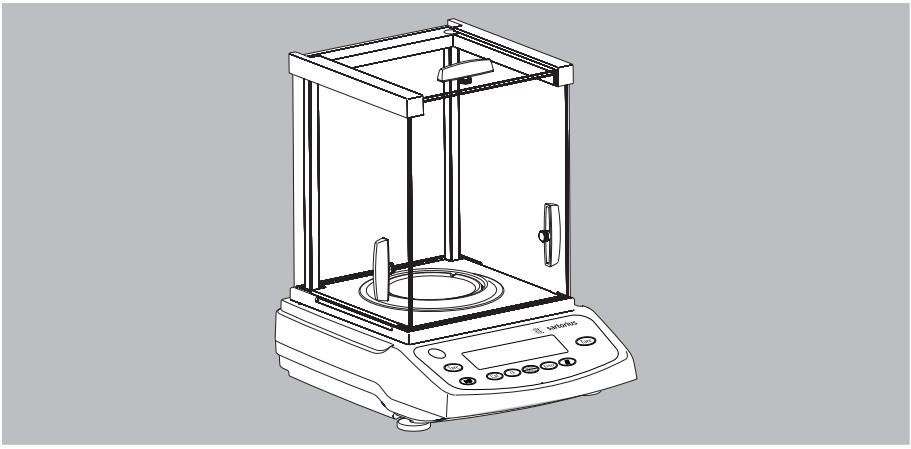
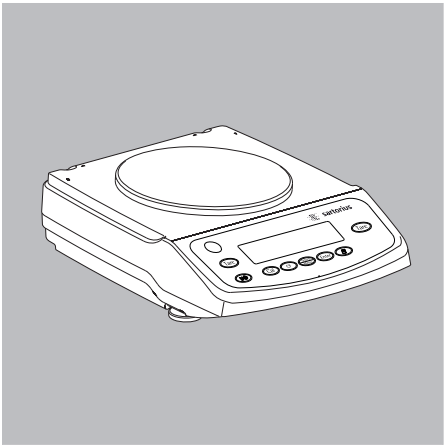
sartorius
mechatronics

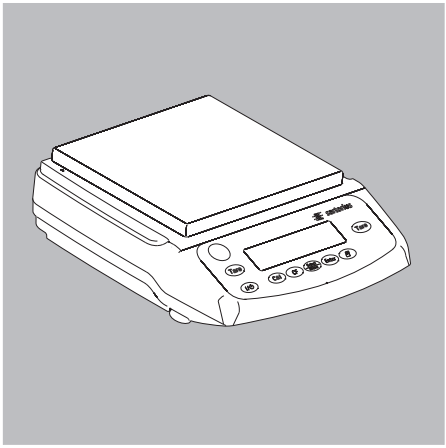
Operating Instructions

Sartorius BSA Series

Electronic Analytical and Precision Balances







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Contents

Symbols

The following symbols are used in these instructions:

● indicates required steps

○ indicates steps required only under certain conditions

> describes what happens after you have performed a particular step

– indicates an item in a list

⚠ indicates a hazard

Warnings and Safety Precautions

Safety

● To prevent damage to the equipment, please read these operating instructions carefully before using the balance.

⚠ Do not use this equipment in hazardous areas.

⚠ The balance may be opened only by trained service technicians.

⚠ Disconnect the balance from power before connecting or disconnecting peripheral devices.

⚠ If you operate the balance under ambient conditions subject to higher safety standards, you must comply with the applicable installation regulations.

⚠ Exposure to excessive electromagnetic interference can cause the readout value to change. Once the disturbance has ceased, the instrument can be used again in accordance with its intended purpose.

Make sure that no liquid enters the equipment housing; use only a slightly moistened cloth to clean the balance.

Installation

⚠ Make sure the voltage rating printed on the power supply is identical to your local line voltage.

– Proceed with extreme caution when using pre-wired RS-232 connecting cables, as the pin assignments may not be compatible with Sartorius equipment. Before connecting the cable, check all pin assignments against the cabling diagrams and disconnect any lines that are assigned differently.

⚠ If there is visible damage to the equipment or power cord, disconnect the equipment from power and lock it in a secure place to ensure that it cannot be used for the time being.

