result

Preparation

● Turn on the balance: Press (I/O)

> Sartorius logo is displayed

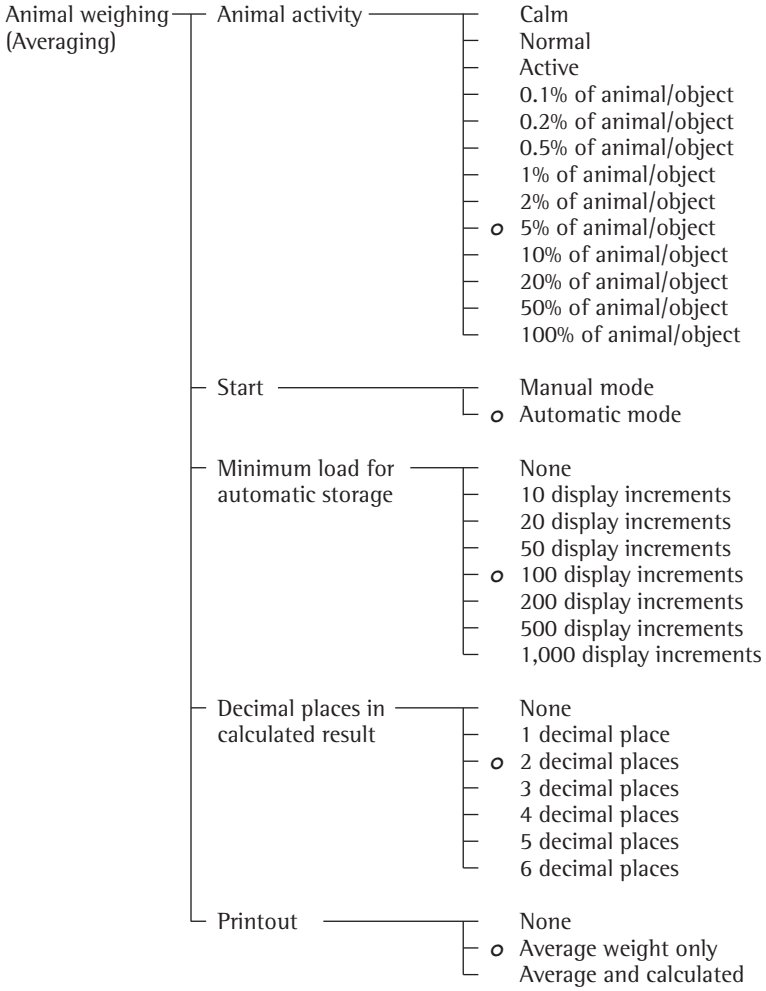
● Select the Animal weighing application in the Setup menu: Press (Setup)

● Select `Application parameters`: press the `v` soft key 2 ×, then the `>` soft key once

● Select `Application 1 (basic settings)`: press the `>` soft key

● Select `Animal weigh.`: `^` or `v` soft key repeatedly

● Confirm `Animal weigh.`: `>` soft key



o = factory setting

see also the “Application Menu (Overview)” in the chapter entitled “Configuration”

● Save settings and exit the Setup menu: Press the `<<` soft key

Additional Functions

In addition to the functions for:

– alphanumeric input,

– taring (not during alphanumeric input),

– printing,

you can also access the following functions from this application:

Calibration/Adjustment

● Press the `Cal` soft key

> See “Calibration/Adjustment” for further instructions

Toggling to the Next Application

● Press (Dn)

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

● Press (Setup)

> See “Configuration” for further instructions

Turning Off the Balance

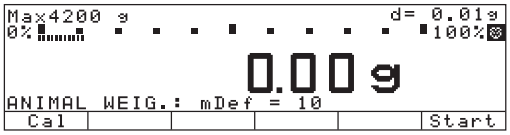
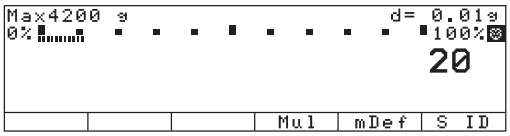
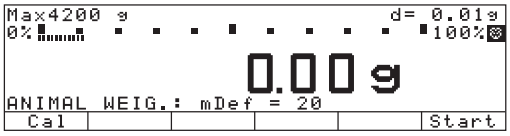
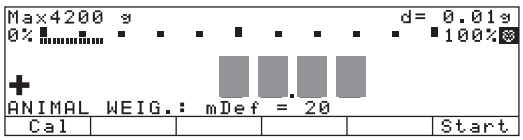
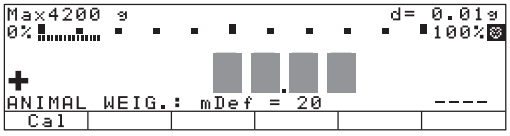
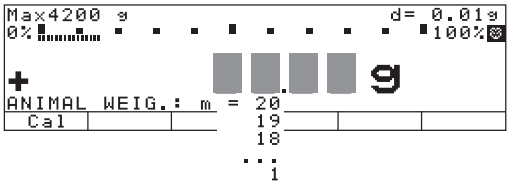
● Press (I/O)

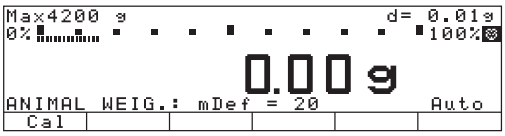
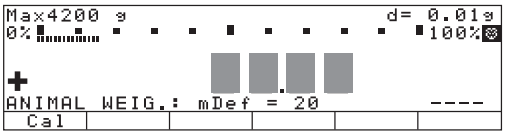
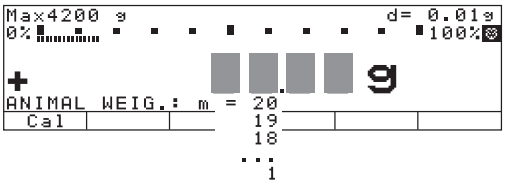
> The balance shuts off

> The display goes blank, then OFF/Standby is displayed with backlighting

Practical Example
Determining Animal Weight With Automatic Start of 20 Subweighing Operations for Averaging; Automatic Printout of the Number of Subweighing Operations and of the Animal Weight

Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Animal weighing: Animal activity: Active
Setup: App: Application 1: Animal weighing: Printout: Average and calculated values
Setup: App: Printout: Auto print upon initialization: All values

Step	Key (or instruction)	Display/Output
1. Delete previous setting if necessary	CF	
2. Prepare a container (cage)	Place empty cage on the balance	
3. Tare the balance	Tare	
4. Enter number of subweighing operations for averaging	2 0	
5. Save number	`mDef` soft key	
6. Weigh the first animal	Place 1st animal in cage	weight value fluctuates due to animal activity 
7. Start automatic animal weighing	`Start` soft key	
The balance delays starting the subweighing operation until three successive subweights lie within the range defined for an “active” animal	When this criterion is met, the subweighing series begins	

Step	Key (or instruction)	Display/Output
After 20 subweighing operations the arithmetic average (xNet) is display		
(**mDef**: no. of subweighs **Mul**: calculation factor **xNet**: arithm. average, net value **xRes**: calculated value)		mDef 20 Mul 1 xNet + 69.72 g xRes + 69.72 o
8. Unload the balance	Remove animal from cage	
9. If desired, weigh next animal	Place animal in cage	
Next weighing series begins automatically		

Calculation

Purpose
With this application program you can calculate a weight value using an algebraic equation. This can be used, for example, to determine the gsm weight (grams per square meter) of paper.

You can use the "Calculation" application in combination with a program chosen from Application 2 (checkweighing, time-controlled functions) and one from Application 3 (totalizing, formulation, statistics) as well as the extra functions.

Available Features
- You can store an equation and configure the Setup menu to initialize this program automatically with the stored equation (Setup: App: Basic settings : Auto start upon initialization: On)
- The o symbol is displayed to indicate a calculated vale. The equation used is displayed in the text line
- If no equation was entered, the weight value is displayed
- Toggle between the weight readout, equation input and display of the calculated result by pressing the corresponding soft keys (or press CF to toggle between weight and calculated value)
- The are four operators (+, –, *, /) and one factor (weight value) available when you enter an equation
- Max. equation length: 28 characters
- Pressing CF will delete either the equation or the last character entered, depending on the configuration in the Setup menu (Setup: Device: Keys: CF function for input: Delete last character)
- The calculated result is displayed with the number of decimal places configured in the Setup menu. Not all decimal places are displayed if the result is longer than the display allows. If there are more digits before the decimal point than the display can show, an error message is displayed.
- The equation is stored in non-volatile memory

Factory Settings
Decimal places in calculated result:
2 decimal places

Soft Key Functions

Equat.	Toggle to equation
+	Enter an addition operator in the equation
–	Enter a subtraction operator in the equation
*	Enter a multiplication operator in the equation
/	Enter a division operator in the equation
Weight	Enter a weight value in the equation
Start	Start calculation
Weigh.	Toggle to the weighing mode

Preparation
- Turn on the balance: Press I/⏻
- > Sartorius logo is displayed
- Select the Calculation application program in the Setup menu: Press Setup
- Select the Application parameters: press the v soft key 2 ×, then the > soft key once
- Select Application 1 (basic settings): press the > soft key
- Select Calculation: press the ^ or v soft key, repeatedly, if necessary
- Confirm Calculation: press the > soft key

Calculation — Decimal places in calculated result
- None
- 1 decimal place
- o 2 decimal places
- 3 decimal places
- 4 decimal places
- 5 decimal places
- 6 decimal places

o = factory setting

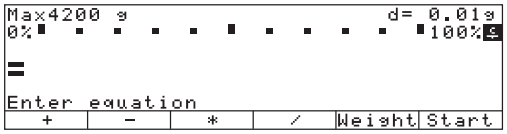
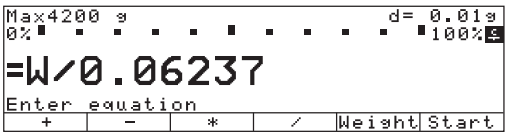
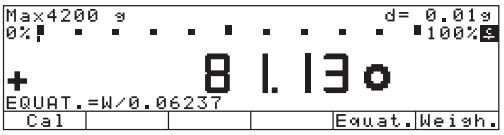
see also the "Application Parameters (Overview)" in the chapter entitled "Configuration"

- Save settings and exit the Setup menu: press the << soft key

Practical Example
Calculate the gsm weight of paper: determine the gsm of a sheet of A4 paper with the dimensions 0.210 m × 0.297 m = 0.06237 m^2.
The gsm weight is a product of the division of the weight by the surface area.

Settings (changes in the factory settings required for this example):

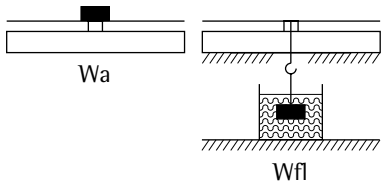
Setup: App: Application 1: Calculation

Step	Key (or instruction)	Display/Output
1. Turn on the balance and configure the settings as indicated above	I/⏻	
2. Delete previous setting if necessary	CF	
3. Tare the balance	Tare	
4. Select equation input	**Equat.** soft key	
5. Enter weight value Enter division sign Enter the surface area of a sheet of A4 paper	**Weight** soft key / soft key · 0 6 2 3 7	
6. Turn on the calculated result display	**Start** soft key	
7. Determine the gsm weight	Place A4 sheet	

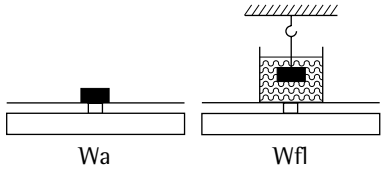
Density Determination

Purpose
With this application you can determine the density and volume of solid, pasty, liquid or powdered samples.
You can use the "Density Determination" application in combination with a program chosen from Application 2 (e.g., checkweighing, timer functions) and one from Application 3 (totalizing, formulation, statistics) as well as the extra functions.

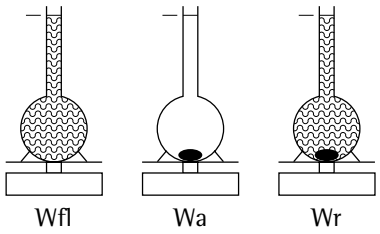
Available Features
- Choose from 2 methods for determining density of solids:
- Buoyancy, or



- displacement.



- Density determination on pasty or powdered samples using the pycnometer method



- Density determination on liquids using the liquid density method

- Choice of liquids for buoyancy:
  - Water
  - Ethanol
  - Other liquids (user-definable)

- Reference values can be entered using the numeric keys
  - Weight of sample in air (Wa)
  - Weight of sample in liquid, or weight of reference liquid when using the pycnometer (Wfl)
  - Weight of sample and reference liquid when using the pycnometer (Wr)

- Long-term storage of parameters:
  - Temperature
  - Buoyancy correction
  - Air density
  - Density of reference liquid
  - Expansion coefficient
  - Plummet volume

Factory Settings
Method: `Buoyancy`

Liquid causing buoyancy: `Water`

No. of decimals for display of vol. density: `2 decimals`

Printout: `None`

Soft Key Assignments

`Wa` Store weight of sample in air

`Wfl` With liquid density, buoyancy and displacement methods:
- Store weight of sample in liquid

With pycnometer method:
- Store weight of reference liquid

`Wr` With pycnometer method: Store weight of sample and liquid

`Start` Start a new measurement routine

`Param.` Toggle to parameter input mode (depending on method selected)

`Densit` Display the density (the parameters set remain effective for the next measurement)

`Weigh` Display the weight (the parameters set remain effective for the next measurement)

`Vol.` Display the volume (the parameters set remain effective for the next measurement)

Equations Used to Determine Density:

Buoyancy: $Rho = (Wa \times (Rhofl - LA)) \div ((Wa - Wfl) \times Corr) + LA$

For the buoyancy method, a factor of 0.99983 (factory setting) is used to allow for the buoyancy caused by the bars of the sample holder of the YDK 01 (LP) Density Determination Kit. This factor is yielded by allowing for this equation:
buoyancy of bars = $2 \times d^2 \div D^2 (Wa - Wfl)$

The equation takes the following variables into consideration: the number of wires or bars, the wire/bar diameter of the sample holder, and the inner diameter of the vessel used.
The factor 0.99983 is yielded by $1 - 2 \times d^2 \div D^2$

where: 2 = number of wires/bars
d = wire/bar diameter (0.7 mm*)
D = inner diameter of the vessel (76 mm*)

If you are using different vessels or other density kits, press the **Param.** soft key to enter any necessary changes in this calculation factor.

To determine the density of a solid according to the buoyancy method with our YDK 01 (LP) Density Determination Kit, make sure to use the beaker with a 76 mm diameter.

Displacement: $Rho = (Wa \times (Rhofl - LA)) \div (Wfl \times Corr) + LA$

For the displacement method, a factor of 1.00000 (factory setting) is used to allow for the buoyancy caused by a wire suspended in the liquid.

If you are using different vessels or other density kits, press the **Param.** soft key to enter any necessary changes in this calculation factor.

The equation takes the following variables into consideration: the number of wires or bars, the wire/bar diameter of the sample holder, and the inner diameter of the vessel used.
This factor is yielded by: $Corr = 1 - \chi \times d^2 \div D^2$

where: χ = number of wires
d = wire diameter
D = inner diameter of the vessel

with:
Rhofl = density of the reference liquid
Wa = weight of sample in air
Wfl = weight of the sample in liquid/buoyancy of sample
Corr = correction for buoyancy produced by the immersed wires or bars of the sample holder:
0.99983 for the buoyancy method
1 for the displacement method
LA = correction for air buoyancy = 0.0012 g/ccm

Pycnometer: $Rho = (Wa \times (Rhofl - LA)) \div (Wfl + Wa - Wr) + LA$
where:
Rhofl = density of the reference liquid
Wa = weight of the sample
Wfl = weight of the reference liquid
Wr = weight of sample + the reference liquid
LA = correction for air buoyancy = 0.0012 g/ccm

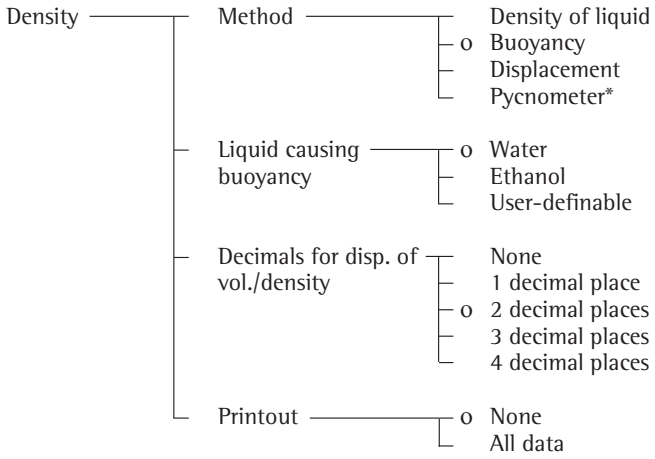
* For the YDK 01 (LP) Density Determination Kit

Preparation

- Turn on the balance: Press (I/⏻)

> Sartorius logo is displayed

- Select the Density application in the Setup menu: Press (Setup)
- Select the `Application parameters`: press the `v` soft key 2×, then the `>` soft key once
- Select `Application 1 (basic settings)`: press the `>` soft key
- Select `Density`: press the `^` or `v` soft key, repeatedly, if necessary
- Confirm `Density`: press the `>` soft key



o = factory setting

see also the “Application Parameters (Overview)” in the chapter entitled “Configuration”

- Save settings and exit the Setup menu: press the `<<` soft key

Additional Functions

In addition to the functions for:

– alphanumeric input,

– taring (not during alphanumeric input),

– printing,

you can also access the following functions from this application:

Calibration/Adjustment

- Press the `Cal` soft key

> See “Calibration/Adjustment” for further instructions

Toggling to the Next Application

- Press (▷|)

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

- Press (Setup)

> See “Configuration” for further instructions

Turning Off the Balance

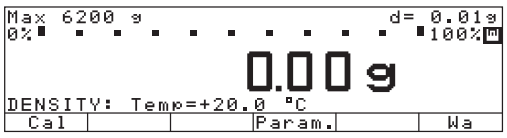
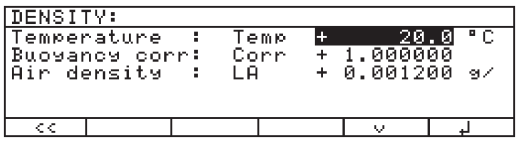
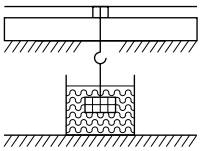
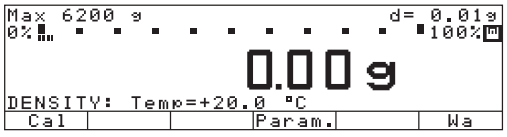
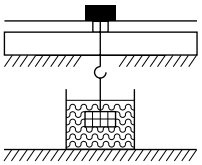
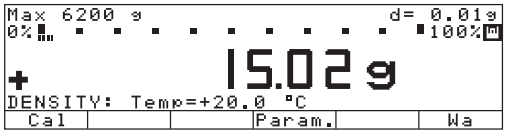
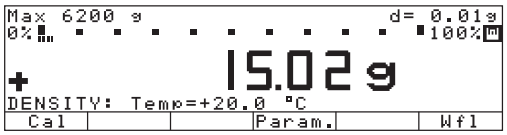
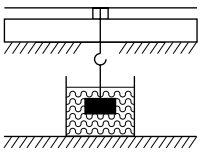
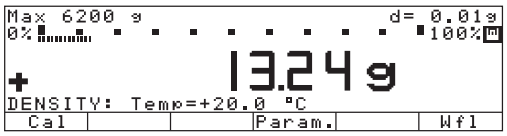
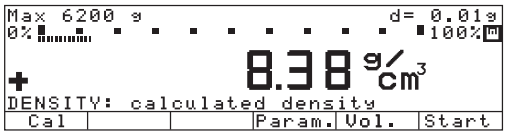
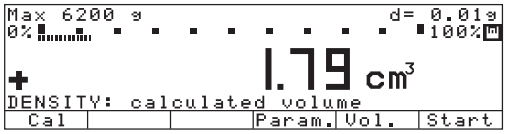
- Press (I/⏻)

> The balance shuts off

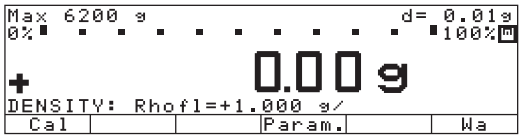
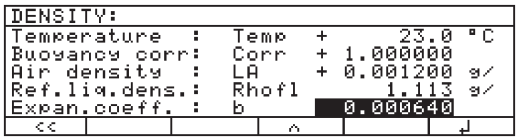
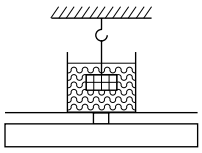
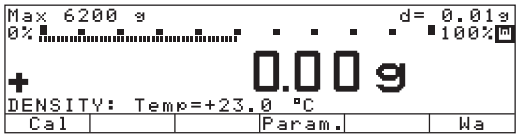
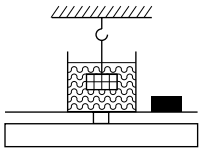
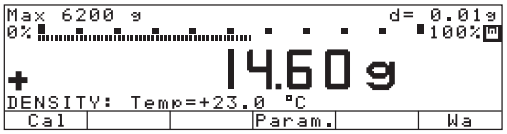
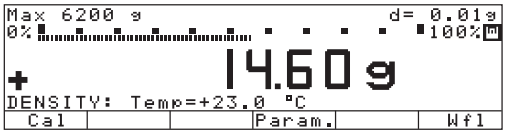
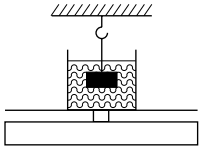
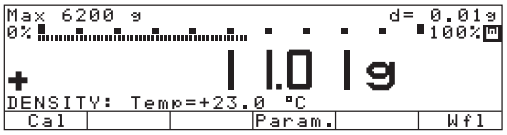
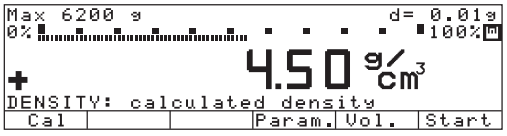
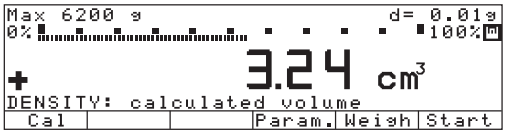
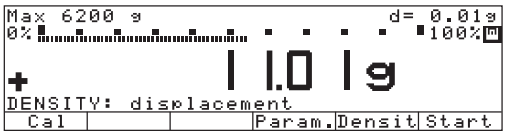
* = How to run this application is described in detail in our “Genius ME”. Installation and Operating Instructions. Request your copy directly from Sartorius or download it from the Internet (www.sartorius.com; see “download”)

Practical Example
Buoyancy: Determine the Density of Samples of a Solid Using the Buoyancy Method. Reference Liquid: Water.

Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Density

Step	Key (or instruction)	Display/Output
1. Delete previously stored values if necessary	CF	
2. Change configurations, if necessary	**Param.** soft key	
3. Position the sample holder (immersed)		
4. Tare the balance	Tare	
5. Determine the weight of the sample in air: place sample on the weighing pan		
6. Store weight value	**Wa** soft key	
7. Determine the weight of the sample in liquid: place samplein the sample holder		
8. Store weight Density of sample is displayed	**Wfl** soft key	
9. Display volume of sample	**Vol.** soft key	
10. Display weight	**Weigh** soft key	
11. Repeat procedure with next sample, if desired	**Start** soft key	

Practical Example
Displacement: Determine the Density of Samples of a Solid Using the Displacement Method.
Reference Liquid: Ethylene glycol. Temperature: 23°C (73.4 °F). Set the density at 20°C (68°F) to 1.113 g/cm² and the volume expansion coefficient at 20°C (68°F) to 0.00064 grd⁻¹.
Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Density: Method: Displacement
Setup: App: Application 1: Density: Liquid for buoyancy: User-definable

Step	Key (or instruction)	Display/Output
1. Delete previously stored values if necessary	CF	
2. Change configurations: Temperature: 23.0 Density of ref. liquid: 1.113 Expansion coefficient: 0.000640	**Param.** soft key	
3. Place the container with the reference liquid on the balance		
4. Tare the balance	Tare	
5. Determine the weight of the sample in air: place sample on the weighing pan		
6. Store weight value	**Wa** soft key	
7. Determine the weight of the sample in liquid: place sample in the sample holder		
8. Store weight Density of sample is displayed	**Wfl** soft key	
9. Display volume of sample	**Vol.** soft key	
10. Display weight	**Weigh** soft key	
11. Repeat procedure with next sample, if desired	**Start** soft key	

Differential Weighing

Purpose
This application enables you to compare samples before and after a given treatment (such as drying or ashing) and determine the difference in weight.

There are different procedures available for this application:
- Collect all data (tare, initial weight, and backweighing result) for each sample individually (menu setting "Weighing sequence: Individual weighing")

- Save the tare weights and initial weights for all samples first, then perform backweighing (menu setting "Combined weighing")

- Save the tare weights for all samples first, then determine the initial weight of each sample and, finally, perform backweighing (serial weighing)

Features
- 4 different sequences for measuring the tare weights, initial sample weights and the backweights (backweighing result):
  - Individual weighing
  - Consecutive individual weighing
  - Combined weighing
  - Serial weighing

- Choice of weighing sequence by selecting this parameter in the Setup menu or by pressing the Wg.seq soft key (if the "Weighing sequence key" option is set)

- Perform up to 99 backweighing routines on a single sample

- Differential weighing with or without tare weighing (not necessary for measuring coatings or lamination layers)

- Define the number of decimal places displayed for calculated results

- Define whether autosaving weight values is dependent on the stability parameter

- Define whether the minimum load for autosave is dependent on the display

- List function, with
  Display page for lots:
  Lists all lots (up to 100 max.) with the number of samples in each lot and the processing status (tare weight, initial weight, backweighed residue ("backweight")
  View, create, rename or delete lots generated
  Enter or change a factor for calculation of results

  Display page for samples:
  Lists all samples (up to 999 max.) with processing status
  View, delete, omit, or include samples

  Display page for measured values:
  Shows date, time, ID and values measured

  Display page for results:
  Values calculated for a sample (backweight, loss, ratio1, ratio2)

- Special display page for statistics lets you define whether lot statistics are dependent on backweight, loss, or ratio values

- Press a soft key to view the desired display page (lots, samples, values or results)

- To view lot, sample or measured value data, enter the ID and then press the corresponding soft key (Lot/Sample/Values)

- Define whether printer output is dependent on the processing status of the sample

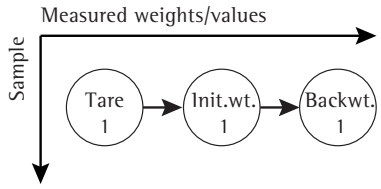
- Printout can contain individual values, backweighed values and statistics

- User-definable printout format

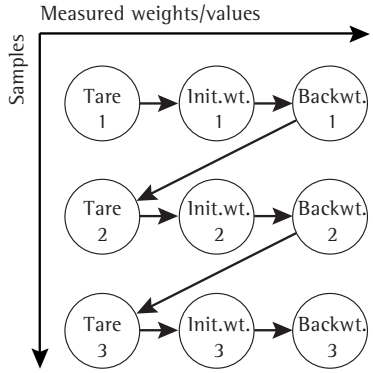
- The configurations for the weighing sequence and results are saved separately for each lot

Differential Weighing: Defining the Weighing Sequence
You can choose from among four sequences for measuring tare weights, initial sample weights and backweighed residue ("backweight") during differential weighing:

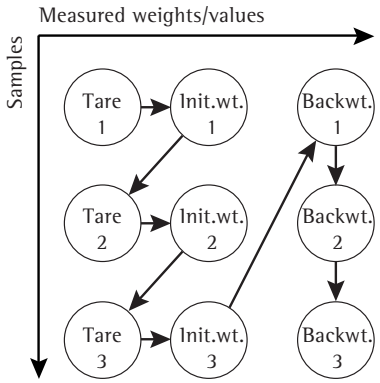
1. Individual Weighing
   Tare weight, initial weight and backweight are measured in that order.



