Intended Use

The Masterpro Series from Sartorius offers precision balances with capacities ranging from 1 to 34 kg. A broad range of special performance features make the Masterpro balances ideal for use as measuring and test equipment in ISO or GLP quality management systems. These features include:

- 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

Masterpro 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

Masterpro balances save work and speed up simple routine applications through:

- Ultrafast response times
- Built-in applications (counting, animal weighing, weighing in percent, etc.)
- 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
- Connectivity for control through an on-line computer

Warnings and 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
- The balance housing is IP54-protected against harmful dust deposits and water splashes
- The housing is not completely dust-tight, however
- Protect the AC adapter from contact with liquid
- Connect only Sartorius accessories and options, as these are optimally designed for use with your Masterpro 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 Masterpro 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 Masterpro balances follows a uniform “philosophy” which is described in this manual.

Keys

The functions used most often are assigned to their own specific keys. There are additional keys for assignment of other (multiple) functions, in some cases dependent on the current operating status (so-called “soft keys”). Each key is described in detail in the chapter entitled “Overview.”

Normal Operation

In the operating mode, these four keys function as CF, CAL, and F keys.

Setup Mode

In the setup mode, these keys take on the function of arrow keys <, v, ^, >.

Soft Key Mode

The ‘soft key’ functions depend on the current operating status; the current function is indicated in the text line of the display. In this example, the soft keys are used to access Info, Menu and Input functions.

Display

The display is divided into six sections:

- Line for metrological data: Metrological specifications of the weighing platform.
- Bar graph: Display during use as a legal measuring instrument.
- Measured value line: Display in percent of the weight on the balance relative to the maximum capacity and for over/under checkweighing.
- Weight unit display: Weight unit, other unit of measure, operating information.
- Symbol display: Indicates operating status; application selected.
- Text line: Prompts for operator guidance, soft key designations.

Important 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.

The symbol indicates non-verified weight values.

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

Numeric Input

To enter numbers:
Press the 1 2 ... 0 . keys

To store numbers entered:
Press the soft key

To interrupt/cancel numeric input:
Press [CF]

Alphabetic Input

To enter letters:
First press the [ABC] key, then press a letter soft key (↑ or ↓) repeatedly until the desired letter or special character is displayed in the text line

To store a word entered:
Press the soft key

To interrupt/cancel alphabetic input:
Press [CF]

Configuring Balance Operating Parameters

To set parameter options for configuring your balance, you can select the desired parameters from a list. The lists of parameter options comprise a menu, which has three levels.

For configuration functions:
Press the [SETUP] key; then press the MENU soft key

To move within a menu level:
Press [↑] or [↓]

To change to another menu level:
Press [←] or [→]

To confirm the selected parameter setting in the 3rd menu level:
Press [X]

“0” indicates the currently set parameter

Additional information is displayed in the text line. See the chapter entitled “Configuring the Balance” for a detailed description of all parameter settings.

To save setting and exit menu:
Press [SETUP]

To interrupt the parameter setting process without saving changes:
Press [X]

Data Output

Your Masterpro balance is equipped with a data interface 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 [Q]; 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 “Operating the Balance” 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, and
- where necessary, a message is displayed for 2 seconds in the text line, after which the text line returns to the previous display.

The response to an operator error is identical in all models of the Masterpro 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 the “Menu” and “Input” functions.
Getting Started

Warranty
Do not miss out on the benefits of our full warranty. Complete the warranty registration card, indicating the date of installation, and return the card to your Sartorius office or dealer.

Storage and Shipping Conditions
Allowable storage temperature: 0 °C ...+40 °C (+32 °F ...+104 °F)
The packaging has been designed to ensure that the balance will not be damaged even if it is dropped from a height of 80 centimeters (about 31 inches). Do not expose the balance to extreme temperatures, blows, shocks, 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 section on “Safety Inspection” in the chapter entitled “Care and Maintenance.”

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. The cardboard strips between the display and control unit and the weighing platform are part of the protective packaging for shipment!

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 to 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:
- LP 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
- LP 8200S, LP 8200P, LP 6200S, LP 4200S, LP 2200S, LP 820, LP 420, LP 2200P, LP 5200P
  - Balance with display and control unit
  - AC adapter
  - Dust cover
  - Pan draft shield
  - Weighing pan

- LP 16000S, LP 34000P, LP 34
  - Balance with display and control unit
  - AC adapter
  - Weighing pan

Installation Instructions
The Sartorius Masterpro balances are designed to provide reliable weighing results under normal ambient conditions in the laboratory and in industry. 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:
- Set up the balance on a stable, even surface
- 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 that come from open windows or doors
- Avoid exposing the balance to extreme vibrations during weighing
- Protect the balance from aggressive chemical vapors
- Do not expose the balance to extreme moisture

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. Afterwards, if you keep the balance connected to AC power, the continuous positive difference in temperature between the inside of the balance and the outside will practically rule out the effects of moisture condensation.

* including the Signatories of the Agreement on the European Economic Area
Setting Up the Balance

Preparing Balances with a Round Glass Draft Shield

- Place the components listed below on the balance in the order given:
  - Dust cover
  - Shield disk; turn counter-clockwise until it stops and is secured
  - 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
  - Pan draft shield (depending on the model)
  - 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 upside down 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
  - LP balances with a weighing capacity ≤ 12 kg: 55 cm
  - LP balances with a weighing capacity ≥ 16 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 the LP 16000S, LP 34000P, LP 34

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 weighing cell

- Turn the weighing cell over
- Use an Allen wrench to remove the fastening screws from the display unit retainer.

- Remove the cable from the raceway (channel)
- Fasten the display unit retainer onto the back of the weighing cell with the 2 Allen screws
- Thread the cable through the raceway as shown in the diagram on the left.
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 inside your facilities to have this equipment installed

○ See the “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 tighten the screws
- Then plug the AC adapter into a wall outlet (mains)

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).

Information on Radio Frequency Interference

Warning!

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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 deliver exact results, the balance must warm up for at least 30 minutes after initial connection to AC power or after a relatively long power outage. Only after this time will the balance have reached the required operating temperature.

Using Verified Balances as Legal Measuring Instruments in the EU*

The balance must warm up for at least 24 hours after initial connection to AC power.

* including the Signatories of the Agreement on the European Economic Area
Fastening an Antitheft Locking Device: Balances with a Weighing Capacity of 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 after it has been moved.

Leveling Balances with a Weighing Capacity ≤ 12 kg

Only the 2 front feet are used for leveling.
- Retract the 2 rear feet
- Turn the 2 front feet as shown in the diagram until the air bubble is centered within the circle of the level indicator
  - Several leveling steps are usually required.
- For weighing heavy samples: 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 three leveling feet until the air bubble is centered within the circle of the level indicator
Configuring the Balance

**Purpose**
You can configure your Masterpro balance to meet individual requirements by entering user data and setting parameters in the Setup menu. You can also configure the display to show balance-specific information (such as the serial no.).

Setting the Function Switch for Using the Balance in Legal Metrology
To use the balance in legal metrology, the following functions must be activated by setting the switch as described below:

- Display: Verification scale interval \( e \); lower weighing range limit: \( \text{Min} \)
- External calibration/adjustment: Blocked
- MP8 interface emulation active

**Preparation**

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

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

> Note:
Do not move Switch 2

Setting the Language

**Available Features**
You can choose from 5 languages for the information display:

1. German
2. English (factory setting)
3. English with U.S. date/time format
4. French
5. Italian
6. Spanish

**Selecting the Language**
- Enter the corresponding number
- Press **SETUP**

‘Info’ Display

**Purpose**
To have information about the equipment displayed.

**Features**
You can have the following information displayed:

- Program version number for the display and control unit
- Program version for the weighing platform
- Balance model
- Serial number of the weighing cell

**Display Balance Information**

- Select the Setup menu: Press **SETUP**
- Select information: Press the **INFO** soft key [CAL]

> Readout in measured value line: Version number of the display and control unit
(see also “Data Output Functions,” pages 56–57, in the chapter entitled “Operating the Balance”)

- Select next item of information: Press **▲**
- Readout in measured value line: Next information
- Select previous information: Press **▼**
- Readout in measured value line: Previous information
- Print information: Press **P**

> Printout (example)

<table>
<thead>
<tr>
<th>Mod.</th>
<th>LP6200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ser. no.</td>
<td>60406906</td>
</tr>
<tr>
<td>Ver. no.</td>
<td>01-30-13</td>
</tr>
</tbody>
</table>

Software version (display and control unit)

| Ver. no. | 00-20-07 |

Software version (weighing platform)

- Exit the Setup menu: Press **SETUP**
- Balance returns to previous status
**Configuring the Balance**

**Entering User Data (Input)**

**Purpose**
To display, input or change user data. You can block access to these data by assigning a password.

**Features**
You can display, input or change the following user data:
- Workstation number* for the balance: ID (balance ID; max. 20 characters)**
- Weighing series number, to designate a series or lot: L ID (lot ID; max. 20 characters)**
- Weight set number for calibration/adjustment: W ID (weight ID; max. 14 characters)**
- Exact weight value for calibration/adjustment of the balance (see the section on “Calibration/Adjustment,” starting on page 24 in the chapter entitled “Operating the Balance; in particular refer to page 27)
- Password for access to the Setup menu: Input and Setup: Menu (max. 8 characters)**

*** Only in conjunction with ISO/GLP-compliant printouts (see the section on “Setting Parameters” in the chapter entitled “Configuring the Balance;” under menu code number 8 10 x).

** A decimal point is displayed together with its preceding digit or character; it does, however, count as a separate character. This also applies when you enter S ID and NUM as well as to data entered via the interface.

*** To delete user password:
Enter a decimal point using the key and confirm

**Factory Settings**
Password: No designation
If no password has been assigned, anyone can access the “Setup: Input” and “Setup: Menu” functions without entering a password.
If you assign a password and then forget what the word is, you can use the General Password (see Appendix) to access these menus.

**Preparation**
Display existing user data
- Select the Setup program: Press \texttt{SETUP}
- The soft keys \texttt{INFO}, \texttt{MENU} and \texttt{INPUT} are displayed in the text line
- Select the user data input function: Press the \texttt{INPUT} softkey \texttt{F}
- The password prompt is displayed
- If access is blocked by a password: enter the password using the alphanumeric input keys
- Display user data:
  - Press the \texttt{ENTER PASSW.} softkey \texttt{F}
  - The last 8 digits of a workstation/balance number (ID no.), if any ID is assigned, are displayed in the measured value line

**Enter/Change Password**
- Select the Setup menu: Press \texttt{SETUP}
- The soft keys \texttt{INFO}, \texttt{MENU} and \texttt{INPUT} are displayed in the text line
- Select the user data input function: Press the \texttt{INPUT} soft key \texttt{F}
- Write down the password here: Password = .................. If you no longer remember the password assigned:
  - Enter the General Password (see Appendix)
  - Press the \texttt{ENTER PASSW.} soft key \texttt{F}
  - The last 8 digits of a workstation/balance number (ID no.), if any ID is assigned, are displayed in the measured value line
- Select password setting: Press \texttt{y}
- New password: Enter the letters/numbers for the new password (8 characters max.)**
  - The password “none” means that no password is stored.***
- Confirm input: Press \texttt{X}
- Exit the Setup menu: Press \texttt{SETUP}
- Restart the application

---

**Purpose**
To display, input or change user data. You can block access to these data by assigning a password.

**Features**
You can display, input or change the following user data:
- Workstation number* for the balance: ID (balance ID; max. 20 characters)**
- Weighing series number, to designate a series or lot: L ID (lot ID; max. 20 characters)**
- Weight set number for calibration/adjustment: W ID (weight ID; max. 14 characters)**
- Exact weight value for calibration/adjustment of the balance (see the section on “Calibration/Adjustment,” starting on page 24 in the chapter entitled “Operating the Balance; in particular refer to page 27)

*** Only in conjunction with ISO/GLP-compliant printouts (see the section on “Setting Parameters” in the chapter entitled “Configuring the Balance;” under menu code number 8 10 x).

** A decimal point is displayed together with its preceding digit or character; it does, however, count as a separate character. This also applies when you enter S ID and NUM as well as to data entered via the interface.

*** To delete user password:
Enter a decimal point using the key and confirm
### Practical Example

Enter “Workstation 234” as Balance ID; Display and Print Other User Data

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select Setup menu, then Input; Display balance workstation ID (in this example: no ID number exists)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>see Preparation</td>
<td>ID ————</td>
</tr>
<tr>
<td>2.</td>
<td>Enter the first letter of the balance workstation ID</td>
<td>ABC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13th through 20th digits of ID displayed</td>
</tr>
<tr>
<td>3.</td>
<td>Set the letter “W”</td>
<td>✓ repeatedly, until the W is in the middle</td>
</tr>
<tr>
<td>4.</td>
<td>Enter the next letter of the balance workstation ID</td>
<td>ABC</td>
</tr>
<tr>
<td>5.</td>
<td>Select the letter “o”</td>
<td>▲ repeatedly</td>
</tr>
<tr>
<td>6.</td>
<td>Repeat steps 4 and 5 with the appropriate letters (display “longer” values: see “Data Output Functions” on page 57)</td>
<td>ABC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 th through 20th digits of ID displayed</td>
</tr>
<tr>
<td>7.</td>
<td>Store balance workstation ID</td>
<td>ID soft key ▶</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ID on 234</td>
</tr>
<tr>
<td>8.</td>
<td>Display the 5th through 12th digits of the balance workstation ID</td>
<td>&lt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 on 234</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horfs</td>
</tr>
<tr>
<td>Step</td>
<td>Key (or instruction)</td>
<td>Display/Output</td>
</tr>
<tr>
<td>------</td>
<td>---------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>9.</td>
<td>Display lot number</td>
<td>^</td>
</tr>
<tr>
<td></td>
<td>(In this example: 09-10-96/ABC1)</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Display 5th through 12th digits of lot no.</td>
<td>&lt;</td>
</tr>
<tr>
<td>11.</td>
<td>Display other user data</td>
<td>&lt; ► ▲ ▼</td>
</tr>
<tr>
<td></td>
<td>– Weight set no.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Exact calibration weight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Password</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Print user data (example)</td>
<td>▼</td>
</tr>
<tr>
<td></td>
<td>ID WORKSTATION 234</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L ID 09-10-96/ABC1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W ID A-123.456.XY C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cal.wt. +2000.02</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Exit “Setup: Input”</td>
<td>SETUP</td>
</tr>
</tbody>
</table>
Setting Parameters (Menu)

Purpose
To configure the balance; i.e., adapt the balance to individual requirements by choosing from a list of parameter options in a menu. You can block access to this menu by assigning a password.

Features
The parameter options are divided into the following groups (1st menu level):
1 Balance functions
2 Application programs
3 Application parameters
4 +/– parameter
   (for over/under checkweighing)
5 Interface parameters
6 Print for weighing (print weights)
7 Print for application program
   (print app. data)
8 Additional functions
9 Reset menu

Factory Settings
The factory-set configurations are marked with an “o” in the list starting on page 16

Preparation
- Select the Setup menu:
  Press SETUP
  > The INFO, MENU and INPUT soft keys are displayed in the text line
- Select the parameter menu:
  MENU soft key ▶
  > Password prompt is displayed
- Enter password using the alphanumeric input keys
- Confirm password entered:
  ENTER PASSW. soft key F
  > Measured value line:
  1 (1st menu level)
  > Text line: BALANCE FUNCTIONS
  o Select the next group: Press ▲
  o Select the next submenu within a group (2nd menu level):
    Press ▶
  o Select previous group: Press ▼
  o Return to next higher menu level:
    Press ◀

Additional Functions
- Exit the menu: Press SETUP
  > Restart the application
- Print parameter settings:
  - When the 3rd menu level is selected: Press O
  > Printout (example)
    4 2 Auto print +/-
    2 Off
  - When the 2nd menu level is selected: Press O
  > Printout (example)
    4 Parameter +/-
    -------------------
    4 2 Auto print +/-
    2 Off
    4 3 +/- ctrl ports
    1 Within ctrl r
  - When the 1st menu level is displayed: Press O
  > Prints all of the menu parameters that are currently set
## Practical Example

Select the Counting Application Program

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select Setup menu</td>
<td>SETUP</td>
<td>INFO--MENU--INPUT</td>
</tr>
<tr>
<td>2. Select Balance Functions group code (Menu)</td>
<td>MENU soft key</td>
<td></td>
</tr>
<tr>
<td>3. Select the Application Prog. group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Confirm Application Program (2nd menu level)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Confirm App. Selection (3rd menu level shows current setting; in this case: weighing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Select the Counting program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Confirm selection of Counting program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Set other parameters, if desired</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Save settings and exit menu</td>
<td>SETUP</td>
<td></td>
</tr>
</tbody>
</table>
### Setup Parameters (Overview)