– Connect only Sartorius accessories and options, as these are optimally designed for use with your BSA balance. The operator shall be solely responsible for installation and testing of any modifications to Sartorius equipment, including connection of cables or equipment not supplied by Sartorius. On request, Sartorius will be happy to provide information on operating specifications (in accordance with the Standards for defined immunity to interference).

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

○ If you have any problems with your balance, contact your local Sartorius customer service center.

Getting Started

Storage and Shipping Conditions

– Do not expose the balance to extreme temperatures, moisture, shocks, blows or vibration.

Unpacking the Equipment

● After unpacking the equipment, please check it immediately for any external damage.

○ If you detect any damage, proceed as directed in the chapter entitled “Care and Maintenance,” under “Safety Inspection.”

○ Save the box and all parts of the packaging for any future transport. Disconnect all cables before packing the balance for shipping.

Equipment Supplied

– Balance
– Weighing pan
– Pan support (only for models with a round weighing pan)
– AC adapter with country-specific power cord

Additional equipment supplied with models BSA224S, BSA124S:

– Draft shield chamber with sliding doors
– Shield ring
– Shield plate
– Dust cover

Additional equipment supplied with models BSA623S, BSA423S, BSA323S, BSA223S:

– Draft shield chamber with sliding doors

Installation

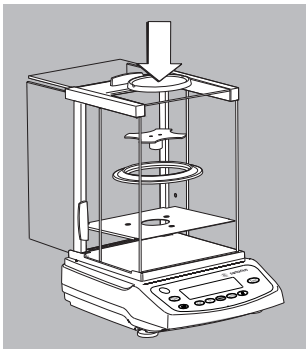
Choose a location that is not subject to the following negative influences:

– Heat (heater or direct sunlight)
– Drafts from open windows and doors
– Excessive vibration during weighing
– Excessive moisture

Conditioning the Balance

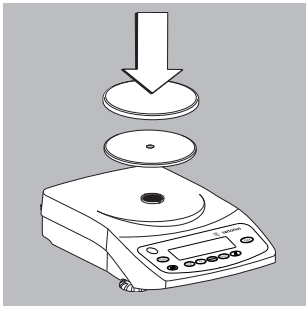
Moisture in the air can condense on cold surfaces whenever the equipment is moved to a substantially warmer place. To avoid the effects of condensation, condition the weighing instrument for 2 hours at room temperature, leaving it unplugged from AC power.

Installation



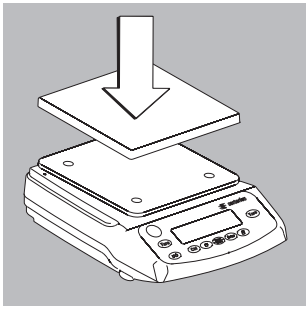
Setting Up the Balance
Instruments with sliding-door draft shield chamber:

- Place components inside the chamber in the following order:
- Shield plate
- Shield ring (not on versions BSA623S, BSA423S, BSA323S, BSA223S)
- Pan support
- Weighing pan

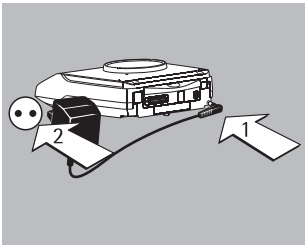


Instruments with a round weighing pan

- Position the components listed below in the order given:
- Pan support
- Weighing pan

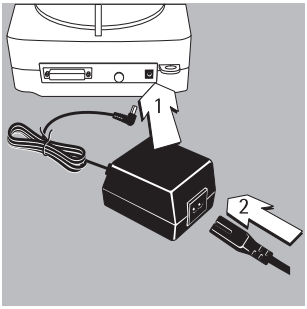


⚠ Instruments with a rectangular weighing pan: Place the weighing pan on the balance, so that the rubber guide elements underneath the weighing pan fit exactly into the holes on the pan support.



Connecting the Balance to AC Power
Use only original Sartorius AC adapters.
For use within China: part no. 6971969

- 1) Connect the angle plug to the balance
- 2) Connect the AC adapter to the wall outlet (mains)



AC Adapter with Country-specific Power Cord
Some models come with separate country-specific power cords for the AC adapter. In India, use only original Sartorius AC adapter part no. 6971983.