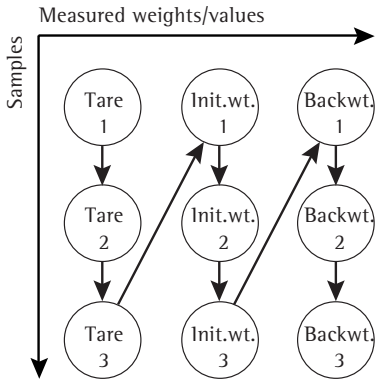
2. Consecutive Individual Weighing
   Several individual weighing routines (see above) are performed in series.



3. Combined Weighing
   The tare and initial weight, in that order, of each sample is measured first, then the backweight of each sample is measured.



4. Serial Weighing
   First the tare weight for each sample is measured, then the initial weight of each sample is measured in the same order that their tare weights were measured, and then all backweights are measured.



You can define the weighing sequence in the Setup menu or by pressing the **Wg.** seq (if the "Weighing sequence key" option is activated).

Factory Settings of the Parameters
Weighing sequence:
`Group weighing`

Tare weighing: `Yes`

Result with decimal point:
`2 decimal places`

Autosave values: `No`

Minimum load for autosave:
`20 digits`

Save statistics: `No`

Generate printout:
`Automatic after backweighing`

Include sample ID in the text line: `No`

Wg. seq. key: `Yes`

Clear sample after individual weight, result + unload: `No`

Last residual weight saved as the initial weight: `No`

Printout for Differential Weighing

Generating Printouts Automatically
The configured backweighing printout is generated automatically after backweighing, if one of the following settings is selected Setup: Application 1: Differential weighing: Generate printout:

```
Automatic after
backweighing
Auto after init.weigh
+ backweigh
Auto after tare-,
init- +backweigh.
```

Generating Printouts Manually

The individual printout is generated when the ⎙ key is pressed while there is a tare, initial or backweight on the balance, or when ⏻ is pressed to toggle applications.

You can generate the configured printout manually after backweighing if you press the ⎙ key while the display page for the results is shown.

To generate the statistics printout, press the ⎙ key

- when the display page for statistics is shown,
- when the samples with a desired number of backweighing operations is selected (for example, statistics on all samples with 2 backweighing operations).

The following printout is generated:

Backweighing Printout
(Example)

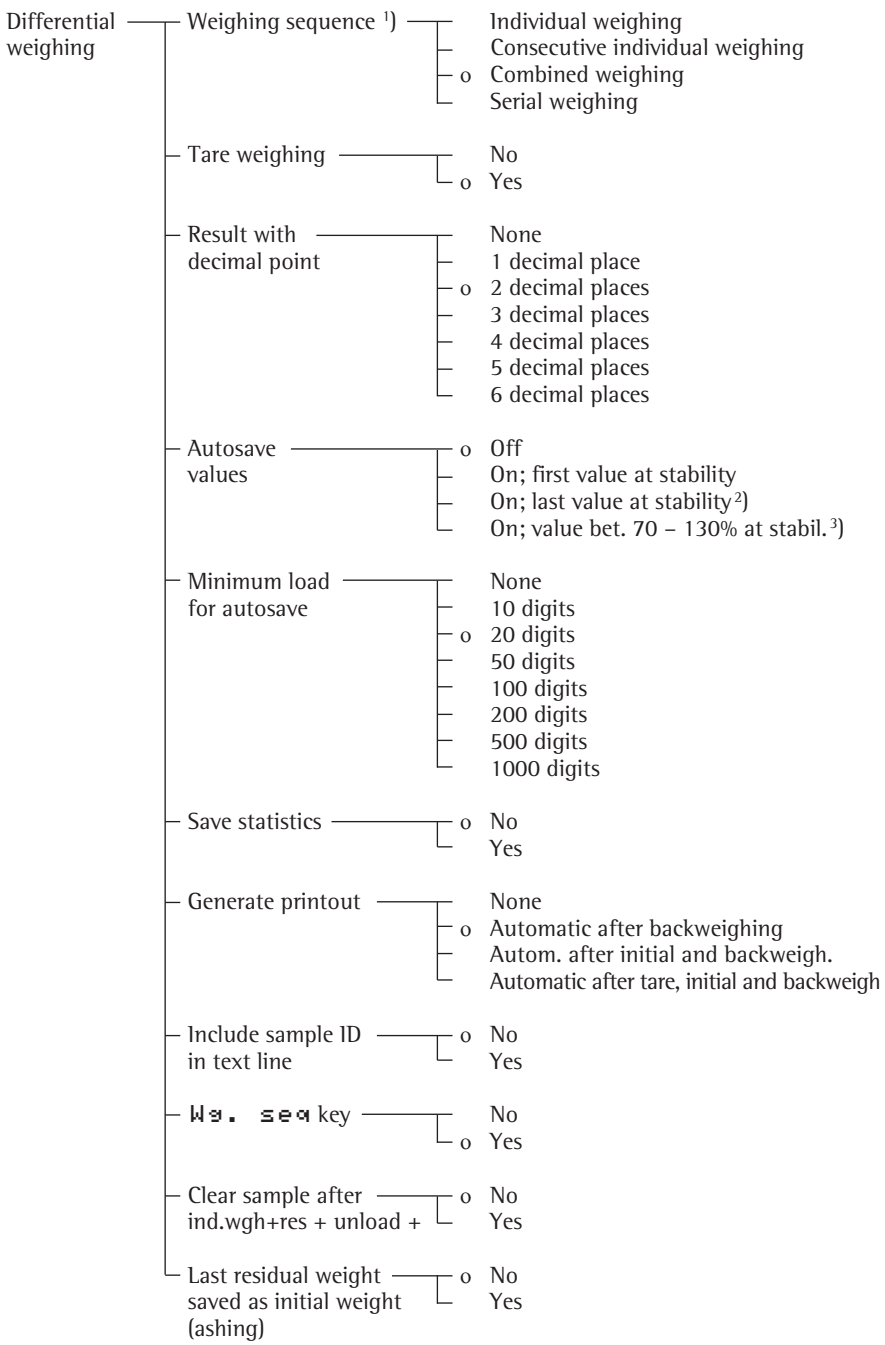
`--------------------`	Dotted line
`16.11.1999  14:55:12`	Date/time
`Lot          CH12345`	Lot ID
`Sample            14`	Sample number
`ID              CX88`	Sample ID
`T1     +   23.458 g`	Tare weighing (with PT1 selected)
`N1     +  125.572 g`	Initial weight
`R   (3)+  103.684 g`	Backweight (residue as weight)
`R      +   82.57 %`	Residue in percent
`D      -   21.887 g`	Loss as a weight
`D      -   17.43 %`	Loss in percent
`Fact   +  1.10345`	Calculation factor
`D-Res  -   24.15 o`	Calculated loss
`Ratio1+   21.11 %`	Ratio 1
`Ratio2+   121.11 %`	Ratio 2
`--------------------`	Dotted line

Preparation

- Turn on the balance: press (I/⏻)

> Sartorius logo is displayed

- Select the Differential Weighing application in the Setup menu: press (Setup)
- Select the `Application parameters`: press the `v` soft key 2×, then the `>` soft key once
- Select `Application 1 (basic settings)`: press the `>` soft key
- Select `Differential weighing`: press the `^` or `v` soft key, repeatedly, if necessary
- Confirm `Differential weighing`: press the `>` soft key



o = factory setting

[1]) Setting can only be changed when the application is first run and when the `Wg. seq` key option is set to "No"

[2]) The last value with the stability symbol is saved only during initial sample weighing. Tare and backweights are saved as the "first value at stability." This menu option enables you to perform filling functions during initial weighing.

[3]) To autosave a value between 70 and 130% of the initialization value, the balance must be unloaded to below 30% or loaded to above 170% of this initialization value.

Equations

Backweight in %: backweight / initial weight · 100%

Loss in weight: backweight – initial weight

Loss in %: (backweight – initial weight) / initial weight · 100%

Calculated loss: (backweight – initial weight) · factor

Ratio 1 in %: (initial weight – backweight) / backweight · 100%

Ratio 2 in %: initial weight / backweight · 100%

Function of the (CF) Key

Weighing sequence	Status	Press (CF) key	Value deleted	Subsequent status
Individual weighing	Tare weighing	–	–	–
	Initial weighing	1 ×	Tare	Tare weighing
	Backweighing	1 ×	Initial weight	Initial weighing
		2 ×	Tare	Tare weighing
	Results displayed	1 ×	Backweight	Backweighing
Consecutive individual weighing	As for individual weighing			
Combined weighing	Tare weighing	1 ×	Previous init. weight	Initial weighing
		2 ×	Previous tare value	Tare weighing
	Initial weighing	1 ×	Tare	Tare weighing
	Backweighing	1 ×	Previous backweight	Backweighing
	Results displayed	1 ×	Last backweight	Backweighing
Serial weighing	Tare weighing	1 ×	Previous tare value	Previous tare weighing
	Initial weighing	1 ×	Previous init. weight	Previous initial weighing
	Backweighing	1 ×	Previous backweight	Previous backweighing
	Results displayed	1 ×	Last backweight	Backweighing

Soft Key Functions

`Create` Create a new lot

`Lot` Select/view the display page for lots

`Ini.wt.` Save initial weight

`>Ini.w` Go to initial weighing function

`Result` View display page for results

`>Resul` Go to display page for results

`M-ini` Input initial weight value

`M-back` Input backweighed residue

`M-tare` Input tare value

`Delete` Delete lot/sample

`Values` Select/view the display page for values

`Sample` View the display page for samples

`Spl#` Select/create sample data record

`Backw.` Save backweight value

`>Backw` Go to backweighing function

`Omit` Omit/include sample

`Stat.` View display page for statistics

`Tare` Save tare value

`>Tare` Go to tare weighing function

`Wg.seq` Select weighing sequence

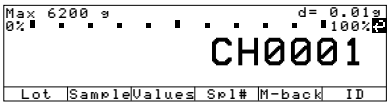
Direct Selection of Lot/Sample/Value

When the measured values are displayed, you can enter numbers and letters to:

– change the lot and sample directly (displayed in the text line)

– directly access the display pages for samples and values

● Enter lot/sample/value ID



(in this example, “CH0001”, designates a certain lot)

● Press the corresponding soft key

> `Lot` soft key:
The lot corresponding to the ID entered is displayed (if the lot is not found, the display page for lots is shown)

> `Sample` soft key:
The display page is shown for samples in the active lot that contains the sample number entered

> `Values` soft key:
The values for the sample entered are shown

> `Spl#` soft key:
Change samples without the list function

Toggle between Differential Weighing and Basic Weighing:

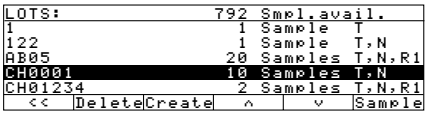
Press (Q)

Direct Selection of the Weighing Sequence

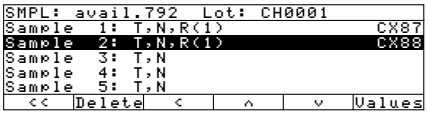
You can change the weighing sequence (individual weighing, combined weighing, etc.) directly during measurement by pressing the `Wt.seq` key, if this function has been activated in the Setup menu [Application parameters: Application 1: Differential weighing: Weighing sequence key: Yes]

List Function for Differential Weighing

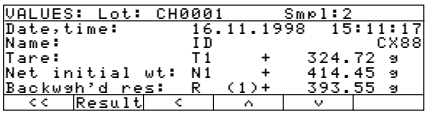
The list function has 4 display pages: one each for lots, samples, values and results.



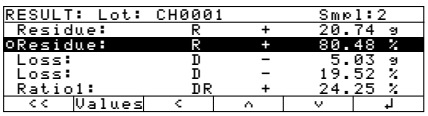
Display Page for Lots
The display page for lots shows all of the lots that have already been created, as well as the number of samples in each lot and the processing status of the selected sample (tare, initial and backweight). On this display page you can create, rename, delete and print lots.
You can also define a factor for calculation of loss; for instance, to have weight per unit area calculated (such as grams per square meter). You can also enter a lot ID alphanumerically to access a lot directly.



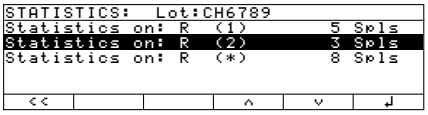
Display Page for Samples
This display page shows the samples contained in a selected lot, as well as the processing status of the samples (tare, initial and backweight) and the sample IDs. You can also enter a sample ID alphanumerically to access a sample directly.



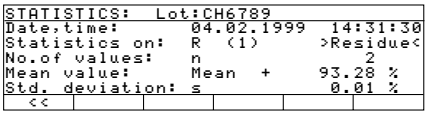
Display Page for Values
This display page shows the date and time of sampling, as well as the sample ID and the values measured, for a selected sample.



Display Page for Results
This display page shows the calculated values for a selected sample. These include backweighed residue, loss, loss calculated using a factor, and the ratio values. The o symbol indicates the value that is selected for display immediately following a backweighing procedure. To change this setting, use the v and ^ soft keys to move the highlight bar to the desired value, and press ↵ to confirm.

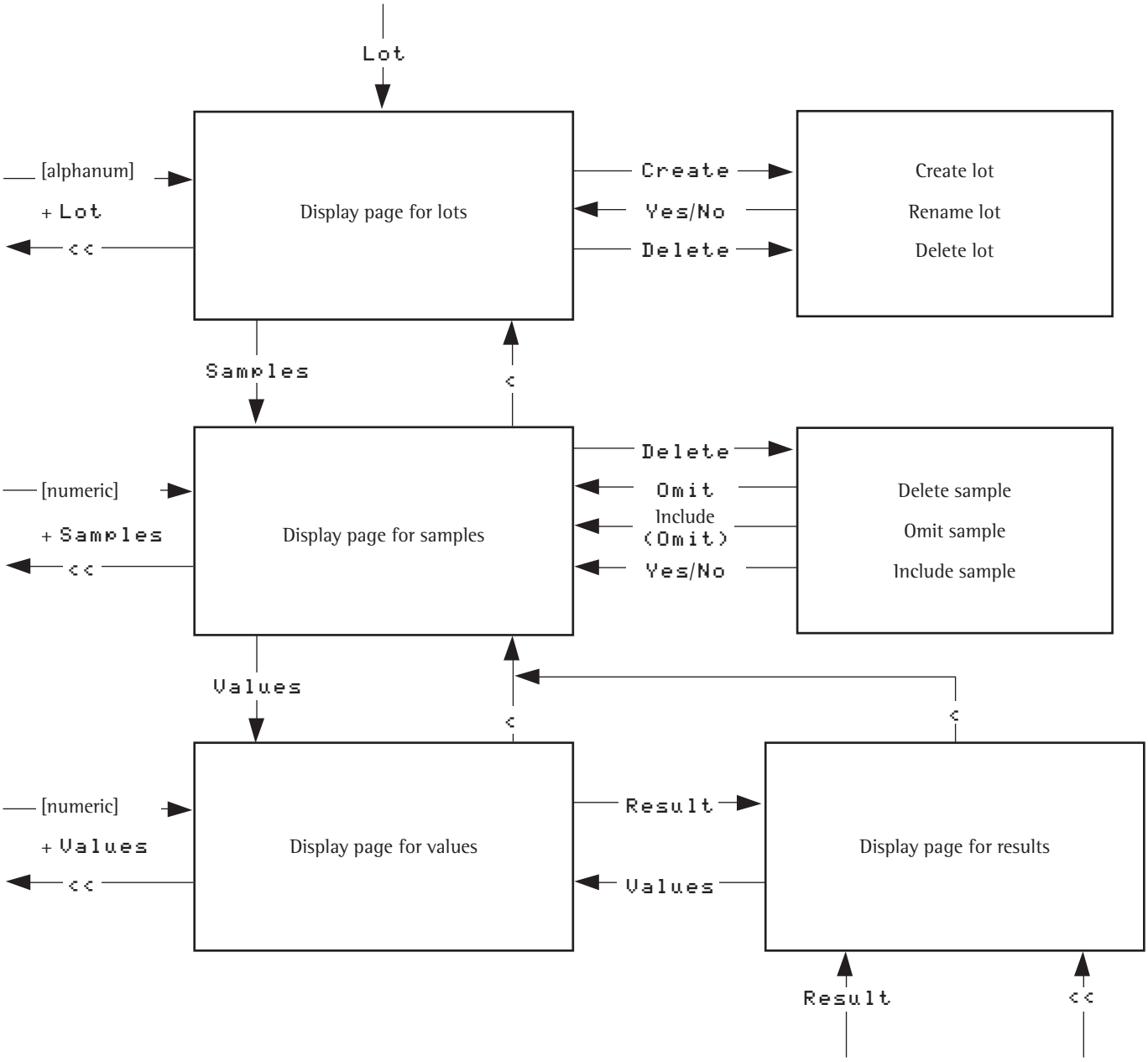


Display Page for Statistics
This page shows the characteristic data for a lot (date; time; statistics on, for example, the backweighed residue; number of samples) as well as the calculated values (mean value, standard deviation).



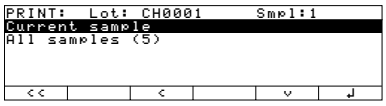
To select a set of statistics from a lot with different numbers of backweighing procedures: Press the ↵ soft key to display the selected set of statistics:

Selecting Display Pages in the List Function for Differential Weighing



View and Print Display Pages
You can use the manual mode to print display pages (for lots, samples, values and results).

To view and print a display page for values:
- Show the display page for lots: press the **Lot** soft key
- Show the display page for samples: press the **Sample** soft key
- Show the display page for values: press the **Values** soft key
- Print the display page for values: press (F)



○ Select amount of data to be included on the printout: press the v or ^ soft key
- Confirm print command: press the ↵ soft key

The display pages for lots and samples can be printed when they are shown on the balance display.

View the Display Page for Results:
- Show the display page for lots: press the **Lot** soft key
- Show the display page for samples: press the **Sample** soft key
- Show the display page for values: press the **Values** soft key
- Show the display page for results: press the **Result** soft key
- Print the display page for results: see instructions for printing the display page for values

You can manually print the display page for statistics when it is shown on the balance

To view the display page for statistics:
- Select statistics: press the **Stat.** soft key

○ For samples each with a different number of backweights: Select the kind of statistics: press the v or ^ soft key

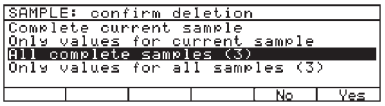
○ Confirm selection: press the ↵ soft key

Deleting or Omitting a Lot or Sample
Lots can be deleted; samples can be deleted or omitted.

You can choose between
- deleting the current lot and
- deleting all lots.

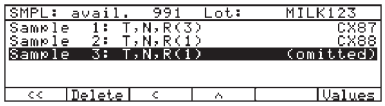
You can choose whether
- the active sample is deleted entirely, or
- only the values from the active sample are deleted, or
- all samples are deleted completely, or
- only the values from all samples are deleted, or
- a sample is omitted

Deleting a Lot/Sample
- Activate the display page for lots/samples
- Select the desired lot/sample
- Select the "Delete" function: Press the **Delete** key
- Define the lot(s)/sample(s) to be deleted and confirm
- Select "Yes" to complete the delete function or "No" to cancel it



Example: Deleting all samples completely (in this case, 3 samples)

Omit or Include Sample
- Activate the display page for samples
- Select the desired (or omitted) sample
- Delete: Press the **Delete** key
- Omit: Press the **Omit** key



Example: Sample 3 has been omitted

Additional Functions
In addition to the functions for:
- alphanumeric input,
- taring (not during alphanumeric input), and
- printing,

you can also access the following functions from this application:

Calibration/Adjustment
- Press the **Cal** soft key

> See the section entitled "Calibration/ Adjustment" for further instructions

Setup (Parameter Settings)
- Press the (Setup) key

> See the chapter entitled "Configuration" for further instructions

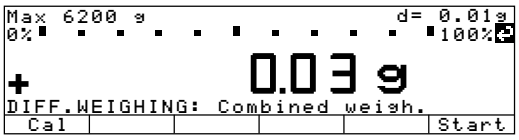
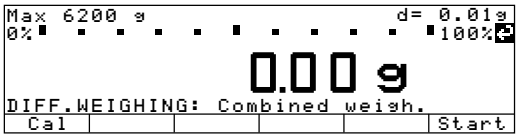
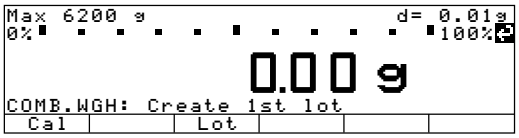
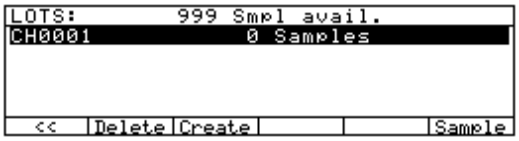
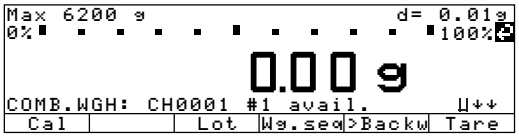
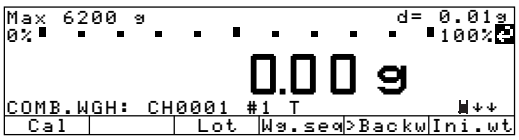
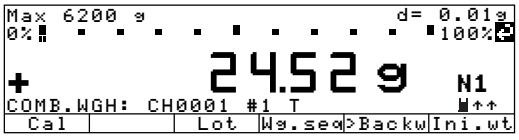
Turning Off the Balance
- Press the (I/⏻) key

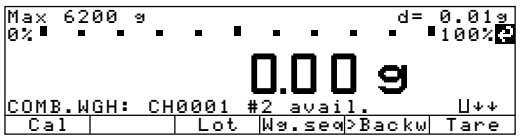
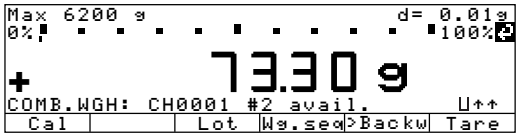
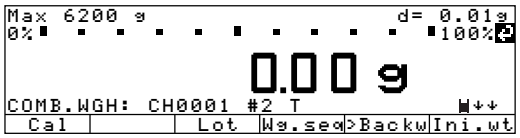
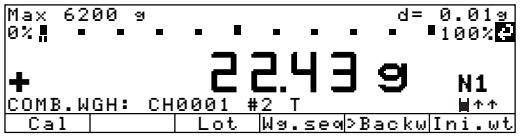
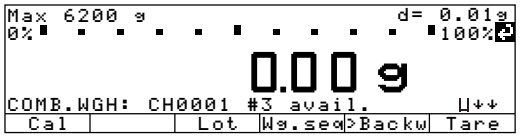
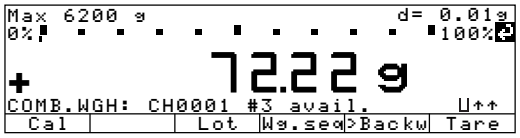
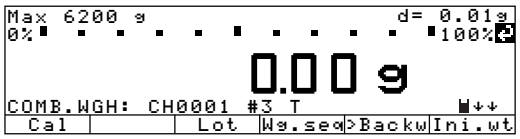
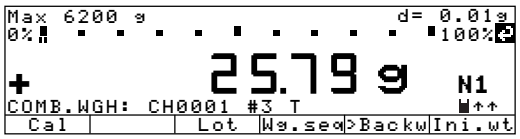
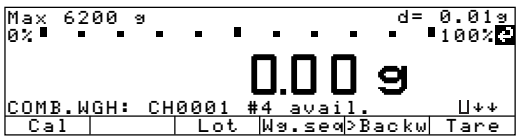
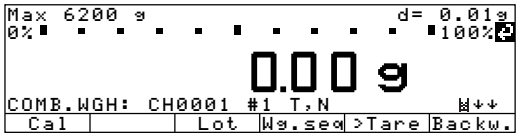
> The balance shuts off

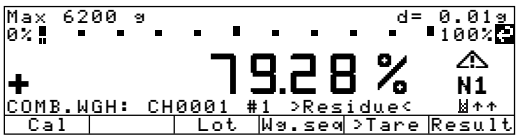
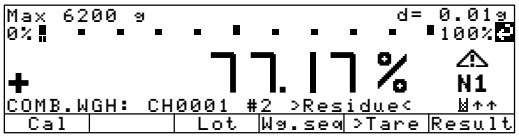
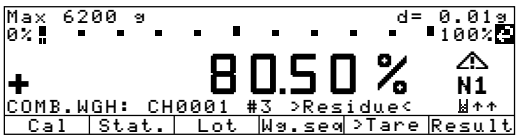
Practical Examples

Combined weighing; create lot, determine the difference in weight between initial weights and backweights of three samples
(with autoprint of the formatted backweighing record)

Settings: factory settings

Step	Key (or instruction)	Display/Output
1. Turn on the balance/scale, if necessary	(I/⏻)	
2. Tare the balance/scale, if necessary	(Tare)	
3. Start combined weighing	**Start** soft key	
4. Select lot ID input	**Lot** soft key	
5. Enter lot ID	(ABC) (1) ... (9) (0) (·)	
6. Confirm input	↵ soft key	
7. Activate weight readout (or toggle to combined weighing)	<< soft key **Wt. seq** soft key	
8. Measure 1st tare weight	Place 1st empty container on balance/scale	
9. Save tare value	**Tare** soft key Remove the empty container	
10. Measure the initial weight (in this case: 24.52 g)	Fill the 1st container Place filled container	

Step	Key (or instruction)	Display/Output
11. Save initial weight value	**Ini.wt** soft key Remove the filled container	
12. Measure the 2nd tare weight	Place 2nd empty container on balance/scale	
13. Save tare value	**Tare** soft key Remove the empty container	
14. Measure the initial weight (in this case: 22.43 g)	Fill the second container Place filled container on balance/scale	
15. Save initial weight value	Ini.wt soft key Remove the filled container	
16. Measure the third tare weight	Place 3rd empty container on balance/scale	
17. Save tare value	**Tare** soft key Remove the empty container	
18. Measure the initial weight (in this case: 25.79 g)	Fill the container Place filled container on balance/scale	
19. Save initial weight value	**Ini.wt** soft key Remove the filled container	
20. Treat the sample		
21. Go to backweighing function	**>Backw** soft key	

Step	Key (or instruction)	Display/Output
22. Save the 1st backweight is defined (the value to be displayed on the display page for results; in this case: backweighed residue in %)	Place 1st container on balance/scale **Backw.** soft key	
Configured backweighing printout is generated		``` -------------------- 17.11.1998 12:49:23 Lot CH0001 Sample 1 T1 + 72.07 g N1 + 24.52 g R (1)+ 19.44 g R + 79.28 % D - 5.08 g D - 20.72 % Ratio1+ 26.13 % Ratio2+ 126.13 % -------------------- ```
23. Save the 2nd backweight	Remove 1st container Place 2nd container **Backw.** soft key	
Configured backweighing printout is generated		``` -------------------- 17.11.1998 12:52:57 Lot CH0001 Sample 2 T1 + 73.30 g N1 + 22.43 g R (1)+ 17.31 g R + 77.17 % D - 5.12 g D - 22.83 % Ratio1+ 29.58 % Ratio2+ 129.58 % -------------------- ```
24. Save the 3rd backweight	Remove the 2nd container Place the 3rd container on the balance/scale **Backw.** soft key	
Configured backweighing printout is generated		``` -------------------- 17.11.1998 12:53:23 Lot CH0001 Sample 3 T1 + 72.22 g N1 + 25.79 g R (1)+ 20.76 g R + 80.50 % D - 5.03 g D - 19.50 % Ratio1+ 24.23 % Ratio2+ 124.23 % -------------------- ```
25. Unload the balance/scale	Remove the 3rd container	

Checkweighing %

Purpose
This program is used to check whether a sample corresponds to a pre-set target value or is within a specific tolerance range. In addition to the display in the measured value line, the results are shown on the bar graph and can also be routed through the interface port via control lines for further electronic processing.