- **Factory setting**
- **User setting**

<table>
<thead>
<tr>
<th>Setup menu for applications</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Factory setting</th>
<th>Menu item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance functions</td>
<td>1</td>
<td>11</td>
<td>111</td>
<td>Minimum vibration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>112</td>
<td>Normal vibration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>113</td>
<td>Strong vibration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>114</td>
<td>Extreme vibration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>121</td>
<td>Final readout</td>
<td>Filling mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>122</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>131</td>
<td>1/4 digit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>132</td>
<td>1/2 digit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>133</td>
<td>1 digit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>134</td>
<td>2 digits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>135</td>
<td>4 digits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>136</td>
<td>8 digits*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>151</td>
<td>Taring*</td>
<td>Without stability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>152</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>161</td>
<td>Auto zero</td>
<td>On</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>162</td>
<td></td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>172</td>
<td>Weight unit 1</td>
<td>Grams/g</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>173</td>
<td>Kilograms/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>174</td>
<td>Carats/ct*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>175</td>
<td>Pounds/lb*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>176</td>
<td>Ounces/oz*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>177</td>
<td>Tray ounces/oz*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>178</td>
<td>Hong Kong tael/s/th*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>179</td>
<td>Singapore tael/s/lt*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1710</td>
<td>Taiwanese tael/s/lt*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1711</td>
<td>Grains/gn*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1712</td>
<td>Pennyweight/dwt*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1713</td>
<td>Milligrams/mg*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1714</td>
<td>Pairs per pound./lb*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1715</td>
<td>Chinese tael/s/lt*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1716</td>
<td>Mannes/mam*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1717</td>
<td>Austrian carats/x*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1718</td>
<td>Tals/tel*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1719</td>
<td>Berar/ber*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1720</td>
<td>Mezhals/MS*</td>
<td></td>
</tr>
</tbody>
</table>

* = setting not applicable in balances verified for use in legal metrology.
** = not in balance model LP34-OCE

2 to 9: see following pages
Configuring the Balance

Setup menu for applications
1 Balance functions
   11 to 17 see previous page
     18 Display accuracy
        181 All digits
        182 Fewer for wt. change
        185 Last digit off
     19 CAL key function
        191 External calibration/adjustment** with the preset weight value
        193 External calibration/adjustment** with a user-defined weight
        194 Internal calibration/adjustment
        1910 CAL key blocked
        1911 Reproducibility test
        1912 Selection mode for calibration/adjustment
   110 Calibration/adjustment sequence
      1101 Calibration -> automatic adjustment
      1102 Calibration -> manual adjustment
   113 Tare with power on*
      1131 On
      1132 Off
   115 isoCAL function
      1151 Off
      1152 Only adjustment prompt
      1153 On + reset application (app. deleted)
      1155 On: application active

2 Application programs
   21 Application selection
      211 Weighing
      212 Toggle weight units
      214 Counting
      215 Percent weighing
      216 Net/total
      217 Animal weighing
      218 Over/under checkweighing

3 Application parameters
   31 Weight unit 2
      312 O Grams/g
      313 Kilograms/kg
      314 Carats/ct*
      315 Pounds/lb*
      316 Ounces/oz*
      317 Tray ounces/ozt*
      318 Hong Kong toels/lb*
      319 Singapore toels/lb*
      3110 Taiwanese toels/lb*
      3111 Grams/gr*
      3112 Pennyweight/dwt*
      3113 Milligrams/mg*
      3114 Parts per pound/1p*
      3115 Chinese toels/klc*
      3116 Mannes/mom*
      3117 Austrian carats/k*
      3118 Tala/td*
      3119 Baht/bat*
      3120 Mesghal/MS*

4 to 9 see following pages

* = setting not applicable in balances verified for use in legal metrology.
** = not in balance model LP34-0CE
*** = for balances of accuracy class C3, only calibration (not adjustment) can be performed with a user-defined weight.
Setup menu for applications

1 to 2 see previous pages

3 Application parameters

3.1 Display accuracy 2
   3.21
   3.22
   3.25
   3.2

3.5 Counting/percent parameters
   3.52
   3.53

3.6 Decimals for calculation
   3.61
   3.62
   3.63
   3.64
   None
   1 decimal place
   2 decimal places
   3 decimal places

3.7 Animal activity
   3.71
   3.72
   3.73
   Calm
   Normal
   Active

3.8 Start animal weighing
   3.81
   3.82
   Manual
   Automatic

3.9 Print animal weights
   3.91
   3.92
   3.93
   Off
   On, animal weight
   On, animal weight factor

3.10 Autostart application
   3.101
   3.102
   On
   Off

4 Parameter +/-

4.2 Auto print +/-
   4.21
   4.22
   On, values in tolerance range
   Off

4.3 +/- control parts on
   4.31
   4.32
   4.33
   4.34
   4.35
   Within control range
   Always on
   Stability + control range
   At stability only
   Stability + control range -> on

5 Interface

5.1 Baud rate
   5.11
   5.12
   5.13
   5.14
   5.15
   5.16
   5.17
   5.18
   150 baud
   300 baud
   600 baud
   1,200 baud
   2,400 baud
   4,800 baud
   9,600 baud
   19,200 baud

5.2 to 5.4 see the next page

6 to 9 see following pages

*= setting not applicable in balances verified for use in legal metrology
**Setup menu for applications**

1. **Level 1**
   - 1 to 4: see previous pages

2. **Level 2**
   - 5 Interface:
     - 5.1: see previous page
     - 5.2 Parity:
       - 5.2.1: Space
         - 5.2.2: Odd
       - 5.2.3: Even
     - 5.3 No. of stop bits:
       - 5.3.1: 1 stop bit
       - 5.3.2: 2 stop bits
     - 5.4 Handshake mode:
       - 5.4.1: Software handshake
       - 5.4.2: Hardware handshake, 1 character after CTS
     - 5.5 Communication mode:
       - 5.5.1: SBI
       - 5.5.2: xBI
       - 5.5.3: YDPO1S
       - 5.5.4: YDPO2S
       - 5.5.5: YDPO3S
       - 5.5.6: YDPO1S Label printer
       - 5.5.7: YDPO2S Label printer
       - 5.5.8: YDPO3S Label printer
       - 5.5.9: YDPO4S Label printer
     - 5.6 Network address:
       - 5.6.1: Address 0
       - 5.6.2: Addresses 1 to 30
       - 5.6.3: Address 31

3. **Level 3**
   - 6 Print for weighing:
     - 6.1 Print manual/automatic:
       - 6.1.1: Manual without stability parameter
       - 6.1.2: Manual with stability parameter
       - 6.1.3: Auto print without stability parameter
       - 6.1.4: Auto print at stability
       - 6.1.5: Auto print after weight change**
     - 6.2 Stop auto print:
       - 6.2.1: Use (△) key
       - 6.2.2: Not possible
     - 6.3 Time-dependent auto print:
       - 6.3.1: 1 display update
       - 6.3.2: 2 display updates
       - 6.3.3: 10 display updates*
       - 6.3.4: 100 display updates*
     - 6.4 Print → autotare:
       - 6.4.1: Off
       - 6.4.2: On

4. **Level 4**
   - 7 Print for application parameters:
     - 7.1 Print application parameters:
       - 7.1.1: Off
       - 7.1.2: All parameters
       - 7.1.3: Only main parameters
     - 7.2 Line format:
       - 7.2.1: For raw data
       - 7.2.2: For other applications/GLP
     - 7.3 Print net total:
       - 7.3.1: Auto print net
       - 7.3.2: Auto print tare

5. **Level 5**
   - 8 Extra functions:
     - 8.1 Menu:
       - 8.1.1: Parameter settings alterable
       - 8.1.2: Parameter settings readable

6. **Level 6**
   - 9 Balance menu:
     - 9.1: see next page

---

* = setting not applicable in balances verified for use in legal metrology
** = Auto print if change in weight >10 d and has stable readout; function enabled when load <5 d
* = not in balance models with a weighing capacity ≥ 16 kg.
Operating the Balance

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 (1 5 2)
Print manual/automatic: Manual after stability (6 1 2)
Line format for printout: For other applications/GLP (7 2 2)
Alphanumeric input of a weight ID: Keys unblocked (8 3 1)

Below-Balance Weighing
A port for a below-balance weighing hanger is located on the bottom of the balance (for balances with a weighing capacity >12 kg, see the “Accessories” in the chapter entitled “Overview”).

- Open cover plate (1) on the bottom of the balance
- Attach the sample (e.g., using a suspension wire) to the hook (2)

Preparation
- Turn on the balance: Press U6
  > All display segments light up briefly
- To change configurations: see the chapter entitled “Configuring the Balance”
- To load factory-set configurations: see “Configuring the Balance,” parameter 9
- To tare the balance: Press TARE
  > The –0– symbol is displayed when the balance is zeroed or tared (only on balances verified for use in legal metrology)

Using Verified Balances Approved for Use as Legal Measuring Instruments in the EU*

This balance is not allowed to be used for weighing goods intended for direct sale to the public. 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.

- You must calibrate the balance at the place of installation before using it as a legal measuring instrument (see the section entitled “Calibration/Adjustment” in this chapter)

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

Example:
MD BF 100
CD +15 °C./+25 °C

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.

* including the Signatories of the Agreement on the European Economic Area
ID for weight value (if desired):

- Select the parameters “Line format” and “For other app./GLP” from the Setup menu: Press SETUP

- Select mode: Press the MENU soft key

- Set parameter 122: See the chapter entitled “Configuring the Balance”

- Exit the Setup menu: Press SETUP

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.

Setup Menu

- Press SETUP

> See the chapter entitled “Configuring the Balance” for further instructions.

Turning Off the Balance

- Press W0

> The balance shuts off

> The display goes blank

**Important Note Concerning Verified Balances of Accuracy Class 1:**

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

\[ m = n_w \left(1 - \frac{\rho_L}{\rho}\right) \frac{1}{8000} \text{ kg m}^{-3} \]

- \( m \) = mass of the sample
- \( n_w \) = weight readout
- \( \rho_L \) = air density during weighing
- \( \rho \) = density of the sample

**Practical Examples**

Example W1: Simple Weighing

**Step** | **Key (or instruction)** | **Display/Output**
---|---|---
1. If necessary, tare the balance (symbol: balance is tared, verified balances only) | **TARE** | ![TARE Display](image)

2. Enter sample ID | see Example W2

3. Determine sample weight (Example) | Place sample on balance | ![Sample Weighing](image)

4. Print weight | **P** | ![Printed Weight](image)
Example W2

Enter “ABC123” as a sample ID

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

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial status (balance unloaded)</td>
<td></td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>(ID can also be entered while balance is loaded)</td>
<td></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>1. Enter the letter “A”</td>
<td>ABC</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>2. Select and enter the letter “B”</td>
<td>ABC</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Softkey B [Key ↑]</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>3. Select and enter the letter “C”</td>
<td>ABC Softkey . .</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>(Key ↑ ↑)</td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td>4. Enter the numbers “1,” “2” and “3”</td>
<td>1 2 3</td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>5. Store the ID (max. 20 characters)</td>
<td>Press the SP.ID soft key</td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
</tbody>
</table>

– The next printout will include this ID
**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 the difference to an allowable level within the maximum permissible error limits.

### Using Verified Balances as Legal Measuring Instruments in the EU*

Before using your balance as a legal measuring instrument, you must perform “internal calibration” at the place of installation after the warmup period.

### Available Features

Your balance can be calibrated externally (menu item 1 9 1 or 1 9 3) or internally (1 9 4).

External calibration can be performed
- with the pre-set weight value (1 9 1), or
- with a user-defined weight value (1 9 3)

Adjustment can be performed
- automatically following calibration (1 10 1); or
- if desired, the adjustment operation can be started manually after calibration (1 10 2).

You can also configure whether the calibration mode
- will be activated according to the specific setting (by setting 1 9 1, 1 9 3 or 1 9 4), or
- can be selected by the user after pressing the [CAL] key (1 9 12).

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 have the calibration/adjustment results documented in an ISO/GLP-compliant printout.

### Releasing Access to External Calibration in Verified Balances of Accuracy Class k

- 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.

### Factory Settings

**Calibration/adjustment mode:**
Selection mode (1 9 12)

**Calibration/adjustment sequence:**
Adjustment automatically follows calibration in a single operation (1 10 1).

Automatic initiation of calibration/adjustment (isoCAL function):
isoCAL on (1 15 5).

ISO/GLP printout: off (1 10 1).

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

Preparation
Configure Parameters for Calibration and Adjustment

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Turn on the balance</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>2. Select the Setup menu</td>
<td>SETUP</td>
<td>INFO MENU INPUT</td>
</tr>
<tr>
<td>3. Select the Balance Functions menu</td>
<td>MENU soft key</td>
<td>BALANCE FUNCTIONS</td>
</tr>
<tr>
<td>4. Set parameters for:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Calibration key function</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>- Calibration/adjustment sequence</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>- isoCAL self-calibrating and adjustment function</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>See the chapter entitled “Setup”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Exit the Setup menu</td>
<td>SETUP</td>
<td>0.00 g</td>
</tr>
</tbody>
</table>

See the chapter entitled “Setup”
### Selecting the Calibration/Adjustment Parameter

The setting `19/2` must be selected in the Setup menu.

You can configure the balance so that after selecting a calibration procedure by pressing the **CAL** key, you can choose among the following calibration/adjustment modes:

- External calibration/adjustment with the pre-set weight value (**Def. Ext. Adj.**)
- External calibration with a user-defined weight value (**USER. Ext. Adj.**)
- Internal calibration (**INT. ADJUST**)
- Reproducibility test (**REPROTEST**)

### Configure External Calibration and Automatic Adjustment of the Balance in Selection Mode

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the calibration function</td>
<td><strong>CAL</strong></td>
</tr>
<tr>
<td>2.</td>
<td>Select external calibration/adjustment mode</td>
<td>Press the <strong>SELEC.</strong> soft key three times <strong>F</strong></td>
</tr>
<tr>
<td>3.</td>
<td>Confirm external calibration/adjustment mode</td>
<td>Press the <strong>USER. Ext. Adj.</strong> soft key <strong>CAL</strong></td>
</tr>
</tbody>
</table>
| 4.   | Place the calibration weight on the balance (e.g., 4000.00 g) | Minus sign –: Weight too low  
Plus sign +: Weight too high  
No plus/minus sign: Weight o.k.  
This is displayed after calibration:  
(on verified balances, the display shows the difference between the weight readout and the actual weight value)  
This is displayed after adjustment:  
Place weight on balance |
| 5.   | Unload the balance | Remove weight(s) |
External Calibration/Adjustment* with a User-Defined Weight

First set either 19 3 or selection mode (19 12) in the menu. 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. The balance has a factory-set weight value (see “Specifications”).

To reset a user-defined calibration/adjustment weight to the original factory setting, enter the factory-set weight value manually (see “Specifications”) or set menu code 19 1 in the Setup menu.

Define the Calibration Weight

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select the Setup menu</td>
<td>SETUP</td>
<td>INFO MENU INPUT</td>
</tr>
<tr>
<td>2. Access the Input Mode</td>
<td>INPUT soft key F</td>
<td>ID</td>
</tr>
<tr>
<td>3. Select input for calibration weight (currently 3000.00 g)</td>
<td></td>
<td>3000.00 g CAL./ADJ.WEIGHT</td>
</tr>
<tr>
<td>4. Enter calibration weight (e.g., 4000.00 g)</td>
<td>4000.00 CAL./ADJ.WEIGHT</td>
<td></td>
</tr>
<tr>
<td>5. Save weight</td>
<td>...WEIGHT soft key F</td>
<td>4000.00 g CAL./ADJ.WEIGHT</td>
</tr>
<tr>
<td>6. Exit the Setup menu</td>
<td>SETUP</td>
<td>Max 4200 g 0.00 5</td>
</tr>
</tbody>
</table>

* = for verified balances of accuracy class OIML, only external calibration is possible
Internal Calibration/Adjustment

The menu code setting 194 must be selected in the Setup menu.

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

The internal calibration/adjustment sequence is as follows:

- Select the calibration function: Press [CAL]
- The internal calibration weight is applied automatically
- The balance is calibrated
- If the setting for “Calibration automatically followed by adjustment” (1101) is selected in the Setup menu, the balance is now automatically adjusted
- The internal calibration weight is removed

Calibration and Adjustment Sequence

In the Setup menu, you can configure the balance so that:

- calibration is always followed automatically by adjustment (CAL. -> AUTO ADJUST. 1101), or
- you have the choice of ending the sequence or starting adjustment after calibration (CAL. -> MAN. ADJUST. 1102).

If no deviation is determined during 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 soft keys active at this point:

- EXT. ADJUST or INT. ADJUST to start adjustment
- END to end the sequence
**isOCAL:** Automatic Calibration and Adjustment

Either 1 15 3 or 1 15 5 must be selected in the Setup menu.

The "isOCAL" display automatically begins flashing if the ambient temperature has changed 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 self-calibrate and adjust.

This adjustment prompt is activated when:

- The change in temperature or the elapsed time interval is greater than that shown in the table below
- The balance status does not correspond to Setup configurations
- No number or letter input is active
- The load on the pan has not been changed within the last 2 minutes
- The balance has not been operated within the last 2 minutes
- The weight on the pan must be no more than 2% at the most of the maximum capacity of the balance

When these requirements are met, the following symbols are displayed:

- £ in the measured value line
- isOCAL in the symbol display
- Δ in the weight unit display

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

In the Setup menu, you can also configure the balance so that it displays an adjustment prompt, but does not perform the calibration/functions automatically (ONLY ADJ.PROMPT. 1 15 2)

In the Setup menu, you can also configure the balance so that it displays an adjustment prompt, but does not perform the calibration/functions automatically (ONLY ADJ.PROMPT. 1 15 2)

Deactivating the “isOCAL” Function in Verified Balances:

Automatic calibration is also performed outside of the limited temperature range if you set menu code 1 15 1, “isOCAL function: off” or code 1 15 2, “only at adjustment prompt” in the Setup menu.