- 1) Connect the angle plug to the balance
- 2) Select the power cord for your area and connect it to the AC adapter
- 3) Plug the power cord into the wall outlet (mains)

Use an original Sartorius AC adapter with a wide input voltage range (100 to 240 V~), order no. 6971966, and replaceable power cord:
6900900 (Europe, Indonesia, Vietnam)
6900901 (US/CDN, Philippines, Thailand, Taiwan)
6900905 (Australia, New Zealand)
6971945 (UK, Hong Kong, Malaysia, Singapore)
6971964 (India)
6971978 (China)

Safety Precautions
Plug-in AC Adapter and Benchtop AC Adapter 6971983:
The AC adapter rated to Class 2 can be plugged into any wall outlet without additional safety precautions.

Benchtop AC Adapter 6971966:
The AC adapter rated to Class 1 can be plugged into any wall outlet without additional safety precautions.

The ground terminal is connected to the balance housing, which can be additionally grounded for operation. The data interface is also electrically connected to the balance housing (ground).

NOTE: This equipment has been tested and found to comply with the limits pursuant to part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications.

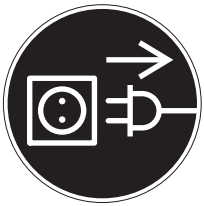
For information on the specific limits and class of this equipment, please refer to the Declaration of Conformity. Depending on the particular class, you are either required or requested to correct the interference.

If you have a Class A digital device, you need to comply with the FCC statement as follows: "Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense."

If you have a Class B digital device, please read and follow the FCC information given below: "However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

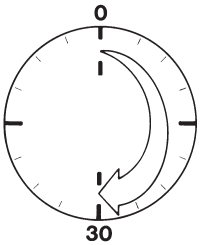
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help."

Before you operate this equipment, check which FCC class (Class A or Class B) it has according to the Declaration of Conformity included. Be sure to observe the information of this Declaration.



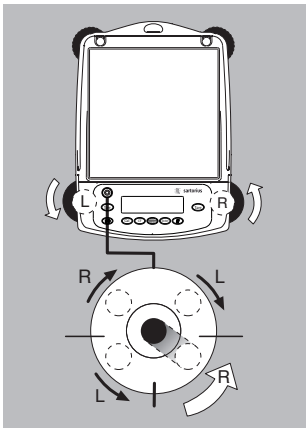
Connecting Electronic Peripheral Devices

- Make sure to unplug the balance from AC power before you connect or disconnect a peripheral device (printer or computer) to or from the interface port.



Warmup Time

To ensure accurate results, the balance must warm up for 30 minutes before operation. Only after this time will the instrument have reached the required operating temperature.



Leveling the Balance

Purpose:

– To compensate for unevenness at the place of installation

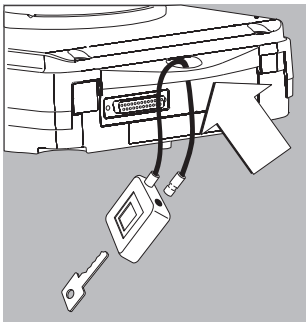
Always level the balance again any time after it has been moved to a different location. Only the 2 front feet are adjusted to level the balance.

● Retract the two rear feet (only on models with a rectangular weighing pan).

● Turn the 2 front feet as shown in the diagram until the air bubble is centered within the circle of the level indicator.

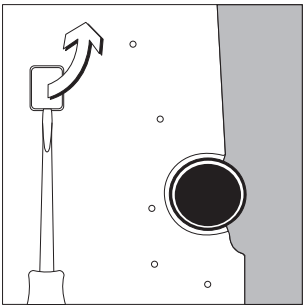
> In most cases this will require several adjustment steps.

● On models with a rectangular weighing pan: extend the 2 rear feet until they touch the surface on which the balance rests.



Anti-theft Locking Device

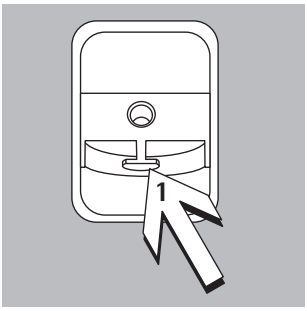
● To secure the balance at the place of installation, fasten a chain or a lock to the lug located on the rear panel of the balance.



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

○ Below-balance weighing is not permitted in legal metrology.