You can use the "Checkweighing" application in combination with a program chosen from Application 1 (e.g., counting, weighing in percent) and one from Application 3 (totalizing, formulation, statistics).

Available Features

- Optional configuration in the Setup menu for long-term storage of target value and tolerance limits
- Optional balance configuration in Setup for automatically initializing this application and loading the values stored in long term memory for the target value and the upper and lower tolerance limits when you turn on the balance
- You can perform checkweighing
  - without entering a target value, but only upper and lower tolerance limits;
  - as differential checkweighing;
  - with symmetric or asymmetric limits which can be entered as percentages
- Enter target value and limits by placing a load on the balance or using the numeric keys
- Control in entering target and tolerance values, so that the upper limit ≥ the target ≥ the lower limit ≥ 1 display increment
- Accuracy of a weight readout or keyboard input as target/tolerance values corresponds to the display accuracy
- Optional balance configuration in the Setup menu for automatic output to the interface port (print application parameters) of target value and tolerance limits when initialization is completed
- Control range for the balance's data output port lines is 30% to 170% of the target value
- Optional configuration in the Setup menu for activation of control lines dependent on weight value (weight value within control range, stability reached)
- Toggling the display between weight readout and control (checkweighing) display by pressing the corresponding soft key. If the weight value exceeds tolerances, the measured value line shows the weight while the control display shows "LL" for "too low" or "HH" for "too high."
- Press the `Show` soft key to display target value and tolerance limits in the text line after initializing the application.
- Weight value in bar graph displayed in relation to upper and lower limits and target value.
- "OK" value counter displayed in the text line (e.g., `n = 4`). This counter shows the number of measured values that lie within the tolerance range.
- Optional automatic printout of weight value when it is within the control range at stability

  After an automatic printout, the balance is blocked. Before you can generate the next printout, you must unblock the balance by unloading it (weight must be under 30% of the target) or by placing a load on the balance (bringing the weight up to at least 170% of the target).
- Press (CF) to delete the initialization parameters and end the Checkweighing program

Factory Settings
Activation of port lines: `Within checkweighing range`

Type of checkweighing input: `Target, minimum, maximum weight`

Weight display mode: `Absolute value`

Automatic printout of OK values: `No`

Soft Key Functions

`Param.`	Begin input of target and tolerance values
`Show`	Display target and tolerance values in turn during checkweighing
`LLHH`	Toggle to control display ("LL" for too light and "HH" for too heavy)
`Diff.`	Display difference between current value and target
`Net`	Display net weight

Preparation
The checkweighing program often requires a target value for comparison with the current value. This target has a tolerance range, which is defined by absolute weight values. The tolerance range is defined as either an absolute value or a percentage with upper and lower limits. Percentage values can be symmetric or asymmetric to the target value. These values can be entered either by storing weights on the balance or by key input.

There are four control lines, called data output port lines, which are activated as follows: (see also the diagram at the right):

- lighter
- equal
- heavier
- set

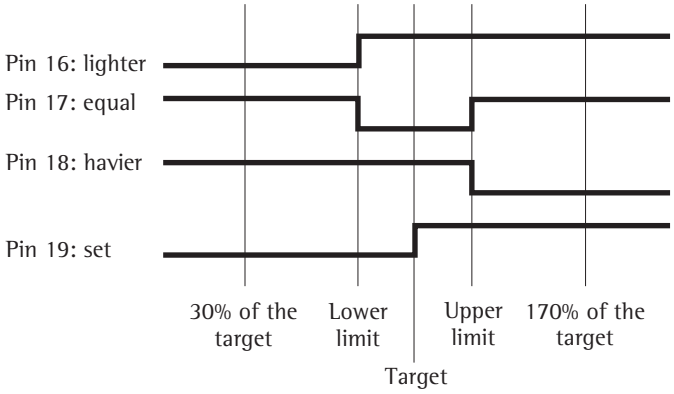
The control range spans 30% to 170% of the target value. You can configure this parameter in the Setup menu (App: Application 2: Checkweighing: Activation of port lines:) to select whether the control lines are:

- activated within the control range
- always on
- activated at stability within the control range
- activated at stability

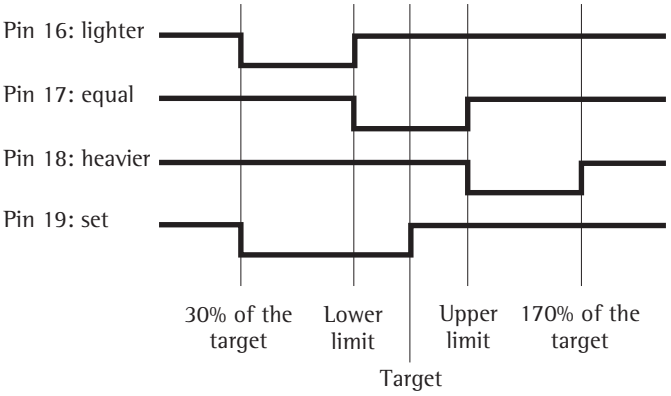
This makes it possible, for example, to connect a simple indicator for the weighing results (e.g., three different colors, one each for the weighing results: too light, O.K., too heavy).

Response of Control Lines During Checkweighing

Configurations:
- always on
- activated at stability



Configurations:
- activated within control range
- activated at stability within control range



Output port specifications
- When not in use, the voltage level is high: >2.4 V/+2 mA.
- When activated, the voltage level is low: <0.4 V/–2 mA.

⚠ The output ports are not protected against short circuits!

Preparation

● Turn on the balance: Press I/⏻

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● Select the Checkweighing application in the Setup menu: Press Setup

● Select `Application 2`: Press the `v` soft key and then the `>` soft key

● Select the `Application parameters`: press the `v` soft key 2 ×, then the `>` soft key

● Select `Application 2 (control functions)`: Press the `v` soft key, then the `>` soft ke

● Select `Checkweighing`: press the `^` or `v` soft key, repeatedly, if necessary

● Confirm `Checkweighing`: press the `>` soft key

- Checkweighing
  - Activation of port lines
    - o Within checkweighing range
    - Always on
    - Stability and checkweighing range
    - At stability
    - Stability + checkweighing range –> once
  - Type of checkweighing input
    - o Target, min, max weight
    - Min, max weight
    - Target, min in %, max in %
  - Weight display mode
    - o Absolute value
    - Difference from the target
  - Automatic printout of OK values
    - Yes
    - o No

o = factory setting

see also the “Application Parameters (Overview)” in the chapter entitled “Configuration”

● Save settings and exit the Setup menu: press the `<<` soft key

Additional Functions

In addition to the functions for:

– alphanumeric input, (not during initialization),

– taring (not during alphanumeric input)

– printing,
you can also access the following functions from this application:

Calibration/Adjustment

● Press the `Cal` soft key

> See “Calibration/Adjustment” for further instructions

Toggling to Another Application

● Press ⇄

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

● Press Setup

> See “Configuration” for further instructions

Turning Off the Balance

● Press I/⏻

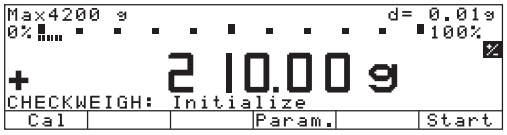
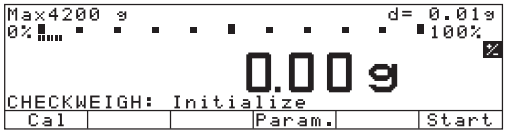
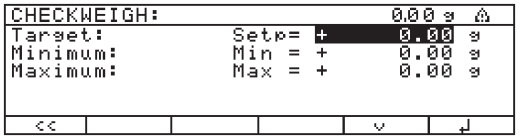
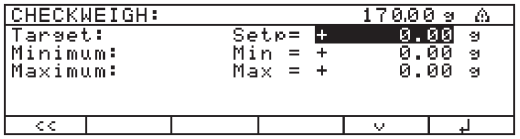
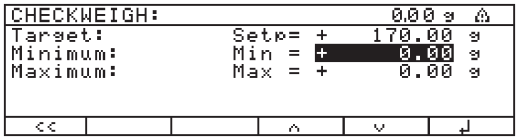
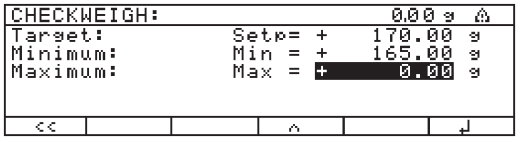
> The balance shuts off

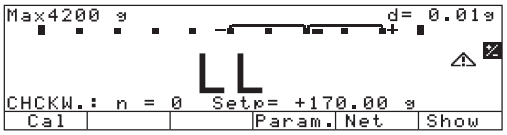
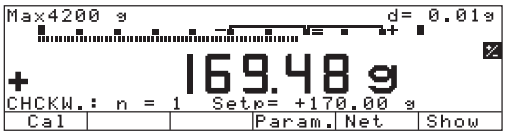
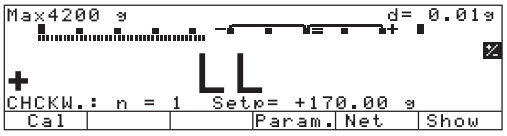
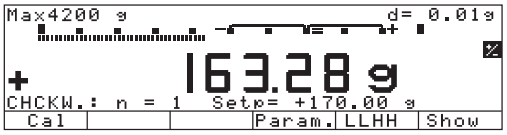
> The display goes blank

Practical Example
Checkweighing samples of 170 g, with an allowable tolerance of –5 g and +10 g. Printout of upper and lower tolerance limits. Weighed values are printed out automatically when stability is reached and weight value is within the control range.

Settings (changes in the factory settings required for this example):

Setup: App: Application 2: Checkweighing: Automatic printout of OK values: Yes

Step	Key (or instruction)	Display/Output
1. Turn on the balance and configure the settings as indicated above	I/⏻	
2. Delete previous setting if necessary	CF	
3. Prepare a container for the samples	Place empty container on the balance	
4. Tare the balance	Tare	
5. Enter initialization values	Param. soft key	
6. Enter target value via the balance (here: 170 g)	Place ideal sample in container	
7. Store target value and unload balance	↵ soft key Remove ideal sample from balance	
8. Enter value for lower limit (170 g – 5 g) and store	1 6 5 ↵ soft key	

Step	Key (or instruction)	Display/Output
9. Enter value for upper limit (170 g + 10 g) and store	(1) (8) (0) ↵ soft key	 Setp + 170.00 g Min + 165.00 g Max + 180.00 g
10. Weigh sample (in this case 169.48 g)	Place sample in container	 N + 169.48 g
If the weight value had been too low, the display would have shown the following:		
11. In this case, switch to net value display (here: 163.28 g)	**Net** soft key	
12. Weigh next sample (if any)	Place sample in container	

Time-Controlled Functions

Purpose
With this application program, you can configure the balance to perform certain functions (e.g., automatic printout of values, store value in totalization memory) at a given time or after a set interval.

You can use the "Time-Controlled Functions" application in combination with a program chosen from Application 1 (e.g., counting, weighing in percent) and one from Application 3 (e.g., totalizing, formulation).

Available Features
- Time-controlled activation of balance functions:
  - one time only, at a given time

    (`Setting=` is displayed in the text line)
  - repeatedly, at given intervals

    (`Interval=` is displayed in the text line before the function is started, and
    `Repeat=` is displayed after the function is started)

  Functions that can be time-controlled include:
  - Acoustic signal
  - Lock in readout
  - Automatic printout of values
  - Store values for totalizing, formulation or statistics
- Print time in addition to weight value
- Store value independent of stability
- Tare the balance after printout of weight values
- Press the corresponding soft key to cancel time-controlled functions

Factory Settings
Function after time interval:
`Automatic printout of values`

Automatic function restart: `On`

Storage mode:
`Without stability`

Print then tare: `On`

Soft Key Functions

`Stop`	Stop the application
`Quit`	Confirm performed function (e.g., "Lock in readout" or "Beep")
`Interv`	Store input interval for time-controlled functions
`Set.`	Store input time for one-time performance of function

Preparation
- Turn on the balance: Press (I/⏻)

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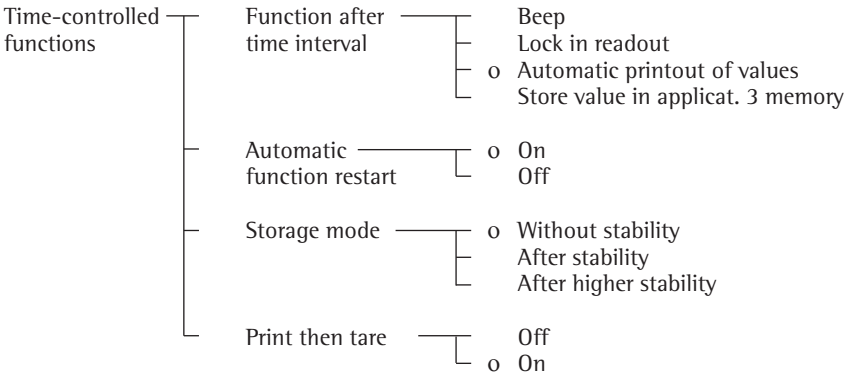
- Select the "Time-controlled functions" application in the Setup menu: Press (Setup)
- Select the `Application parameters`: press the `v` key 2 ×, then the `>` soft key
- Select `Application 2 (control functions)`: press the `v` soft key, then the `>` soft key
- Select `Time-controlled functions`: press the `^` or `v` soft key
- Confirm `Time-controlled functions`: press the `>` soft key



o = factory setting

see also the "Application Parameters (Overview)" in the chapter entitled "Configuration"

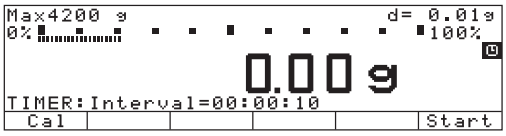
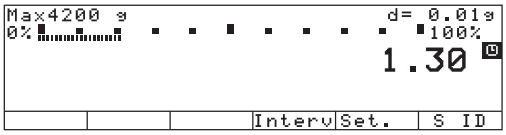
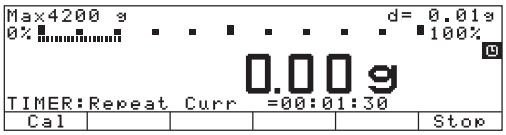
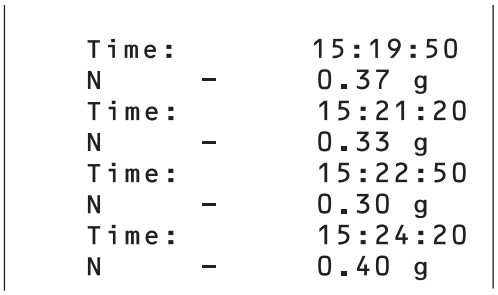
- Save settings and exit the Setup menu: press the `<<` soft key

Print Net Values without Printout of Time
Select the Setup menu:
Setup: Printout: Application-defined output: Auto print upon initialization: Off

Practical Example
Document the amount of evaporation of a sample with defined surface, temperature and air pressure at preset intervals of 1 minute, 30 seconds.

Settings (changes in the factory settings required for this example):

Setup: App: Application 2: Time-controlled functions
Setup: Balance functions: Taring: Without stability
Setup: Print in weighing mode: Manual/auto print mode: Manual without stability

Step	Key (or instruction)	Display/Output
1. Turn on the balance and configure the settings as indicated above	I/⏻	
2. Delete stored values if necessary	CF	
3. Place container with sample on the balance and tare	Tare	
4. Enter time interval: 1 minute, 30 seconds	1 · 3 0	
5. Store time interval	**Interv** soft key	
6. Begin documentation (Time remaining until the next printout is displayed in the text line)	**Start** soft key	
Printout of evaporation amount every 1½ minutes		
7. Stop the documentation procedure	**Stop** soft key	

Totalizing Σ

Purpose
This application program acts as a cumulative memory function.

You can use the "Totalizing" application in combination with a program chosen from Application 1 (e.g., counting, weighing in percent) and one from Application 2 (checkweighing, time-controlled functions) as well as with the extra functions.

Available Features
- Totalization of weight values and calculated values
- Optional configuration in the Setup menu for simultaneous storage of net and calculated values
- Optional configuration in the Setup menu for loading weight values and calculated values either from Application 1 (e.g., counting, weighing in percent) or from Application 2 (checkweighing, time-controlled functions)
- Totalization memory for up to 65535 values
- Simultaneous display in the text line of transaction counter and, e.g., the current total
- Optional configuration in the Setup menu for having the balance tare automatically after a value is stored in the totalization memory, if no preset tare has been entered
- Manual input of the number of individual weighing operations (target no. of operation `nDef`). Result printed and memory cleared after printout of `nDef`.
- Optional configuration in the Setup menu to add the current weight, with display accuracy, to the current total by pressing the `M+` soft key and generate a printout of the result
- Optional configuration in the Setup menu for stability-dependent storage of the measured value: `Stability range`
- Optional automatic storage of measured values

  Storage of measured value is indicated by →←.
  ↓↓ indicates that you can place a load on the balance.
- Minimum load threshold for automatic storage
- Press the `M–` soft key to delete the last value added to the totalization memory. The transaction counter value is reduced by one and a printout is generated.
- Press the `MR` soft key for information about number of transactions and the current total. By configuring the Setup menu, you can define whether the information is displayed and printed, or only printed, and whether the information comprises an intermediate or final evaluation (see the example)
- In the Info window you can choose which value is displayed in the text line during weighing
- Printout of the end result independent of which program is configured for Application 1 or Application 2. Configure the Setup menu to define which values are included on the printout (Printout of individual components)
- Press the key identified by `MR` (soft key label) for a printout of an intermediate evaluation after each addition or a final evaluation
- If you end the totalization process by pressing CF without having first pressed the `MR` soft key for a printout, a final evaluation is printed when you press CF
- Optional configuration in the Setup menu to clear the totalization memory and reset the transaction counter by pressing CF or after an evaluation is printed out
- Totalization data and transaction counter data are stored in non-volatile memory
- Continue totalization after turning the balance off and back on

Factory Settings
Automatic storage: `Off`

Minimum load for automatic storage:
`20 digits`

Source of data for auto storage:
`Application 1`

Evaluated values: `Net`

Evaluation mode, MR key function:
`Intermediate evaluation, print`

M+/M– function, then tare: `Off`

Printout of individual components: `On`

Balance functions: Stability range:
`2 digits`

Printout: Application-defined output:
Print on request, then tare: `Off`

Soft Key Functions

`M+`	Add weight values or application values to the total in the totalization memory. The component or transaction counter value increases by one each time you press this key.
`M–`	Delete the last value added to memory. The transaction counter value decreases by 1. You cannot delete previous values by repeatedly pressing this key.
`MR`	Print or display an intermediate or final evaluation
`nDef`	Store the input number of components

Printout for Totalizing
The transaction or component counter is printed in front of each measured value (weight). When an intermediate or final evaluation is printed out, all results up to this point are included.

```
n                5
Total + 151.67 g
```

Preparation

- Turn on the balance: Press (I/⏻)

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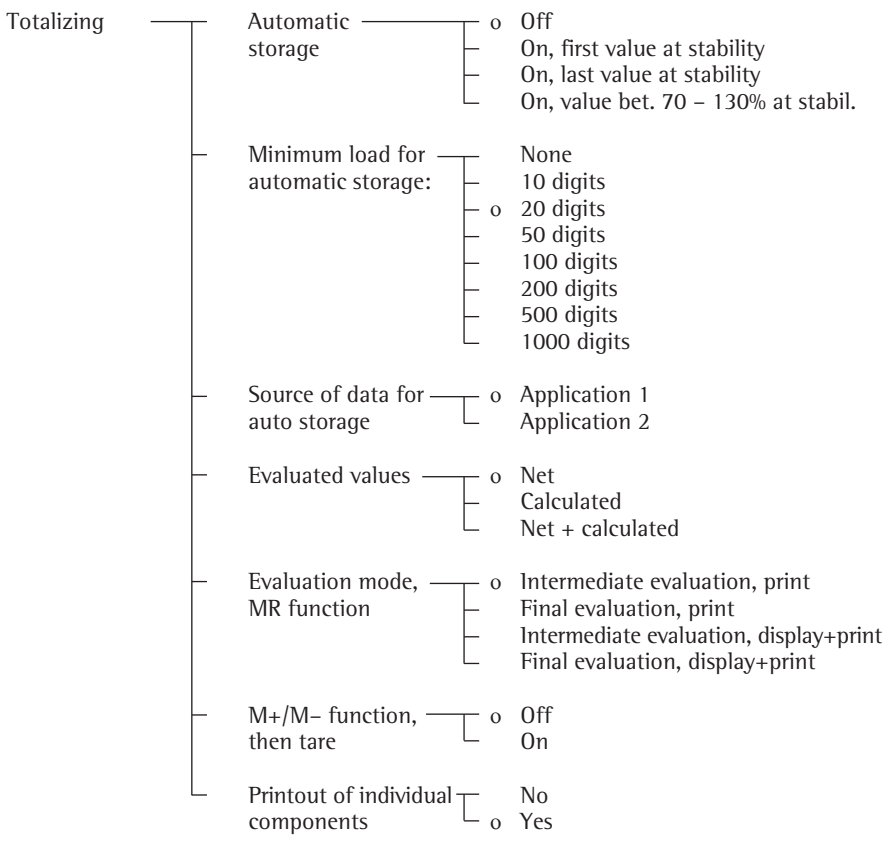
- Select the Totalizing application program in the Setup menu: Press (Setup)
- `Anwendungsparameter` wählen: 2 × Softkey `v` , Softkey `>` drücken
- Select the `Application parameters`: press the `v` soft key 2 ×, then the `>` soft key
- Select `Totalizing`: press the `^` or the `v` soft key
- Select `Totalizing`: press the `>` soft key



o = factory setting

see also the “Application Parameters (Overview)” in the chapter entitled “Configuration”

- Save settings and exit the Setup menu: press the `<<` soft key

Additional Functions

In addition to the functions for:

– alphanumeric input,

– taring (not during alphanumeric input),

– printing,

you can also access the following functions from this application:

Calibration/Adjustment

- Press the `Cal` soft key

> See “Calibration/Adjustment” for further instructions

Toggling to Another Application

- Press (⇧⇩)

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

- Press (Setup)

> See “Configuration” for further instructions

Turning Off the Balance

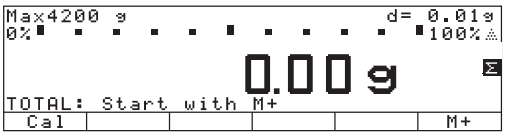
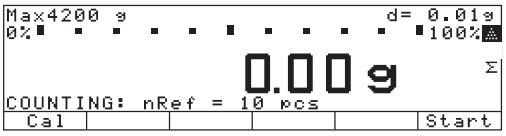
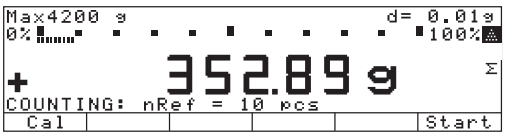
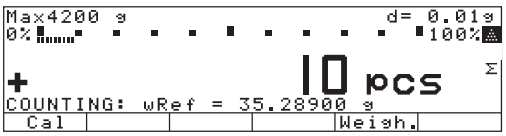
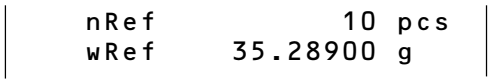
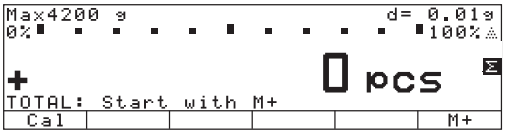
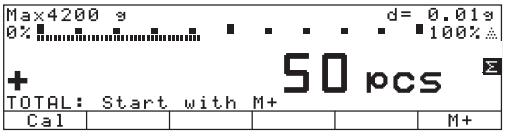
- Press (I/⏻)

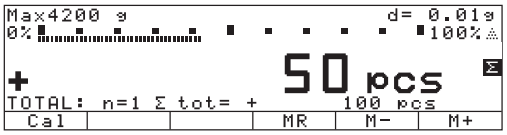
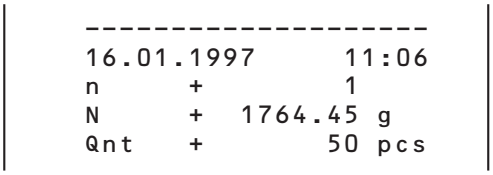
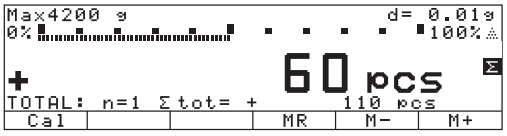
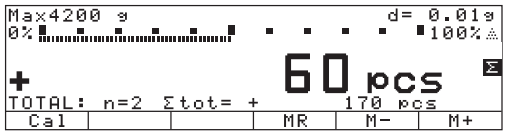
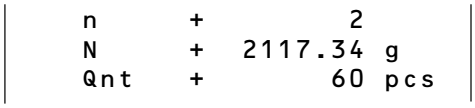
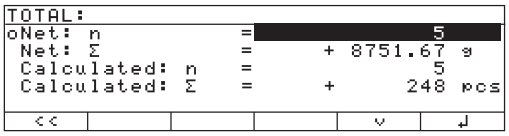
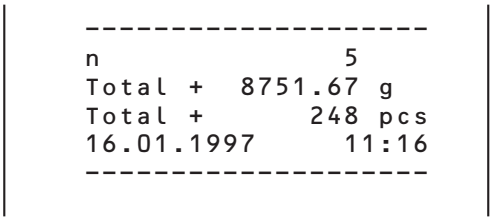
> The balance shuts off

Practical Example
Totalize counted pieces

Settings (changes in the factory settings required for this example):

Setup: App: Application 1: Counting
Setup: App: Application 3: Totalizing: Evaluated values: Net + calculated
Setup: App: Application 3: Totalizing: Evaluation mode, MR function: Final evaluation, display + print

Step	Key (or instruction)	Display/Output
1. Turn on the balance and configure the settings as indicated above	I/⏻	
2. Delete old totalization data, if necessary	CF	
3. Tare the balance	Tare	
4. Toggle to Application 1: Counting	⏻	
5. Place the displayed number of parts on the balance (here: 10 pcs)	Place parts to be counted on the balance	
6. Initialize the Counting application	**Start** soft key	 
7. Remove the reference sample quantity and toggle to Totalizing	Unload the balance ⏻	
8. Place a number of parts on the balance (here: 50 pcs)	Place parts on the balance	

Step	Key (or instruction)	Display/Output
9. Store piece count	**M+** soft key	
		
10. Unload the balance	Remove parts from the balance	
11. Place another load of parts on the balance (e.g., 60 pcs)	Place parts on the balance	
12. Add piece count to stored total	**M+** soft key	
		
13. Repeat steps 10 and 11 as required		
14. Display final evaluation ("Info" window) (here: 5 weighing operations; total weight: 8751.67 g; total quantity: 248) The ○ indicates which value is displayed in the text line; you can change this selection	**MR** soft key	
15. Print final evaluation		

Formulation

Purpose
With this application program you can add weight values and calculated values to a totalization memory as components of a formula.

You can use the "Formulation" application in combination with a program chosen from Application 1 (except Recalculation) and one from Application 2 (checkweighing, time-controlled functions) as well as with the extra functions.