To generally deactivate automatic calibration in balances with a weighing capacity ≤12 kg:

- After the balance has been modified by the Sartorius Service Center

> Afterwards, the balance can only be used for legal metrology within the temperature range allowed by law

Limited temperature range:

- For balances of accuracy class C1: +15°C to +25°C (59°F to 77°F)
- For balances of accuracy class C2: +10°C to +30°C (50°F to 86°F)

Extended temperature range:

- 0°C to +40°C (32°F to 104°F)

Fully automatic adjustment is initiated under the following conditions:

<table>
<thead>
<tr>
<th>Model</th>
<th>When the temperature changes by</th>
<th>After a time interval of</th>
</tr>
</thead>
<tbody>
<tr>
<td>LP 3200D, LP 1200S</td>
<td>1.5 Kelvin</td>
<td>4 h</td>
</tr>
<tr>
<td>LP8200S, LP8200P, LP 620S, LP 620P, LP 6200S, LP 4200S, LP 5200P, LP 220S</td>
<td>2 Kelvin</td>
<td>6 h</td>
</tr>
<tr>
<td>LP 2200S, LP 2200P, LP 34000P</td>
<td>4 Kelvin</td>
<td>12 h</td>
</tr>
<tr>
<td>LP 820, LP 420, LP 16000S, LP 12000S, LP 12000P, LP 6200, LP 4200, LP 2200, LP 34</td>
<td>4 Kelvin</td>
<td>24 h</td>
</tr>
</tbody>
</table>

These values are also set in the corresponding verified or verifiable balances [LP models with the -0CE designation].
Determination of the Repeatability (reproTEST)

Definition
Repeatability (reproducibility) is the ability of the balance to display identical readouts when it is loaded several times with the same weight under constant ambient conditions. The standard deviation for a given number of measurements is used to quantify the repeatability.

Purpose
The “reproTEST” function automatically calculates the repeatability of results (based on 6 individual measurements). In this way, the balance determines one of the most important quantities in relation to the place of installation. The results are displayed with the balance’s accuracy.

Preparation
- Turn on the balance: Press [PO]
- All display segments light up briefly
- Select reproTEST in the Setup menu: Press [SETUP]
- Select Menu: Press [S] (MENU softkey)
- Select either 1911 (reproTEST) or 1912 (selection mode): See “Configuring the Balance.”
- Exit the Setup menu: Press [SETUP]

Check the Reproducibility of the Balance

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>If parameter 1911 is set (reproTEST), proceed with step 4.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Access the Selection Mode for calibration/adjustment CAL</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Select reproTEST SELECT, soft key F</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Start reproTEST CAL Number of measurements is displayed 6 measurements will now be performed</td>
<td></td>
</tr>
</tbody>
</table>

The standard deviation is displayed

5.   | End reproTEST or restart reproTEST END soft key F reproTEST soft key |

30
Operating the Balance

Application Programs

Using Verified Balances as Legal Measuring Instruments in the EU*

All application programs can be selected on balances used as legal measuring instruments. Non-metric values are indicated as follows:

- Percent = %
- Piece count (counting) = pcs
- Computed value = o

Toggle between Weight Units

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.

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 (1 7 2)
Display accuracy 1 (in the 1st range): All digits (1 8 1)
Weight unit 2: Grams/g (3 1 2)
Display accuracy 2 (in the 2nd range): All digits (3 2 1)

Preparation

The following weight units are available in both ranges:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Conversion factor</th>
<th>Display</th>
<th>Printout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grams</td>
<td>1.000000000000</td>
<td>g</td>
<td>g</td>
</tr>
<tr>
<td>Kilograms</td>
<td>0.001000000000</td>
<td>kg</td>
<td>kg</td>
</tr>
<tr>
<td>Carats**</td>
<td>5.000000000000</td>
<td>ct</td>
<td>ct</td>
</tr>
<tr>
<td>Pounds**</td>
<td>0.00220462260</td>
<td>lb</td>
<td>lb</td>
</tr>
<tr>
<td>Ounces**</td>
<td>0.03527396200</td>
<td>oz</td>
<td>oz</td>
</tr>
<tr>
<td>Troy ounces**</td>
<td>0.03215074700</td>
<td>ozt</td>
<td>ozt</td>
</tr>
<tr>
<td>Hong Kong taels**</td>
<td>0.02671725000</td>
<td>tl</td>
<td>tlh</td>
</tr>
<tr>
<td>Singapore taels**</td>
<td>0.02645544638</td>
<td>tl</td>
<td>tls</td>
</tr>
<tr>
<td>Taiwanese taels**</td>
<td>0.02666666000</td>
<td>tl</td>
<td>tlh</td>
</tr>
<tr>
<td>Grains**</td>
<td>15.432358350000</td>
<td>GN</td>
<td>GN</td>
</tr>
<tr>
<td>Pennyweights**</td>
<td>0.64301493100</td>
<td>dwt</td>
<td>dwt</td>
</tr>
<tr>
<td>Milligrams**</td>
<td>1000.000000000000</td>
<td>mg</td>
<td>mg</td>
</tr>
<tr>
<td>Parts per pound**</td>
<td>1.12876677120</td>
<td>o</td>
<td>/lb</td>
</tr>
<tr>
<td>Chinese taels**</td>
<td>0.02645547175</td>
<td>tl</td>
<td>tlc</td>
</tr>
<tr>
<td>Mommes**</td>
<td>0.266700000000</td>
<td>o</td>
<td>mom</td>
</tr>
<tr>
<td>Austrian carats**</td>
<td>5.000000000000</td>
<td>o</td>
<td>K</td>
</tr>
<tr>
<td>Tola**</td>
<td>0.085733381000</td>
<td>o</td>
<td>tol</td>
</tr>
<tr>
<td>Baht**</td>
<td>0.06578947436</td>
<td>o</td>
<td>bat</td>
</tr>
<tr>
<td>Mesghal**</td>
<td>0.217000000000</td>
<td>o</td>
<td>MS</td>
</tr>
</tbody>
</table>

The following levels of display accuracy are available in both ranges:

- All digits
- Fewer for weight change
- Last digit off (reduced by 1 digit)

* Turn on the balance: Press [e]

> All segments of the display light up briefly

Configure the “Toggle between Weight Units” application in the Setup menu: Press [SETUP]

Set the parameter for weight unit 1 (1 7 2 through 1 7 20): See “Configuring the Balance”

Set display accuracy 1 (1 8 1 through 1 8 5): See “Configuring the Balance”

Setting Weight Unit 1

- Access the Setup menu: select [MENU]
- Set the parameter for weight unit 1 (1 7 2 through 1 7 20): See “Configuring the Balance”
- Set display accuracy 1 (1 8 1 through 1 8 5): See “Configuring the Balance”
- Exit the Setup menu: Press [SETUP]

Setting Weight Unit 2

- Access Setup: select [MENU]
- Set the parameter for weight unit 2 (3 1 2 through 3 1 20): See “Configuring the Balance”
- Set display accuracy 2 (3 2 1 through 3 2 5): See “Configuring the Balance”
- Exit the Setup menu: Press [SETUP]

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

** = not applicable in balances verified for use in legal metrology
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 (not during alphanumeric input),
- setup,
- turning off the balance.

Calibration/Adjustment

- Press \[\text{CAL}\]

> See “Calibration/Adjustment” for further instructions

Setup (setting parameters)

- Press \[\text{SET}\]

> See “Configuring the Balance” for further instructions

Turning Off the Balance

- Press \[\text{PO}\]

> The balance shuts off
> The display goes blank

Practical Example

Toggle the Display From Grams [\text{g}] (1st Unit) to Troy Ounces [\text{ozt}] (2nd Unit)

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Toggle to Troy ounces [\text{ozt}] ((\text{R}^2\text{: weight unit 2}))</td>
<td>[\text{ozt}] soft key [\text{F}]</td>
</tr>
<tr>
<td>2.</td>
<td>Toggle to grams [\text{g}] ((\text{R}1\text{: weight unit 1}))</td>
<td>[\text{g}] soft key [\text{F}]</td>
</tr>
</tbody>
</table>
Counting

Purpose
With the Counting program you can determine the number of parts that each have approximately equal weight.

Available Features
- Reference sample quantity “nRef” loaded from long-term memory when you turn on the balance
- Optional balance configuration in the Setup menu for automatically initializing this application and loading the most recent reference sample quantity “nRef” and average piece weight “wRef” when you turn on the balance (automatic initialization; menu code 3 10 1)
- Minimum load checked when the balance is initialized (factory setting: 10 display increments; can only be changed by the Sartorius FastFactory)
- Reference sample quantity “nRef” entered using the keys
- Average piece weight “wRef” entered using the keys
- Storage parameter (level of accuracy with which the average piece weight “wRef” is stored) for piece count calculation can be configured
- Optional configuration for having the piece count and average piece weight output automatically via the data interface port after initialization or reference sample updating while running the Counting program (print application parameters)
- Long-term storage of the last reference sample quantity “nRef” entered
- Long-term storage of the last average piece weight “wRef” entered with the corresponding reference sample quantity “nRef,” by configuring automatic initialization
- Toggling between two weight units by pressing [S]
- Counting program initialized again after using the balance for weighing (after initialization)

Factory Settings
Auto-start application (automatic initialization with reference sample quantity and average piece weight loaded from long-term memory): off (3 10 2)
Counting/percent parameter (accuracy when storing average piece weights): display accuracy (3 5 2)
Printout application parameters (automatic output of application parameters): off (1 1 1)
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:

- 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;
- With automatic initialization switched on, 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;
- Enter the average piece weight using the numeric keys and store it.

Reference Sample Updating

When the upsoft key is displayed during counting, you can have the average piece weight updated (while the piece count is displayed in the measured value line).

The upsoft key is displayed when:

- the balance has reached stability
- the current piece count is less than double the original piece count
- the current piece count is less than 100
- the internally calculated piece count (e.g., 17.24 pcs) differs from the nearest whole number (here: 17 pcs) by less than 0.3

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

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

Setting Parameters for the Counting Application

- Access the Setup menu:
  Select MENU
- Set parameters for:
  - Storage accuracy: 35 COUNT/PCT.PRAM.
  - Automatic initialization: 3 10 AUTO-START APP.
  - Automatic output of parameters to interface port: 7 1 PRINT APP.PRAM.
  See “Configuring the Balance”
- Exit the Setup menu:
  Press SETUP

Turning Off the Balance

- Press e
  > The balance shuts off
  > The display goes blank
**Practical Example**

Counting with:  Preset Reference Sample Quantity Weighed In

| Parameter settings: | Counting program: 2 1 4; Print all parameters: 1 2 |

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the counting application in the Setup menu</td>
<td>see “Preparation”</td>
</tr>
<tr>
<td>2.</td>
<td>Prepare a container for the parts</td>
<td>Place the empty container on the balance</td>
</tr>
<tr>
<td>3.</td>
<td>Tare the balance</td>
<td>TARE</td>
</tr>
<tr>
<td>4.</td>
<td>Place reference sample quantity on the balance (example: 10 pcs, each weighing 2.148 g)</td>
<td>Place the displayed number of parts in the container</td>
</tr>
<tr>
<td>5.</td>
<td>Initialize the balance (the number of digits following the decimal point depends on the balance model)</td>
<td>START soft key F</td>
</tr>
<tr>
<td>6.</td>
<td>If necessary, increase number of parts and update the reference sample (here: 7 more pieces)</td>
<td>Place parts in container UPDAT soft key F</td>
</tr>
<tr>
<td>7.</td>
<td>Weigh uncounted parts</td>
<td>Place parts to be counted in container</td>
</tr>
<tr>
<td>8.</td>
<td>If desired, print total piece count (here: 153 pcs)</td>
<td>Qnt + 153 pcs</td>
</tr>
</tbody>
</table>

Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Max 4200 g  d= 00.1 g
Weighing in Percent %

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

Available Features
- Reference percentage “pRef” loaded from long-term memory when you turn on the balance
- Optional balance configuration in the Setup menu for automatically initializing this application and loading the most recent reference percentage “pRef” entered with reference weight “W100%” when you turn on the balance
- Minimum load checked when the balance is initialized (factory setting: 10 display increments; can only be changed by the Sartorius FastFactory)
- Reference percentage “nRef” entered using the numeric keys
- Reference weight “Wxx%” entered using the numeric keys
- Storage parameter (rounding-off factor) for storing the reference weight “W100%” to calculate the percentage can be configured
- Configuration of decimal places displayed in “weighing in percent” mode
- Optional configuration for having the reference weight “Wxx%” and reference percentage automatically output via the data interface port after initialization of the weighing-in-percent program (print application parameters)
- Long-term storage of the last reference percentage “pRef” entered
- Long-term storage of the last reference weight “W100%” entered, by configuring automatic initialization (auto-start)
- Toggle between two weight units by pressing [5]

Factory Settings
Auto-start application (automatic initialization with reference percentage and reference weight loaded from long-term memory): off (3 1 0 2)
Counting/percent parameter (accuracy when storing reference weights): display accuracy (3 5 2)
Number of decimal places displayed in “weighing in percent” mode: 2 decimal places (3 2 3)
Printout application parameters (automatic output of application parameters): off (7 2 1)
Operating the Balance

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, 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 (W 00% soft key).

- Turn on the balance: Press \[\text{on}\]
  > All display segments light up briefly
- Select the Weighing-in-Percent application in the Setup menu: Press \[\text{SETUP}\]
- Select menu: Press the MENU soft key (\[\text{SETUP}\])
- Set parameter 2 1 5: See “Configuring the Balance”
- Exit the Setup menu: Press \[\text{SETUP}\]

Setting Parameters for the Weighing-in-Percent Application

- Access the Setup menu: Select MENU
- Set parameters for:
  - Storage accuracy: 3 5 COUNT/PCT.PAR.
  - Decimal places displayed: 3 6 DECIMALS.F.CALC.
  - Automatic initialization: 3 10 AUTO-START APP.
  - Automatic output of parameters to interface port: 1 1 PRINT APP.PAR.

- See “Configuring the Balance”
- Exit the Setup menu: Press \[\text{SETUP}\]

Additional Functions

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

you can also access the following functions from this application:
- calibration (not during alphanumeric input),
- setup,
- turning off the balance.

Calibration/Adjustment

- Press \[\text{CAL}\]
  > See “Calibration/Adjustment” for further instructions

Setup (setting parameters)

- Press \[\text{SETUP}\]
  > See “Configuring the Balance” for further instructions

Turning Off the Balance

- Press \[\text{on}\]
  > The balance shuts off
  > The display goes blank
## Practical Examples

**Example P1: Weighing in Percent with Reference Weight Taken from Weight on Balance**

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the weighing-in-percent application in the Setup menu</td>
<td>see “Preparation”</td>
</tr>
<tr>
<td>2.</td>
<td>Prepare a container for the parts</td>
<td>Place the empty container on the balance</td>
</tr>
<tr>
<td>3.</td>
<td>Tare the balance</td>
<td>TARE</td>
</tr>
<tr>
<td>4.</td>
<td>Place the reference weight on the balance (here: 1821.48 g = 100%)</td>
<td>Place weight equal to reference weight in the container</td>
</tr>
<tr>
<td>5.</td>
<td>Initialize the balance</td>
<td>START soft key</td>
</tr>
<tr>
<td>6.</td>
<td>Unload the balance</td>
<td>Remove reference weight from the container</td>
</tr>
<tr>
<td>7.</td>
<td>Determine the percentage of an unknown weight</td>
<td>Place sample to be measured in the container</td>
</tr>
<tr>
<td>8.</td>
<td>If desired, print percentage (here: 98.37%)</td>
<td>pRef 100 % Wxx% 1821.48 g Prc 98.37 %</td>
</tr>
</tbody>
</table>
Example P2: Weighing in Percent with Reference Weight Entered Using the Numeric Keys

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the weighing-in-percent application in the Setup menu</td>
<td>see “Preparation”</td>
</tr>
<tr>
<td>2.</td>
<td>Prepare a container for the parts</td>
<td>Place the empty container on the balance</td>
</tr>
<tr>
<td>3.</td>
<td>Tare the balance</td>
<td>TARE</td>
</tr>
<tr>
<td>4.</td>
<td>Enter the reference weight using the numeric keys (here: 120 g)</td>
<td>1 2 0</td>
</tr>
<tr>
<td>5.</td>
<td>Store the reference weight</td>
<td>W 100% soft key (CAL)</td>
</tr>
<tr>
<td>6.</td>
<td>Determine the percentage of an unknown weight</td>
<td>Place sample to be measured in the container (in this case: 114.78 g)</td>
</tr>
</tbody>
</table>
**Net-Total Formulation**

**Purpose**
With this application program you can weigh in different components up to a defined total. You can also print out the total weight and the individual weights of the components.

**Available Features**
- **Taring**
- Weighing different components (maximum: 99 components) from “0” to a defined total component weight
- Storing component weights (“Store xx comp.”), with display zeroed after value stored, and automatic printout (print application parameters); either of the last component weight (net value) or of the total weight (tare value)
- Display of the transaction counter “XXth” (referring in each case to the next component) in the soft key label display
- Clearing of the component memory when the weighing series is canceled and printout of the total weight if you have configured the balance for GLP-compliant printouts; otherwise, printout of the net value
- Toggling between component weight and total weight by pressing
  - ISO/GLP-compliant printout of the total of the individual component weights (Tot.cp)

**Preparation**
- Turn on the balance
- All display segments light up briefly
- Select the Net Total application in the Setup menu: Press [SETUP]
- Select menu: Press the [MENU] soft key
- Set parameter 2 16: See “Configuring the Balance”
- Exit the Setup menu: Press [SETUP]

**Setting Parameters for the Net-Total Application**
- Access the Setup menu: Select [MENU]
- Set the parameter for automatic printout when component stored
  - PRINT NET TOTAL
  - See “Configuring the Balance”
- Exit the Setup menu: Press [SETUP]

**Factory Settings**
Automatic printout when component value stored: print net total (Tot.cp)

**Additional Functions**
In addition to functions for:
- alphanumeric input,
- taring (not during alphanumeric input),
- printing,
you can also access the following functions from this application:
- calibration (not during alphanumeric input),
- setup,
- turning off the balance.