● Open cover plate on the bottom of the balance. Important: set the balance on its side to access the cover plate. DO NOT turn the balance upside-down.

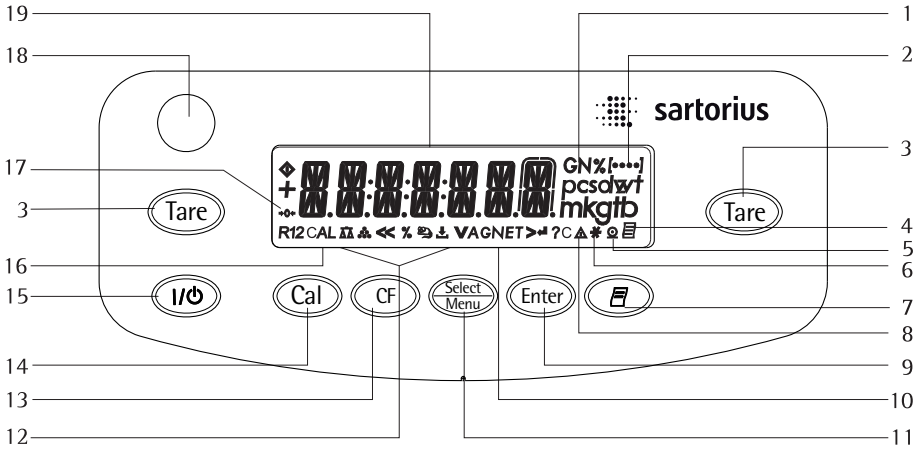


● Using the built-in hook **1**: Attach the sample (e.g., using a suspension wire) to the hanger.

○ Install a shield for protection against drafts if necessary.

Operation

Overview of Display and Operating Elements



Position	Designation
1	Weight units
2	Menu level indicator
3	Taring
4	Symbol: “GLP printing mode active”
5	Symbol: “Printing mode active”
6	Symbol: “Application program active”
7	Data output: Press this key to send readout values to the built-in data interface.
8	Calculated-value indicator (i.e., not a weight value)
9	Start an application program
10	Symbol: Gross or net value
11	Select an application program | Open the operating menu
12	Symbols for active application (⚖⚖, ⁂, %, 🫙, ⬇, A, C)

Position	Designation
13	Delete (Clear Function) This key is generally used to cancel functions: – Quit application program – Cancel calibration/adjustment routine | Exit the operating menu
14	Start calibration/adjustment routine
15	On/off
16	Symbol: Calibration/adjustment function
17	Symbols for zero range (verified models only)
18	Level indicator
19	Weight value displayed in selected weight unit
Symbols:	
<<	Save settings and exit the operating menu
<	One menu level higher
V	Scroll through menu items
>	Next item on current menu level
↵	Select a parameter setting

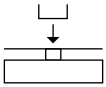
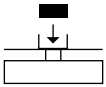
Basic Weighing Function

Features
- Taring the balance
- Printing weights

Preparation
- ● Switch on the balance: Press (I/⏻)
- ● Tare the balance, if necessary: Press (Tare)
- ○ If necessary, change the configuration settings: see the chapter entitled “Configuration”
- ○ If desired, load the factory settings: see the chapter entitled “Configuration”

Additional Functions
- ○ Switching off the balance: Press (I/⏻)

Example
Simple Weighing

Step	Key (or instruction)	Display/Printout
1. Switch on the balance Self-test is performed, followed by automatic initial tare function.	(I/⏻)	0.0 g
2. Place container on weighing pan (in this example: 11.5 g).		+ 11.5 g
3. Tare the balance	(Tare)	0.0 g
4. Place sample in container (in this example: 132 g).		+ 132.0 g
5. Print weight.	(⎙)	N + 132.0 g

Calibration and Adjustment

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

Features
Calibration/adjustment can be performed only when:
- there is no load on the balance,
- the balance is tared, and
- the internal signal is stable.
- the weight displayed for the sample on the balance must not differ from the nominal weight by more than 2%.

If these conditions are not met, an error message is displayed ("ERR 02").

You can use any of the following weight units in calibration/adjustment: CAL.UNIT: GRAMS, KILOGR. or POUNDS (not for verified models)

For details on generating an ISO/GLP-compliant printout of calibration/adjustment results, see page 43.