Available Features
- Totalization of weight values and calculated values
- Weigh in different components to a total amount defined by pressing the **Nom** soft key and entering the value through the numeric keys
- Simultaneous storage of net and calculated values
- Optional configuration in the Setup menu for loading weight values and calculated values either from Application 1 (e.g., counting, weighing in percent) or from Application 2 (checkweighing, time-controlled functions)
- Totalization memory for up to 65535 values
- Transaction counter and current total displayed in the text line
- Balance tared after a value is stored
- Manual input of the number of individual weighing operations (target no. of operation **nDef**). Result printed and memory cleared after printout of **nDef**.
- Optional configuration in the Setup menu to add the current weight, with display accuracy, to the current total by pressing the **M+** soft key and generating a printout of the result
- Optional configuration in the Setup menu for stability-dependent storage of the measured value: **Stability range**
- Optional automatic storage of measured values

  Storage of measured value is indicated by →←.

  →← indicates that you can place a load on the balance.
- Minimum load threshold for automatic storage
- Press the **M–** soft key to delete the last value added to the totalization memory. The transaction counter value is reduced by one and a printout is generated.
- Printout of an evaluation of results, depending on the Application 1 or Application 2 parameters. Configure the Setup menu to define the information included on this printout.
- Press the key identified by **MR** (soft key) for a printout of an intermediate evaluation after each addition or a final evaluation
- A final evaluation is printed when the formulation routine is ended by pressing (CF), if no final evaluation was generated by pressing **MR**
- Optional configuration in the Setup menu to clear the totalization memory and reset the transaction counter by pressing (CF) or after an evaluation is printed out
- Totalization data and transaction counter data are stored in non-volatile memory
- Continue formulation after turning the balance off and back on

Factory Settings
Automatic storage: **Off**

Minimum load for automatic storage: **20 digits**

Source of data for auto storage: **Application 1**

Evaluated values: **Net**

Evaluation mode, MR key function: **Intermediate evaluation, print**

Printout of individual components: **On**

Balance functions: Stability range: **2 digits**

Printout: Application-defined output: Print on request, then tare: **Off**

Soft Key Functions

M+	Add weight values or application values to the total in the totalization memory. The component or transaction counter value increases by one each time you press this key.
M–	Delete the last value added to memory. The transaction counter value decreases by 1. You cannot delete previous values by repeatedly pressing this key.
MR	Print or display an inter-mediate or final evaluation
nDef	Store the input number of component
Nom	Press to enter target component weight using the numeric keys

Printout of Formulation Report
When an intermediate or final evaluation is printed out, all results up to this point are included.

```
Comp2 + 42.38 g
Tot.cp+184.89 g
```

Comp2: Weight of the 2nd component
Tot.cp: Total of all components

Preparation

- Turn on the balance: Press (I/⏻)

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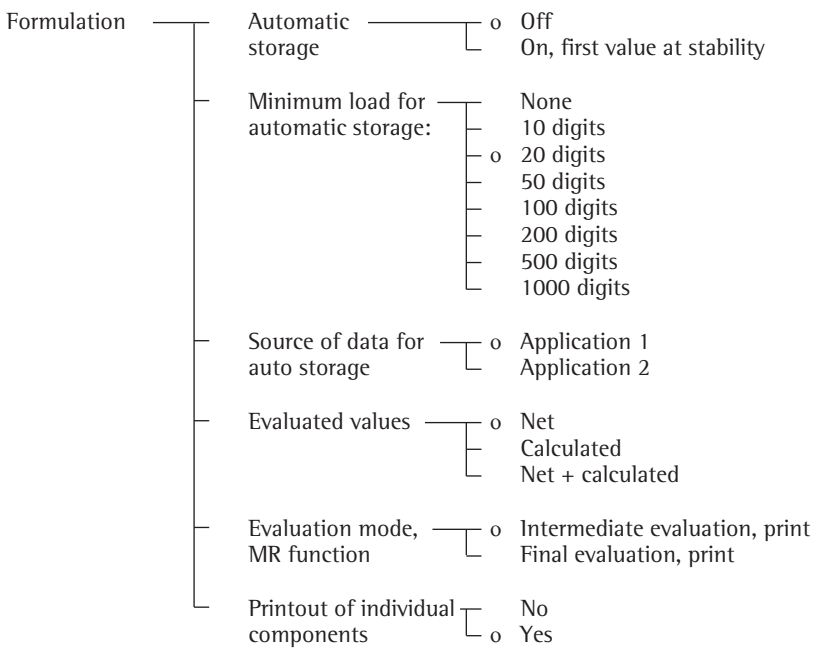
- Select the Formulation application program in the Setup menu: Press (Setup)
- Select `Application parameters`: press the `v` soft key 2 ×, then the `>` soft key once
- Select `Application 3 (data records)`: press the `v` soft key 2 ×, then the `>` soft key once
- Select `Formulation`: press the `^` or the `v` soft key
- Select `Formulation`: press the `>` soft key



o = factory setting

see also the “Application Parameters (Overview)” in the chapter entitled “Configuration”

- Save settings and exit the Setup menu: press the `<<` soft key

Additional Functions

In addition to the functions for:

– alphanumeric input,

– taring (not during alphanumeric input),

– printing,

you can also access the following functions from this application:

Calibration/Adjustment

- Press the `Cal` soft key

> See “Calibration/Adjustment” for further instructions

Toggling to Another Application

- Press (⇧01)

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

- Press (Setup)

> See “Configuration” for further instructions

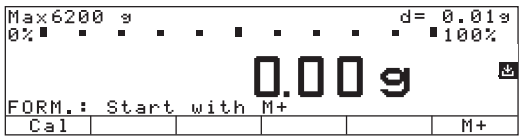
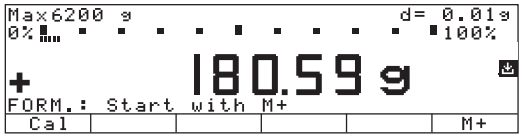
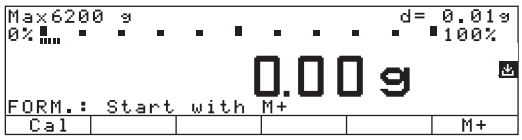
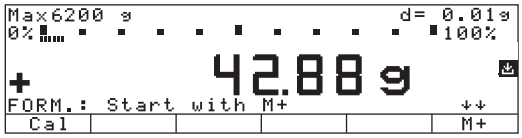
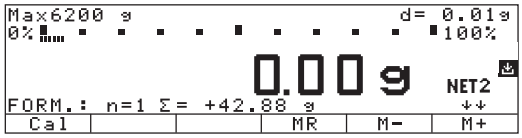
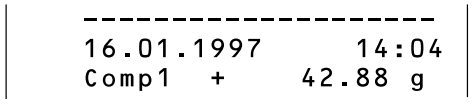
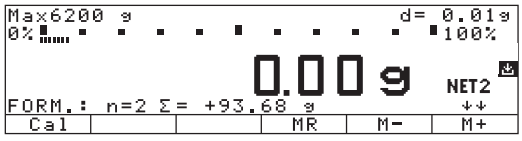
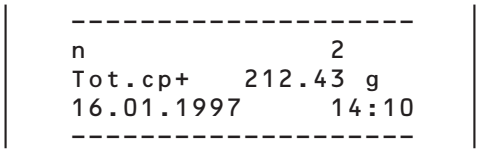
Turning Off the Balance

- Press (I/⏻)

> The balance shuts off

Practical Example
Weighing in Components

Settings (changes in the factory settings required for this example):
Setup: App: Application 3: Formulation: Automatic storage: On, first value at stability
Setup: App: Application 3: Formulation: Minimum load for automatic storage: 100 digits
Setup: App: Application 3: Formulation: Evaluation mode, MR function: Final evaluation, print

Step	Key (or instruction)	Display/Output
1. Turn on the balance and configure the settings as indicated above	I/⏻	
2. Delete old formulation data, if necessary	CF	
3. Tare the balance	Tare	
4. Place the empty container on the balance (here: 180.59 g)	Place load on the balance	
5. Tare the balance	Tare	
6. Weigh in the first component (here: 42.88 g)	Place components in container	
7. Store components in the formulation memory Balance is tared automatically	**M+** soft key	
Components are printed out automatically		
8. Weigh in the next component (here: 50.80 g) Components are stored in the totalization memory at stability and printed out	Place components in container	
Balance is tared automatically		
9. Repeat step 7 as required		
10. Print final evaluation (here: with total weight of all components: 212.43 g)	**MR** soft key	
11. Delete old formulation data, if necessary	CF	

Statistics $\bar{x}$

Purpose
With this application program you can have weight values and calculated values totalized and statistically evaluated.

The values determined for the evaluation are:

- average
- standard deviation
- variation coefficient
- sum of all values
- lowest value (minimum)
- highest value (maximum)
- difference between the minimum and the maximum

You can use the "Statistics" application in combination with a program chosen from Application 1 (e.g., counting, weighing in percent) and one from Application 2 (checkweighing, time-controlled functions) as well as with the extra functions.

Available Features
- Storage of weight values and calculated values
- Simultaneous storage of net and calculated values
- Optional configuration in the Setup menu for loading weight values and calculated values either from Application 1 (e.g., counting, weighing in percent) or from Application 2 (checkweighing, time-controlled functions)
- Totalization memory for up to 65535 values
- Simultaneous display in the text line of transaction counter and, e.g., the current total
- Optional configuration in the Setup menu for having the balance tare automatically after a value is stored in the totalization memory
- Manual input of the number of individual weighing operations (target no. of operation `nDef`). Result printed and memory cleared after printout of `nDef`.
- Optional configuration in the Setup menu to add the current weight, with display accuracy, to the current total by pressing the `M+` soft key and generate a printout of the result
- Optional configuration in the Setup menu for stability-dependent storage of the measured value: Balance functions: `Stability range`
- Optional automatic storage of measured values

  Storage of measured value is indicated by →←.
  ↓↓ indicates that you can place a load on the balance.
- Minimum load threshold for automatic storage
- Press the `M–` soft key to delete the last value added to the totalization memory. The transaction counter value is reduced by one and a printout is generated.
- Press the `MR`: soft key for information about number of transactions and the current total. By configuring the Setup menu, you can define whether the information is displayed and printed, or only printed, and whether the information comprises an intermediate or final evaluation (see the example)
- In the Info window you can use the ∨, ↲ soft keys to choose which value is displayed in the text line during weighing
- Printout of the end result depending on the Application 1 or Application 2 parameters. Configure the Setup menu to define which values are included on the printout (Printout of individual components)
- Press `MR` for a printout of an intermediate evaluation after each addition or a final evaluation
- A final evaluation is printed when the statistics routine is ended by pressing CF, if no final evaluation was generated by pressing `MR`
- Optional configuration in the Setup menu to clear the totalization memory and reset the transaction counter by pressing CF or after an evaluation is printed out
- Totalization data and transaction counter data are stored in non-volatile memory
- Continue totalization after turning the balance off and back on

Factory Settings
Automatic storage: `Off`

Minimum load for automatic storage: `20 digits`

Source of data for auto storage: `Application 1`

Evaluated values: `Net`

Evaluation mode, MR key function: `Intermediate evaluation, print`

M+/M– function, then tare: `Off`

Printout of individual components: `Off`

Balance function: Stability range: `2 digits`

Printout: Application-defined output: Print on request, then tare: `Off`

Soft Key Functions

`M+`	Add weight values or application values to the total in the totalization memory. The component or transaction counter value increases by one each time you press this key.
`M–`	Delete the last value added to memory. The transaction counter value decreases by 1. You cannot delete previous values by repeatedly pressing this key.
`MR`	Print or display an inter-mediate or final evaluation
`nDef`	Store the input number of components

Preparation

● Turn on the balance: Press (I/O)

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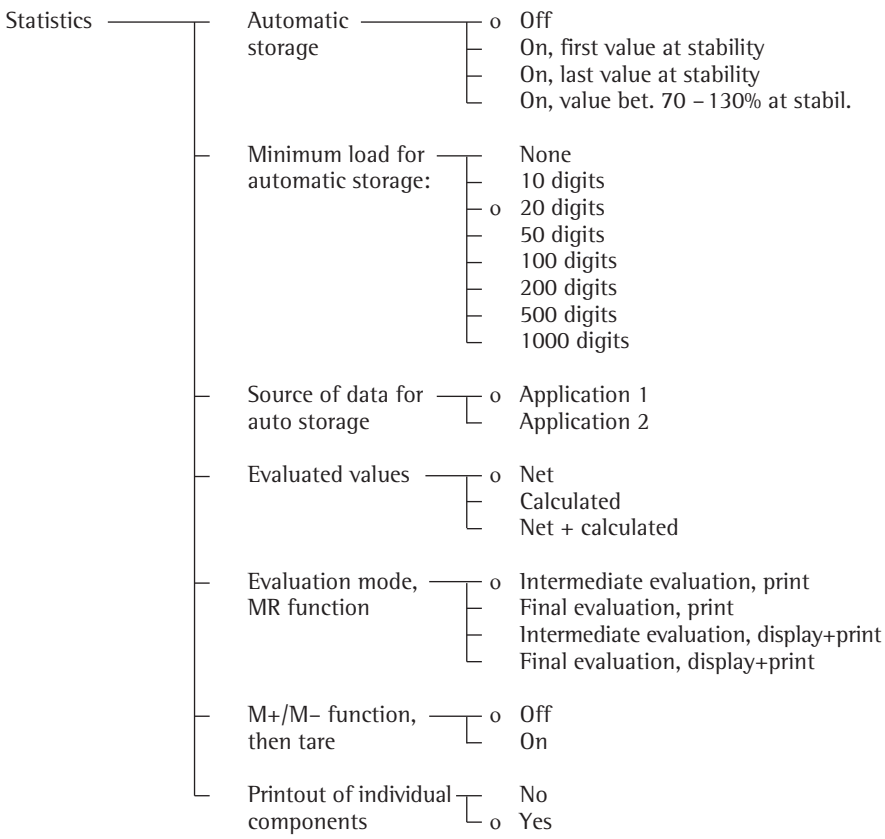
● Select the Statistics application program in the Setup menu: Press (Setup)

● Select `Application parameters`: press the `v` soft key 2 ×, then the `>` soft key once

● Select `Application 3 (data records)`: press the `v` soft key 2 ×, then the `>` soft key once

● Select `Statistics`: press the `^` or the `v` soft key

● Select `Statistics`: press the `>` soft key



o = factory setting

see also the “Application Parameters (Overview)” in the chapter entitled “Configuration”

● Save settings and exit the Setup menu: press the `<<` soft key

Additional Functions

In addition to the functions for:

– alphanumeric input,

– taring (not during alphanumeric input),

– printing,

you can also access the following functions from this application:

Calibration/Adjustment

● Press the `Cal` soft key

> See “Calibration/Adjustment” for further instructions

Toggling to Another Application

● Press (Application)

> See the section on the corresponding application program for further instructions

Setup (setting parameters)

● Press (Setup)

> See “Configuration” for further instructions

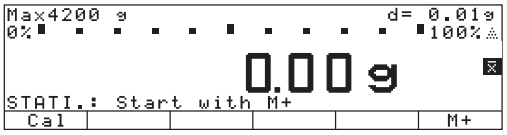
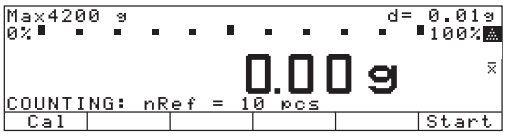
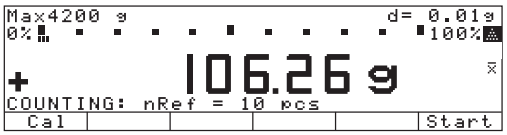
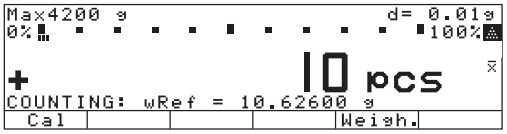
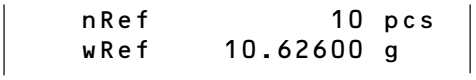
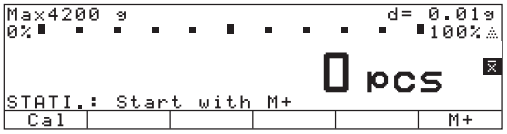
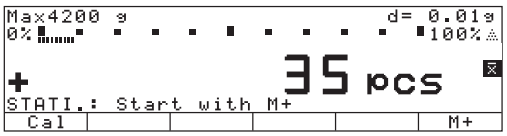
Turning Off the Balance

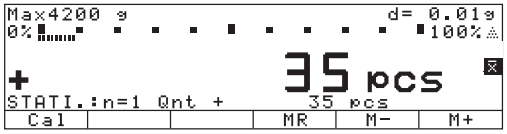
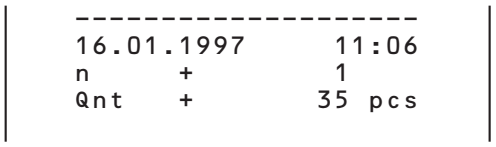
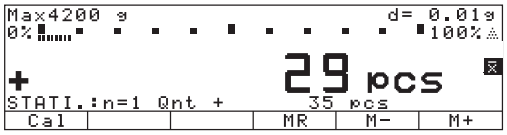
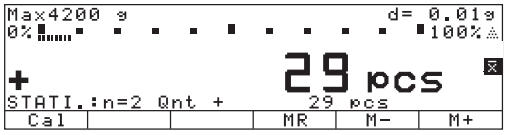
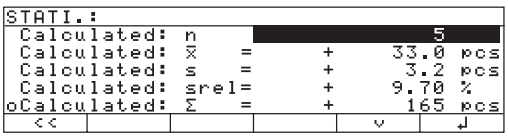
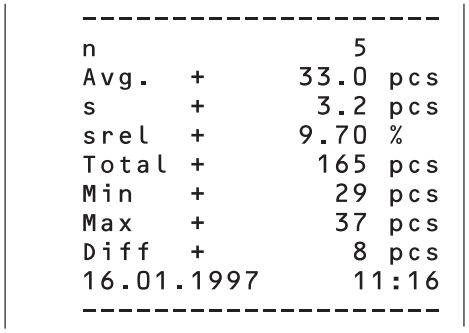
● Press (I/O)

> The balance shuts off

Practical Example
Totalize counted pieces and print out statistics

Settings (changes in the factory settings required for this example):
Setup: App: Application 1: Counting: Average piece weight updating: Manual
Setup: App: Application 3: Statistics: Evaluated values: Calculated
Setup: App: Application 3: Statistics: Evaluation mode, MR function: Final evaluation, display + print

Step	Key (or instruction)	Display/Output
1. Turn on the balance and configure the settings as indicated above	I/O	
2. Delete old statistics data, if necessary	CF	
3. Tare the balance	Tare	
4. Toggle to Application 1: Counting	D1	
5. Place the displayed number of parts on the balance (here: 10 pcs)	Place parts to be counted on the balance	
6. Initialize the Counting application	**Start** soft key	 
7. Remove the reference sample quantity and toggle to Statistics	Unload the balance D1	
8. Place a number of parts on the balance (here: 35 pcs)	Place parts on the balance	

Step	Key (or instruction)	Display/Output
9. Store piece count	**M+** soft key	 
10. Unload the balance	Remove parts from the balance	
11. Place another load of parts on the balance (e.g., 29 pcs)	Place parts on the balance	
12. Add piece count to stored total	**M+** soft key	 
13. Repeat steps 11 and 12 as required		
14. Display final evaluation (“Info” window) (here: 5 weighing operations; total quantity: 165) The ○ indicates which value is displayed in the text line; you can change this selection	**MR** soft key	
15. Print final evaluation		

Second Tare Memory (Preset Tare)

Purpose
With this function you can store the weight currently on the balance as a tare weight, or use the numeric keys to enter a number for a preset tare weight.

You can use “Extra Functions” in combination with a program from Application 1 (e.g., counting, weighing in percent), one from Application 2 (checkweighing, time-controlled functions) and one from Application 3 (totalizing, formulation, statistics) as well as with the extra functions.

Available Features
- Store a weight on the balance in the second tare memory (without numeric input)
- Store a numeric value in the second tare memory (input using the numeric keys)
- Label a net value as **NET1** when there is a value stored inthe second tare
- You can assign this function to the fourth or fifth soft key (from the right), i.e. F4 or F5

  The soft key designation for this function is: PT1/T1
- Optional configuration in the Setup menu for storing the current weight readout as the container tare weight. Any load subsequently placed on the scale that is more than 70% of the tare weight is automatically recognized as a container and the scale is tared automatically.
- Automatic printout when a value is stored or input (see “Configuration”)
- Press (CF) to delete the (preset) tare value

Factory Settings
Container tare weight: No

Automatic printout: Off

Soft Key Functions

PT1/T1	Store weight as tare value
PT1	Save tare weight entered using the numeric keys

Printout of the Data in the 2nd Tare Memory
The printout shows either
- Net value N1
- Tare weight T1, or
- Manually entered tare value PT1

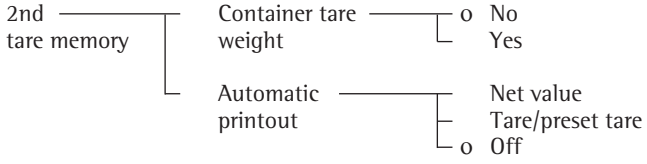
```
N1      163.48 g
T1      138.73 g
PT1     150.00 g
```

N1: Net weight /value) when a weight is stored in the tare memeory
T1: Tare weight
PT1: Preset tare value entered using the numeric keys

Preparation
- Turn on the balance: Press (I/⏻)

> Sartorius logo is displayed

- Select Extra function (F4) or Extra function (F5) in the Setup menu: Press (Setup)
- Select Application parameters: press the v soft key 2 ×, then the > soft key once
- Select Extra function (F4) or Extra function (F5): press the v soft key 3 ×, then press the > soft key once
- Select 2nd tare memory
- Confirm 2nd tare memory



o = factory setting

see also “Application Parameters (Overview)” in the chapter entitled “Configuration”

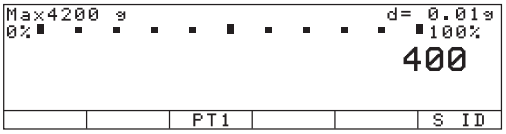
- Save settings and exit the Setup menu: press the << soft key

Second Tare Memory in Legal Metrology
- Press the (i)PT1 soft key to enter information about the tare value using the number keys.
- The PT1 tare value is printed out with the net value.

Practical Example
Determine the Contents of Bottles: Bottle weight = 400 g.

Settings (changes in the factory settings required for this example):

Setup: App: Extra function(F4): 2nd tare memory: Automatic printout: Tare/preset tare

Step	Key (or instruction)	Display/Output
1. If necessary: turn on the balance and enter the settings given above	I/⏻	
2. Enter bottle weight (here: 400 g)	4 0 0	
3. Store tare value	**PT1** soft key	 PT1 + 400.00 g
4. Determine content weight of bottles (here: contents = 650 g)	Place filled bottles on the balance	

Individual Identification Codes (ID)

Purpose
With this function you can assign identifiers to values for documentation and printouts.

You can use this extra function in combination with a program from Application 1 (e.g., counting, weighing in percent), one from Application 2 (checkweighing, time-controlled functions) and one from Application 3 (totalizing, formulation, statistics) as well as with the other extra functions.

Available Features
- Store up to 4 IDs; these can be stored, changed or deleted individually.
- Each ID consists of a name and a value; both can be defined by the user.
- ID designations are configured in the Setup: Input menu.
- Each ID designation can have up to 20 characters; when you enter the value later, however, no more than 15 characters of the designation are displayed.
- The ID values are entered while the application program is active; press the **ID** soft key to toggle to the ID input mode.
- Each ID value can have up to 20 characters.
- Access 1 of the 4 IDs directly using the numeric keys. The other three can only be accessed by pressing the **ID** soft key to toggle to the identifier input mode.
- You can assign this function to the fourth or fifth soft key (from the right), i.e. F4 or F5.
- You can configure when the ID is included on the printout (see "Preparation," next page).
- You can configure the position of IDs on the individual or total printout.
- The designation is printed flush left; the value flush right. If the name and value together are too long for one line, the data is printed on two lines.
- Optional configuration in the Setup menu to delete a single character when entering an identifier by pressing CF. Setup: Device: Keys: CF function for input: Delete last character
- Press the **Delete** soft key to delete an ID

Factory Settings for ID Designations
ID1: **ID1**
ID2: **ID2**
ID3: **ID3**
ID4: **ID4**

Factory Settings for ID Values
No values set

Factory Settings for Other Parameters
Printout:
`Each time the print key is pressed`

Soft Key Functions

ID	Toggle to "Identification codes" menu
Delete	Delete input of selected ID

Preparation

● Turn on the balance: Press (I/⏻)

> Sartorius logo is displayed

● Select Extra function (F4) or Extra function (F5) in the Setup menu: Press (Setup)

● Select `Application parameters`: press the `v` soft key 2 ×, then the `>` soft key once

● Select `Extra function(F4)` or `Extra function(F5):` press the `v` soft key 3 × (or 4 ×), then the `>` soft key once

● Select `Identification codes`

● Confirm `Identification codes`

Identification codes — Printout:
- Automatic, if configured
- Once after pressing print, if configured
- o Each time the print key is pressed
- Once for M+ function (app.3 memory)

o = factory setting

see also “Application Parameters (Overview)” in the chapter entitled “Configuration”

● Save settings for the printout: press the `<` soft key 4 ×

● Enter ID name: Select “Printout”: press the `v` soft key, then the `>` soft key

● Select “Identification #”: press the `v` soft key 5 ×, then the `>` soft key once

● Select `ID1`

● Enter name for `ID1` and confirm: use the numeric keys for numbers and/or the soft keys to enter letters

○ Enter names for `ID2`, `ID3` and `ID4`, if desired

● Save settings and exit the Setup menu: press the `<<` soft key

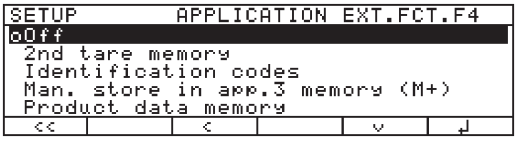
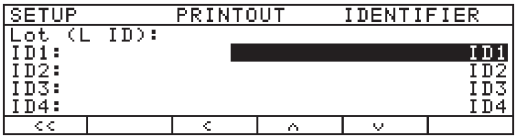
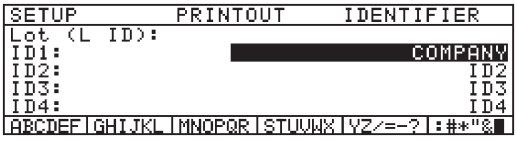
Example

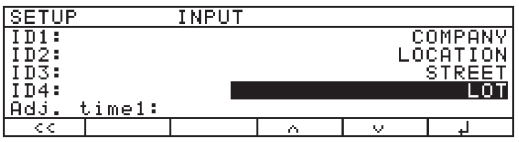
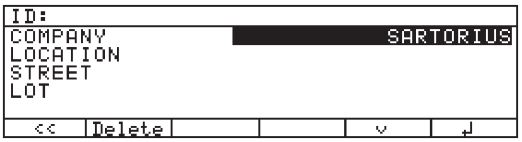
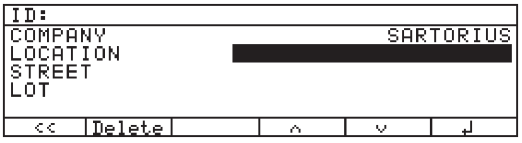
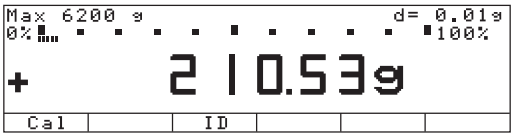
See next page

Example
Include company address and sample lot number on the printout. Each ID line begins with the name.
Print this ID for each net value.