**Calibration/Adjustment**
- Press [CAL]
  - See “Calibration/Adjustment” for further instructions

**Setup (setting parameters)**
- Press [SETUP]
  - See “Configuring the Balance” for further instructions

**Turning Off the Balance**
- Press [PO]
  - The balance shuts off
  - The display goes blank
### Practical Example

Weighing in Several Components

(Parameters settings: Net-total application program 215; print all parameters 12)

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the net-total application in the Setup menu</td>
<td>see “Preparation”</td>
</tr>
<tr>
<td>2.</td>
<td>Prepare a container for the components</td>
<td>Place the empty container on the balance</td>
</tr>
<tr>
<td>3.</td>
<td>Tare the balance</td>
<td>![Tare image]</td>
</tr>
<tr>
<td>4.</td>
<td>Add first component</td>
<td>Place the first component in the container</td>
</tr>
<tr>
<td>5.</td>
<td>Store component value</td>
<td>1.COMP soft key ![F]</td>
</tr>
<tr>
<td>6.</td>
<td>Add next component</td>
<td>Place next component in the container</td>
</tr>
<tr>
<td>7.</td>
<td>Store component value</td>
<td>2.COMP soft key ![F]</td>
</tr>
<tr>
<td>8.</td>
<td>If desired, add further components</td>
<td>Repeat steps 6 and 7 as needed</td>
</tr>
<tr>
<td>9.</td>
<td>Display total weight</td>
<td>![Total weight image]</td>
</tr>
</tbody>
</table>
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.”

Available Features
- Animal weighing started manually or automatically
- Optional balance configuration in the Setup menu for automatically initializing this application when you turn on the balance
- Minimum load threshold for starting animal weighing:
  - 100 display increments for automatic start
  - 50 display increments for manual start
- Start range: Automatic start of animal weighing operation when three successive subweights lie within a user-defined tolerance range (calm = 2%, normal = 5%, active = 10%)
- Number of weighing operations for calculation of an average can be set before the beginning of each animal weighing operation
- 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 . A circle “o” is displayed as weight unit and  is shown in the text line
- Toggling between weighed and calculated results by pressing
- Automatic output via the interface port:
  - Number of weighing operations
  - Multiplication factor
- Automatic output of results via the interface port:
  - Weighing result
  - Calculated result
- Stop limit: Unload threshold
- Return to weighing mode by unloading the balance; i.e., when the load is below the stop threshold

Factory Settings
Auto-start application (automatic initialization with automatic start of animal weighing): off
Animal activity (3 subweights lie within a preset range; i.e., animal is calm, normal or active):
  - normal
Start animal weighing:
  - automatic
Automatic printout of number of weighing operations used in averaging and of the calculation factors: off
Print animal weights (automatic printout of weighed or calculated result):
  - On: animal wt.
Preparation

- Turn on the balance:
  Press \[\text{ON}\]
  > All display segments light up briefly

- Select the animal weighing application in the Setup menu:
  Press \[\text{SETUP}\]

- Select menu:
  Press the \[\text{MENU}\] soft key (\[\text{SEL}\])

- Set parameter 2 1 7:
  See “Configuring the Balance”

- Exit the Setup menu:
  Press \[\text{SETUP}\]

Setting Parameters for the Animal Weighing Application

- Access the Setup menu:
  Select \[\text{MENU}\]

- Set parameters for:
  - Start range:
    \[\text{3 7 ANIMAL ACTIVITY}\]
  - Start animal weighing
    \[\text{3 8 START ANIMAL WGH.}\]
  - Printout of results and calculated results:
    \[\text{3 9 PRINT ANIMAL WTS.}\]
  - Automatic output to interface port:
    \[\text{7 1 PRINT APP. PARAM.}\]

  See “Configuring the Balance”

- Exit the Setup menu:
  Press \[\text{SETUP}\]

Additional Functions

In addition to functions for:
- alphanumeric input
  [not when automatic start is configured or after animal weighing has been started],
- taring
  [not during alphanumeric input],
- printing,

you can also access the following functions from this application:
- calibration [not during alphanumeric input or after animal weighing has been started],
- setup [not after animal weighing has been started],
- turning off the balance.

Calibration/Adjustment

- Press \[\text{CAL}\]
  > See “Calibration/Adjustment” for further instructions

Setup (setting parameters)

- Press \[\text{SETUP}\]
  > See “Configuring the Balance” for further instructions

Turning Off the Balance

- Press \[\text{OFF}\]
  > The balance shuts off
  > The display goes blank

Practical Example

See next page
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

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the animal weighing application in the Setup menu</td>
<td>see &quot;Preparation&quot;</td>
</tr>
<tr>
<td>2.</td>
<td>Set the following animal weighing parameters in the Setup menu:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Animal activity: Active</td>
<td>Setting 3 7 3 in Setup menu</td>
</tr>
<tr>
<td></td>
<td>- Start animal weighing: Automatic</td>
<td>Setting 3 8 2 in Setup menu</td>
</tr>
<tr>
<td></td>
<td>- Printout: On: anim.wt.*fact.</td>
<td>Setting 3 9 3 in Setup menu</td>
</tr>
<tr>
<td></td>
<td>- Print: All parameters</td>
<td>Setting 7 1 2 in Setup menu</td>
</tr>
<tr>
<td>3.</td>
<td>Prepare a container (cage)</td>
<td>Place empty cage on the balance</td>
</tr>
<tr>
<td>4.</td>
<td>Tare the balance</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Enter number of subweighing operations for averaging</td>
<td>2 0</td>
</tr>
<tr>
<td>6.</td>
<td>Save number</td>
<td>MDEF soft key</td>
</tr>
<tr>
<td>7.</td>
<td>Weigh the first animal</td>
<td>Place 1st animal in cage weight value fluctuates due to animal activity</td>
</tr>
<tr>
<td>8.</td>
<td>Start automatic animal weighing</td>
<td>START soft key</td>
</tr>
</tbody>
</table>

![Image of balance screen](image_url)
### Operating the Balance

#### Step Key (or instruction) Display/Output

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>The balance delays starting the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>subweighing operation until three</td>
<td></td>
<td></td>
</tr>
<tr>
<td>successive subweights lie within</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the range defined for an &quot;active&quot; animal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When this criterion is met,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the subweighing series begins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 20 subweighing operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mdef: no. of subweighs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mul: Calculation factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xNet: arith. average, net value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Unload the balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remove animal from cage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. If desired, weigh next animal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place animal in cage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Next weighing series begins automatically</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Over/Under 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.

Available Features
- Lower tolerance limit (minimum), target value and upper limit (maximum) stored in long-term memory
- Optional balance configuration in the Setup menu 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
- 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 value stored 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
- Control range can be set anywhere from 10% to infinity. Control lines set when stability is reached within the control range; deleted only when you exit this application
- Optional configuration in the Setup menu for activation of control lines independent of weight value (weight within control range, stability reached)
- Toggling the display between weight readout and control (checkweighing) display by pressing [F]. 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.”
- Toggle the text line display between weight value and control display, nominal value “SET P” and tolerance values “MIN” and “MAX” by pressing the [S] key.
- Weight displayed on bar graph in relation to upper and lower limits and target value.
- Optional automatic printout of weight when it is within the control range at stability (AUTO PRINT +/-).

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 over/under checkweighing program

Factory Settings
Auto-start application (automatic initialization with target value and tolerance limits loaded from long-term memory): off (3 1 0 2)
Automatic output of target value and tolerance limits via the interface port (print application parameters): off (1 1 1)
Auto print +/- (automatic printout of a weight when it is within the control range at stability): off (4 2 2)
Control lines +/- on (activating data output port lines): Within control range (4 3 1)
**Preparation**

The checkweighing program requires a target value for comparison to the current value. This target has a tolerance range, which is defined by absolute weight values: upper and lower limits. These limits can be entered either by storing weights on the balance or via 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 (4 3 +/- CTRL PORTS ON) to select whether the control lines are:

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

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

![Diagram showing response of control lines](image)

**Output port specifications**

When not in use, the voltage level is high: >2.4 V/+2 mA

When in active use, the voltage level is low: <0.4 V/−2 mA.

⚠️ The output ports are not protected against short circuits!
● Turn on the balance:
  Press \textit{[ON]}
  > All display segments light up briefly

● Select the over/under checkweighing application in the Setup menu: Press \textit{[SETUP]}

● Select menu:
  Press the \textit{[MENU]} soft key (\textit{[S]})

● Set parameter 2 \textbf{1B}:
  See “Configuring the Balance”

● Exit the Setup menu:
  Press \textit{[SETUP]}

Setting Parameters for the Over/Under Checkweighing Application

○ Access the Setup menu:
  Select \textit{[MENU]}

● Set parameters for:
  – Automatic initialization when balance switched on:
    \textbf{3 10 \textit{AUTO-START APP}}.
  – Automatic printout when weight value is within limits and balance at stability:
    \textbf{4 2 \textit{AUTO PRINT +/-}}
  – Control lines on:
    \textbf{4 3 \textit{+)CTRL PORTS ON}}
    Automatic output of initialization values to interface port:
    \textbf{1 \textit{PRINT APP, PARM}}.
  – Signal direction for data output port lines:
    \textbf{8 0 \textit{INPUT}} or
    \textbf{8 0 2 \textit{OUTPUT}}
    See “Configuring the Balance”

● Exit the Setup menu:
  Press \textit{[SETUP]}

Additional Functions

In addition to functions for:
  – alphanumeric input
    (not during initialization),
  – taring
    (not during alphanumeric input),
  – printing,

you can also access the following functions from this application:
  – calibration
    (not during alphanumeric input or during initialization),
  – setup (not during initialization),
  – turning off the balance.

Calibration/Adjustment

● Press \textit{[CAL]}
  > See “Calibration/Adjustment” for further instructions

Setup (setting parameters)

● Press \textit{[SETUP]}
  > See “Configuring the Balance” for further instructions

Turning Off the Balance

● Press \textit{[OFF]}
  > 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 printed out automatically when stability is reached and weight is within the control range.

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Select the checkweighing application in Setup</td>
<td>see “Preparation”</td>
</tr>
</tbody>
</table>
| 2.   | Set the following checkweighing parameters in the Setup menu:  
  - Auto print +/-: On: values in tol.  
  - Print app. param.: All parameters | See “Configuring the Balance” |
| 3.   | Prepare a container for the sample | Place empty container on the balance |
| 4.   | Tare the balance | **TARE** |
| 5.   | Enter initialization values | **START** soft key **F** |
| 6.   | Store target value (here: 170 g) | Place ideal sample in container |
| 7.   | Store target value and unload balance | **SETP** soft key **F**  
Remove ideal sample from balance |
| 8.   | Enter value for lower limit (170 g – 5 g) | **1 6 5** |
9. Store lower limit value

10. Enter value for upper limit
(170 g + 10 g)

11. Store upper limit value

12. Weigh sample
(in this case 169.48 g)

If the weight had been too low, the display
would have shown the following:

13. In this case, switch to net value
display (in this case: 163.28 g)

14. Weigh next sample (if any)
Recalculation

Purpose

With this application program you can compensate for over-poured components in formulation.

If a component is over-poured when weighing in the individual formulation components, the mixture already poured cannot be used in its current composition. To avoid having to discard the materials weighed, you can adjust the proportions of the formulation to compensate for the over-pour.

When you use this application, the recalculation procedure is mainly performed by the balance.

Available Features

- Individual components (up to 99) weighed in with a readout showing from “0” to the desired component weight
- Transaction counter shows the next component expected
- Weighed components are stored, followed by automatic printout and taring
- Additive weighing of components with printout
- Toggle the display between component weight and total formulation weight (additive mode) after first component is stored
- Stored component weight displayed as true net weight for 2 seconds
- Enter a divisor before or during component weighing. For example, if the formulation has a total weight of 100 g, enter the divisor 10 to weigh in a total formulation of 1,000 g.
- If a component is over-poured, you can use the recalculation function to change the amount of this component indicated in the formulation by using plus or minus keys or numeric input. A factor is then calculated by which all components amounts are then adjusted.
- Recalculation factor displayed in the text line, with a warning symbol if the factor is not equal to 1.
- All components displayed with number and the amount (by weight) to be added in follow-on filling. Components displayed in sequence by the balance.
- Display of actual net weight during follow-on filling
- After the amounts of the components already weighed have been corrected, weighing continues according to the adjusted formulation amount. The readout is recalculated (updated) according to the divisor.
- You can repeat the over-pour correction procedure as often as necessary, in case other components are over-poured.
- After follow-on (corrective) filling, the total amount differs from that given for the formulation, but the proportion of components in relation to each other is the same.
- You can have the weight printed after each measurement
- Choose whether the current component weight or the tare value is printed after each measurement
- Individual component weights are printed as “Compxx.”
- Press [CF] to exit the application program. The component memory is cleared and the sum of components printed as “S-Comp.”
Factory Settings

Print application parameters [automatic output of application parameters]: off (7 1 1)
Line format: for other apps/GLP (7 2 2)

Preparation

● Turn on the balance: Press [⑩]
  > All display segments light up
● Select the Recalculcation application in the Setup menu: Press [SETUP]
● Select menu:
  Press the menu soft key (⑩)
● Set parameter 2 1 9:
  see “Configuring the Scale”
● Exit the Setup menu: Press [SETUP]

Setting Parameters for the Recalculcation Application

○ Access the Setup menu: Select [MENU]
● Set parameters for:
  - Automatic printout:
    7 1 PRINT APP, PARR.
  - Line format:
    7 2 LINE FORMAT
  see “Configuring the Balance”
● Exit the Setup menu: Press [SETUP]

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

Calibration/Adjustment

● Press [CAL]
  > See “Calibration/Adjustment” for further instructions

Setup (setting parameters)

● Press [SETUP]
  > See “Configuring the Balance” for further instructions

Turning Off the Balance

● Press [⑩]
  > The balance shuts off
  > The display goes blank
### Practical Example
When weighing in formulation components, the second component is over-poured.
(Parameter settings: Recalculation application: 2 1 9; Print all parameters: 1 1 2)

<table>
<thead>
<tr>
<th>Step</th>
<th>Key (or instruction)</th>
<th>Display/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select the recalculation application in the Setup menu</td>
<td>see “Preparation”</td>
<td></td>
</tr>
<tr>
<td>2. Place container for filling components on the balance</td>
<td>Place empty container on the balance</td>
<td></td>
</tr>
<tr>
<td>3. Tare</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Add the first component</td>
<td>Weigh the first component into the container</td>
<td></td>
</tr>
<tr>
<td>5. Store component</td>
<td>Press the COMP. 1 soft key ( )</td>
<td></td>
</tr>
<tr>
<td>6. Add the second component</td>
<td>Weigh the second component into the container</td>
<td></td>
</tr>
<tr>
<td>7. Start recalculation, because 12.42 g were poured rather than 12.30 g</td>
<td>RECAL soft key ( )</td>
<td></td>
</tr>
<tr>
<td>8. Either press the minus key to correct the value…</td>
<td>MINUS soft key repeatedly</td>
<td></td>
</tr>
</tbody>
</table>
... or enter the desired value

```
1 2 3 0
```

9. Confirm the new value

- **COMP.2** soft key (F)
- or **COMP.** soft key (G)

The true net value is displayed for 2 seconds

Follow-on filling amount for first component is displayed

10. Follow-on filling of 1st component

Weigh the first component up to 0

and store

- **COMP.** soft key (F)

The true net value is displayed for 2 seconds

11. Weigh in further components, if called for in the formulation as needed

12. Toggle to the additive mode, if required

13. Add further components, as required ...

[here, e.g., up to the total weight of the formulation: 1,000 g]
14. ... and store

[here, e.g., the 6th component]

Press soft key [F]

The true net value of the 6th component is displayed for 2 seconds

Then the total weight is displayed

15. End the weighing procedure

Total weight is printed

Total weight is displayed

Component memory is cleared
Data Output Functions

There are 3 options for data output:
- Output to the display/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 6 sections:
- Line for metrological data
- Bar graph
- Measured value line
- Weight unit display
- Symbol display
- Text line

Line for Metrological Data (when used as a legal measuring instrument)

This line shows:
- \( \text{Max} \ 4200 \ g \): Maximum balance capacity (e.g., 4,200 g)
- \( \text{Min} \ 10 \ g \): Minimum balance capacity; the weight must not go below this limit when the balance is used in legal metrology (e.g., 10 g)
- \( e = 0.1 \ g \): Verification scale interval of the balance; irrelevant if the balance is not used in legal metrology (e.g., 0.1 g)
- \( d = 0.01 \ g \): Readability: Indicates the actual scale interval (display increment of the balance) (e.g., 0.01 g)

Bar Graph

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.

Measured Value Line

This line displays:
- 1234.56: The current weight readout (digits bordered with a broken line are invalid in use for legal metrology)
- 01-30-13: Information on the balance and display and control unit (e.g., version numbers)
- -96-AbC: Data entered by the user (e.g., lot number)
Operating the Balance

Weight Unit Display
This line shows:

- Current weight unit (e.g., kg)
- Designation of other units of measure (e.g., piece count)
- Operating status (e.g., net weight; printing)
- Identification of currently selected menu item

Symbol Display
This line shows:

- Indicators and warnings (e.g., isoCAL)
- Symbol of application program selected

Text Line
This line contains:

- Explanatory text for value displayed in measured value line
- Designation of current function of the soft keys (below the arrows)
- Arrows indicating the soft keys designated above

Display of “Longer” Values
You can enter values up to 20 characters in length (e.g., identification numbers). These are displayed in the measured value line; this line, however, can only show up to 8 characters at a time.