Following calibration/adjustment, the application program is cleared.

Internal Calibration/Adjustment
In the operating menu, select CAL.-ADJ.: CAL.INT. before beginning. The built-in motorized calibration weight is applied and removed automatically for internal calibration.

● Select calibration/adjustment: Press (Cal)
> The built-in weight is applied automatically
> The balance is adjusted
> The built-in calibration weight is removed.

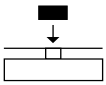
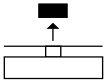
Internal Calibration/Adjustment only on
BSA...-CW Models with a Built-in Motorized Calibration Weight
Set the following parameters:
SETUP: BAL.SCAL.: CAL.-ADJ.: CAL.INT. (menu code 1.1.9.4)

The built-in motorized calibration weight is applied and removed automatically for internal calibration.

Step	Key (or instruction)	Display
1. Tare the balance	Tare	0.0 g
2. Start calibration	Cal	CAL.INT.
The built-in weight is applied automatically		CAL.RUN.
3. Calibration/adjustment executed		CAL.END
4. The built-in weight is removed		0.0 g

External Calibration

Parameters (changes in factory settings):
SETUP: BAL.SCAL.: CAL.-ADJ.: CAL.EXT. (menu code 1.1.9.1)
The required calibration weight is configured at the factory (see "Specifications")

Step	Key (or instruction)	Display
1. Tare the balance	Tare	0.0 g
2. Start calibration. Once you store the zero point the required calibration weight is prompted (flashing display)	Cal	CAL.EXT. - 5000.0 g
3. Apply the prompted calibration weight (in this example: 5000 g) Weight too light: a minus sign "–" is shown Weight too heavy: a plus sign "+" is shown The display stops flashing as soon as the weight value is within the defined limit.		5000.0 g
4. Calibration/adjustment executed; then the calibration weight is displayed		CAL.END + 5000.0 g
5. Remove the calibration weight		0.0 g

Configuration (Operating Menu)

You can configure the balance; i.e., adapt it to individual requirements.

Functions of the Keys during Configuration

Symbol	Key	Function
V	Select Menu	Scroll through menu items
>	Enter	One menu level lower
↲	Enter	Confirm menu item
	CF (press and hold)	Save settings and exit menu from any position
<<	CF	Save settings and exit menu
<	CF	One menu level higher
[••••]		Indicates menu level

Menu Navigation

Example: Setting the Language

Step	Key (or instruction)	Display
1. **Open the menu:** In weighing mode: first menu item is shown	Select Menu (hold)	APPLIC.
2. Scroll upward within the menu level; after the last menu code, the first code is displayed again	Repeatedly: Select Menu	INPUT ... LANGUAG.
3. Select menu level (scrolls to the right)	Enter	ENGLISH o
5. **Change setting:** Scroll until the desired setting is shown	Select Menu	ESPANOL
6. **Confirm the menu code**; "o" indicates the active setting	Enter	ESPANOL o
7. Return to the next higher menu level (from the fourth level)	CF	LENGUA
○ Set other menu items as desired	Select Menu, Enter	
8. **Save settings** and exit menu	Repeatedly: CF	
or		
○ Exit menu without saving changes	I/⏻	
> Restart your application		0.0 g