Settings (changes in the factory settings required for this example):

Setup: Application parameters: Extra function (F4): Identification codes
Setup: Input: ID1: Company
Setup: Input: ID2: Location
Setup: Input: ID3: Street
Setup: Input: ID4: Lot

Step	Press key(s) (or follow instructions)	Display/Output
1. If necessary, turn on the balance	(I/⏻)	
2. Select “Extra Function (F4)” in the Setup menu	(Setup) ˅ soft key2 ×, then ˃ soft key once ˅ soft key 3 ×, then ˃ soft key once	
3. Select “Identification codes”	˅ or ˄ soft key; repeatedly, if necessary	
4. Confirm “Identification codes” and exit this menu item	˃ soft key; then ˂ soft key 3 ×	
5. Select ID1 (Printout: Identifier)	˅ or ˃ soft key ˅ soft key 5 ×, then ˃ soft key, then ˅ soft key	
6. Enter name for ID 1 (in this case: COMPANY and confirm	(ABC) ... see also page 37 (ABC), ↲ soft key	

Step		Key (or instruction)	Display/Output
7.	Repeat steps 5 and 6 for: ID2: LOCATION ID3: STREET ID4: LOT		
8.	Save settings, exit the Setup menu and select input mode for ID values	<< soft key twice **ID** soft key	
9.	Enter name of company (here: Sartorius)	ABC ... See also page 37	
10.	Confirm	ABC, ↵ soft key	
11.	Repeat steps 9 and 10 for LOCATION: GOETTINGEN STREET: WEENDER LANDSTRASSE LOT: 15		
12.	Place the first sample on the balance (here: 210.53 g)	Place load on balance	
13.	Print weight value (if desired, perform further weighing operations and print results)	⎙	COMPANY SARTORIUS LOCATION GOETTINGEN STREET WEENDER LANDSTRASSE LOT 15 N + 210.53 g
14.	When weighing is completed, delete each ID individually	**ID** soft key **Delete** soft key 4 times	

Saving Values Manually (M+)

Purpose
With this function you can load weight values and calculation results directly from Application 1 (e.g., counting, weighing in percent) or Application 2 (checkweighing, time-controlled functions) into Application 3 (totalizing, formulation, statistics).

Available Features
– You can assign this function to the fourth or fifth soft key (from the right), i.e. F4 or F5
The soft key designation for this function is: M+

– An Application 3 program (totalizing, formulation or statistics) must be running so you can display and print the result

Factory Settings
There are no optional parameters

Preparation
● Turn on the balance: Press (I/⏻)

> Sartorius logo is displayed

● Select Extra function (F4) or Extra function (F5) in the Setup menu:
Press (Setup)

● Select Application parameters: press the v soft key 2 ×, then the > soft key

● Select Extra function (F4) or Extra function (F5): press the v soft key 3 × (or 4 ×), then the > soft key once

● Select Man. store in app.3 memory (M+)

● Confirm Man. store in app.3 memory (M+)

See also “Application Parameters (Overview)” in the chapter entitled “Configuration”

● Save settings and exit the Setup menu: press the << soft key

Product Data Memory

Purpose
With this function you can enter, store and load data records for initialization of applications, including user-defined data.

You can use this extra function in combination with a program from Application 1 (e.g., counting, weighing in percent), one from Application 2 (checkweighing, time-controlled functions) and the other extra functions for F4 and F5 (identification codes, 2nd tare memory).

Available Features
- Store up to 300 data records.
- Data records can be created, stored or deleted individually.
- Press the **ProDat** soft key to display product data.
- Define a name for each data record of up to 15 alphanumeric characters.
- Optional configuration in the Setup menu to delete a single character when entering a data record name by pressing (CF). Setup: Device: Keys: CF function for input: Delete last character.
- Data records are displayed in alphabetical order.
- Initialization data set for an application (such as wRef, nRef) is saved when you select the Store option. With several applications and extra functions active, you can select the desired parameters before saving the data to define initialization data.
- Use the alphanumeric keypad to search for and display individual data records.
- You can assign this function to the fourth or fifth soft key (from the right), i.e. F4 or F5.
- Error messages are displayed in the text line in plain English.
- Press the **Delete** soft key to delete a data record.

Data Battery-Backed Data Memory
When the balance is disconnected from AC power, these balance-generated data will remain stored for approx. three months. In the standby mode, data are retained by the power supply.

Factory Settings
No user-definable parameters.

Soft Key Functions

ProDat	Toggle to product data display
Delete	Delete selected data record
Load	Overwrite the initialization data with the selected data record
Change	Change the data in the stored data record
Store	Store the initialization data of the selected application under the chosen data record name. If data already exist for this data record, a prompt asks whether this data should be overwritten.
No	Answer no to cancel a “delete” or “overwrite” operation
Yes	Answer yes to perform the “delete” or “overwrite” operation
New	Create a new data record (after entering a data record name) and selecting an application, if desired).

Preparation
- Turn on the balance: Press (I/⏻)

> Sartorius logo is displayed

- Select Extra function (F4) or Extra function (F5) in the Setup menu: Press (Setup)
- Select **Application parameters**: press the **v** soft key 2 ×, then the **>** soft key
- Select **Extra function (F4)** or **Extra function (F5)**: press the **v** soft key 3 × (or 4 ×), then the **>** soft key
- Select **Product data memory**
- Confirm **Product data memory**

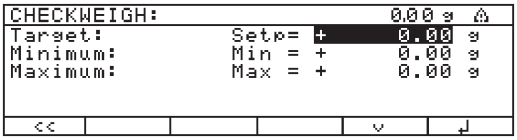
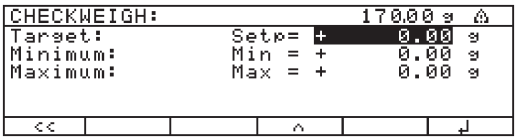
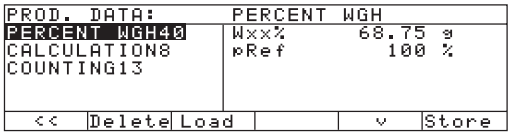
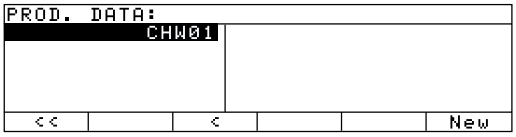
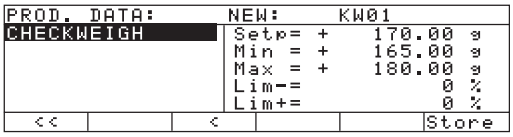
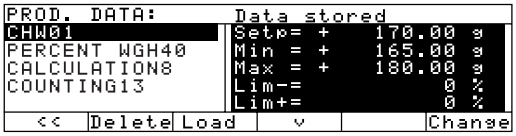
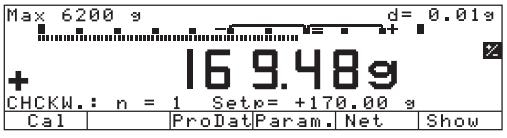
See also “Application Parameters (Overview)” in the chapter entitled “Configuration”

- Save settings and exit the Setup menu: press the **<<** soft key

Practical Example
Create a New Base Data Record for Initializing the Checkweighing Program, Including: Target Value, Minimum, Maximum

Settings (changes in the factory settings required for this example):

Setup: App: Extra function (F4): Product data memory
Setup: App: Application 2: Checkweighing

Step	Key (or instruction)	Display/Output
1. If necessary: turn on the balance and enter the settings given above	I/O	
2. In the Checkweighing application, toggle to the input mode for target, minimum and maximum values	**Param.** soft key	
3. Enter target: 170 g; minimum: 165 g; maximum: 180 g	see the Practical Example for Checkweighing, steps 5 through 9	
4. Toggle to display of product data (existing data records are displayed; in this example, 3 data records have been stored)	**ProDat** soft key	
5. Enter a name for the new data record (here: CHW01)	ABC **ABCDEF** soft key, **C** soft key **GHIJKL** soft key, **H** soft key **STUVWX** soft key, **W** soft key 0 1	
6. Store current Checkweighing parameters as a data record	**New** soft key	
7. Confirm	**Store** soft key	
8. Exit data record display	**<<** soft key	

SQmin Function

Purpose
To display the allowable minimum sample quantity "SQmin" in accordance with the United States Pharmacopeia (USP). According to USP guidelines, the uncertainty of measurement may not exeed 0.1 % of the sample quantity when substances are weighed with the highest degree of accuracy for volume determination. This additional function ensures that weight results lie within defined tolerance limits corresponding to the requirements of your quality assurance system.

Features
- The service technician will determine the required minimum sample quantity based on your quality assurance requirements at the location where the balance is set up. Afterwards, he will store this value in the balance. This setting cannot be changed by the user. Once he has finished programming the balance, the service technician will prepare a "Test in Accordance with the USP" certificate, on which he will record the measurements and the minimum sample quantity for the balance. If you use the SQmin function, you can be sure that the weight results will correspond to the specifications on the certificate and, therefore, USP guidelines.

- Displaying the minimum sample quantity:
  The value is shown in the next line for 4 seconds after the "SQmin" soft key is pressed
  or
  the value is constantly displayed in place of the bar graph.

- This function can be assigned to either the fourth or fifth soft key from the right (F4 or F5). The soft key should then be labeled with `SQmin`.

- If the minimum sample quantity has not been reached:
  The `SQmin` soft key will flash inversely. Weights will be marked with an asterisk "`*`" in the printout.

- Header of GLP-complicant records: The minimum sample quantity entered for "SQmin" can be printed out in addition.

Factory-set parameters
Display: `Text display`

Print in GLP header: `Off`

Preparation
Turn on the balance: press (I/⏻)

> Sartorius logo is displayed

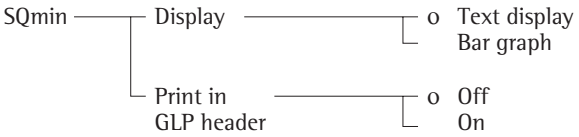
Select Extra function (F4) or Extra function (F5) in the Setup menu: press (Setup)

Select `Application parameters`: press the `v` soft key twice, then press the `>` soft key once

Select `Extra function (F4)` or `Extra function (F5)`: press the `v` soft key repeatedly, then press the `>` soft key

Select `SQmin`.

Confirm `SQmin`.



o = Factory setting

See also "Application Parameters (Overview)" in the chapter entitled "Configuration"

Store the settings and exit the Setup menu: press the `<<` soft key.

Example
Determining the weights of samples while monitoring the minimum sample quantity (here: SQmin: 30 mg)

Presettings (different from the factory settings):
Setup: Application parameters: Additional function (F4): SQmin

Step	Press key(s) (or follow instructions)	Display/Output
1. Switch on the balance if necessary and enter the presettings as shown above	I/⏻	
2. Place the container into which the sample will be filled onto the weighing pan and tare the balance	Tare	
3. Weigh a sample (here: the minimum sample quantity has not been reached)	Place the sample on the weihing pan	
4. Print out the weight		*N + 0.02 g
5. Weigh another sample (here: the minimum sample quantity has been exceeded)	Place the sample on the weighing pan	
6. Print out the weight		N + 16.38 g
7. Display the minimum sample quantity for 4 seconds	SQmin soft key	
8. If necessary, weigh further samples		

DKD Uncertainty of Measurement

Purpose
Display of the dynamic uncertainty of measurement in conformance with the specifications listed on the DKD Calibration Certificate.

Features
After Technical Service has prepared the balance:

- A service technician performs on-site DKD calibration of your balance to determine its uncertainty of measurement. On the DKD Calibration Certificate, the measurements and the uncertainty for the initial sample weight are recorded. Then the service technician enters this data in the balance.

- Display of the factor and the exponent entered; activation by accessing the Setup menu: Device information: DKD uncertainty of measurement

- Display of the uncertainty of measurement, for example:
  Absolute uncertainty of measurement:
  `U = 0.54 g`
  Relative uncertainty of measurement:
  `U* = 0.00045 %`
  Process accuracy:
  `PA = 0.00013 %`

- Display of up to 2 DKD uncertainty of measurement values:
  The first two calculated values that are actviated by selecting “Display” in the Setup menu are shown.

- This function can be assigned to a key identified by the fourth or fifth soft key (from the right, F4 or F5).
  The soft key is identified by `U⁄PA`

- Resolution
  The absolute uncertainty of measurement is displayed with a 10 times higher resolution.
  The absolute uncertainty of measurement and the process accuracy are displayed with up to 5 decimal places (2 significant decimal places).

- Printout of the addend and the factor of the uncertainty of measurement when the power is turned on:
  In the Setup menu, select “Auto print upon initialization: All values.”

- Display `---------` (for U* and PG) for:
  - Calculated net values (e.g., counting, weighing in percent, etc.)
  - Values greater than 100%
  - Net value equal to “zero”

Preparation
Turn on the balance: press (I/⏻)

> The Sartorius logo is displayed

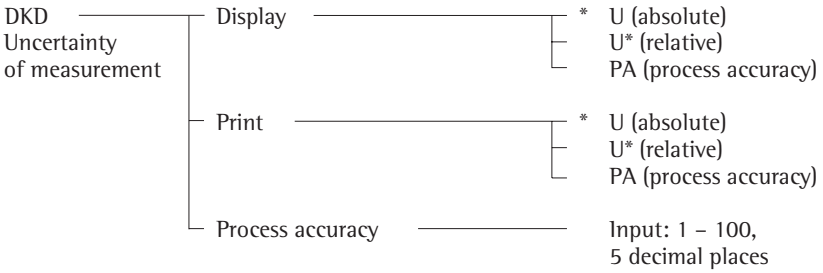
In the Setup menu, select “Extra functions (F4)” or “Extra functions (F5)”: press (Setup)

Select the `Application parameters`: press the `v` soft key 2 times, then the `>` soft key

Select `Extra function (F4)` or `Extra function (F5)`: press the `v` soft key repreatedly, then press the `>` soft key

Select `DKD uncertainty of measurement`

Confirm `DKD uncertainty of measurement`



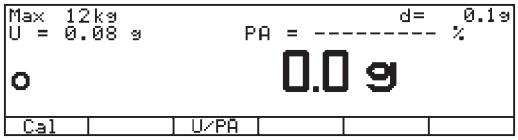
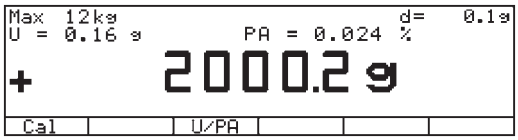
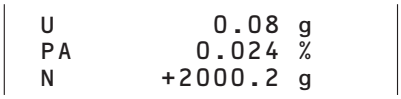
* = An asterisk (*) indicates an activated menu item. You can select up to 3 items.
* = factory setting

See also “Application Parameters (Overview)” in the chapter entitled “Configuration”

Save settings and exit the Setup menu: press the `<<` soft key

Example
Perform a weighing procedure with the “DKD uncertainty of measurement” application

Settings:
Setup: Application parameters: Extra function (F4): DKD uncertainty of measurement: Display: PA (process accuracy)
Setup: Application parameters: Extra function (F4): DKD uncertainty of measurement: Print: PA (process accuracy)
Setup: Application parameters: Extra function (F4): DKD uncertainty of measurement: Display: Input: 3.00000 (factory setting)

Step	Press key(s) (or follow instructions)	Display/Output
1.	Turn on the balance, if not on, and configure the settings as indicated above	I/⏻
2.	Place a container for a sample on the balance and tare	Tare 
3.	Measure weight of sample	Add sample to container 
4.	Print weight	
5.	Weigh next sample (if any)	

Combining Applications

The following table summarizes the possibilities for combination of the application programs described here. Each line stands for one combination. The weighing function is generally available, and does not have to be combined with a calculating function.

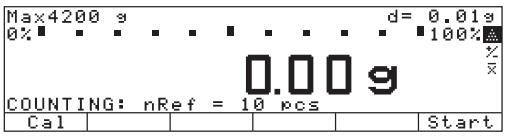
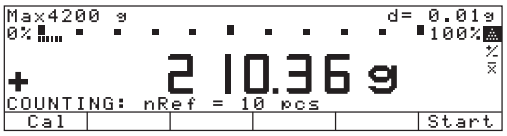
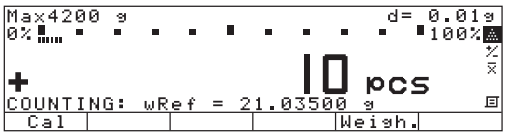
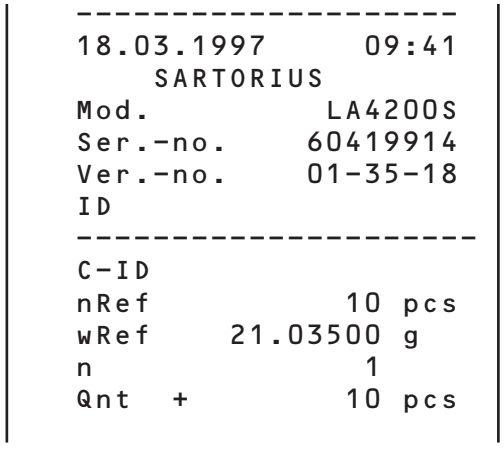
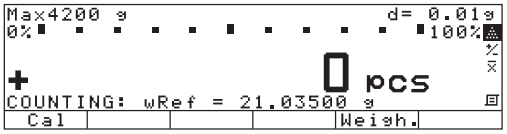
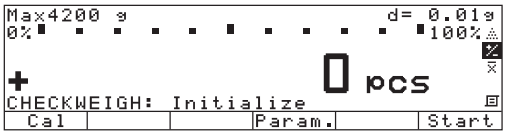
Application 1 (basic settings)	Application 2 (checking and control functions)	Application 3 (data records and documenting functions)
Counting	–	Totalizing
Counting	–	Formulation
Counting	–	Statistics
Weighing in percent	–	Totalizing
Weighing in percent	–	Formulation
Weighing in percent	–	Statistics
Animal weighing	–	Totalizing
Animal weighing	–	Statistics
Recalculation	–	Totalizing
Recalculation	–	Statistics
Calculation	–	Totalizing
Calculation	–	Formulation
Calculation	–	Statistics
Density determination	–	Statistics
Density determination	Time-controlled functions	Statistics
Differential weighing	–	–
Air buoyancy correction	–	Totalizing
Air buoyancy correction	–	Statistics
Diameter determination	–	Totalizing
Diameter determination	–	Formulation
Diameter determination	–	Statistics
–	Checkweighing	Totalizing
–	Checkweighing	Formulation
–	Checkweighing	Statistics
Counting	Checkweighing	Totalizing
Counting	Checkweighing	Formulation
Counting	Checkweighing	Statistics
Weighing in percent	Checkweighing	Totalizing
Weighing in percent	Checkweighing	Formulation
Weighing in percent	Checkweighing	Statistics
Recalculation	Checkweighing	Totalizing
Recalculation	Checkweighing	Statistics
Calculation	Checkweighing	Totalizing
Calculation	Checkweighing	Formulation
Calculation	Checkweighing	Statistics
Air buoyancy correction	Checkweighing	Totalizing
Air buoyancy correction	Checkweighing	Statistics
Diameter determination	Checkweighing	Totalizing
Diameter determination	Checkweighing	Formulation
Diameter determination	Checkweighing	Statistics
–	Time-controlled functions	Totalizing
–	Time-controlled functions	Formulation
–	Time-controlled functions	Statistics
Counting	Time-controlled functions	Totalizing
Counting	Time-controlled functions	Formulation
Counting	Time-controlled functions	Statistics
Weighing in percent	Time-controlled functions	Totalizing
Weighing n percent	Time-controlled functions	Formulation
Weighing in percent	Time-controlled functions	Statistics
Animal weighing	Time-controlled functions	Totalizing
Animal weighing	Time-controlled functions	Statistics
Recalculation	Time-controlled functions	Totalizing
Recalculation	Time-controlled functions	Statistics
Calculation	Time-controlled functions	Totalizing
Calculation	Time-controlled functions	Formulation
Calculation	Time-controlled functions	Statistics
Air buoyancy correction	Time-controlled functions	Totalizing
Air buoyancy correction	Time-controlled functions	Statistics
Diameter determination	Time-controlled functions	Totalizing
Diameter determination	Time-controlled functions	Formulation
Diameter determination	Time-controlled functions	Statistics

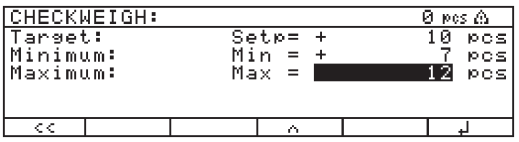
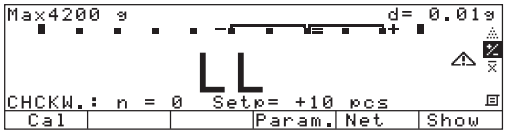
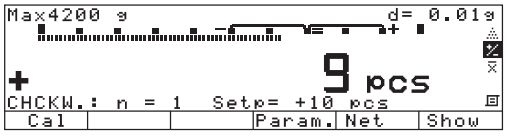
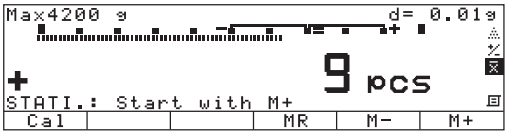
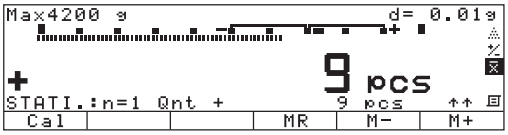
Examples of Application Combinations

Checkweighing with statistical evaluation
You want to check a piece count, and have the results that lie within the tolerance range statistically evaluated and printed as a ISO/GLP-compliant record.

Settings (changes in the factory settings required for this example):

Setup: Application parameters: Application 1: Counting
Setup: Application parameters: Application 2: Checkweighing
Setup: Application parameters: Application 3: Statistics: Automatic storage: On, first value at stability
Setup: Application parameters: Application 3: Statistics: Source of data for auto storage: Application 2
Setup: Application parameters: Application 3: Statistics: Evaluated value: Calculated
Setup: Application parameters: Application 3: Statistics: Evaluation mode, MR function: Intermediate evaluation, display+print
Setup: Application parameters: Printout configuration: ISO/GLP/GMP printout: Always

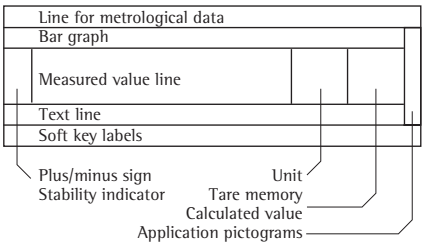
Step	Key (or instruction)	Display/Output
1. If necessary: turn on the balance and enter the settings given above		
2. Place reference sample quantity on the balance	Place parts on the balance	
3. Initialize the balance	`Start` soft key	
		
4. Remove reference sample quantity	Unload the balance	
5. Initialize Checkweighing Toggle to Checkweighing		

Step	Key (or instruction)	Display/Output
6. Enter target, minimum and maximum values (here: target: 10 pcs; minimum: 7 pcs; maximum: 12 pcs)	Param. soft key 1 0, ↵ soft key 7, ↵ soft key 1 2	
7. Store input	↵ soft key	 Setp + 10 pcs Min + 7 pcs Max + 12 pcs
8. Determine first unknown quantity	Place uncounted parts on the balance	
9. Toggle to Statistics	(DT)	
10. Initialize automatic storage	M+ soft key	 n 1 Qnt + 9 pcs
11. Determine further unknown quantities Printout is generated automatically	Place parts to be counted on the balance	n 4 Avg. + 10.0 pcs s + 0.8 pcs srel + 8.00 % Total + 40 pcs Min + 9 pcs Max + 11 pcs Diff + 2 pcs ---------- 18.03.1997 10:26 Name: ----------
12. End weighing series Statistics are evaluated Final GLP printout is generated	(CF)	
13. Delete initialization of the last application	(CF)	

Data Output Functions

There are 3 options for data output:

- Output to the display and control unit
- Output to a printer (generate a printout)
- Output to a peripheral device (e.g., computer) via the interface port



Output to the Display and Control Unit
The display is divided into 9 sections. Information about the balance, the application being used and the sample weighed is output in the following sections:

- Line for metrological data
- Bar graph
- Plus/minus sign, stability symbol display
- Measured value line
- Weight unit display
- Data in tare memory; calculated value
- Application symbol display
- Text line
- Soft key labels

Line for Metrological Data (on balances verified for legal metrology)

This line shows:

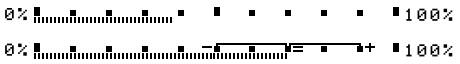
Max4200 g – Maximum balance capacity (e.g., 4,200 g)

Min 0.5 g – Minimum balance capacity; the weight must not go below this limit when the balance is used in legal metrology

e= 0.1g – Verification interval of the balance; irrelevant if the balance is not used in legal metrology (e.g., 0.1 g)

d=0.01g – Readability: Indicates the actual scale interval (display increment of the balance) (e.g., 0.01 g)

Bar Graph (overview display)
In the bar graph, weighing results are displayed either



- as a percentage of the maximum balance capacity, or
- in relation to a target value, with tolerance limits indicated.

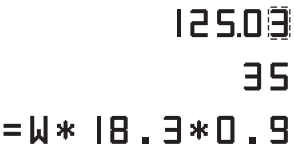
You can turn off (blank) the bar graph display (Setup: Device: Display: Digit size: 13 mm + text display or 13 mm)

Plus/Minus Sign, Stability Symbol
This section shows:

◈ – "Busy" symbol

+ – – Plus or minus sign

○ – Zero symbol (indicating the scale has been zeroed)



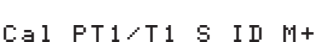
Measured Value Line
This line shows:
- The current weight value (bordered values are invalid in legal metrology)
- Calculated values (e.g., piece count)
- User input (e.g., lot number, equation)

Weight Unit Display
This section shows:
- The current weight unit (e.g., kg)
- Designation of other values (e.g., “pcs”)

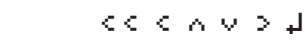
Tare Memory, Calculated Value
This section shows:
- Indication that value is calculated (not valid in legal metrology)
- Indication that the tare memory contains application data

Application Symbols
This column shows:
- Symbol for Application 1 (toggling between weight units, counting, weighing in percent, animal weighing, calculation)
- Symbol for Application 2 (checkweighing, time)
- Symbol for Application 3 (totalizing, formulation, statistics)
- Symbol for current print job
- Symbol for ISO/GLP printout

Text Line
This line contains:
- Explanatory text about the application program (e.g., about “Counting”)
- Explanation of error codes

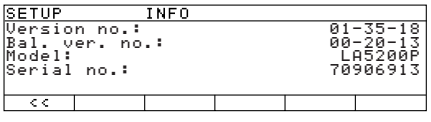


Soft Key Labels
This line shows
- Texts (abbreviations) to indicate the function assigned to each key



- Symbol for selecting and confirming parameter settings (see also “Operating Design”)

Balance Information
In the Setup menu, you can select `Setup: Info: Device information` for a display of balance information. The display includes:



- Software version number
- Balance version number
- Balance model
- Balance serial number
- Date: next maintenance
- Service phone

Printouts

Purpose
This function enables you to print out weights, other measured values and IDs. You can format the printout to meet different requirements.

Features
Line format: you can configure a data ID code with up to 6 characters at the beginning of each of the values to be printed

Weight ID:
You can configure an extra line for identification of each weighed or calculated value using the code S ID

Print application parameters:
You can generate a printout of the values configured for initialization of an application before printing the measured results

ISO/GLP-compliant printout:
You can print out parameters relating to the weighing conditions

Print animal weights:
Application-defined, automatic printout of animal weights or of animal weights plus calculated weights after averaging

Optimizing interfaces:
- Use the highest possible baud rate
- Turn off interfaces that are not in use
- Optimize the amount of data to be transfered

Configuring Printout Formats
For a number of application programs, you need to set initialization values. All values upon initialization or only the main values can be automatically printed as soon as you have configured this in the Setup menu: Auto print upon initialization

Weights and calculated values can be printed as numeric values either with a preceding data ID code (numeric value with 22 characters) or without one (numeric value only 16 characters). See also the section on Line format in the chapter entitled “Data Output Functions”.