When a 20-character value is displayed, for example, the last 8 characters (13 through 20) are displayed first (in this example, the ID number is: “Shelf 5, carton 4020”).

The text line displays the name of the value (“ID”) and an arrow indicating the direction of the characters not displayed.

Display characters 5 through 12: Press [<]

Display characters 1 through 4: Press [<]
Printing a Data Record

Purpose

You can generate a printout of weights, other measured values and identification numbers for documentation purposes. You can format the printout to meet individual requirements.

Available Features

Print manually/automatically:
To print the information contained in the measured value line (weight readout, calculated value, numeric entry, alphabetic entry).

Line format: You can configure a data ID code of up to 6 characters for each of the values printed; this data ID code is printed at the beginning of the line.

Sample ID: You can configure an extra line for identification of each weighed or calculated value.

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:
To print out parameters relating to weighing conditions.

Auto print: To have a printout generated automatically when certain conditions are met, e.g., time elapsed, stability reached, etc.

Print net-total: For a printout of a component or total weight when using the “net-total” application.

Print animal weights: For an automatic printout of animal weight, or of animal weight plus calculated weight after averaging.

Auto print +/–: For automatic printout of a weight when it lies within preset limits at stability.

Factory Settings

Print manually/automatically:
Printout generated manually (by pressing \( \text{[]} \) or automatically, depending on stability parameter: Manual after stability \( \{5 \ 2\} \)

Line format:
A data ID code of up to 6 characters preceding weighed or calculated values. For other applications/GLP \( \{1 \ 2 \} \)

Print application parameters:
Print one or more of the initialization values for the current application program: Off \( \{1 \} \)

ISO/GLP-compliant printout/data record: Documentation of weighing conditions for each series of measurements/each lot: Off \( \{8 \ 10 \} \)

Auto print:
Automatic printout of weighed/calculated values: not a factory setting; see “Print manually/automatically” \( \{6 \ 1 \ 2\} \)

Not possible to stop by pressing \( \text{[]} \) \( \{6 \ 2 \} \)

After 1 display update \( \{6 \ 3 \} \)

Print net-total:
Printout of component weight (net weight) or total weight (tare weight): Auto print net \( \{7 \ 3 \} \)

Print animal weights:
Automatic printout of animal weight, or of animal weight plus calculated result: On: animal wt. \( \{3 \ 9 \} \)

Auto print +/–:
Automatic printout of weights when within tolerance at stability: off \( \{4 \ 2 \} \)

Parameter settings:
See “Configuring the Balance”
Operating the Balance

Print Manually/Automatically

The printout contains the current value in the measured value display (weight readout with weight unit; calculated value; numeric/alphabetic display)

| + 1530.000 g | Weight in grams |
| + 58.5620 ozt | Weight in Troy ounces |
| + 253 pcs | Piece count |
| + 88.23 % | Percentage |
| + 105.78 o | Calculated value |

Line Format

The current value displayed can be printed with a data ID code of up to 6 characters at the beginning of the line. You can use this data ID code, e.g., to designate a weight readout as a net weight (N) or a calculated value as a piece count (Qnt).

| ID | ABC123DEF456GH |
| L ID | ABC123DEF456GH |
| W ID | ABC123DEF456GH |
| N | + 1530.000 g |
| Qnt | + 253 pcs |
| Prc | + 88.23 % |
| Nom. | + 2000.00 g |
| Identification number* |
| Lot number (weighing series)* |
| Weight set number* |
| Net value |
| Quantity |
| Percentage |
| Exact calibration weight |
| * = only on ISO/GLP-compliant printouts |

Sample ID

You can have each weighed or calculated value that you print preceded by a line of text containing numbers and/or letters. You can either print this ID immediately as an alphanumeric input (press [p] or store it as the sample ID (S ID) soft key).

| S ID | ABC123DEF456GH |
| ABC123DEF456GHI789JK |
| NUM | 12345678 |
| Sample ID (with less than 14 characters) |
| Sample ID (with more than 14 characters) |
| Numeric key output when [Q] is pressed |

Print Application Parameters

You can generate a printout of one or more of the values configured for initialization of an application as soon as you initialize the balance. This can include such values as nRef, wRef, pRef, etc.

| nRef | 10 pcs |
| wRef | 1.23456 g |
| pRef | 80 % |
| Wxx% | 1200.00 g |
| mDef | 10 |
| Mul | 0.00347 |
| Setp | + 1000.035 g |
| Min | + 981.054 g |
| Max | + 1020.063 g |
| N1 | + 278.11 g |
| T2 | + 1821.48 g |
| Comp7 | + 278.11 g |
| Tot.cp+ | 2117.56 g |
| Counting: Reference sample quantity |
| Counting: Average piece weight |
| Weighing in percent: Reference percentage |
| Weighing in percent: Reference weight |
| Animal weighing: Number of subweighs for averaging |
| Animal weighing: multiplication factor |
| Over/under checkweighing: Target weight |
| Over/under checkweighing: Lower limit |
| Over/under checkweighing: Upper limit |
| Nettotal: net weight |
| Nettotal: tare weight |
| Nettotal: weight of 7th component |
| Nettotal: total weight of components (only for ISO/GLP-compliant records) |
Auto Print

You can have the weight readout (or the value displayed in the measured value line) printed automatically; this printout can be generated after a certain number of display updates; you can also configure whether or not the auto-print function is dependent on the stability parameter. The display update frequency depends on both the model of the balance and the current operating state.

Print Net-Total

When you run the net-total application, you can have the weight of the last component weighed (net value) or the total weight (tare value) printed automatically.

Print Animal Weights

When using the animal weighing application, you can have the results printed automatically upon completion of the averaging process. You can also have both the weight and the calculated result printed.

Auto Print +/-

With the over/under checkweighing application, you can have the result printed automatically if it lies within a defined range (acceptable value).

Data Output Functions

Printing a Data Record

Print for use in legal-for-trade applications:

You can configure the scale operating menu to generate a printout that conforms to the regulations for use in legal metrology (last digit marked) on a Sartorius printer:

- YDPO1S: 554
- YDPO2: 555
- YDPO3: 556
ISO/GLP-compliant Printout/Record

You can have the parameters pertaining to the ambient weighing conditions printed before (GLP header) and after (GLP footer) the values of a weighing series. These parameters include:

- Date
- Time at the beginning of a weighing series
- Balance manufacturer
- Balance model
- Model serial number
- Software version
- Lot ID (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)

You can connect a special printer from Sartorius to your balance for printing ISO/GLP-compliant records. This printer, called “Data Printer” (order no.: YDP03-0CE), offers the following features:

- ISO/GLP function can be switched on and off
- Date/time
- ID no. for identification of workstation/operator
- Documentation includes balance-specific data

Note:
The time indicated on the printout consists of only hours and minutes.

For ISO/GLP-compliant documentation with a computer, you will need special software. Contact Sartorius for a detailed description for creating this software.
Interface Description

Purpose

Your Masterpro balance comes equipped with an interface port for connection to a computer or other peripheral device.

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 data output port lines for the over/under checkweighing program.

⚠️ Warning When Using Pre-wired RS-232 Connecting Cables!

RS-232 cables purchased from other manufacturers often have incorrect pin assignments for use with Sartorius balances. Be sure to check the pin assignment against the chart on the right 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.

Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of interface:</td>
<td>Serial interface</td>
</tr>
<tr>
<td>Operating mode:</td>
<td>Full duplex</td>
</tr>
<tr>
<td>Standard:</td>
<td>RS-232</td>
</tr>
<tr>
<td>Transmission rates:</td>
<td>150; 300; 600; 1,200; 2,400; 4,800; 9,600; 19,200 baud</td>
</tr>
<tr>
<td>Parity:</td>
<td>Space, odd, even</td>
</tr>
<tr>
<td>Character format:</td>
<td>1 start bit, 7-bit ASCII, parity, 1 or 2 stop bits</td>
</tr>
<tr>
<td>Handshake:</td>
<td>2-wire interface: via software (XON/XOFF); 4-wire interface: via hardware handshake lines (CTS/DTR)</td>
</tr>
<tr>
<td>Data output format of the balance:</td>
<td>16 or 22 characters</td>
</tr>
</tbody>
</table>

Factory settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission rate:</td>
<td>1,200 baud [5 1 4]</td>
</tr>
<tr>
<td>Parity:</td>
<td>Odd [5 2 3]</td>
</tr>
<tr>
<td>Stop bits:</td>
<td>1 stop bit [5 3 1]</td>
</tr>
<tr>
<td>Handshake:</td>
<td>Hardware 1 character after CTS [5 4 3]</td>
</tr>
<tr>
<td>Print manually/automatically:</td>
<td>Manual with stability [6 1 2]</td>
</tr>
<tr>
<td>Stop automatic printing:</td>
<td>Not possible [6 2 2]</td>
</tr>
<tr>
<td>Automatic printout, time-dependent:</td>
<td>After 1 display update [6 3 1]</td>
</tr>
<tr>
<td>Line format:</td>
<td>For other applications/GLP [7 2 2]</td>
</tr>
</tbody>
</table>

Preparation

- See page 68 for the pin assignment chart
Operating the Balance

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 under item 12.

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

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+</td>
<td>*</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>*</td>
<td>U</td>
<td>U</td>
<td>CR</td>
<td>LF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*: Space
D: Digit or letter
U: Unit symbol
CR: Carriage return
LF: Line feed

Special Codes

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>–</td>
<td>–</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>CR</td>
<td>LF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>or</td>
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<td>or</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*: Space
– –: Weight; all numbers shown in stable readout
H: Overload
H H: Overload during checkweighing
L: Underload
L L: Underload during checkweighing
C: Calibration/adjustment

Error codes

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>E</td>
<td>r</td>
<td>r</td>
<td>*</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>*</td>
<td>*</td>
<td>CR</td>
<td>LF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*: Space
# # #: Error code number
Data output example: +1255.7 g

<table>
<thead>
<tr>
<th>Position 1</th>
<th>Position 2</th>
<th>Positions 3–10</th>
<th>Position 11</th>
<th>Positions 12–14</th>
<th>Position 15</th>
<th>Position 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>*</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>CR</td>
<td>LF</td>
</tr>
</tbody>
</table>

Position 1: Plus or minus sign or space
Position 2: Space
Positions 3–10: Weight with a decimal point; leading zeros = space
Position 11: Space
Positions 12–14: Unit symbol or space
Position 15: Carriage return
Position 16: Line feed

Data Output with an 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 following value:

<table>
<thead>
<tr>
<th>I</th>
<th>D</th>
<th>U</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I: ID code character
*: Space
D: Digit or letter
U: Unit symbol
CR: Carriage return
LF: Line feed

1) depending on balance type; e.g., not all units and characters are available on balances verified for use in legal metrology

Special Codes

<table>
<thead>
<tr>
<th>Stat</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>L</td>
<td>L</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>C</td>
<td>C</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*: Space
-: Weight; all numbers shown in final, stable readout
H: Overload
HH: Overload during checkweighing

Error codes

<table>
<thead>
<tr>
<th>Stat</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>Err</th>
<th>*</th>
<th>*</th>
<th>#</th>
<th>#</th>
<th>*</th>
<th>*</th>
<th>*</th>
<th>CR</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*: Space
# # #: Error code number

Unit symbol U

<table>
<thead>
<tr>
<th>No stability parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
</tr>
<tr>
<td>k g</td>
</tr>
<tr>
<td>c t</td>
</tr>
<tr>
<td>l b</td>
</tr>
<tr>
<td>o z</td>
</tr>
<tr>
<td>o z t</td>
</tr>
<tr>
<td>t l h</td>
</tr>
<tr>
<td>t l s</td>
</tr>
<tr>
<td>t l t</td>
</tr>
<tr>
<td>G N</td>
</tr>
<tr>
<td>m g</td>
</tr>
<tr>
<td>/ l b</td>
</tr>
<tr>
<td>t l c</td>
</tr>
<tr>
<td>m o m</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>t o l</td>
</tr>
<tr>
<td>b a t</td>
</tr>
<tr>
<td>M S</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>p c s</td>
</tr>
</tbody>
</table>

ID code characters

<table>
<thead>
<tr>
<th>Stat</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>Application tare memory</td>
</tr>
<tr>
<td>N</td>
<td>Net weight (T1 = 0)</td>
</tr>
<tr>
<td>N1</td>
<td>Net weight (T1 &gt; 0)</td>
</tr>
<tr>
<td>Qnt</td>
<td>Quantity</td>
</tr>
<tr>
<td>Prc</td>
<td>Percentage</td>
</tr>
<tr>
<td>nRef</td>
<td>Reference sample quantity</td>
</tr>
<tr>
<td>pRef</td>
<td>Reference percentage</td>
</tr>
<tr>
<td>wRef</td>
<td>Average piece weight</td>
</tr>
<tr>
<td>Wxx%</td>
<td>Reference percentage weight</td>
</tr>
<tr>
<td>NUM</td>
<td>Numeric input</td>
</tr>
<tr>
<td>Compxx</td>
<td>Component no. xx in net-total component mode</td>
</tr>
<tr>
<td>Tot.cp</td>
<td>Total weight in net-total component mode</td>
</tr>
<tr>
<td>mDef</td>
<td>No. of subweighs for animal weighing</td>
</tr>
<tr>
<td>Mul</td>
<td>Multiplication factor for animal weighing</td>
</tr>
<tr>
<td>x-Net</td>
<td>Result in animal weighing</td>
</tr>
<tr>
<td>x-Res</td>
<td>Calculated result in animal weighing</td>
</tr>
<tr>
<td>Setp</td>
<td>Target value for checkweighing</td>
</tr>
<tr>
<td>Min</td>
<td>Lower limit for checkweighing</td>
</tr>
<tr>
<td>Max</td>
<td>Upper limit for checkweighing</td>
</tr>
</tbody>
</table>
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 ! # & (max. 20 &) & _ CR LF
Format 4: Esc ! _ CR LF

Esc: Escape
I: Command character
#: Number
&: Number or letter
CR: Carriage return
LF: Line feed

Format 1

! Meaning
K 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 [TARE]
Z Internal calibration/adjustment

Format 2

!# Meaning
f0 Function key [G]
f1 Function key [CAL]
f2 Function key [F]
f3 Zero (separate zeroing key)
f4 Tare (separate zeroing key)
x0 Perform internal calibration
x1 Print balance model
x2 Print weighing cell serial number
x3 Print weighing cell software version
x4 Print display and control unit software version
x5 Print balance ID number
x6 Print weight set number
x7 Print lot number
|weighing series ID|

Format 3

(not allowed in the Setup menu)

!# Meaning
z5 Input balance ID number
z6 Input weight set number
z7 Input lot number

Format 4

! Meaning

! Text input in display
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)
- 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 has transmitted all but 14 characters.

If the device addressed does not understand the control command, the SBI receiving device activates DTR (Data Terminal Ready) after 6 more characters have been received. The busy signal is deactivated by XON (14 characters).
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 settings).

Data Output by Print Command

The print command can be transmitted by pressing [enter] or by a software command [Esc P].

Automatic Data Output

In the “auto print” operating mode, data are 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 state.

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 [enter].
### Pin Assignment Chart

**Female Interface Connector:**
25-position D-Submini, DB25S, with screw lock hardware for cable gland

**Male Connector Required:**
(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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal Ground</td>
</tr>
<tr>
<td>2</td>
<td>Data Output (TxD)</td>
</tr>
<tr>
<td>3</td>
<td>Data Output (RxD)</td>
</tr>
<tr>
<td>4</td>
<td>Signal Return (TxD/RxD)</td>
</tr>
<tr>
<td>5</td>
<td>Clear to Send (CTS)</td>
</tr>
<tr>
<td>6</td>
<td>Internally Connected</td>
</tr>
<tr>
<td>7</td>
<td>Internal Ground</td>
</tr>
<tr>
<td>8</td>
<td>Internal Ground</td>
</tr>
<tr>
<td>9</td>
<td>Reset _ In**</td>
</tr>
<tr>
<td>10</td>
<td>– 12 V</td>
</tr>
<tr>
<td>11</td>
<td>+ 12 V</td>
</tr>
<tr>
<td>12</td>
<td>Reset _ Out**</td>
</tr>
<tr>
<td>13</td>
<td>+ 5 V</td>
</tr>
<tr>
<td>14</td>
<td>Internal Ground</td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Data Terminal Ready (DTR)</td>
</tr>
<tr>
<td>21</td>
<td>Supply Voltage Ground &quot;COM&quot;</td>
</tr>
<tr>
<td>22</td>
<td>Not Connected</td>
</tr>
<tr>
<td>23</td>
<td>Not Connected</td>
</tr>
<tr>
<td>24</td>
<td>Supply Voltage Input + 15 ... 25 V</td>
</tr>
<tr>
<td>25</td>
<td>+5 V</td>
</tr>
</tbody>
</table>

**Pin Assignment Chart:**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Signal Ground</td>
</tr>
<tr>
<td>2</td>
<td>Data Output (TxD)</td>
</tr>
<tr>
<td>3</td>
<td>Data Output (RxD)</td>
</tr>
<tr>
<td>4</td>
<td>Signal Return (TxD/RxD)</td>
</tr>
<tr>
<td>5</td>
<td>Clear to Send (CTS)</td>
</tr>
<tr>
<td>6</td>
<td>Internally Connected</td>
</tr>
<tr>
<td>7</td>
<td>Internal Ground</td>
</tr>
<tr>
<td>8</td>
<td>Internal Ground</td>
</tr>
<tr>
<td>9</td>
<td>Reset _ In**</td>
</tr>
<tr>
<td>10</td>
<td>– 12 V</td>
</tr>
<tr>
<td>11</td>
<td>+ 12 V</td>
</tr>
<tr>
<td>12</td>
<td>Reset _ Out**</td>
</tr>
<tr>
<td>13</td>
<td>+ 5 V</td>
</tr>
<tr>
<td>14</td>
<td>Internal Ground</td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Data Terminal Ready (DTR)</td>
</tr>
<tr>
<td>21</td>
<td>Supply Voltage Ground &quot;COM&quot;</td>
</tr>
<tr>
<td>22</td>
<td>Not Connected</td>
</tr>
<tr>
<td>23</td>
<td>Not Connected</td>
</tr>
<tr>
<td>24</td>
<td>Supply Voltage Input + 15 ... 25 V</td>
</tr>
<tr>
<td>25</td>
<td>+5 V</td>
</tr>
</tbody>
</table>

***) = See “Additional Functions” for information on changing pin assignments

**++) = Hardware restart
Operating the Balance

Cabling Diagram

- Diagram for interfacing a computer or different peripheral device to the balance using the RS-232/V24 standard and cables up to 15 m (50 ft.) long.