Parameter Settings: Menu

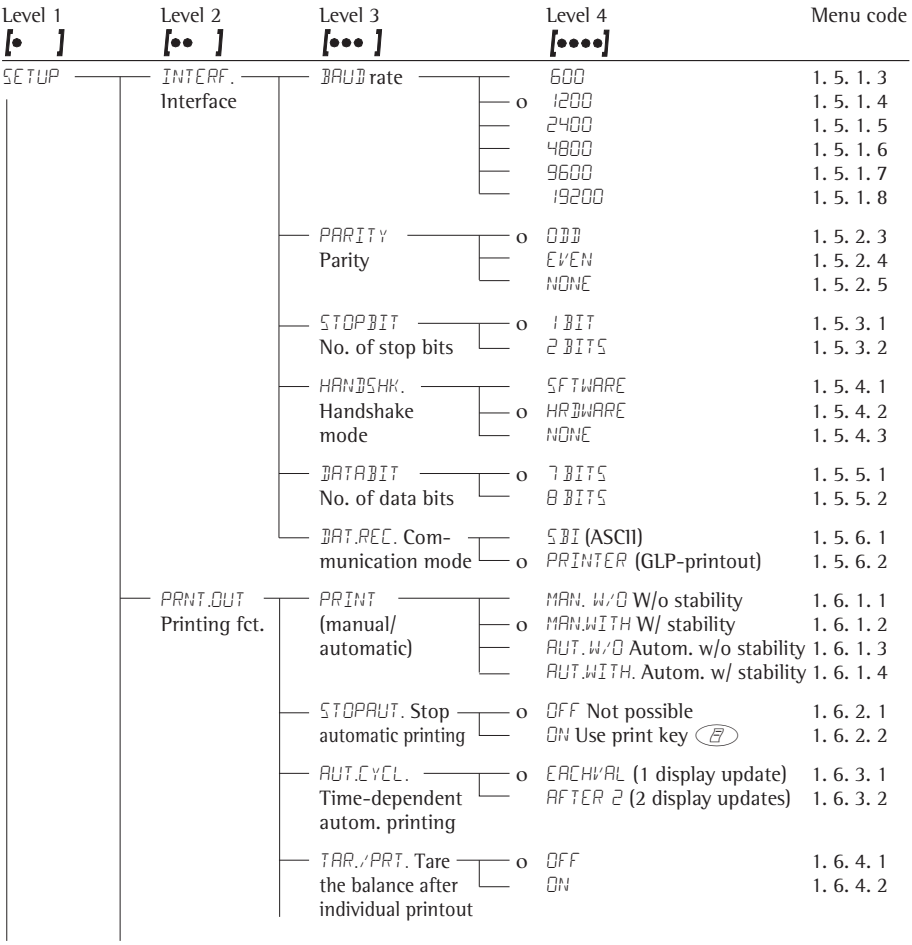
Level 1 [•]	Level 2 [••]	Level 3 [•••]	Menu code
SETUP	BAL.SCAL. Balance/balance parameters	AMBIENT Ambient conditions	1. 1. 1.
		APP.FILT. Application filter	1. 1. 2.
		STAB.RNG. Stability range	1. 1. 3.
		TARING Taring	1. 1. 5
		AUTOZER. Auto zero	1. 1. 6
		WT.UNIT Basic weight unit	1. 1. 7.
		DISPLAY Display accuracy[1])	1. 1. 8.
		CAL./ADJ. Function of the (Cal) key	1. 1. 9.
		CAL.UNIT Weight unit for calibration	1. 1. 11.
	INTERF. Interface	BAUD Baud rate	1. 5. 1.
		PARITY Parity	1. 5. 2.
		STOPBIT Number of stop bits	1. 5. 3.
		HANDSHK Handshake mode	1. 5. 4.
		DATABIT Number of data bits	1. 5. 5.
		DAT.REC. Output: SBI (ASCII) or printout	1. 5. 6.
	PRNT.OUT Settings for print function	PRINT (manual/automatic)	1. 6. 1.
		STOPAUT. Stop automatic printing	1. 6. 2.
		AUT.CYCL. Time-dependent autom. printing	1. 6. 3.
		TAR./PRT. Tare bal./balance after ind. print	1. 6. 4.
		PRT.INIT. Printout of appl. parameters	1. 6. 5.
		FORMAT Line format for printout	1. 6. 6.
		GLP ISO/GLP-compliant printout	1. 6. 7.
		TIME: 12/24 h	1. 6. 8.
		DATE: Format	1. 6. 9.
	EXTRAS Additional functions	MENU	1. 8. 1.
		SIGNAL Acoustic signal (beep)	1. 8. 2.
		KEYS Keypad	1. 8. 3.
		EXT.KEY External switch function	1. 8. 4.
		ON MODE Power-on mode	1. 8. 5.
		BACKLIT Display backlighting	1. 8. 6.
	RESET	MENU Factory settings	1. 9. 1.
APPLIC. Application programs	WEIGH		2. 1.
	UNIT Toggle wt. unit	DISP.DIG. Display accuracy	2. 2. 2.
	COUNT. Counting	RESOLUT. Resolution	2. 3. 1.
		REF.UPDT. Autom. ref. sample updating	2. 3. 2.
	PERCENT Weighing in percent	DEC.PLCS Decimal places	2. 4. 1.
	NET-TOT Net-total formulation	COMP.PRT. Printout of components	2. 5. 1.
	TOTAL Totalizing	COMP.PRT. Printout of components	2. 6. 1.
	ANIMALW. Animal weighing	ACTIVTY. Animal activity	2. 7. 1.
		START	2. 7. 2.
	CALC. Calculation	METHOD (operator)	2. 8. 1.
		DEC.PLCS Decimal places	2. 8. 2.
	DENSITY Density determination	DEC.PLCS Decimal places	2. 9. 1.
INPUT Input	ID NO.	ID input; max. 7 characters	3. 1.
INFO Information	VERSION, SER.NO., MODEL	Display software ver., serial no., model	4. 1./.2./.3.
LANGUAG.	ENGLISH (factory setting)		5. 1.
	DEUTSCH (German)		5. 2.
	FRANC. (French)		5. 3.
	ITAL. (Italian)		5. 4.
	ESPANOL (Spanish)		5. 5.
	PYCCKNN (Russian)		5. 6.
	POLSKI (Polish)		5. 7.
	CODES Menu shows codes (not texts)		5. 8.