You can generate an ISO/GLP print-out always or only for calibration/adjustment or turn off this option. See also page 116.

Generating an ISO/GLP Printout
In the Setup menu, you have a choice of three settings:

- No ISO/GLP printout generated (Off)
- ISO/GLP printout generated only for calibration/adjustment (Only for calibration/adjustment)
- Every printout is an ISO/GLP-compliant report (Always on)

Auto print checkweighing results: automatic printout of a weight when it lies within the preset limits at stability

Auto print with time-controlled functions: automatic printout of weights after a preset time has elapsed or at a defined time
Printout of intermediate or final evaluation from the application 3 memory (totalizing, formulation and statistics); generate by pressing the MR soft key

Generating Printouts Acceptable for Legal Metrology:
You can configure the Setup menu of the balance to generate data records that are acceptable for legal metrology on a Sartorius printer:

- YDP02
- YDP03
- YDP01IS
- YDP01IS Label
- YDP02IS
- YDP02IS Label
- YDP04IS
- YDP04IS Label

ISO/GLP-compliant Printout/Record

You can have the parameters pertaining to weighing conditions printed before (GLP header) and after (GLP footer) the values from the weighing series.
These parameters include:

- Date
- Time at the beginning of a weighing series
- Balance manufacturer
- Balance model
- Model serial number
- Software version
- Lot number (weighing series no.)
- Time at the conclusion of the weighing series
- Field for operator signature

Operating the Balance with an ISO/GLP-capable Documentation Device (Printer)

ISO/GLP-compliant documentation requires a computer with special software. Contact Sartorius for a detailed description for creating this software.

Setting:
Setup: Printout: ISO/GLP/GMP printout: Always on

The record is output to a Sartorius YDP03-0CE Data Printer or a computer.

End GLP printout:

● Press CF
End GLP printout while application is active:
This requires the following settings:
Setup: Device: Keys: CF function in application: Clear only selected applications

● Press CF

> Text line: CF selected: clear application

● Press the GLP soft key

`--------------------`	Dotted line
`17.01.1997  16:12`	Date/time
`SARTORIUS`	Balance manufacturer
`Mod.  LA4200S`	Balance model
`Ser. no.  60419914`	Balance serial number
`Ver. no.  01-35-18`	Software vers. (display and control unit)
`ID  12345678901234`	Balance ID no.
`--------------------`	Dotted line
`L ID  12345678901234`	Weighing series no.
`nRef  10 pcs`	Application initialization value
`wRef  1.35274 g`	Application initialization value
`Qnt  +  235 pcs`	Counting result
`Qnt  +  4721 pcs`	Counting result
`S ID  12345678901234`	ID for counting result
`Qnt  +  567 pcs`	Counting result
`--------------------`	Dotted line
`17.01.1997  16:13`	Date/time
`Name:`	Field for operator signature
	Blank line
`--------------------`	Dotted line

Record of Internal Calibration/Adjustment:

`--------------------`	Dotted line
`17.01.1997  16:24`	Date/time
`SARTORIUS`	Balance manufacturer
`Mod.  LA4200S`	Balance model
`Ser. no.  60419914`	Balance serial number
`Ver. no.  01-35-18`	Software vers. (display and control unit)
`ID`	Balance ID no.
`--------------------`	Dotted line
`L ID  12345678901234`	Weighing series no.
`Internal calibration`	Calibration adjustment mode
`Start:  manual`	Beginning mode for calibration/adjustment
`Diff. +  0.006 g`	Difference after calibration/adjustment
`Internal calibration`	Confirmation of completed
`completed`	calibration/adjustment routine
`Diff. +  0.000 g`	Difference between current and target values after calibration
`--------------------`	Dotted line
`17.01.1997  16:25`	Date/time
`Name:`	Field for operator signature
	Blank line
`--------------------`	Dotted line

Interface Description

Purpose
Your LA Reference balance comes equipped with an interface port for connection to a computer or other peripheral devices.

You can use an on-line computer to change, start and/or monitor the functions of the balance and the application programs. The interface port also has four control lines for the over/under checkweighing program. You can also connect a hand switch or foot switch.

⚠ **Warning When Using Pre-wired RS-232 Connecting Cables!**

RS-232 cables purchased from other manufacturers often have incorrect pin assignements for use with Sartorius balances. Be sure to check the pin assignment against the chart below before connecting the cable, and disconnect any lines marked “Internally Connected” (e.g., pin 6). Failure to do so may damage or even completely ruin your balance and/or peripheral device.

Available Features

Type of interface:	Serial interface
Operating mode:	Full duplex
Standard:	RS-232
Transmission rates:	150; 300; 600; 1,200; 2,400; 4,800; 9,600; 19,200 baud
Parity:	Space, odd, even
Character format:	1 start bit, 7-/8-bit ASCII, parity, 1 or 2 stop bits
Handshake:	2-wire interface: via software (XON/XOFF); 4-wire interface: via hardware handshake lines (CTS/DTR)
Operating mode:	SBI, xBPI*
Network address**:	0, 1, 2, ..., 30, 31
Data output format of the balance:	16 or 22 characters

* xBPI operating mode: 9,600 baud, 8 bits, odd parity, 1 stop bit
** Network address is only valid in the xBPI mode

Factory Settings:

Transmission rate:	1,200 baud
Parity:	Odd
Stop bits:	1 stop bit
Handshake:	Hardware 1 character after CTS
Operating mode:	SBI
Network address:	0
Print manually/automatically:	Manual after stability
Stop automatic printing:	Not possible
Automatic printout, time-dependent:	After 1 display update
Tare after indiv. printout:	Off
Application initialization values:	Off
Line format:	For other applications/GLP (22 characters)

Preparation
● See page 122 for the pin assignment chart

Line Format (Data Output Format)
You can output the values displayed in the measured value line and the weight unit with or without a data ID code

Example: Without data ID code
```
+   253 pcs
```

Example: With data ID code
```
Qnt  +   253 pcs
```

Configure this parameter in the Setup menu (Setup: Printout: Line format).

The output with data ID code has 16 characters; without data ID code, 22 characters.

Output Format With 16 Characters

Display segments that are not activated are output as spaces. Characters without a decimal point are output without a decimal point.

The following characters can be output, depending on the characters displayed on the balance:

Normal Operation

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
or	–		.	.	.	.	.	.	.	.		*	*	*		
or	*		*	*	*	*	*	*	*	*						

*: Space
D: Digit or letter
U: Unit symbol
CR: Carriage return
LF: Line feed

Special Codes

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	*	*	*	*	*	*	–	–	*	*	*	*	*	*	CR	LF
or							H	H								
or							L	L								
or							C									

*: Space
– –: Weight
H: Overload
H H: Overload in checkweighing
L: Underload
L L: Underload in checkweighing
C: Calibration/adjustment

Error Codes

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

Data output example: + 1255.7 g

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	+	*	*	*	1	2	5	5	.	7	*	g	*	*	CR	LF

Position 1: Plus or minus sign or space
Position 2: Space
Position 3–10: Weight with a decimal point; leading zeros = space
Position 11: Space
Position 12–14: Unit symbol or space
Position 15: Carriage return
Position 16: Line feed

Data Output With ID Code
When data with an ID code is output, the ID code consisting of 6 characters precedes the data with the 16-character format. These 6 characters identify the subsequent value.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
I	I	I	I	I	I	+	*	D	D	D	D	D	D	D	D	*	U	U	U	CR	LF
	*	*	*	*	*	–		.	.	.	.	.	.	.	.		*	*	*		
						*		*	*	*	*	*	*	*	*						

I: ID code character[1)]
*: Space
D: Digit or letter
U: Unit symbol[1)] see “Toggling between Weight Units”
CR: Carriage return
LF: Line feed

[1)] depends on balance type; e.g., not all units and characters are available on balances verified for use in legal metrology

Special Codes

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
– –: Weight
H: Overload
H H: Overload in checkweighing
L: Underload
L L: Underload in checkweighing
C: Calibration/adjustment

Error Codes

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

ID code characters I [1)]

`Stat`	Status
`ID`	Identifier
`L ID`	Weighing series no.
`W ID`	Weight set number
`Nom.`	Exact calibration weight
`S ID`	Sample ID
`NUM`	Numeric input
`T1`	Application tare memory 1
`N`	Net weight (T1 = 0)
`N1`	Net weight (T1# 0)
`Qnt`	Quantity
`Prc`	Percentage
`nRef`	Reference sample quantity
`pRef`	Reference percentage
`wRef`	Average piece weight
`Wxx%`	Reference percentage weight
`mDef`	Target value for animal weighing
`Mul`	Multiplication factor for animal weighing
`x–Net`	Result in animal weighing
`x–Res`	Calculated result in animal weighing
`Res`	Result using equation (Calculation)
`Setp`	Target value for checkweighing
`Min`	Lower limit for checkweighing
`Max`	Upper limit for checkweighing
`Time`	Time that a value was stored
`Compxx`	No. of components in formulation
`Tot.cp`	Total weight in formulation
`n`	Transaction counter
`Total`	Sum of all values
`Avg`	Average in statistics
`s`	Standard deviation
`srel`	Variation coefficient
`Diff`	Difference between maximum and minimum

Data Input Format
You can connect a computer to your balance to send commands via the balance interface port to control balance functions and applications.
The commands sent are control commands and may have different formats; e.g., control commands can have up to 26 characters. Each character must be transmitted according to the settings configured in the Setup menu for data transmission.

Format for Control Commands

Format 1:	Esc	!	CR	LF					
Format 2:	Esc	!	#	_	CR	LF			
Format 3:	Esc	!	#	&t		(max. 20 &t) &t	_	CR	LF
Format 4:	Esc	!		&t		(max. 20 &t) &t	_	CR	LF

Esc:	Escape	_:	Underline (ASCII: 95)
!:	Command character	CR:	Carriage RETURN (optional)
#:	Number	LF:	Line FEED (optional)
&t:	Number or letter	max:	depends on command character: i.e. parameter: once the max. length is reached, input received is cut off, rather than discarded as with keyboard input

Format 1

!	Meaning
I	Weighing mode 1
L	Weighing mode 2
M	Weighing mode 3
N	Weighing mode 4
O	Block keys
P	Print
R	Unblock keys
S	Restart
T	Tare and zero
Z	Internal calibration/adjustment**
Q	Acoustic signal

Format 2

!#	Meaning	
f3	Zero	
f4	Tare (without zeroing)	
kF1	Soft key 1*	Function depends
...		on setting in
kF6	Soft key 6*	application program
kF7	Function key	
kF8	Function key	
s3	Function key CF	
x0	Perform internal calibration**	
x1	Print balance model	
x2	Print weighing platform serial number	
x3	Print weighing platform software version	
x4	Print display and control unit software version	
x5	Print operator ID	
x6	Print weight set (“inventory”) number	
x7	Print batch number	

Format 3 (not allowed in the Setup menu)

!#	Meaning
z5	Input (GLP) balance ID no. (20 characters max.)
z6	Input weight set (“inventory”) number (14 characters max.)
z7	Input weighing series no. (20 characters max.)

Format 4

!	Meaning
t	Text input in display

* numbered from right to left
** Internal calibration weight necessary

Synchronization
During data communication between the balance and an on-line device (computer), messages consisting of ASCII characters are transmitted via the interface. For error-free data communication, the parameters for baud rate, parity, handshake mode and character format must be the same for both units.

You can set these parameters in the Setup menu so that they match those of the on-line device. You can also define parameters in the balance to make data output dependent on various conditions. The conditions that can be configured are described under each of the application program descriptions.

If you do not plug a peripheral device into the balance interface port, this will not generate an error message.

Handshake
The balance interface (Sartorius Balance Interface = SBI) has transmit and receive buffers. You can define the handshake parameter in the Setup menu:

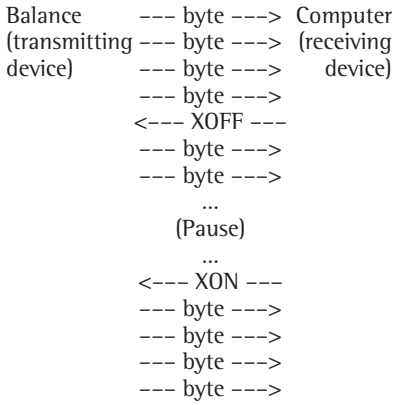
- Hardware handshake (CTS/DTR)
- Software handshake (XON, XOFF)

Hardware Handshake
With a 4-wire interface, 1 more character can be transmitted after CTS (Clear to Send).

Software Handshake
The software handshake is controlled via XON and XOFF. When a device is switched on, XON must be transmitted to enable any connected device to communicate.

When the software handshake is configured in the Setup menu, the hardware handshake becomes active after the software handshake.

The data transmission sequence is as follows:



Transmitting Device:
Once XOFF has been received, it prevents further transmission of characters.
When XON is received, it re-enables the transmitting device to send data.

Receiving Device:
XOFF is transmitted after the 26th character has been stored. To prevent too many control commands from being received at one time, XON is not transmitted until the buffer is almost empty.

Activating Data Output
You can define the data output parameter so that output is activated either when a print command is received or automatically and synchronous with the balance display or at defined intervals (see application program descriptions and auto-print setting).

Data Output by Print Command
The print command can be transmitted by pressing  or by a software command (Esc P).

Automatic Data Output
In the “auto print” operating mode, data is output to the interface port without a print command. You can choose to have data output automatically at defined print intervals with or without the stability parameter. Whichever parameter you select, the data will be output as the readouts appear on the balance display. The display update frequency depends on both the model of the balance and the current operating status.

If you select the auto print setting, data will be transmitted immediately the moment you turn on the balance. In the Setup menu you can configure whether this automatic output can be stopped and started by pressing  .

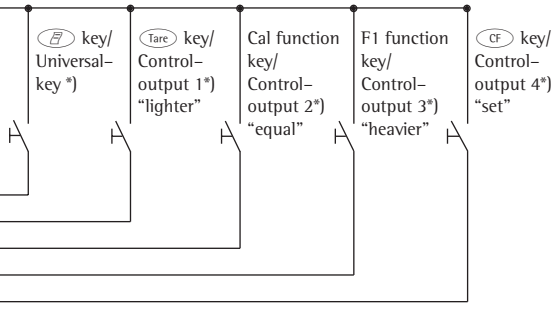
Pin Assignment Chart

Female Interface Connector:
25-position D-Submini, DB25S, with screw lock hardware for cable gland

Male Connector Used:
(please use connectors with the same specifications):
25-pin D-Submini, DB25S, with integrated shielded cable clamp assembly (Amp type 826 985-1C) and fastening screws (Amp type 164 868-1)

Pin Assignment Chart:

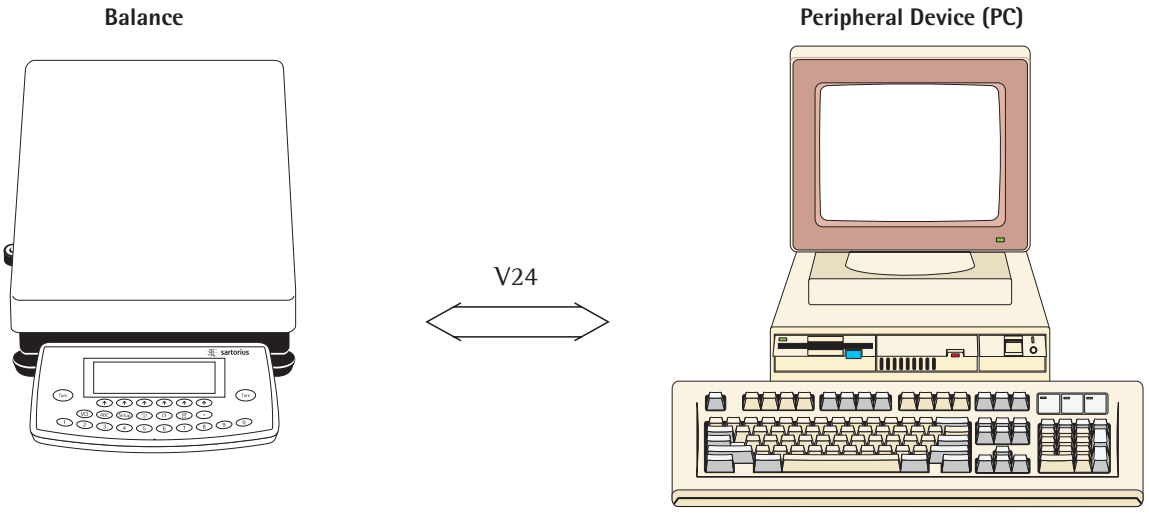
Pin 1: Signal Ground
Pin 2: Data Output (TxD)
Pin 3: Data Input (RxD)
Pin 4: Signal GND
Pin 5: Clear to Send (CTS)
Pin 6: Internally Connected
Pin 7: Internal Ground (GND)
Pin 8: Internal Ground (GND)
Pin 9: Reset _ In**)
Pin 10: – 12 V Output
Pin 11: + 12 V Output
Pin 12: Reset _ Out***)
Pin 13: + 5 V Output
Pin 14: Internal Ground (GND)
Pin 15:
Pin 16:
Pin 17:
Pin 18:
Pin 19:
Pin 20: Data Terminal Ready (DTR)
Pin 21: Ext. Supply Voltage Ground (GND)
Pin 22: Not Connected
Pin 23: Not Connected
Pin 24: Ext. Supply Voltage Input + 15 ... 25 V
Pin 25: +5 V Output

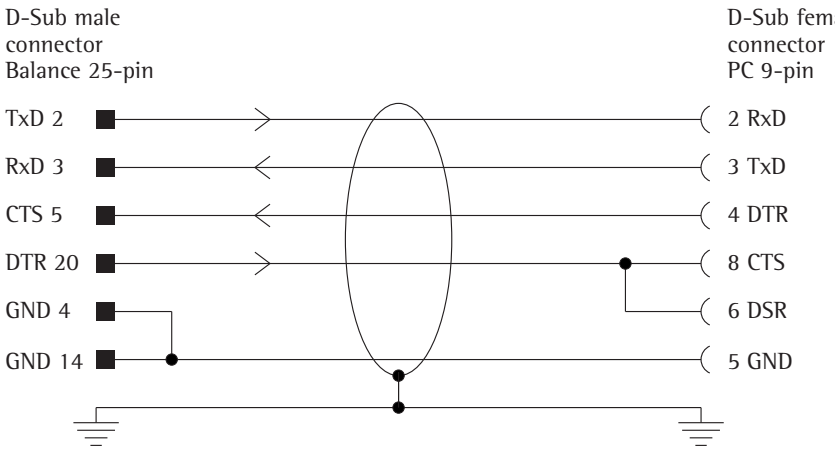


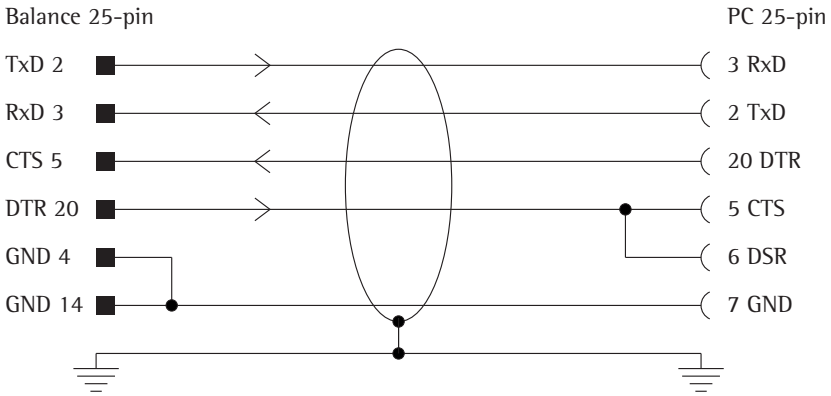
*) = See “Additional Functions” for information on changing pin assignments
**) = Hardware restart
***) = Restart of peripheral devices

Cabling Diagram

– Diagram for interfacing a computer or different peripheral devices to the balance using the RS-232/V24 standard and cables up to 15 m (50 ft.) long







Type of cable: AWG 24 specification

Error Codes and Messages

Error codes and messages are displayed in the main display or text line for 2 seconds.
The program then returns automatically to the previous status.

Display	Cause	Solution
No segments appear on the display	No AC power is available The AC adapter is not plugged in Automatic shutoff configured in Setup (code 871)	Check the AC power supply Plug in the AC adapter Press (I/⏻) to switch on the balance or select “no automatic shutoff” in Setup
H	The load exceeds the balance capacity	Unload the balance capacity
L or Err 54	The weighing pan is not in place	Place the weighing pan on the balance
Err 01 > Display range	Data output not compatible with output format	Change the configuration in the Setup menu
Err 02 Cal. n. possible	Calibration/adjustment condition not met, e.g., – The balance was not tared – The balance is loaded	Calibrate only when zero is displayed Press (Tare) to tare Unload the balance
Err 03 Cal./adj. interrupt	Calibration/adjustment could not be completed within a certain time	Allow the balance to warm up again and repeat the adjustment process
Err 05	Built-in calibration weight cannot be retracted	Contact your local Sartorius Service Center
Err 06 Int. wt. defective	Built-in calibration weight is defective	Contact your local Sartorius Service Center
Err 07 Function blocked	Function not allowed in balances verified for use in legal metrology	Contact your local Sartorius Service Center for information on having the settings changed
Err 08* <> zero range	The load on the balance is too heavy to zero the readout	Check whether the “power-on zero range” is set
Err 09* < 0 not allowed	Taring is not possible when the gross weight is ≤ zero	Zero the balance
Err 10 Tare fct. blocked	Tare key and 2nd tare memory are blocked when there is data in the tare memory for the formulation application Differential weighing: The tare key is blocked when a tare weight is stored for a specific sample	Press (CF) to clear the formulation application; the tare key and 2nd tare memory are then accessible Differential weighing: Unload the balance or change to a different sample
Err 11 Tare2 blocked	Tare memory not allowed – Cannot load the sample tare weight – Total weight in the tare memory exceeds the capacity of the balance – Tare value exceeds the fine range of the verified balance	Check the tare value entered
Err 12 Tare2 > Max.	Tare memory greater than weighing range or range limits	Check sample/container
Err 17 Adj.-wt. > Max.	Internal adjustment is not possible because preload is too heavy	Reduce the preload or change the configuration
Err 30 Print fct. blocked	Interface port for printer output is blocked	Contact your local Sartorius Service Center

* = occurs only via the SBI interface (ESC f3_/f4_)

Display/Problem	Cause	Solution
Err 31 Print fct. blocked	Interface handshake interrupted (XOFF, CTS)	Transmit XON, then CTS
Ref.wt. too light	Error in storing reference weight (with the counting or weighing-in-percent application)	Weight too light or there is no sample on the balance
Cannot update	Reference updating not possible (with the counting application)	See “Counting” in “Operation” for reference updating criteria
Not a number xxxxx Too low xxxxx Too high	Input wrong (with any application program), e.g., alphabetic input not allowed	Follow the instructions for the application programs
Too many char.	Input text too long	Allowable text lengths, incl. decimal point: – S ID, NUM, L ID, ID: max. 20 characters – W ID: max. 14 characters
Wrong line format	Configured printout, printout memory and 16-character format selected	Select the 22-character format
Limits unequal for unit	Unit entered for tolerance limits in check-weighing different from the appl. used	Adjust tolerance limits
Equation too long	Equation exceeds 28 characters informulation	Limit equation to 28 characters
Err 10x	Key is stuck Key pressed when switching on the balance:	Release key or Contact your local
x = 1:	↑ (F1, F2, F5, F6), CF	Sartorius Service Center
x = 2:	0/↑, ↑ (F3), 0, 3, 4, 9	
x = 3:	2, 5, 6, ·, ⌨, Tare-right	
x = 4:	1, 7, 8, ↑ (F4), ABC, Tare-left	
“Checkerboard” pattern displayed continuously	Setup key was pressed when turning on the balance, or is stuck	
Err 320	Operating program memory defective	Contact your local Sartorius Service Center
Err 340	Operating parameter (EEPROM) is wrong RAM lost data Factory settings deleted	Turn the balance off, then back on again. If this error remains displayed, please contact your local Sartorius Service Center
Err 341	Battery needs to be rechearged	Leave the balance power on for at least 10 hours
No WP	Weighing platform is defective	Contact your local Sartorius Service Center
blocked	Function blocked	none
The special code ◆ remains displayed	None of the keys has been pressed since the balance was turned on	Press a key
The weight readout changes constantly	Unstable ambient conditions Too much vibration, or the balance is exposed to a draft A foreign object is caught between the pan and the balance housing	Set up the balance in another area Change Setup configurations to adapt the balance to the ambient conditions Remove the foreign object
The weight readout is obviously wrong	The balance has not been calibrated/adjusted The balance was not tared before weighing The balance is not level The dust cover is caught under the weighing pan	Calibrate/adjust the balance Tare before weighing Level the balance See “Replacing the Dust Cover” in the chapter “Care and Maintenance”

Error Code/Message Displayed	Cause	Solution/Remarks
Differential weighing:		
SAMPLE: Confirm delete/ omit	"SAMPLE: delete/omit" prompt on display page for samples	Select Yes to delete Select Omit to omit
SAMPLE: Include	"SAMPLE: include" prompt on display page for samples	Select Omit to include a sample already omitted
Cannot store	File manager: – Not possible to save data – No available memory	Delete lot(s)
Cannot load	File manager: – Not possible to load data – Memory capacity limit reached	Delete lot(s)
Only 30 backweighs possible	An attempt was made to save a 31st backweighing operation	None
LOT: already exists	Lot already exists on the display page for LOTS	Choose a different lot ID
No sample	The Sample key was pressed when the display page for lots was shown, but there are no samples in the lot selected	Save sample first
Out of range	On the display page for LOTS or SAMPLES, an alphanumeric lot or samle ID was input and not found	Enter the correct lot or sample ID
Not enough memory space or 999 samples maximum	An attempt was made to save more than 999 samples using the numeric keys and the #Spl key	Use less memory or delete one or more lots
Sample omitted	An attempt was made to save data from an omitted sample	None
Value too small to accept	An attempt was made to save a tare, initial or backweight that is less than one display digit	Place the particular weight on the balance
No choice available	Factor was selected while attempting to activate the display page for results No 2nd resolution available	Selection not possible Contact your local Sartorius Service Center
CF not possible	Only one sample or certain portions of a sample can be deleted by pressing the (CF) key. This message indicates that further delete functions are not possible.	Samples can be deleted one at a time on the display page for samples
Calculated statistics	Message output when statistics are being calculated. This process can take several seconds if there are many samples.	Goes out automatically
No statistics available	No valid backweights available in this lot	Goes out automatically
No net initial wts. available	In serial and combined weighing, no initial weights found	Measure initial weights

If any other errors occur, contact your local Sartorius Service Center!

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 can offer you service contracts, with your choice of regular maintenance intervals ranging from 1 month to 2 years. The optimum maintenance interval depends on the operating conditions at the place of installation and on the individual tolerance requirements.

Repairs
Repair work must be performed by trained service technicians. Any attempt by untrained persons to perform repairs may lead to hazards for the user.

Cleaning
- Unplug the AC adapter from the wall outlet (mains supply). If you have an interface cable connected to the balance port, unplug it from the port.
- Clean the balance using a piece of cloth which has been wet with a mild detergent (soap).
- After cleaning, wipe down the balance with a soft, dry cloth

⚠ Make sure that no dust or liquid enters the balance housing.