![Cabling Diagram Image]

Type of cable: AWG 24 specification
Additional Functions

Password
You can block access to parameter settings in the Setup menu and to the ID-code input function, as well as to the exact calibration weight, by assigning a password.

Enter the password by selecting INPUT in the Setup menu.
See “Configuring the Balance” for a detailed description.

Protecting Menu Parameters
In the Setup menu, you can define whether menu parameters are:
- accessible for changes (ALTERABLE, \( B \ 1 \ 1 \)),
- can be read only (READABLE, \( B \ 1 \ 2 \)).

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, \( B \ 2 \ 1 \)), or
- the acoustic signal should not sound (OFF, \( B \ 2 \ 2 \)).

Blocking the Keys
When you operate the balance via an on-line computer, it is advisable that you block the keys on the display and control unit. In the Setup menu, you can configure whether
- the keys are active (KEYS UNBLOCKED, \( B \ 3 \ 1 \)),
- the keys are blocked (KEYS BLOCKED, \( B \ 3 \ 2 \)), except for \( \text{setup} \) and \( \text{vol} \), or
- the alphanumeric keys are blocked (ALPHANUM. BLOCKED, \( B \ 3 \ 3 \)).

Universal Switch for Remote Control
You can connect an external universal switch to the interface port of your balance (e.g., a foot switch) for remote control of the functions listed below. In the Setup menu, you can configure which function is to be controlled via remote switch:
- Printing (PRINT KEY FUNCT., \( B \ 4 \ 1 \)),
- Taring (TARE KEY FUNCTION, \( B \ 4 \ 2 \)),
- Calibration (CAL KEY FUNCTION, \( B \ 4 \ 3 \)),
- Function key (F KEY FUNCTION, \( B \ 4 \ 4 \)),
- Delete/cancel (CF KEY FUNCTION, \( B \ 4 \ 5 \)),
- Toggling (TOGGLE KEY FUNCT., \( B \ 4 \ 6 \)).

Display Backlighting
You can have the display backlit for improved readability of displayed values. In the Setup menu, you can configure whether the
- display backlighting is on (ON, \( B \ 5 \ 1 \)),
- display backlighting is off (OFF, \( B \ 5 \ 2 \)), or
- display backlighting switches off automatically if there is no change in the readout for at least 4 minutes (AUTO OFF AFT. 4 MIN., \( B \ 5 \ 3 \)).

Power-On Mode
You can configure the balance so that once a power supply is connected,
- the balance is turned off (OFF : ON / STANDBY, \( B \ 6 \ 1 \)) or (OFF : ON, \( B \ 6 \ 2 \)), or
- the balance switches on automatically (AUTO ON, \( B \ 6 \ 4 \)).

You can also set the configurations so that when the balance is switched off after use, it is
- off – not in balances with a weighing capacity \( \geq 16 \) kg (OFF : ON, \( B \ 6 \ 2 \)), or
- in the standby mode (OFF : ON / STANDBY, \( B \ 6 \ 1 \)).

When you turn on the balance, a self-test of the functions is run (test is displayed; the bar graph is shown).
After the self-test has been completed, the weighing range of the balance is displayed (line for metrological data shows different maximum values).

Automatic Shutoff
When parameter \( B \ 6 \ 2 \) is selected in the Setup menu, you can configure whether
- the balance will shut off automatically after 4 minutes without use (AFTER 4 MIN., \( B \ 7 \ 1 \)), or
- automatic shutoff is deactivated (OFF, \( B \ 7 \ 2 \)).
Operating the Balance

Interface Port Input/Output

You can connect a checkweighing display and a remote universal switch to the interface port (factory setting).

When you connect a remote universal switch, you need to change the following parameters.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Input Function</th>
<th>Output Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>p key</td>
<td>Remove universal switch (see below)</td>
</tr>
<tr>
<td>16</td>
<td>t key</td>
<td>Control output port 1: lighter</td>
</tr>
<tr>
<td>17</td>
<td>q key</td>
<td>Control output port 2: equal</td>
</tr>
<tr>
<td>18</td>
<td>f key</td>
<td>Control output port 3: heavier</td>
</tr>
<tr>
<td>19</td>
<td>c key</td>
<td>Control output port 4: “set”</td>
</tr>
</tbody>
</table>

Remote universal switch

<table>
<thead>
<tr>
<th>Function</th>
<th>Menu setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>p key</td>
<td>8 4 1</td>
</tr>
<tr>
<td>t key</td>
<td>8 4 2</td>
</tr>
<tr>
<td>q key</td>
<td>8 4 3</td>
</tr>
<tr>
<td>f key</td>
<td>8 4 4</td>
</tr>
<tr>
<td>c key</td>
<td>8 4 5</td>
</tr>
<tr>
<td>s key</td>
<td>8 4 6</td>
</tr>
</tbody>
</table>

See “Pin Assignment Chart” in the chapter entitled “Overview” for detailed information.

Printing an ISO/GLP-compliant Record

In the Setup menu, you can configure whether

- no ISO/GLP-compliant record will be printed (OFF, 8 10 4),
- an ISO/GLP-compliant record will be printed after calibration/adjustment (ONLY FOR CRL./BBL., 8 10 2), or
- every printout will be an ISO/GLP-compliant record (ALWAYS ON, 8 10 3)

Undoing All Parameter Changes – Reset Function

There is a factory setting for each parameter. In the Setup menu, you can configure whether

- menu factory settings will be restored after exiting Setup (RESTORE, 9 1 1), or
- menu factory settings will not be restored after exiting Setup (DO NOT RESTORE, 9 1 2)
MP8 Interface Emulation

Purpose
With the MP8 interface emulation you can connect peripheral devices of the MP8 generation that have separate AC power supplies, such as the 73822... Data Control terminal, a YFC... Flow Rate Controller, a YDI50Z Data Input dedicated keyboard, etc., to your LP series balance.

Available Features
- The balance can only be used to determine weights
- The interface communicates exclusively in the MP8 binary protocol.
- Select application programs for use with the MP8 under item 3 in the balance operating menu.
- The Index 2 program for MP8 can be selected under item 4 of the balance operating menu
- The following parameters remain accessible as before:
  - Weighing parameters [1-xx]
  - Extra functions [8-xx]
  - Reset function [9-xx]
  (see “Setting Parameters (Menu)” in the chapter entitled “Configuring the Balance”)
- “MP8 interface” not allowed during use in legal metrology. When the menu access switch is sealed, the MP8 interface will not function.

Factory Settings of the Parameters
(special settings for MP8 functions)
Program selection: MP8: 3-1-1
Program index 2: 1 INI 2.1

Preparation
- Turn on the balance:
  Press [ON]

> All display segments light up briefly
Switch to the MP8 interface:
- Press [SETUP]
- Select balance operating menu: MENU soft key (press the [S] key) then the [▼] key
- Select and confirm the BALANCE MENU: press the [▼] and then the [▶] key
- Confirm FACTORY SETTING: [▶] key
- Select and confirm MP8 mode [9-1-9] Press [▼] or [▲] key, repeatedly if necessary; then press [▶]
- Press [SETUP]

Parameter Settings for the MP8 Interface
- Press [SETUP]
- Select the balance operating menu: MENU soft key (press the [S] key)
- Select and confirm:
  - 3 APPLICATION PROG. APP. SELECTION:
    1 MP8 3-1-1 or
    9 MP8 3-1-9 or
    10 MP8 3-2-1 or
    18 MP8 3-2-9 or
    19 MP8 3-3-1 or
    27 MP8 3-3-9
  - 4 PROGRAM-INDEX 2 INI 2:
    1 INI 2.1 or
    2 INI 2.2 or
    3 INI 2.3 or
    4 INI 2.4
  - 5 INTERFACE:
    1 BAUD RATE
    1 150 BAUD or
    2 300 BAUD or
    3 600 BAUD or
    4 1,200 BAUD or
    5 2,400 BAUD or
    6 4,800 BAUD or
    7 9,600 BAUD or
    2 PARITY
    2 SPACE or
    3 ODD or
    4 EVEN
  - 6 PRINT WEIGHING
    1 PRINT MAN./AUTO
    1 MANUAL WITHOUT STABILITY or
    2 MANUAL WITH STABILITY or
    4 AUTOMATIC WITHOUT STABILITY or
    5 AUTOMATIC AT STABILITY
- Store settings and exit the Setup menu: Press [SETUP]
## Error Codes

Error codes are displayed in the main display or application display for 2 seconds. The program then returns automatically to the previous mode (e.g., weighing).

<table>
<thead>
<tr>
<th>Display</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No segments appear on the display</td>
<td>No AC power is available</td>
<td>Check the AC power supply</td>
</tr>
<tr>
<td></td>
<td>The AC adapter is not plugged in</td>
<td>Plug in the AC adapter</td>
</tr>
<tr>
<td></td>
<td>Automatic shutoff configured in the Setup menu (code 871)</td>
<td>Press [\text{OK}] to turn on the balance or select code 872 in the Setup menu (“no automatic shutoff”)</td>
</tr>
<tr>
<td>H</td>
<td>The load exceeds the balance’s capacity</td>
<td>Unload the balance</td>
</tr>
<tr>
<td>L or Err 54</td>
<td>The weighing pan is not in place</td>
<td>Place the weighing pan on the balance</td>
</tr>
<tr>
<td>Err 01</td>
<td>DISPLAY RANGE</td>
<td>Data output not compatible with output format</td>
</tr>
<tr>
<td>Err 02</td>
<td>CAL/N.POSSIBLE</td>
<td>Calibration/adjustment criterion not met, e.g., - not tared - the balance is loaded</td>
</tr>
<tr>
<td>Err 03</td>
<td>CAL./ADJ. INTERRUPT</td>
<td>Calibration/adjustment could not be completed within a certain time</td>
</tr>
<tr>
<td>Err 06</td>
<td>INT. WT. DEFECTIVE</td>
<td>Built-in calibration weight is defective</td>
</tr>
<tr>
<td>Err 07</td>
<td>FUNCTION BLOCKED</td>
<td>Function not allowed in balances, verified for use in legal metrology</td>
</tr>
<tr>
<td>Err 08</td>
<td>ZERO RANGE</td>
<td>The load on the balance is too heavy to zero the readout</td>
</tr>
<tr>
<td>Err 09</td>
<td>(0 NOT ALLOWED)</td>
<td>Taring is not possible when the gross weight is (\leq) zero</td>
</tr>
<tr>
<td>Err 10</td>
<td>TARE F.C.T. BLOCKED</td>
<td>The tare key is blocked when there is data in the tare memory (e.g., when running the net-total application); the tare functions cannot be accessed simultaneously</td>
</tr>
<tr>
<td>Err 11</td>
<td>TARE 2 BLOCKED</td>
<td>Tare memory not allowed</td>
</tr>
<tr>
<td>Err 12</td>
<td>TARE &gt; MAX.</td>
<td>Tare stored in memory greater than weighing range or range limits</td>
</tr>
<tr>
<td>Err 17</td>
<td>ADJ.-WT. &gt; MAX.</td>
<td>Internal adjustment is not possible because the preload is too heavy</td>
</tr>
</tbody>
</table>

* = occurs only when balance is operated via the SBI interface [ESC f3_/f4_]
<table>
<thead>
<tr>
<th>Display</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Err 30</strong></td>
<td>Interface port for printer output is blocked</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td><strong>PRINT FCT. BLOCKED</strong></td>
<td>Error in storing reference weight (with the counting or weighing-in-percent application)</td>
<td>Weight too light or there is no sample on the balance</td>
</tr>
<tr>
<td><strong>REF WT. TOO LIGHT</strong></td>
<td>Reference sample updating not possible (with the counting application)</td>
<td>See “Counting” in “Operating the Balance” for reference updating criteria</td>
</tr>
<tr>
<td><strong>UPD. NOT POSSIBLE</strong></td>
<td>Reference sample updating not possible (with the counting application)</td>
<td>See “Counting” in “Operating the Balance” for reference updating criteria</td>
</tr>
<tr>
<td><strong>NUM. VALUE</strong></td>
<td>Input wrong.</td>
<td>Follow the instructions for the application programs</td>
</tr>
<tr>
<td><strong>W TOO LOW</strong></td>
<td>Input wrong.</td>
<td>Follow the instructions for the application programs</td>
</tr>
<tr>
<td><strong>W TOO HIGH</strong></td>
<td>Input text too long.</td>
<td>Allowable text lengths, incl. decimal point:</td>
</tr>
<tr>
<td></td>
<td>- S ID and L ID: 20 characters max.</td>
<td>- W ID: 14 characters max. for weights</td>
</tr>
<tr>
<td><strong>Err 10</strong></td>
<td>Key is stuck.</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td></td>
<td>Key pressed when turning on the balance:</td>
<td>Release key</td>
</tr>
<tr>
<td></td>
<td>- CF, CAL, GS, F</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td></td>
<td>- 0, 3, 4, 9</td>
<td>Release key</td>
</tr>
<tr>
<td></td>
<td>- 2, 5, 6, 9, TARE – right</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td></td>
<td>- 1, 7, 8, ABC, TARE – left</td>
<td>Release key</td>
</tr>
<tr>
<td></td>
<td>All segments displayed continuously</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td></td>
<td>Either <strong>SETUP</strong> was pressed when you turned on the balance, or this key is stuck</td>
<td>Release key</td>
</tr>
<tr>
<td><strong>Err 340</strong></td>
<td>Operating parameter (EEPROM) is wrong</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td></td>
<td>Weighing cell (platform) defective</td>
<td>Contact your local Sartorius Service Center</td>
</tr>
<tr>
<td><strong>BLOCKED</strong></td>
<td>Function blocked.</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>The special code (\Phi) remains displayed</td>
<td>Press a key</td>
</tr>
<tr>
<td></td>
<td>None of the keys has been pressed since the balance was turned on</td>
<td>Press a key</td>
</tr>
<tr>
<td></td>
<td>The weight readout changes constantly</td>
<td>Unstable ambient conditions</td>
</tr>
<tr>
<td></td>
<td>Too much vibration, or the balance is exposed to a draft</td>
<td>Set up the balance in another area</td>
</tr>
<tr>
<td></td>
<td>A foreign object is caught between the pan and the balance housing</td>
<td>Change Setup configurations</td>
</tr>
<tr>
<td></td>
<td>The weight readout is obviously wrong</td>
<td>to adapt the balance</td>
</tr>
<tr>
<td></td>
<td>The balance has not been calibrated/adjusted</td>
<td>to the ambient conditions</td>
</tr>
<tr>
<td></td>
<td>The balance was not tared before weighing</td>
<td>Remove the foreign object</td>
</tr>
<tr>
<td></td>
<td>The balance is not level</td>
<td>Change Setup configurations</td>
</tr>
<tr>
<td></td>
<td>The dust cover is caught under the weighing pan</td>
<td>to adapt the balance</td>
</tr>
<tr>
<td></td>
<td>The weight readout is obviously wrong</td>
<td>Change Setup configurations</td>
</tr>
</tbody>
</table>

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.

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

⚠ Make sure that no dust or liquid enters the balance housing
⚠ Do not use any aggressive cleaning agents (solvents or similar agents)

- 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
- Carefully remove any sample residue/spilled powder by using a brush or a hand-held vacuum cleaner
- 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

Replacing the Dust Cover

- Instructions for replacing a damaged dust cover

For LP 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 remaining parts back on the balance.

For LP 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 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 with the AC adapter 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

Safe operation of the balance with the AC adapter is no longer ensured when:

- there is visible damage to the AC adapter
- the AC adapter no longer functions properly
- The AC adapter has been stored for a relatively long period under unfavorable conditions

In this case, notify your nearest Sartorius Service Center or the International Technical Support Unit based in Goettingen, Germany. Maintenance and repair work may only be performed by service technicians who are authorized by Sartorius and who:

- have access to the required maintenance manuals
- have attended the relevant service training courses
Replacement of the Backup Battery

Spare backup battery in the display and control unit (soldered to PCB)
Type: VL 2020; manufacturer: Panasonic. To be replaced by trained service technicians only.

CAUTION:
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Instructions for Recycling

To ensure adequate protection for safe shipment, the MasterPro balance has been packaged to the extent necessary using environmentally friendly materials. After successful installation of the balance, you should return this packaging for recycling.