⚠ Do not use any aggressive cleaning agents (solvents or similar agents)

Cleaning Stainless Steel Surfaces
Clean all stainless steel parts regularly. Remove the stainless steel weighing pan and thoroughly clean it separately. Use a damp cloth or sponge to clean any stainless steel parts on the balance. You can use any commercially available household cleaning agent that is suitable for use on stainless steel. Clean stainless steel surfaces by wiping them down. Then rinse the equipment thoroughly, making sure to remove all residues. Afterwards, allow the balance to dry. If desired, you can apply oil to the cleaned surfaces as additional protection.

Solvents are permitted for use only on stainless steel parts.

Replacing the Dust Cover
> Instructions for replacing a damaged dust cover

For LA Series Balances with a Round Glass Draft Shield
Remove the following parts from the balance:

- Draft shield cover
- Glass draft shield cylinder
- Weighing pan
- Pan support
- Shield disk: turn clockwise and lift off
- Old dust cover
  Place the new dust cover on the balance and press down on the front and back along the edges until it is seated firmly

  Place the shield disk on the balance and turn it counterclockwise

  Follow the above instructions in reverse order when placing the remaining parts back on the balance.

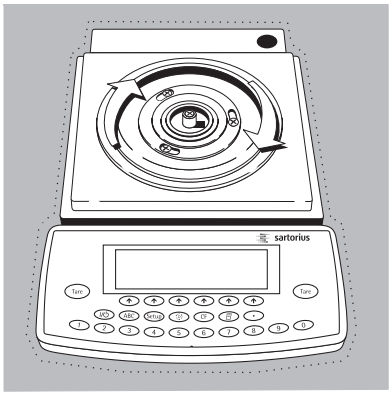
For LA Series Balances with a Rectangular Weighing Pan and a Weighing Capacity ≤ 12 kg
Remove the following parts from the balance:

- Weighing pan
- Pan draft shield (depending on balance model)
- Old dust cover

  Place the new dust cover over the balance

  Follow the above instructions in reverse order when placing the remaining parts back on the balance.

⚠ The dust cover must not touch the weighing pan



Safety Inspection
If there is any indication that safe operation of the balance is no longer warranted:
- Turn off the power and disconnect the equipment from AC power immediately

> Lock the equipment in a secure place to ensure that it cannot be used for the time being.

Notify your nearest Sartorius Service Center. Repair work must be performed by trained service technicians.

We recommend having the power supply inspected by a certified electrician at regular intervals, according to the checklist given below:

- Insulating resistance: > 7 megaohms measured with a constant voltage of at least 500 volts at a 500 K-ohm load
- Leakage current: < 0.05mA measured with a properly calibrated multimeter

Recycling

Information and Instructions on Disposal and Repairs
Packaging that is no longer required must be disposed of at the local waste disposal facility. The packaging is made of environmentally friendly materials that can be used as secondary raw materials.

The equipment, including accessories and batteries, does not belong in your regular household waste. The EU legislation requires its Member States to collect electrical and electronic equipment and disposed of it separately from other unsorted municipal waste with the aim of recycling it.

In Germany and many other countries, Sartorius AG takes care of the return and legally compliant disposal of its electrical and electronic equipment on its own. These products may not be placed with the household waste or brought to collection centers run by local public disposal operations – not even by small commercial operators.

For disposal in Germany and in the other Member States of the European Economic Area (EEA), please contact our service technicians on location or our Service Center in Goettingen, Germany:

Sartorius AG
Service Center
Weender Landstrasse 94–108
37075 Goettingen, Germany

In countries that are not members of the European Economic Area (EEA) or where no Sartorius affiliates, subsidiaries, dealers or distributors are located, please contact your local authorities or a commercial disposal operator.

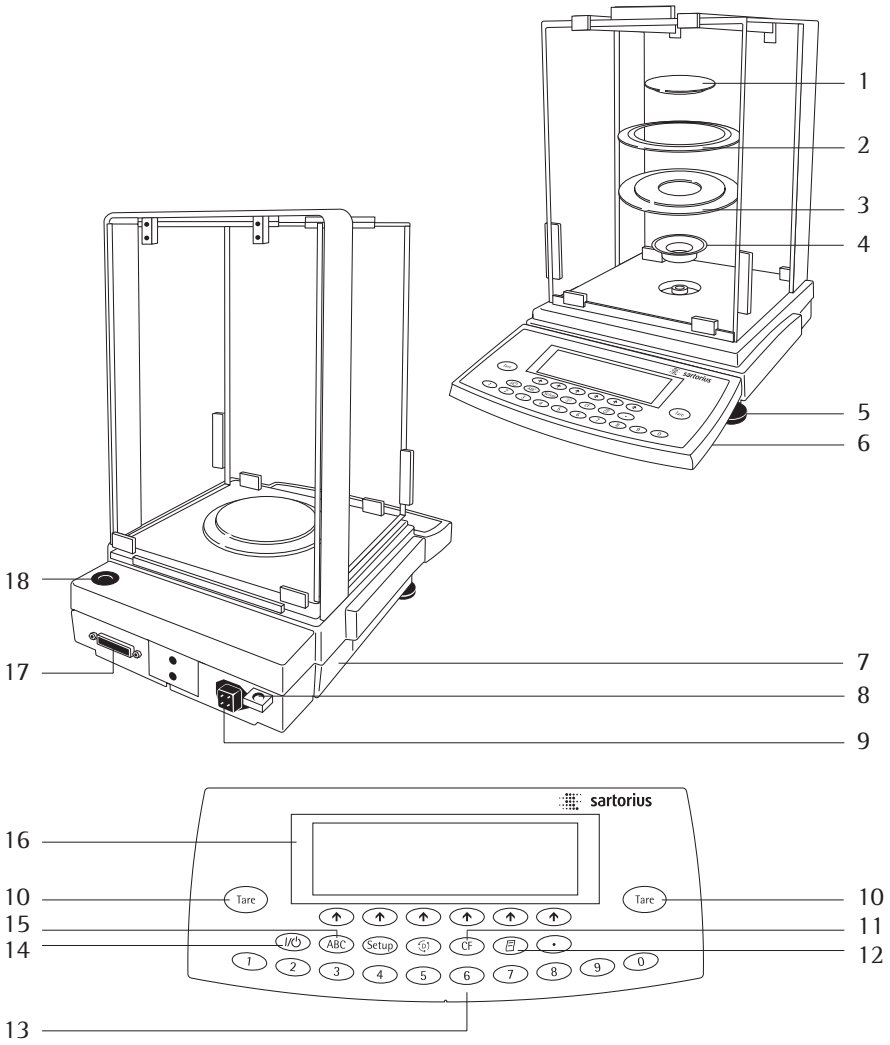
Prior to disposal and/or scrapping of the equipment, any batteries should be removed and disposed of in local collection boxes.

Sartorius AG, its affiliates, subsidiaries, dealers and distributors will not take back equipment contaminated with hazardous materials (ABC contamination) – either for repair or disposal. Please refer to the accompanying leaflet/manual or visit our Internet website (www.sartorius.com) for comprehensive information that includes our service addresses to contact if you plan to send your equipment in for repairs or proper disposal.

Overview

General View of the Balances

LA310S (-0CE), LA230S (-0CE), LA230P (-0CE), LA120S (-0CE)
-0CE identifies the precision balances as verified for legal metrology in the EU*

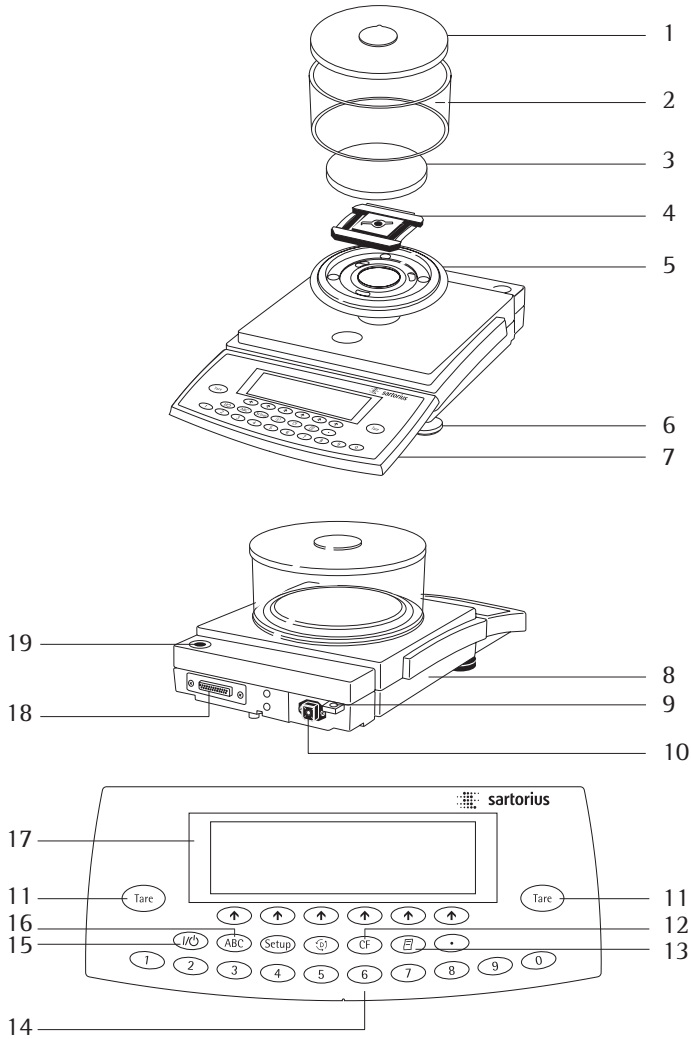


Pos.	Designation	Order No. for replacement
1	Weighing pan	69 LA0006
2	Shield disk	69 A20003
3	Shield plate	69 LA0008
4	Bushing (pan adapter)	69 LA0007
5	Leveling foot	69 B20005
6	Display and control unit	
7	Metrological ID label (only on balances verified for legal metrology)	
8	Lug for attaching an anti-theft locking device	
9	DC jack	
10	Tare key	

Pos.	Designation	Order No. for replacement
11	Function keys	
12	Print key	
13	Numeric keys	
14	On/off key	
15	Toggle key for alphabetic input	
16	Display	
17	Data interface port	
18	Level indicator	
	Not shown:	
	In-use dust cover	6960LA01
	Protective caps and plugs (set)	69 B20009

* including the Signatories of the Agreement on the European Economic Area

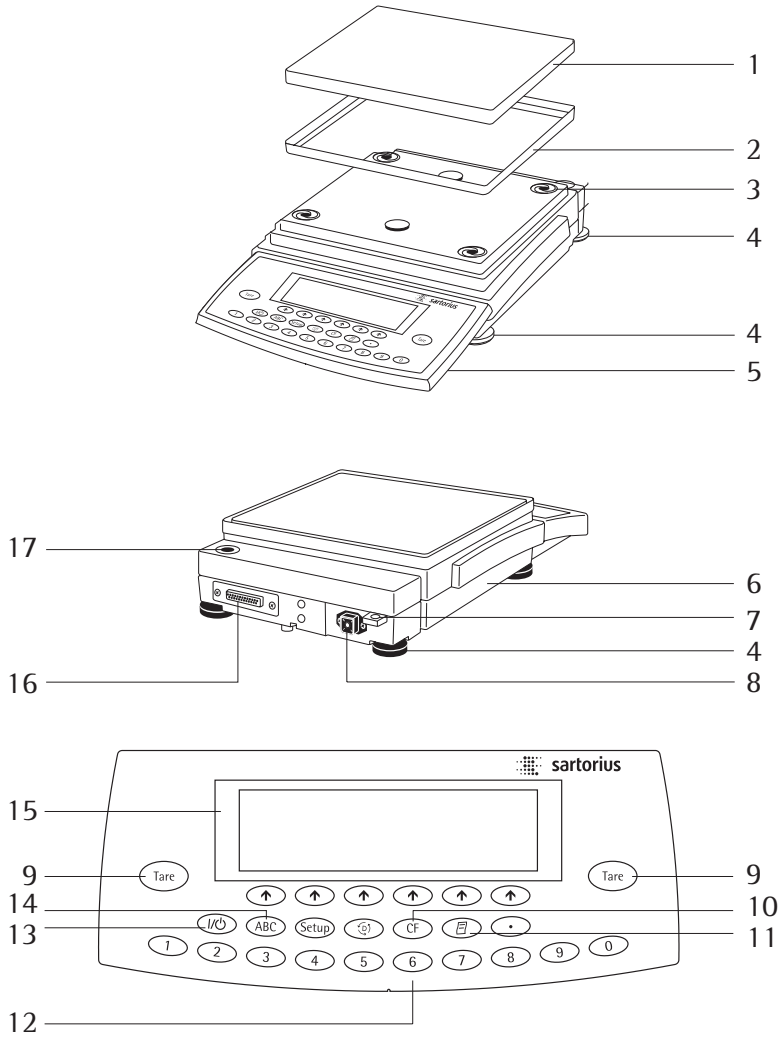
General Views of the Balances
LA1200S (-0CE), LA620S (-0CE), LA220S (-0CE), LA620P (-0CE), LA5200D, LA3200D, LA2000P
-0CE identifies the precision balances as verified for legal metrology in the EU*



No.	Designation	Order no. for replacement
1	Draft shield cover	69 LP0002
2	Glass draft shield cylinder	69 14290
3	Weighing pan	69 LP0004
4	Pan support – LA 3200D:	69 LP0006
	– LA 1200S, LA 620, LA 220S:	69 LP0005
5	Shield disk	69 LP0003
6	Leveling foot	69 B20005
7	Display and control unit	
8	Metrological ID label (only on verified models or models acceptable for legal metrological verification)	
9	Lug for attaching an antitheft locking device	
10	DC jack	
11	Tare key	
12	Function keys	
13	Print key	
14	Keys for numeric input	
15	On/off key	
16	Toggle key for alphabetic input	
17	Weight display	
18	Interface port	
19	Level indicator	
	Not shown:	
	In-use dust covers:	
	– For weigh cell	6960FB01
	– For control unit	6960LA02
	Protective caps and plugs (set)	69 B20009

* including the Signatories of the Agreement on the European Economic Area

General Views of the Balances
LA8200S (-0CE), LA8200P (-0CE), LA6200S (-0CE), LA4200S (-0CE), LA2200S (-0CE), LA820 (-0CE), LA420, LA2200P (-0CE), LA5200P (-0CE), LA12000S (-0CE), LA6200 (-0CE), LA4200, LA2200 (-0CE), LA12000P (-0CE)
-0CE identifies the precision balances as verified for legal metrology in the EU*

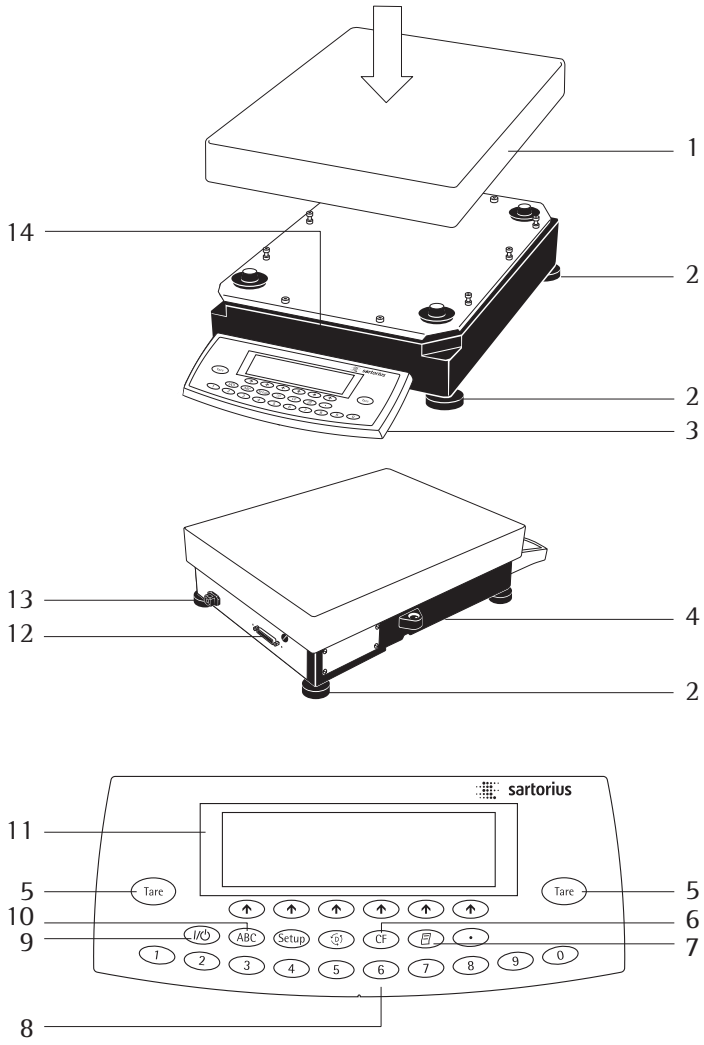


No.	Designation	Order no. for replacement
1	Weighing pan	69 LP0007
2	Pan draft shield (depending on model)	69 LP0008
3	Shock absorber	69 LP0010
4	Leveling foot	69 B20005
5	Display and control unit	
6	Metrological ID label (only on verified models or models acceptable for legal metrological verification)	
7	Lug for attaching an antitheft locking device	
8	DC jack	
9	Tare key	

No.	Designation	Order no. for replacement
10	Function keys	
11	Print key	
12	Keys for numeric input	
13	On/off key	
14	Toggle key for alphabetic input	
15	Weight display	
16	Interface port	
17	Level indicator	
	Not shown:	
	In-use dust covers:	
	– For weigh cell	6960FB02
	– For control unit	6960LA02
	Protective caps and plugs (set)	69 B20009

* including the Signatories of the Agreement on the European Economic Area

General Views of the Balances
LA64001S, LA34001S, LA16001S, LA34001P, LA34000
-0CE identifies the precision balances as verified for legal metrology in the EU*



No.	Designation	Order no. for replacement
1	Weighing pan LA64001S, LA34001S, LA16001S, LA34001P, LA34000:	Available on request
2	Leveling foot	69 LC0093
3	Display and control unit	
4	Level indicator	
5	Tare key	
6	Function keys	
7	Print key	

No.	Designation	Order no. for replacement
8	Keys for numeric input	
9	On/off key	
10	Toggle key for alphabetic input	
11	Weight display	
12	Interface port	
13	DC jack	
14	Metrological ID label (only on verified models or models acceptable for legal metrological verification)	

Not shown:

In-use dust cover for display and control unit	Available on request

* including the Signatories of the Agreement on the European Economic Area

Specifications

Standard Models

General Specifications

AC power source/power requirements	AC adapter, 230 or 115 V, +15% ... – 20%
Frequency	48 – 60 Hz
Allowable ambient operating temperature	0 ... +40 °C (273 ... 313 K, 32 °F ... 104 °F)
Operating temperature range	+ 10 ... + 30 °C
Adaptation to ambient conditions	By selection of 1 of 4 optimized filter levels
Display update (depends on the filter level selected)	0.1 – 0.4
Power consumption	16 VA: maximum; 9 VA: average
Hours of operation with fully charged YRB 06 Z external battery pack, approx.	14 h
Selectable weight units	Grams, kilograms, carats, pounds, ounces, Troy ounces, Hong Kong taels, Singapore taels, Taiwanese taels, grains, pennyweights, milligrams, parts per pound, Chinese taels, Mommes, Austrian carats, Tola, Baht and Mesghal
Selectable application programs	Mass unit conversion, counting, weighing in percent, animal weighing, recalculation, calculation, density determination, differential weighing, over/under checkweighing, time-controlled functions, totalizing, statistics, 2nd tare memory, IDs, product data memories
Built-in interface	RS-232C Format: 7-bit ASCII, 1 start bit, 1 or 2 stop bits Parity: odd, even or space Transmission rates: 150 to 19,200 baud Handshake: Software or hardware

Specifications of the Individual Models:

Model		LA310S	LA230S	LA230P	LA120S
Readability	mg	0.1	0.1	0.1/0.2/0.5	0.1
Weighing capacity	g	310	230	60/120/230	120
Tare range (subtractive)	g	– 310	– 230	– 230	– 120
Repeatability	≤±mg	0.2	0.1	0.1/0.2/0.5	0.1
Linearity	≤±mg	0.3	0.2	0.2/0.2/0.5	0.2
Sensitivity drift within +10 ... +30 °C	≤±/K	$1 \cdot 10^{-6}$			
Response time (average)	s	2			
External calibration weight (of at least accuracy class...)	g	200 + 100 (E2)	200 (E2)	200 (E2)	100 (E2)
Other allowable external calibration weights (of at least accuracy class...)	g	200 (E2)	100, 150 (E2)	100, 150 (E2)	50 (E2)
Pan size	mm	∅ 90			
Dimensions (W × D × H)	mm	261 × 381 × 361			
Clearance above pan	mm	259			
Net weight, approx.	kg	8.7			
Dust and water protection rating according to EN 60529*		IP42			

* = specially protected dust-tight and washdown resistant AC adapter; see the section on “Accessories”

Model		LA1200S	LA620S	LA220S	LA620P
Readability	g	0.001	0.001	0.001	0.001/0.002/0.005
Weighing capacity	g	1,200	620	220	120/240/620
Tare range (subtractive)	g	– 1,200	– 620	– 220	– 620
Repeatability (standard deviation)	≤±g	0.001	0.001	0.001	0.001/0.001/0.003
Linearity	≤±g	0.002	0.002	0.002	0.002/0.002/0.005
Sensitivity drift within +10 ... +30 °C	≤±/K	$2 \cdot 10^{-6}$			
Response time (average)	s	1.5			
External calibration weight (of at least accuracy class...)	g	1,000 (E2)	500 (E2)	200 (E2)	500 (F1)
Other allowable external calibration weights (of at least accuracy class...)	g	–	300, 400, 600 (E2)	100 (E2)	200, 300, 400, 600 (F1)
Pan size	mm	∅ 130			
Dimensions (W × D × H)	mm	261 × 381 × 147			
Net weight, approx.	kg	8.3	6.6	6.6	6.6
Dust and water protection rating according to EN 60529*		IP54			

Model		LA5200D	LA3200D	LA2000P
Readability	g	0.001/0.01	0.001/0.01	0.001/0.01
Weighing capacity	g	1,010/5,200	1,010/3,200	1,010/2,000
Tare range (subtractive)	g	– 5,200	– 3,200	– 2,000
Repeatability	≤±g	0.001/0.01	0.001/0.01	0.001/0.01
Linearity	≤±g	0.002/0.01	0.002/0.01	0.002/0.01
Sensitivity drift within +10 ... +30 °C	≤±/K	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$
Response time (average)	s	2.5	1.5	1.5
External calibration weight (of at least accuracy class...)	g	1,000 (E2)	1,000 (E2)	1,000 (E2)
Other allowable external calibration weights (of at least accuracy class...)	g	2,000, 3,000 (E2)	2,000, 3,000 (E2)	–
Pan size	mm	∅ 130		
Dimensions (W × D × H)	mm	261 × 381 × 147		
Net weight, approx.	kg	8.4		
Dust and water protection rating according to EN 60529*		IP54		

* = specially protected dust-tight and washdown resistant AC adapter; see the section on “Accessories”

Model		LA8200S	LA8200P	LA6200S	LA4200S	LA2200S
Readability	g	0.01	0.01/0.02/0.05	0.01	0.01	0.01
Weighing capacity	g	8,200	2,000/4,000/8,200	6,200	4,200	2,200
Tare range (subtractive)	g	– 8,200	– 8,200	– 6,200	– 4,200	– 2,200
Repeatability (standard deviation)	≤±g	0.01	0.01/0.01/0.03	0.01	0.01	0.01
Linearity	≤±g	0.02	0.02/0.02/0.05	0.02	0.02	0.02
Sensitivity drift within +10 ... +30 °C	≤±/K	$2 \cdot 10^{-6}$				
Response time (average)	s	2	2	1.5	1.5	1.5
External calibration weight (of at least accuracy class...)	g	5,000 (E2)	5,000 (F1)	5,000 (E2)	2,000 (E2)	2,000 (F1)
Other allowable external calibration weights (of at least accuracy class...)	g	6,000, 7,000, 8,000 (E2)	–	6,000 (E2), 4,000 (E2)	3,000	1,000 (F1)
Pan size	mm	218 × 200				
Dimensions (W × D × H)	mm	261 × 381 × 86				
Net weight, approx.	kg	6.5				
Dust and water protection rating according to EN 60529*		IP54				

Model		LA820	LA420	LA2200P	LA5200P
Readability	g	0.01	0.01	0.01/0.02/0.05	0.01/0.02/0.05/0.1
Weighing capacity	g	820	420	400/800/2,200	1,200/2,400/3,800/5,200
Tare range (subtractive)	g	– 820	– 420	– 2,200	– 5,200
Repeatability (standard deviation)	≤±g	0.01	0.01	0.01/0.01/0.03	0.01/0.02/0.05/0.05
Linearity	≤±g	0.01	0.01	0.02/0.02/0.05	0.02/0.02/0.05/0.1
Sensitivity drift within +10 ... +30 °C	≤±/K	$2 \cdot 10^{-6}$			
Response time (average)	s	1.5			
External calibration weight (of at least accuracy class...)	g	500 (F2)	200 (F2)	2,000 (F2)	2,000 (F1)
Other allowable external calibration weights (of at least accuracy class...)	g	600, 700, 800 (F2)	300, 400 (F2)	1,000 (F2)	3,000, 4,000, 5,000 (F1)
Pan size	mm	218 × 200			
Dimensions (W × D × H)	mm	261 × 381 × 86			
Net weight, approx.	kg	6.5			
Dust and water protection rating according to EN 60529*		IP54			

* = specially protected dust-tight and washdown resistant AC adapter; see the section on “Accessories”

Model		LA12000S	LA6200	LA4200	LA2200	LA12000P
Readability	g	0.1	0.1	0.1	0.1	0.1/0.2/0.5
Weighing capacity	g	12,000	6,200	4,200	2,200	3,000/6,000/ 12,000
Tare range (subtractive)	g	– 12,000	– 6,200	– 4,200	– 2,200	–12,000
Repeatability (standard deviation)	≤±g	0.05	0.05	0.05	0.05	0.1/0.1/0.3
Linearity	≤±g	0.2	0.1	0.1	0.1	0.1/0.2/0.5
Sensitivity drift within +10 ... +30 °C	≤±/K	$4 \cdot 10^{-6}$	$4 \cdot 10^{-6}$	$4 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$4 \cdot 10^{-6}$
Response time (average)	s	1	1	1	1	1
External calibration weight (of at least accuracy class...)	kg	5 (F1)	5 (F2)	2 (F2)	2 (F2)	5 (F2)
Other allowable external calibration weights (of at least accuracy class...)	kg	6 to 12 (F1)	4, 6 (F2)	3, 4 (F2)	1 (F2)	6, 7, 8, 9, 10, 11, 12 (F2)
Pan size	mm	218 × 200				
Dimensions (W × D × H)	mm	261 × 381 × 86				
Net weight, approx.	kg	6.5				
Dust and water protection rating according to EN 60529*		IP54				

Model		LA64001S	LA34001S	LA16001S	LA34001P	LA34000
Readability	g	0.1	0.1	0.1	0.1/0.2/0.5	1
Weighing capacity	g	64,000	34,000	16,000	8,000/16,000/ 34,000	34,000
Tare range (subtractive)	g	– 64,000	– 34,000	– 16,000	– 34,000	– 34,000
Repeatability	≤±g	0.1	0.1	0.05	0.05/0.05/0.1	0.5
Linearity	≤±g	0.5	0.2	0.2	0.2	0.5
Sensitivity drift within +10 ... +30 °C	≤±/K	$3 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$
Response time (average)	s	1.5	1.5	1.5	1.5	1
External calibration weight (of at least accuracy class...)	kg	10 (F1)	10 (F1)	10 (F1)	10 (F2)	10 (F2)
Other allowable external calibration weights (of at least accuracy class...)	kg	5, 20, 25, 30 (F1)	15, 20, 25, 30 (F1)	11, 12, 13, 14, 15, 16 (F1)	15, 20, 25, 30 (F2)	15, 20, 25, 30 (F2)
Pan size	mm	300 × 400				
Dimensions (W × D × H)	mm	321 × 546 × 120				
Net weight, approx.	kg	16.0				
Dust and water protection rating according to EN 60529*		IP44				

* = Specially protected dust-tight and washdown-resistant AC adapter; see the section on "Accessories."