For information on recycling options, including recycling of old weighing equipment and disposal of used batteries, contact your municipal waste disposal center or local recycling depot.
Overview

General Views of the Balances

LP1200S (-OCE), LP620S (-OCE), LP220S (-OCE), LP620P (-OCE), LP3200D

No. Designation Order no. for spare part
1 Draft shield cover 69 LP0002
2 Glass draft shield cylinder 69 14290
3 Weighing pan 69 LP0004
4 Pan support – LP 3200D:
   – LP 1200S, LP 620, LP 220S: 69 LP0006
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 AC jack
11 Tare key
12 Function keys
13 Print key
14 Keys for numeric input
15 Toggle key for alphabetic input
16 On/off key
17 Display
18 Interface port
19 Level indicator

Not shown:
Dust cover 69 60LP01
Protective caps and plugs (set) 69 B20009
General Views of the Balances

LP8200S (-OCE), LP8200P (-OCE), LP6200S (-OCE), LP4200S (-OCE), LP2200S (-OCE), LP820 (-OCE), LP420,
LP2200P (-OCE), LP5200P (-OCE), LP12000S (-OCE), LP6200 (-OCE), LP4200, LP2200 (-OCE), LP12000P (-OCE)

<table>
<thead>
<tr>
<th>No.</th>
<th>Designation</th>
<th>Order no. for spare part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weighing pan</td>
<td>69 LP0007</td>
</tr>
<tr>
<td>2</td>
<td>Pan draft shield</td>
<td>69 LP0008</td>
</tr>
<tr>
<td></td>
<td>(depending on balance model)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Shock absorber</td>
<td>69 LP0010</td>
</tr>
<tr>
<td>4</td>
<td>Leveling foot</td>
<td>69 B20005</td>
</tr>
<tr>
<td>5</td>
<td>Display and control unit</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Metrological ID label (only on verified models or models acceptable for legal metrological verification)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Lug for attaching an antitheft locking device</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>AC jack</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Tare key</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Function keys</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Print key</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Keys for numeric input</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Toggle key for alphabetic input</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>On/off key</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Interface port</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Level indicator</td>
<td></td>
</tr>
</tbody>
</table>

Not shown:
- Dust cover: 69 60LP02
- Protective caps and plugs (set): 69 B20009
## General Views of the Balances

**LP16000S (-OCE), LP34000P (-OCE), LP34 (-OCE)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Designation</th>
<th>Order no. for spare part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weighing pan</td>
<td>69 LC0107</td>
</tr>
<tr>
<td>2</td>
<td>Leveling foot</td>
<td>69 LC0093</td>
</tr>
<tr>
<td>3</td>
<td>Display and control unit</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Level indicator</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Interface port</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>AC jack</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Tare key</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Function keys</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Print key</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Keys for numeric input</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Toggle key for alphabetic input</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>On/off key</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Display</td>
<td></td>
</tr>
</tbody>
</table>
| 14  | Metrological ID label (only on verified models or models acceptable for legal metrological verification) | }
Description of the Keys

**On/off switch**

Switches the display on/off. The balance remains in the standby mode.

**Settings for Configuring the Balance**

- Access to the Setup menu
- Stores settings and exits Setup menu

You can select:
- **INFO**
  Display basic information about the equipment (e.g., model name, serial no., software version)
- **MENU**
  Balance operating menu with plain English prompts for adapting the balance to individual requirements
- **INPUT**
  For entering identifying information (e.g., balance ID)

**Clear**

This key is generally used to interrupt/cancel functions:
- Delete keyboard input and clear memory
- Interrupt calibration/adjustment routines
- Return application program to previous status

**Calibration/Adjustment**

Press this key to select and start calibration/adjustment functions.

**Toggle**

This key toggles the display readout between a weight and a calculated value (counting, readout in percent, calculated result)

**Start an Application**

Further instructions on running the applications when this key is pressed are contained in the chapter entitled “Operating the Balance;” refer to the section pertaining to the particular program.

**For moving around within the parameter submenus for Info, Menu and Input in the Setup menu.**

**Tare**

Two large keys for initiating the tare function. Ideally situated for both left-handed and right-handed operation. Sets the readout to zero. With balances that have the “PolyRange” weighing range structure, the fine range is available when this key is pressed.

**Press this key to enter alphabetic characters and/or special characters (*, /, space, etc.).**

**For numeric input**

**Define the decimal point position**

**Press this key to output data via the interface to a Sartorius Data Printer or a computer.**
Menu Structure

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x x Balance functions</td>
<td>i.1 x Adaptn filter</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
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<td>1</td>
<td>9</td>
</tr>
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<td>1</td>
<td>10</td>
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<tr>
<td>1</td>
<td>13</td>
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<td>1</td>
<td>15</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>2 x x Application programs</td>
<td>2.1 x Application program selection</td>
</tr>
<tr>
<td>3 x x Application parameters</td>
<td>3.1 x Weight unit 2</td>
</tr>
<tr>
<td>4</td>
<td>3.2 x Display accuracy 2</td>
</tr>
<tr>
<td>4</td>
<td>3.5 x Counting/percent parameters</td>
</tr>
<tr>
<td>4</td>
<td>3.6 x Decimals for calculation</td>
</tr>
<tr>
<td>4</td>
<td>3.7 x Animal activity</td>
</tr>
<tr>
<td>4</td>
<td>3.8 x Start animal weighing</td>
</tr>
<tr>
<td>4</td>
<td>3.9 x Print animal weights</td>
</tr>
<tr>
<td>4</td>
<td>3.10 x Auto-start application</td>
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<thead>
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<th>Level 3</th>
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<tr>
<td>4 x x Parameter +/-</td>
<td>4.2 x Auto print +/-</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
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<table>
<thead>
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<th>Level 4</th>
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<tbody>
<tr>
<td>5 x x Interface</td>
<td>5.1 x Baud rate</td>
</tr>
<tr>
<td>5</td>
<td>5.2 x Parity</td>
</tr>
<tr>
<td>5</td>
<td>5.3 x Number of stop bits</td>
</tr>
<tr>
<td>5</td>
<td>5.4 x Handshake mode</td>
</tr>
<tr>
<td>5</td>
<td>5.5 x Communication mode</td>
</tr>
<tr>
<td>5</td>
<td>5.6 x Network address</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>6 x x Print for weighing</td>
<td>6.1 x Print manual/automatic</td>
</tr>
<tr>
<td>6</td>
<td>6.2 x Stop auto print</td>
</tr>
<tr>
<td>6</td>
<td>6.3 x Time-depandant auto print</td>
</tr>
<tr>
<td>6</td>
<td>6.4 x Print then autotare</td>
</tr>
</tbody>
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<table>
<thead>
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<th>Level 6</th>
<th>Level 6</th>
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</thead>
<tbody>
<tr>
<td>7 x x Print for application</td>
<td>7.1 x Print application parameters</td>
</tr>
<tr>
<td>7</td>
<td>7.2 x Line format</td>
</tr>
<tr>
<td>7</td>
<td>7.3 x Print net total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 7</th>
<th>Level 7</th>
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</thead>
<tbody>
<tr>
<td>8 x x Extra functions</td>
<td>8.1 x Menu</td>
</tr>
<tr>
<td>8</td>
<td>8.2 x Acoustic signal</td>
</tr>
<tr>
<td>8</td>
<td>8.3 Block keys (blocked or unblocked)</td>
</tr>
<tr>
<td>8</td>
<td>8.4 External universal switch function</td>
</tr>
<tr>
<td>8</td>
<td>8.5 x Backlighting</td>
</tr>
<tr>
<td>8</td>
<td>8.6 x Poweron mode</td>
</tr>
<tr>
<td>8</td>
<td>8.7 x Auto shutoff</td>
</tr>
<tr>
<td>8</td>
<td>8.8 x Control port function</td>
</tr>
<tr>
<td>8</td>
<td>8.10 x ISO/GPL printout</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 8</th>
<th>Level 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 x x Balance menu</td>
<td>9.1 x Factory settings</td>
</tr>
</tbody>
</table>

* = setting cannot be changed in balances used for legal metrology
Specifications

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

Dust and water protection rating according to EN 60529*
IP54 (protected against harmful dust deposits and splashes of water)

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, net-total formulation, animal weighing, over/under checkweighing, recalculation

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 mode

* = specially protected dust-tight and washdown resistant AC adapter; see the section on "Accessories"

Specifications of the Individual Models

<table>
<thead>
<tr>
<th>Model</th>
<th>LP1200S</th>
<th>LP620S</th>
<th>LP220S</th>
<th>LP620P</th>
<th>LP3200D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readability</td>
<td>g</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001/0.002/0.005</td>
</tr>
<tr>
<td>Weighing capacity</td>
<td>g</td>
<td>1,200</td>
<td>620</td>
<td>220</td>
<td>120/240/620</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>g</td>
<td>-1,200</td>
<td>-620</td>
<td>-220</td>
<td>-620</td>
</tr>
<tr>
<td>Repeatability (standard deviation)</td>
<td>≤±g</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001/0.001/0.003</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤±g</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002/0.002/0.005</td>
</tr>
<tr>
<td>Sensitivity drift within +10…+30 °C</td>
<td>≤±/K</td>
<td>2 • 10^-6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External calibration weight (at least accuracy class...)</td>
<td>g</td>
<td>1,000 (E2)</td>
<td>500 (E2)</td>
<td>200 (E2)</td>
<td>500 (F1)</td>
</tr>
<tr>
<td>Other allowable external calibration weights (at least accuracy class...)</td>
<td>g</td>
<td>-</td>
<td>300, 400, 600 (E2)</td>
<td>100 (E2)</td>
<td>200, 300, 400, 600 (F1)</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm Ø</td>
<td>130</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>mm</td>
<td>240x360x147</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg</td>
<td>8.3</td>
<td>6.9</td>
<td>6.9</td>
<td>6.9</td>
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</table>
### Overview

<table>
<thead>
<tr>
<th>Model</th>
<th>LP8200S</th>
<th>LP8200P</th>
<th>LP6200S</th>
<th>LP4200S</th>
<th>LP2200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readability</td>
<td>g</td>
<td>0.01</td>
<td>0.01/0.02/0.05</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Weighing capacity</td>
<td>g</td>
<td>8,200</td>
<td>2,000/4,000/8,200</td>
<td>6,200</td>
<td>4,200</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>g</td>
<td>–8,200</td>
<td>–6,200</td>
<td>–4,200</td>
<td>–2,200</td>
</tr>
<tr>
<td>Repeatability (standard deviation)</td>
<td>≤±g</td>
<td>0.01/0.01/0.03</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
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<tr>
<td>Linearity</td>
<td>≤±g</td>
<td>0.02/0.02/0.05</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Sensitivity drift within +10…+30 °C</td>
<td>≤±/K</td>
<td>2 • 10⁻⁶</td>
<td>2 • 10⁻⁶</td>
<td>2 • 10⁻⁶</td>
<td>6 • 10⁻⁶</td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>External calibration weight</td>
<td>g</td>
<td>5,000 (E2)</td>
<td>5,000 (F1)</td>
<td>5,000 (E2)</td>
<td>2,000 (E2)</td>
</tr>
<tr>
<td>Other allowable external calibration weights</td>
<td>g</td>
<td>6,000; 7,000; 8,000 (E2)</td>
<td>–</td>
<td>6,000 (E2)</td>
<td>3,000; 4,000 (E2)</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm</td>
<td>218×200</td>
<td>218×200</td>
<td>218×200</td>
<td>218×200</td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>mm</td>
<td>240×360×86</td>
<td>240×360×86</td>
<td>240×360×86</td>
<td>240×360×86</td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg</td>
<td>6.5</td>
<td>6.5</td>
<td>6.5</td>
<td>6.5</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Model</th>
<th>LP820</th>
<th>LP420</th>
<th>LP8200P</th>
<th>LP5200P</th>
<th>LP16000S</th>
</tr>
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<tbody>
<tr>
<td>Readability</td>
<td>g</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01/0.02/0.05</td>
<td>0.1</td>
</tr>
<tr>
<td>Weighing capacity</td>
<td>g</td>
<td>820</td>
<td>420</td>
<td>400/800/2,200</td>
<td>1,200/2,400/3,800/5,200</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>g</td>
<td>–820</td>
<td>–420</td>
<td>–2,200</td>
<td>–5,200</td>
</tr>
<tr>
<td>Repeatability (standard deviation)</td>
<td>≤±g</td>
<td>0.01/0.01/0.03</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
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<tr>
<td>Linearity</td>
<td>≤±g</td>
<td>0.02/0.02/0.05</td>
<td>0.02</td>
<td>0.02/0.02/0.05</td>
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<td>≤±/K</td>
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<td>2 • 10⁻⁶</td>
<td>2 • 10⁻⁶</td>
<td>2 • 10⁻⁶</td>
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<tr>
<td>Response time (average)</td>
<td>s</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>External calibration weight</td>
<td>g</td>
<td>500 (F2)</td>
<td>200 (F2)</td>
<td>2,000 (F2)</td>
<td>2,000 (F1)</td>
</tr>
<tr>
<td>Other allowable external calibration weights</td>
<td>g</td>
<td>600; 700; 800 (F2)</td>
<td>300; 400 (F2)</td>
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<td>3,000; 4,000; 5,000 (F1)</td>
</tr>
<tr>
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<td>mm</td>
<td>218×200</td>
<td>218×200</td>
<td>218×200</td>
<td>218×200</td>
</tr>
<tr>
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<td>240×360×86</td>
<td>240×360×86</td>
<td>240×360×86</td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg</td>
<td>6.5</td>
<td>6.5</td>
<td>6.5</td>
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<table>
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<th>LP6200</th>
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<th>LP2200</th>
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<tbody>
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<td>0.1</td>
<td>0.1</td>
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<td>Weighing capacity</td>
<td>g</td>
<td>12,000</td>
<td>6,200</td>
<td>4,200</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>g</td>
<td>–12,000</td>
<td>–6,200</td>
<td>–4,200</td>
</tr>
<tr>
<td>Repeatability (standard deviation)</td>
<td>≤±g</td>
<td>0.05</td>
<td>0.2</td>
<td>0.1</td>
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<tr>
<td>Linearity</td>
<td>≤±g</td>
<td>4 • 10⁻⁶</td>
<td>4 • 10⁻⁶</td>
<td>4 • 10⁻⁶</td>
</tr>
<tr>
<td>Sensitivity drift within +10…+30 °C</td>
<td>≤±/K</td>
<td>4 • 10⁻⁶</td>
<td>4 • 10⁻⁶</td>
<td>4 • 10⁻⁶</td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>External calibration weight</td>
<td>kg</td>
<td>5,000 (F1)</td>
<td>5,000 (F2)</td>
<td>2 (F2)</td>
</tr>
<tr>
<td>Other allowable external calibration weights</td>
<td>kg</td>
<td>6,000 to 12,000 (F1)</td>
<td>4,000; 6,000 (F2)</td>
<td>3, 4 (F2)</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm</td>
<td>218×200</td>
<td>218×200</td>
<td>218×200</td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>mm</td>
<td>240×360×86</td>
<td>240×360×86</td>
<td>240×360×86</td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg</td>
<td>6.5</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Model</td>
<td>LP34000P</td>
<td>LP12000P</td>
<td>LP34</td>
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<td>-------</td>
<td>---------</td>
<td>---------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Readability</td>
<td>g</td>
<td>0.1/0.2/0.5</td>
<td>0.1/0.2/0.5</td>
<td>1</td>
</tr>
<tr>
<td>Weighing capacity</td>
<td>g</td>
<td>8,000/16,000/34,000</td>
<td>3,000/6,000/12,000</td>
<td>34,000</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>g</td>
<td>–34,000</td>
<td>–12,000</td>
<td>–34,000</td>
</tr>
<tr>
<td>Repeatability (standard deviation)</td>
<td>±g</td>
<td>0.1/0.2/0.5</td>
<td>0.1/0.1/0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Linearity</td>
<td>±g</td>
<td>0.2/0.2/0.5</td>
<td>0.1/0.2/0.5</td>
<td>1</td>
</tr>
<tr>
<td>Sensitivity drift within +10...+30 °C</td>
<td>±/K</td>
<td>2 • 10^-6</td>
<td>4 • 10^-6</td>
<td>2 • 10^-6</td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>External calibration weight (of at least accuracy class...)</td>
<td>kg</td>
<td>10 (F2)</td>
<td>5 (F2)</td>
<td>10 (F2)</td>
</tr>
<tr>
<td>Other allowable external calibration weights (of at least accuracy class...)</td>
<td>kg</td>
<td>15; 20; 25; 30 (F2)</td>
<td>6; 7; 8; 9; 10; 11; 12 (F2)</td>
<td>15; 20; 25; 30 (F2)</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm</td>
<td>307x417</td>
<td>218x200</td>
<td>307x417</td>
</tr>
<tr>
<td>Dimensions [W x D x H]</td>
<td>mm</td>
<td>307x538x121</td>
<td>240x360x86</td>
<td>307x538x121</td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg</td>
<td>13.8</td>
<td>6.5</td>
<td>13.8</td>
</tr>
</tbody>
</table>
Verified Models with EC Type Approval

General Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC power source/power requirements</td>
<td>AC adapter, 230 or 115 V, +15% to –20%</td>
</tr>
<tr>
<td>Frequency</td>
<td>48 – 60 Hz</td>
</tr>
<tr>
<td>Dust and water protection rating</td>
<td>IP54 (protected against harmful dust deposits and splashes of water)</td>
</tr>
<tr>
<td>according to EN 60529¹</td>
<td></td>
</tr>
<tr>
<td>Adaptation to ambient conditions</td>
<td>By selection of 1 of 4 optimized filter levels</td>
</tr>
<tr>
<td>Display update</td>
<td>0.1 – 0.4 (depends on the filter level selected)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>16 VA: maximum; 9 VA: average</td>
</tr>
<tr>
<td>Hours of operation with fully charged</td>
<td>1.4 h</td>
</tr>
<tr>
<td>YRB 06 Z external battery pack, approx.</td>
<td></td>
</tr>
<tr>
<td>Selectable weight units</td>
<td>Grams, kilograms</td>
</tr>
<tr>
<td>Selectable application programs</td>
<td>Mass unit conversion, counting, weighing in percent, nettotal formulation, animal weighing, over/under checkweighing, recalculation</td>
</tr>
<tr>
<td>Built-in interface</td>
<td>RS-232 C</td>
</tr>
<tr>
<td>Format:</td>
<td>7-bit ASCII, 1 start bit, 1 or 2 stop bits</td>
</tr>
<tr>
<td>Parity:</td>
<td>odd, even, or space</td>
</tr>
<tr>
<td>Transmission rates:</td>
<td>150 to 19,200 baud</td>
</tr>
<tr>
<td>Handshake:</td>
<td>Software or hardware mode</td>
</tr>
<tr>
<td>¹) specially protected dusttight and washdown resistant AC adapter; see the section on “Accessories”</td>
<td></td>
</tr>
</tbody>
</table>

Specifications of the Individual Models

<table>
<thead>
<tr>
<th>Model</th>
<th>LP1200S-OCE</th>
<th>LP620S-OCE</th>
<th>LP220S-OCE</th>
<th>LP620P-OCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>MD BF 100, BD BF</td>
<td>BA BF 500, BD BF</td>
<td>BA BF 500, BD BF</td>
<td>BA BF 500, BD BF</td>
</tr>
<tr>
<td>Accuracy class*</td>
<td>DS</td>
<td>DS</td>
<td>DS</td>
<td>DS</td>
</tr>
<tr>
<td>Scale interval d*</td>
<td>g 0.001</td>
<td>g 0.001</td>
<td>g 0.001</td>
<td>g 0.001/0.002/0.005</td>
</tr>
<tr>
<td>Max. weighing capacity*</td>
<td>g 1,200</td>
<td>g 620</td>
<td>g 220</td>
<td>g 120/240/620</td>
</tr>
<tr>
<td>Verification scale interval e*</td>
<td>g 0.01</td>
<td>g 0.01</td>
<td>g 0.01</td>
<td>g 0.01</td>
</tr>
<tr>
<td>Min. capacity*</td>
<td>g 0.1</td>
<td>g 0.02</td>
<td>g 0.02</td>
<td>g 0.02</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>≤100% of the max. weighing capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application range according to CD*</td>
<td>g 0.2 – 1,200</td>
<td>g 0.02 – 620</td>
<td>g 0.02 – 220</td>
<td>g 0.02 – 620</td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s 1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable operating temperature range</td>
<td>0°C to +40°C [273 K to 313 K, 32°F to 104°F] with the isoCAL function ²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External calibration weight value (of at least accuracy class...)</td>
<td>g 1,000 [E2]</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm Ø 130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>mm 240x360x147</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg 8.3</td>
<td>6.9</td>
<td>6.9</td>
<td>6.9</td>
</tr>
</tbody>
</table>

²) = 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 DS: +15°C to +25°C
   - For balances of accuracy class E2: +10°C to +30°C (50°F to 86°F)

<table>
<thead>
<tr>
<th>Model</th>
<th>LP8200S-OCE</th>
<th>LP8200P-OCE</th>
<th>LP6200S-OCE</th>
<th>LP4200S-OCE</th>
<th>LP2200S-OCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>BD BF</td>
<td>BD BF</td>
<td>MA BF 200, BD BF</td>
<td>MA BF 200, BD BF</td>
<td>BA BF 500, BD BF</td>
</tr>
<tr>
<td>Accuracy class*</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
<td>ID</td>
</tr>
<tr>
<td>Scale interval d*</td>
<td>g 0.01</td>
<td>g 0.01/0.02/0.05</td>
<td>g 0.01</td>
<td>g 0.01</td>
<td>g 0.01</td>
</tr>
<tr>
<td>Max. weighing capacity*</td>
<td>g 8,200</td>
<td>g 2,000/4,000/8,200</td>
<td>g 6,200</td>
<td>g 4,200</td>
<td>g 2,200</td>
</tr>
<tr>
<td>Verification scale interval e*</td>
<td>g 0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Min. capacity*</td>
<td>g 0.5</td>
<td>g 0.5</td>
<td>g 0.5</td>
<td>g 0.5</td>
<td>g 0.5</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>≤100% of the max. weighing capacity</td>
<td>≤100% of the max. weighing capacity</td>
<td>≤100% of the max. weighing capacity</td>
<td>≤100% of the max. weighing capacity</td>
<td>≤100% of the max. weighing capacity</td>
</tr>
<tr>
<td>Application range according to CD*</td>
<td>g 0.5 – 8,200</td>
<td>g 0.5 – 8,200</td>
<td>g 0.5 – 6,200</td>
<td>g 0.5 – 4,200</td>
<td>g 0.5 – 2,200</td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s 2</td>
<td>s 2</td>
<td>s 1.5</td>
<td>s 1.5</td>
<td>s 1.5</td>
</tr>
<tr>
<td>Allowable operating temperature range</td>
<td>0 ... +40°C (273 ... 313 K, 32°F ... 104°F) with the isoCAL function 1)</td>
<td>0 ... +40°C (273 ... 313 K, 32°F ... 104°F) with the isoCAL function 1)</td>
<td>0 ... +40°C (273 ... 313 K, 32°F ... 104°F) with the isoCAL function 1)</td>
<td>0 ... +40°C (273 ... 313 K, 32°F ... 104°F) with the isoCAL function 1)</td>
<td>0 ... +40°C (273 ... 313 K, 32°F ... 104°F) with the isoCAL function 1)</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm 218 x 200</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
<td>mm 240 x 360 x 86</td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg 6.5</td>
<td>kg 6.5</td>
<td>kg 6.5</td>
<td>kg 6.5</td>
<td>kg 6.5</td>
</tr>
</tbody>
</table>

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 CD: +15°C to +25°C
   For balances of accuracy class K: +10°C to +30°C (50°F to 86°F)

<table>
<thead>
<tr>
<th>Model</th>
<th>LP2200-OCE</th>
<th>LP12000P-OCE</th>
<th>LP16000S-OCE</th>
<th>LP34000P-OCE</th>
<th>LP34-OCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>BA BF 500, BD BF</td>
<td>BA BF 500, BD BF</td>
<td>BB BD 523</td>
<td>BB BD 523</td>
<td>BB BD 523</td>
</tr>
<tr>
<td>Accuracy class*</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Scale interval d*</td>
<td>g 0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Max. weighing capacity*</td>
<td>g 2,200</td>
<td>3,000/6,000/12,200</td>
<td>16,000</td>
<td>8,000/16,000/34,000</td>
<td>34,000</td>
</tr>
<tr>
<td>Verification scale interval e*</td>
<td>g 0.1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Min. capacity*</td>
<td>g 5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Tare range (subtractive)</td>
<td>≤ 100% of the max. weighing capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application range according to CD*</td>
<td>g 5 – 2,200</td>
<td>5 – 12,000</td>
<td>5 – 16,000</td>
<td>5 – 34,000</td>
<td>5 – 34,000</td>
</tr>
<tr>
<td>Response time (average)</td>
<td>s 1</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>Allowable operating temperature range</td>
<td>+10 ... +30°C (50°F ... 86°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selectable weight units</td>
<td>Grams, kilograms</td>
<td>Grams, kilograms</td>
<td>Grams, kilograms</td>
<td>Kilograms</td>
<td>Kilograms</td>
</tr>
<tr>
<td>Pan size</td>
<td>mm 307x417</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>mm 307x538x121</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net weight, approx.</td>
<td>kg 6.5</td>
<td>6.5</td>
<td>13.8</td>
<td>13.8</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Accessories (Options)

Product

Data printer
with date/time, statistical evaluation data, transaction counter functions and LCD
can be used in legal metrology

Order No.
YDP03-0CE

External rechargeable battery pack
has a battery-level indicator (LED); can be recharged using the AC adapter
time it takes to charge the discharged battery pack: 15 hours); see “Specifications” for hours of operation
can be used in legal metrology

Order No.
YRB06Z

Remote display as a second indicator
(weight readout only)
> can be connected via the interface port
- LCD, reflective
- LCD for overhead projectors, transmissive
can be used in legal metrology

Order No.
YRD02Z
YRD13Z

3-segment checkweighing display
conveniently shows whether a sample (amount filled) is within the tolerance limits
can be used in legal metrology

Order No.
YRD11Z

Draft shield chamber
for the LP 1200S, LP 3200D, LP 620S, LP 620P and LP 220S

Order No.
YDS01LP

Density determination kit
for the LP 1200S, LP 3200D, LP 620S, LP 620P and LP 220S

Order No.
YDK01LP

Calibration weights
for all LP balances; extensive assortment, optionally available with officially recognized DKD certificates

Information on request
SartoConnect

Data transfer software; with RS-232 standard cable; for direct input of weighing data into an application program (e.g., such as Excel)

**Standard operating procedure**

To ensure correct operation and handling of the balance in quality assurance systems

**AC adapter, model ING-2**

With IP65 protection rating (dust-tight and washdown-resistant)

- For 230 V: 6971889
- For 120 V: 6971500

**Hanger for below-balance weighing**

For the LP 16000S, LP 34000P and LP 34

**Universal remote control switch**

For remote control of one of the following functions (configured in the balance Setup menu):

- G
- TARE
- CAL
- F
- CF
- S

**Foot switch with T-connector**

YFS01

**Hand switch with T-connector**

YHS02

**T-connector**

YTC01

Cable for connecting the weighing cell to a separate display and control unit (length: 2.70 m)

- For balances with a weighing capacity ≤ 12 kg: YCC01-19M3
- For balances with a weighing capacity ≥ 16 kg: YCC01-18M3

**Support arm** (for raised display configuration)

- For balances with a weighing capacity ≤ 12 kg: YDH01LP
- For balances with a weighing capacity ≥ 16 kg: YDH02LP

**Weighing bowls:**

Made of chromenickel steel; without pouring spout; for all models with a weighing capacity > 400 g:

- 3,000 ml capacity: 641213
- 1,000 ml capacity: 641211
- 500 ml capacity: 641212

**Carrying case**

For balances with a weighing capacity ≤ 12 kg: YDB01LP
Declarations of Conformity

The \(\text{CE}\) 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 \(\text{CE}\) 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 \(\text{CE}\) mark may be affixed only to weighing instruments and associated equipment that comply with the applicable Directive(s):


Acceptable European Standards:

- Limitation of emissions:
  - EN 50081-1 Residential, commercial and light industry
  - EN 50081-2 Industrial environment

- Defined immunity to interference:
  - EN 50082-1 Residential, commercial and light industry
  - EN 50082-2 Industrial environment

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).


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 \(\text{CE}\) 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 you optimal results in working 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 the 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 validity of the verification will become void in accordance with 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
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:

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Accuracy Class</th>
<th>EC Type-Approval Certificate No.</th>
<th>In Conjunction with Test Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA/LP....-0CE</td>
<td>iso-TEST</td>
<td>III</td>
<td>D97-09-018</td>
<td>MD BF</td>
</tr>
<tr>
<td>LA/LP....-0CE</td>
<td>iso-TEST</td>
<td>III</td>
<td>D97-09-018</td>
<td>MA BF</td>
</tr>
<tr>
<td>LA/LP....-0CE</td>
<td>iso-TEST</td>
<td>III or III</td>
<td>D97-09-018</td>
<td>BA BF</td>
</tr>
<tr>
<td>LA/LP....-0CE</td>
<td>iso-TEST</td>
<td>III or III</td>
<td>D97-09-018</td>
<td>BB BD</td>
</tr>
<tr>
<td>LA/LP....-0CE</td>
<td>iso-TEST</td>
<td>III</td>
<td>D97-09-018</td>
<td>BC BF</td>
</tr>
<tr>
<td>LA/LP....-0CE</td>
<td>iso-TEST</td>
<td>III or III</td>
<td>D97-09-018</td>
<td>BD BF</td>
</tr>
</tbody>
</table>

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):

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.

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.

Göttingen, 28.11.2000

Executive Board
(Warten)

SARTORIUS AG
37070 Goettingen
Germany

Head of Technical Operations
(Dr. Maaz)

GAW-113-2/02.96
P103EM04
Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

EG-Bauartzulassung
EC type-approval certificate

Zulassungsinhaber: Sartorius AG
Issued to: Weender Landstraße 94-108
37075 Göttingen
Bundesrepublik Deutschland

Rechtsbezug: § 13 des Gesetzes über das Meß- und Eichwesen (verification act)
(in connection with council directive) 90/384/EWG, geändert durch (amended by) 93/68/EWG

Bauart: Nichtselbsttätige elektromechanische Waage
In respect of: Nonautomatic electromechanical weighing instrument

Typ/type: iso-TEST
Genauigkeitsklasse/class: I II III III Max 0,05 kg ... 300 t
Option: Mehrteilungswaage, Mehrbereichswaage
Multi-interval instrument, multiple range instrument

Zulassungsnummer: D97-09-018 2. Revision
Approval number:

Gültig bis: 26.06.2007
Valid until:

Anzahl der Seiten: 11
Number of pages:

Geschäftszeichen: 1.14 – 0003920
Reference No.:

Benannte Stelle: 0102
Notified Body:

Im Auftrag
By order

Braunschweig, 24.07.2000
Siegel
Seal

Link


The principal characteristics, approval conditions and special conditions, if any, are set out in the Annex which forms an integral part 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:  Sartorius AG
                   Weender Landstraße 94 – 108
                   37075 Göttingen
                   Bundesrepublik Deutschland

Prüfgrundlage:  EN 45501 (1992), Nr.8.1,
                   OIML R 76-1 (1992)

Gegenstand:     Lastaufnehmer mit Wägezelle und Auswertelektronik mit digitalen
                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, MA BF und MD BF

Kennnummer:     ---

Prüfscheinummer: D09-96.30 3. Revision / Revision 3

Datum der Prüfung:  
                   Date of Test:

Anzahl der Seiten:  9
                   Number of pages:

Geschäftszeichen:  1.14 – 00070572
                   Reference No.:

Benannte Stelle:   0102
                   Notified Body:

Im Auftrag
                   By order

Braunschweig, 2000-11-16

Siegel
Seal

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.
Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

Test Certificate

N° D09-95.08 Revision 1

Testing of a
Weighing platform with electronic evaluation unit
of type BB BD

issued by: Physikalisch-Technische Bundesanstalt

issued to: Sartorius AG
Weender Landstraße 94-108
D-37075 Göttingen
Federal Republic of Germany

in accordance with: EN 45501 (1992)
(This standard essentially corresponds to OIML Recommendation
R 76-1, 1992 Edition)

Object tested: Weighing platform with load cell and electronic device with digital output
as module of an electromechanical weighing instrument for connection
to suitable display and operator terminals

Manufacturer: Sartorius AG, Göttingen

The essential functions and characteristics of this module, the conditions to be observed and the
specification of the relevant documentation are set out in the Appendix hereeto. The module meets the
requirements of EN 45501, as far as applicable; it may be used for purposes subject to legal control
as module of an electromechanical weighing instrument provided that the conditions stated in
EN 45501 and in the Appendix hereeto are observed.

The Appendix is an integral part of this Test Certificate and comprises 5 pages.

This Revision 1 replaces Test Certificate D09-95.08 dated 15.03.1995, Reference N° 1.13-5.070.

By order

Braunschweig:
Reference No: 14.07.1995 11.3-95.180 (Brandes)
Physikalisch-Technische Bundesanstalt
Bundesallee 100
D 38116 Braunschweig
Federal Republic of Germany

L.S.

Further information and legal remedy instructions see over-leaf. Test certificates are valid only with signature and seal. This
test certificate shall be reproduced only in full. Partial reproduction or modification only upon permission of the Physikalisch-
Technische Bundesanstalt.

This is to certify that the above translation from the German language
has been made at the Physikalisch-
Technische Bundesanstalt. The original
has been produced.

(G. Panagiotidis)
Foreign Languages Department

Braunschweig, May 28, 1998
Plates and Markings

alternative
Type: BC BF ...
housing for electronics

below the weighing pan (type MA BF only)

K Descriptive plate with CE-mark

M Mark for EC verification (green "M")

S Protective mark (self-adhesive mark or seal, not class I)

English version
EC-Test certificate
D09-96.30 3. Rev.
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Entering the General Password

Enter/Change Password

Select the Setup menu:  SETUP

> The soft keys INFO, MENU and INPUT are displayed in the text line

Select the user data input function: Press the INPUT soft key (F)

> The password prompt is displayed (ENTER PASSW.)

Enter the General Password (see below)

Press the ENTER PASS. soft key (F)

> The last 8 digits of a workstation ID (balance ID no.), if available, are displayed in the measured value line

Select password setting:
Press ▼

> If a password exists, it is now displayed in the measured value line

New password: Enter the letters/numbers for the new password (8 characters max.)

To delete the password, enter a decimal point using the . key and confirm

Confirm input: Press ▼

Exit the Setup menu:
Press SETUP

> Restart your application

General Password: 40414243