Models Verified by the Manufacturer, with EC Type Approval

General Specifications

AC power source/power requirements	AC adapter, 230 or 115 V, +15% ... – 20%	
Frequency	48 – 60 Hz	
Adaptation to ambient conditions	By selection of 1 of 4 optimized filter levels	
Power consumption	16 VA: maximum; 9 VA: average	
Hours of operation with fully charged YRB 06 Z external battery pack, approx.	14 h	
Selectable application programs	Mass unit conversion, counting, weighing in percent, animal weighing, recalculation, calculation, density determination, differential weighing, checkweighing, time-controlled functions, totalizing, formulating, statistics, 2nd tare memory, IDs, product data memories	
Built-in interface	RS-232 C	
	Format:	7-bit ASCII, 1 start bit, 1 or 2 stop bits
	Parity:	odd, even or space
	Transmission rates:	150 to 19,200 baud
	Handshake:	Software or hardware

Specifications of the Individual Models:

Model		**LA310S-0CE**	**LA230S-0CE**	**LA230P-0CE**	**LA120S-0CE**
Type		isoTEST in conjunction with BC BF			
Accuracy class*		Ⓘ	Ⓘ	Ⓘ	Ⓘ
Scale interval, d*	mg	0.1	0.1	0.1/0.2/0.5	0.1
Maximum weighing capacity, Max*	g	310	230	60/120/230	120
Verification scale interval, e*	g	0.001			
Minimum capacity, Min*	g	0.01			
Tare range (subtractive)		≤ 100% of the maximum capacity			
Application range according to CD*	g	0.01 – 310	0.01 – 230	0.01 – 230	0.01 – 120
Response time (average)	s	2			
Allowable operating temperature		273 ... 313 K (0 ... +40 °C, 32 °F ... 104 °F) with isoCAL function			
Selectable weight units	Grams, milligrams				
External calibration weight value (of at least accuracy class...)	g	200 + 100 (E2)	200 (E2)	200 (E2)	100 (E2)
Other permissible external calibration weights (of at least accuracy class...)	g	200 (E2)	100, 150 (E2)	100, 150 (E2)	50 (E2)
Pan size	mm	∅ 90			
Dimensions (W × D × H)	mm	261 × 381 × 361			
Net weight approx.	kg	8.7			
Dust and water protection rating according to EN 60529 [1])		IP42			

[1]) = Specially protected dust-tight and washdown-resistant AC adapter; see the section on “Accessories.”

* CD = Council Directive 90/384/EEC for non-automatic weighing instruments used within the European Economic Area

Model		LA1200S-0CE	LA620S-0CE	LA220S-0CE	LA620P-0CE
Type		isoTEST in conjunction with BD BF			
Accuracy class*		Ⓘ	Ⓘⓘ	Ⓘⓘ	Ⓘⓘ
Scale interval, d*	g	0.001	0.001	0.001	0.001/0.002/0.005
Maximum weighing capacity, Max*	g	1,200	620	220	120/240/620
Verification scale interval, e*	g	0.01	0.01	0.01	0.01
Minimum capacity, Min*	g	0.1	0.02	0.02	0.02
Tare range (subtractive)		≤ 100% of the max. weighing capacity			
Application range according to CD*	g	0.1 – 1,200	0.02 – 620	0.02 – 220	0.02 – 620
Response time (average)	s	1.5			
Allowable operating temperature range		0 ... +40 °C (273 ... 313 K, 32 °F ... 104 °F) with the isoCAL function [1])			
Selectable weight units		Grams, kilograms			
External calibration weight value (of at least accuracy class...)	g	1,000 (E2)			
Pan size	mm	∅ 130			
Dimensions (W × D × H)	mm	261 × 381 × 147			
Net weight, approx.	kg	8.3	6.9	6.9	6.9
Dust and water protection rating according to EN 60529 [2])		IP54			

Model		LA8200S-0CE	LA8200P-0CE	LA6200S-0CE	LA4200S-0CE	LA2200S-0CE
Type		isoTEST in conjunction with BD BF				
Accuracy class*		Ⓘⓘ	Ⓘⓘ	Ⓘⓘ	Ⓘⓘ	Ⓘⓘ
Scale interval, d*	g	0.01	0.01/0.02/0.05	0.01	0.01	0.01
Maximum weighing capacity, Max*	g	8,200	2,000/4,000/8,200	6,200	4,200	2,200
Verification scale interval, e*	g	0.1	0.1	0.1	0.1	0.1
Minimum capacity, Min*	g	0.5	0.5	0.5	0.5	0.5
Tare range (subtractive)		≤ 100% of the max. weighing capacity				
Application range according to CD*	g	0.5 – 8,200	0.5 – 8,200	0.5 – 6,200	0.5 – 4,200	0.5 – 2,200
Response time (average)	s	2	2	1.5	1.5	1.5
Allowable operating temperature range		0 ... +40 °C (273 ... 313 K, 32 °F ... 104 °F) with the isoCAL function [1])				
Selectable weight units		Grams, kilograms				
Pan size	mm	218 × 200				
Dimensions (W × D × H)	mm	261 × 381 × 86				
Net weight. approx.	kg	6.5				
Dust and water protection rating according to EN 60529 [2])		IP54				

[1]) = With the isoCAL function deactivated, the verified balance can only be used within the limited temperature range (can only be modified by the Sartorius Service Center): For balances of accuracy class Ⓘ: +15°C to +25°C (+59°F to +77°F)
For balances of accuracy class Ⓘⓘ: +10°C to +30°C (+50°F to +86°F)

[2]) = Specially protected dust-tight and washdown-resistant AC adapter; see the section on “Accessories.”

* CD = Council Directive 90/384/EEC for non-automatic weighing instruments used within the European Economic Area

Model		LA820-0CE	LA2200P-0CE	LA5200P-0CE	LA12000S-0CE	LA6200-0CE	LA2200-0CE
Type		isoTEST in conjunction with BD BF					
Accuracy class*		(II)	(II)	(II)	(II)	(II)	(II)
Scale interval, d*	g	0.01	0.01/0.02/ 0.05	0.01/0.02/ 0.05/0.1	0.1	0.1	0.1
Maximum weighing capacity, Max*	g	820	400/800/ 2,200	1,200/2,400/ 3,800/5,200	12,000	6,200	2,200
Verification scale interval, e*	g	0.1	0.1	0.1	1	1	0.1
Minimum capacity, Min*	g	0.5	0.5	0.5	5	5	5
Tare range (subtractive)		≤ 100% of the max. weighing capacity					
Application range according to CD*	g	0.5 – 820	0.5 – 2,200	0.5 – 5,200	5 – 12,000	5 – 6,200	5 – 2,200
Response time (average)	s	1.5	1.5	1.5	1	1	1
Allowable operating temperature range		0 ... +40 °C (273 ... 313 K, 32 °F ... 104 °F) with the isoCAL function[1])					
Selectable weight units		Grams, kilograms					
Pan size	mm	218 × 200					
Dimensions (W × D × H)	mm	261 × 381 × 86					
Net weight. approx.	kg	6.5					
Dust and water protection rating according to EN 60529[2])		IP54					

Model		LA12000P-0CE	LA34001S-0CE	LA16001S-0CE	LA34001P-0CE	LA34000-0CE
Type		isoTEST in conjunction with BD BF	isoTEST in conjunction with BF BF	isoTEST in conjunction with BF BF	isoTEST in conjunction with BF BF	isoTEST in conjunction with BF BF
Accuracy class*		(II)	(II)	(II)	(II)	(II)
Scale interval, d*	g	0.1/0.2/0.5	0.1	0.1	0.1/0.2/0.5	1
Maximum weighing capacity, Max*	kg	3/6/12	34	16	8/16/34	34
Verification scale interval, e*	g	1	1	1	1	1
Minimum capacity, Min*	g	5	5	5	5	50
Tare range (subtractive)		≤ 100% of the max. weighing capacity				
Application range acc. to CD*	g	5 – 12,000	5 – 34,000	5 – 16,000	5 – 34,000	50 – 34,000
Response time (average)	s	1	1.5	1.5	1.5	1
Allowable operating temperature range		0 ... +40 °C (273 ... 313 K, 32 °F ... 104 °F) with the isoCAL function[1])				
Selectable weight units		Grams and kilograms	Grams and kilograms	Grams and kilograms	Grams and kilograms	Kilograms
Pan size	mm	218 × 200	300 × 400			
Dimensions (W × D × H)	mm	261 × 381 × 86	321 × 546 × 120	321 × 546 × 120	321 × 546 × 120	321×546×120
Net weight, approx.	kg	6.5	16.0	16.0	16.0	16.0
Dust and water protection rating According to EN 60529[2])		IP54	IP44	IP44	IP44	IP44

[1]) = With the isoCAL function deactivated, the verified balances can be used within the limited temperature range (can only be modified by the Sartorius Service Center): For balances of accuracy class (I): +15°C to +25°C (+59°F to 77°F)
For balances of accuracy class (II): +10°C to +30°C (+50°F to 86°F)

[2]) = Specially protected dust-tight and washdown-resistant AC adapter; see the section on “Accessories“

* CD = Council Directive 90/384/EWG for non-automatic weighing instruments used within the European Economic Area

Accessories (Options)

	Order No.
Data printer, suitable for use in legal metrology; with date, time, statistics and transaction counter functions	**YDP03-0CE**
Paper rolls, for YDP03-0CE; 5 units, each with 50 m	**6906937**
Ink ribbon cartridge, for YDP03-0CE	**6906918**
External rechargeable battery pack, with battery level indicator	**YRB06Z**
SartoConnect data transfer software; with RS-232C standard cable; for direct input of weighing data into an application program (e.g., such as Excel)	
with RS-232 C connecting cable, length 1 m	**YSC01L**
with RS-232 C connecting cable, length 5 m	**YSC01L5**
with RS-232 C connecting cable, length 15 m	**YSC01L15**
Foot switch, for activating the print, tare or F key; function can be selected by menu code; incl. T-connector	**YFS01**
Hand switch, for activating the print, tare or F key; function can be selected by menu code; incl. T-connector	**YHS02**
T-connector for connecting two peripheral devices to the balance	**YTC01**
Balance table for precise, reliable weighing operations	**YWT01**
Cast stone table, with damping device	**YWT03**
Remote display LCD; height of digits: 13 mm; reflective	**YRD02Z**
Density determination kit	
for all 0.1 mg models	**YDK01**
for all 1 mg/10 mg models	**YDK01LP**
Draft shield chamber with sliding doors for 1-mg LA models	**YDS01LP**
In-use dust cover	
– for models with a round weighing pan	**Available on request**
– for models with a rectangular weighing pan (weighing capacity ≤ 12.1kg)	**Available on request**
3-segment checkweighing display red/green/red, for over/under checkweighing (light/heavy); incl. T-connector	**YRD11Z**
Carrying case, for all models, up to 12.1 kg	**YDB01LP**
Weighing bowls/pans/trays: Made of chrome-nickel steel; without pouring spout; for all models with a weighing capacity >400 g;	
– 1,000 ml capacity	**641211**
– 500 ml capacity	**641212**

		Order No.
Weighing scoop Made of chrome-nickel steel, 90 mm × 32 mm × 8 mm		**641214**
Ionizing blower for electrostatically charged samples	220 V	**YIB01-0DR**
	110 V	**YIB01-0UR**
Stat Pen, unit to neutralize static electricity on samples (100V to 230V, 50/60Hz)		**YSTP01**
Cable for connecting the weighing cell to a separate display and control unit (length: 2.70 m)		
– for balances with a weighing capacity ≤ 64 kg		**YCC01-19M3**
Flow Rate Controller for pumps and feed units with analog or pulse interfaces		**YFC02Z-V2**
Support arm, for raised display configuration		
– for balances with a weighing capacity ≤ 12 kg		**YDH01LP**
– for balances with a weighing capacity ≥ 16 kg		**YDH02LP**
Bar code scanner (YCC01-0024M01 required)		**YBR02FC**
Cable for connecting the bar code scanner		**YCC01-0024M01**
Standard Operating Procedure (SOP)		**YSL01E**
RS-232C interface cable for connecting the balance to a PC with a 25-pin COM port; length approx. 1.5 m		**7357312**
RS-232C interface cable for connecting the balance to a PC with a 9-pin COM port; length approx. 1.5 m		**7357314**
RS-232 USB interface cable		**YCC01-USBM2**
AC adapter ING-2 with IP65 protection rating		
for 230 V		**69 71899**
for 120 V		**69 71500**
Antistatic pan for models with a readability of 0.1 mg		**YWP01LA**
Hook for below-balance weighing for models LA34001S, LA16001S, LA34001P, LA34000		**69EA0040**
Calibration weights for all LA balances; extensive assortment; available with certification		**Information on request**

Declarations of Conformity

The CE Mark on Sartorius Equipment
In 1985, the Council of the European Community approved a resolution concerning a new approach to the technical harmonization and standardization of national regulations. The organization for monitoring compliance with the directives and standards concerning the CE marking is governed in the individual EU Member States through the implementation of the EC Directives adopted by the respective national laws. As of December 1993, the scope of validity for all EC Directives has been extended to the Member States of the European Union and the Signatories of the Agreement on the European Economic Area.

Sartorius complies with the EC Directives and European Standards in order to supply its customers with weighing instruments that feature the latest advanced technology and provide many years of trouble-free service.

The CE mark may be affixed only to weighing instruments and associated equipment that comply with the applicable Directive(s):

Council Directive 89/336/EEC
"Electromagnetic compatibility (EMC)"

1. Electromagnetic compatibility:

1.1 Reference to 89/336/EEC:
Official Journal of the European Communities, Nr. 2001/C105/03

EN 61326-1
Electrical equipment for measurement control and laboratory use EMC requirements

Parts 1: General requirements
Defined immunity to interference:
Industrial areas, continuous, un-monitored operation Limitation of emmissions:
Residential areas Class B

Important Note:
The operator shall be responsible for any modifications to Sartorius equipment and for any connections of cables or equipment not supplied by Sartorius and must check and, if necessary, correct these modifications and connections. On request, Sartorius will provide information on the minimum operating specifications (in accordance with the Standards listed above for defined immunity to interference).

Council Directive 73/23/EEC
"Electrical Equipment Designed for Use within Certain Voltage Limits"
Applicable European Standards:

EN 60950
Safety of information technology equipment including electrical business equipment

EN 61010
Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1: General requirements

If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

Weighing Instruments for Use in Legal Metrology: Directive 90/384/EEC
"Non-automatic weighing instruments"
This Directive regulates the determination of mass in legal metrology.

For the respective Declaration of Conformity for weighing instruments that have been verified by Sartorius for use as legal measuring instruments and that have an EC Type-Approval Certificate, see the page after next.

This Directive also regulates the performance of the EC verification by the manufacturer, provided that an EC Type-Approval Certificate has been issued and the manufacturer has been accredited by an officer or a Notified Body registered at the Commission of the European Community for performing such verification.

The legal basis allowing Sartorius to perform EC verification is constituted by the EC Council Directive No. 90/384/ EEC on non-automatic weighing instruments that has been in effect since January 1, 1993, in the Internal Market as well as by the Certificate of Accreditation of the Sartorius AG Quality Management System issued by the Metrology Department of the Regional Administration Office of Lower Saxony, Germany ("Niedersächsisches Landesverwaltungsamt -Eichwesen") on February 15, 1993.

For information on the CE mark on Sartorius equipment and legal regulations currently applicable in your country, and to obtain the names of the persons to contact, please ask your local Sartorius office, dealer or service center.

"New Installation" Service
Initial verification is covered in our "New Installation" service package. In addition to initial verification, this package provides you with a series of important services which will guarantee that you achieve optimal results with your weighing instrument:

- Installation
- Startup
- Inspection
- Training
- Initial verification

If you would like Sartorius to perform initial verification of your weighing instrument, contact an authorized service representative.

"EC Verification" –
A Service Offered by Sartorius
Our service technicians are authorized to perform verification* of your weighing instruments that are acceptable for legal metrological verification and can inspect and verify the metrological specifications at the place of installation within the Member States of the European Union and the Signatories of the Agreement on the European Economic Area.

Subsequent Verifications within the European Countries
The expiration date of the verification depends on the national regulations of the country in which the weighing instrument is used. For information on verification and legal regulations currently applicable in your country, and to obtain the names of the persons to contact, please contact your local Sartorius office, dealer or service center.

* in accordance with the accreditation certificate issued to Sartorius AG

CE Declaration of Type Conformity to Directive No. 90/384/EEC

This declaration is valid for non-automatic electromechanical weighing instruments for use in legal metrology. These weighing instruments accepted for legal metrological verification have an EC Type-Approval Certificate. The model(s) concerned is(are) listed below along with the respective type, accuracy class, and number of the EC Type-Approval Certificate:

Model	Weighing instrument type	Accuracy Class	EC Type Approval No.	In Conjunction with Test Certificate	
				Type	Certificate No.
LA...-.0CE	iso-TEST	(I)	D97-09-018	BC BF	D09-96.30
LA...-.0CE	iso-TEST	(I), (II)	D97-09-018	BD BF	D09-96.30
LA...-.0CE	iso-TEST	(II)	D97-09-018	BF BF	D09-96.30

SARTORIUS AG declares that its weighing instrument types comply with the requirements of the Council Directive on non-automatic weighing instruments, no. 90/384/EEC of 20 June 1990; the associated European Standard "Metrological aspects of non-automatic weighing instruments," No. EN 45501; the amended, currently valid versions of the national laws and decrees concerning legal metrology and verification in the Member States of the European Union, the EU, and the Signatories of the Agreement on the European Economic Area, which have adopted this Council Directive into their national laws; and with the requirements stipulated on the Type-Approval Certificate for verification. This Declaration of Type Conformity is valid only if the ID label on the weighing instrument has the CE mark of conformity and the green metrology sticker with the stamped letter "M" (the two-digit number in large print stands for the year in which the mark has been affixed):

CE 06 0111 M

If these marks are not on the ID label, this Declaration of Type Conformity is not valid. Validity can be obtained, for example, by submitting the weighing instrument for final action to be taken by an authorized representative of SARTORIUS AG. The period of validity of this Declaration of Type Conformity shall expire upon any tampering with, repair or modification of this weighing instrument or, in some Member States, on the date of expiration. This declaration applies only to the weighing instrument without peripheral devices.
The operator of this weighing instrument shall be responsible for obtaining an authorized renewal of the verification, such as subsequent or periodic verification, of the weighing instrument for use as a legal measuring instrument.

Sartorius AG
37070 Goettingen, Germany
Signed in Göttingen, 29.05.2006

Dr. G. Maaz
President of the Mechatronics Division

i.V. J. Rehwald
J. Rehwald
Head of the Production Department
Mechatronics / Weighing Technology Division

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

EG-Bauartzulassung

EC type-approval certificate

Zulassungsinhaber: *Issued to:*	Sartorius AG Weender Landstr. 94-108 37075 Göttingen
Rechtsbezug: *In accordance with:*	§ 13 des Gesetzes über das Mess- und Eichwesen *(verification act)* vom*/dated* 23. März 1992 (BGBl. I S. 711), zuletzt geändert am *(last amended on)* 25.11.2003 (BGBl. I S. 2304), in Verbindung mit Richtlinie *(in connection with council directive)* 90/384/EWG, geändert durch *(amended by)* 93/68/EWG
Bauart: *In respect of:*	Nichtselbsttätige elektromechanische Waage mit oder ohne Hebelwerk *Nonautomatic electromechanical weighing instrument with or without leverwork*
Typ */ Type*:	iso-TEST Genauigkeitsklasse/*class* (I), (II), (III), (IIII) Max 2,1 g ... 300 t Option: Mehrteilungswaage, Mehrbereichswaage *Multi-interval instrument, multiple range instrument*
Zulassungsnummer: *Approval number:*	**D97-09-018 6. Revision**
Gültig bis: *Valid until:*	26.06.2007
Anzahl der Seiten: *Number of pages:*	16
Geschäftszeichen: *Reference No.:*	PTB-1.12-4023683
Benannte Stelle: *Notified Body:*	0102

Im Auftrag
By order

Marcus Link

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 40

Braunschweig, 22.05.2006

Siegel
Seal

R3-0023

Die Hauptmerkmale, Zulassungsbedingungen und Auflagen sind in der Anlage enthalten, die Bestandteil der Revision der EG-Bauartzulassung ist. Hinweise und eine Rechtsbehelfsbelehrung befinden sich auf der ersten Seite der Anlage

The principal characteristics, approval conditions and special conditions, if any, are set out in the Annex which forms an integral part of this Revision of the EC type-approval certificate. For notes and information on legal remedies, see first page of the Annex.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Prüfschein

Test certificate

Ausgestellt für: *Issued to:*	Sartorius AG Weender Landstraße 94 – 108 37075 Göttingen Bundesrepublik Deutschland
Prüfgrundlage: *In accordance with:*	EN 45501 (1992), Nr.8.1, OIML R 76-1 (1992)
Gegenstand: *Object:*	Lastaufnehmer mit Wägezelle und Auswerteelektronik mit digitalem Ausgang als Modul einer elektromechanischen Waage zum Anschluß an geeignete Anzeige- und Bedienterminals *Load receptor with load cell and electronic device with digital output as module of an electromechanical weighing instrument for connection to suitable display- and operator-terminals* Typ / *type* **BA BF, BC BF, BD BF, BF BF, HC BF, MA BF und MD BF**
Kennummer: *Serial number:*	---
Prüfscheinnummer: *Test certificate number:*	D09-96.30 7. Revision / *Revision 7*
Datum der Prüfung: *Date of Test:*	
Anzahl der Seiten: *Number of pages:*	12
Geschäftszeichen: *Reference No.:*	1.14 – 02001430
Benannte Stelle: *Notified Body:*	0102

Im Auftrag
By order

Link

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 40

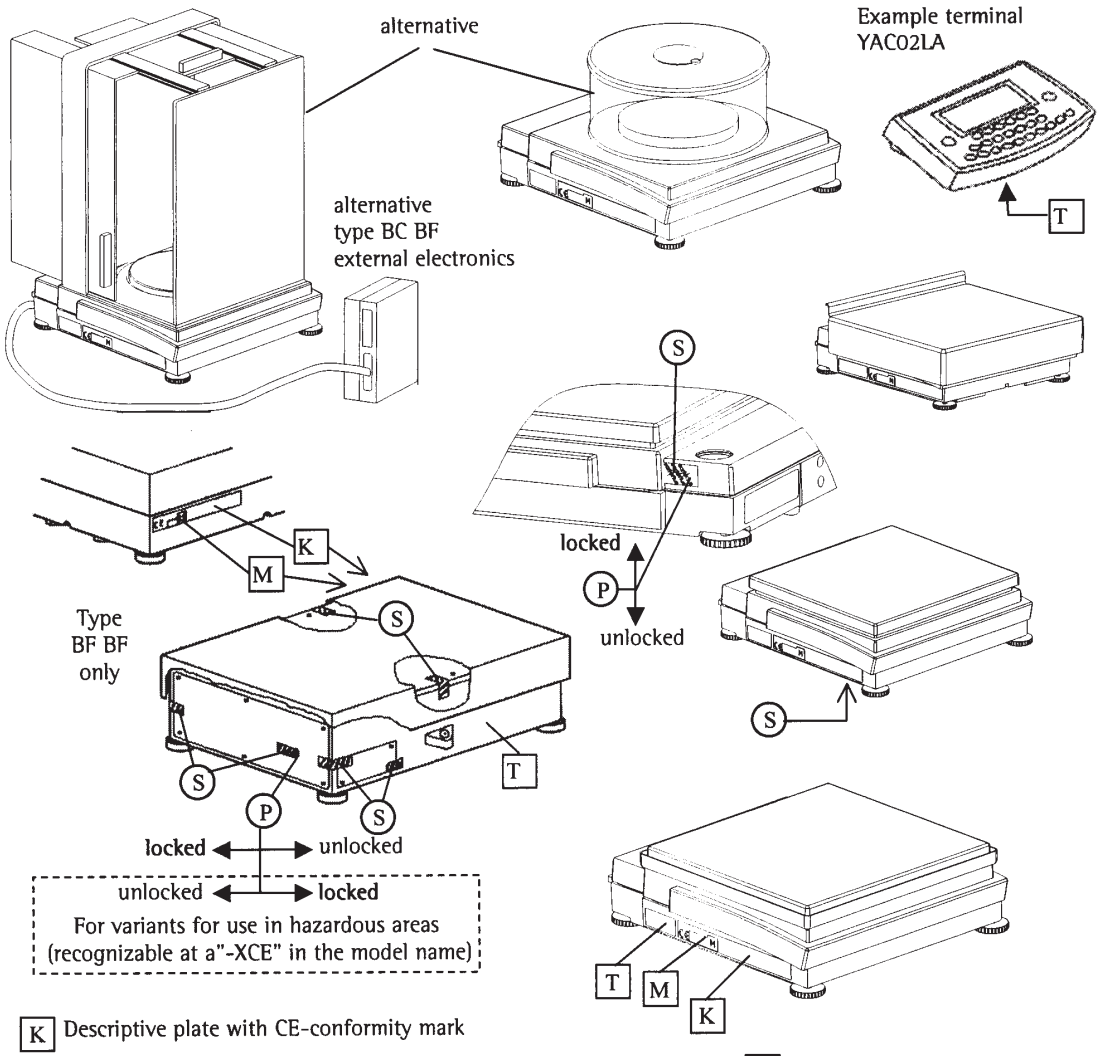
Braunschweig, 2002-11-13

Siegel
Seal

392 00 e-rb

Hinweise siehe erste Seite der Anlage, die Bestandteil des Prüfscheines ist.
For notes, see first page of the Annex which forms an integral part of the test certificate.

Plates and Markings



K Descriptive plate with CE-conformity mark

M Mark for EC verification (green metrology sticker)

S Protective seal, not for accuracy class (I)

T Plate with model designation

P Menu access switch

Indicating and operator terminals isi..., YAC01LA..., YAC02LA..., YAC01LP..., YAC01FC..., YAC02FC...,TN, TN-X, TN-Pro front-mounted, raised (post-mounted) or positioned separately.
Alternative to terminal: PC with Sartorius Win Scale YSW03 software

Example of descriptive plate of the already verified weighing instrument K

SARTORIUS AG GERMANY iso-TEST 12345678 D97-09-018
CE 06 0111 M (II) 0°C / +40°C
Max 2200g d= 0,1g
Min 5g e= 0,1g

Example of plate with model designation T

Weighing module

LA2200-0CE BD BF
12345678 D09-96.30

Indicating and operator terminal

SARTORIUS AG GERMANY
YAC02LA
12345678

PPBF290506e

Type: iso-TEST + BC BF, BD BF, BF BF
EC Type-approval certificate D97-09-018 + EC Test certificate D09-96.30

Index

Entering the General Password

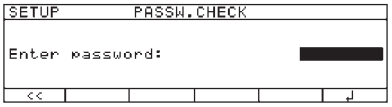
Enter/Change Password

● Select the Setup menu: Press ↓

> SETUP SELECTION
is displayed

● Select the user input function:
Press the Input soft key

> The password prompt
is displayed:



○ Enter the General Password
(see below)

○ Confirm password:
Press the ↵ soft key

> User data is displayed

● Select the password setting function:
Press the v soft key repeatedly until

> Enter password:
is displayed, together with the current password setting

● Define a new password:
Enter letters/numbers for the new password (8 characters max.)
To delete the current password: press (·) and confirm

● To confirm the new password: press the ↵ soft key

● Exit the Setup menu:
Press the << soft key

> Restart your application

General Password:
40414243

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