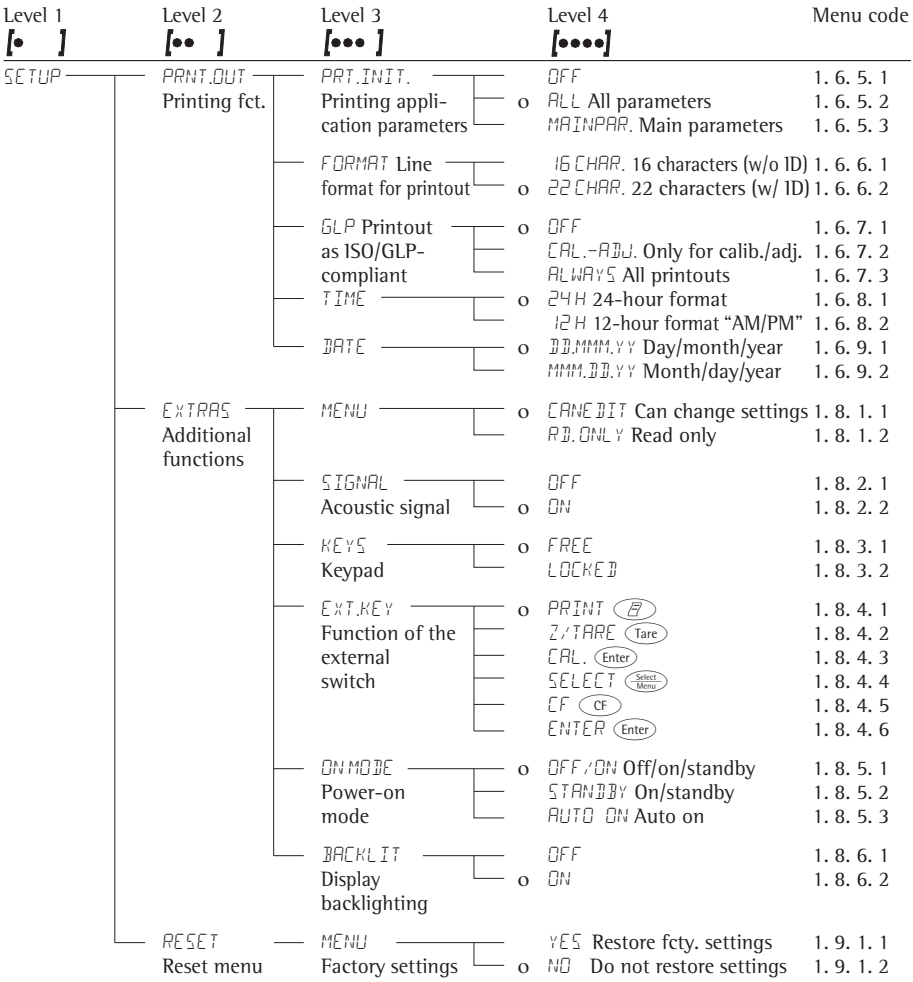
Parameter Settings: Overview

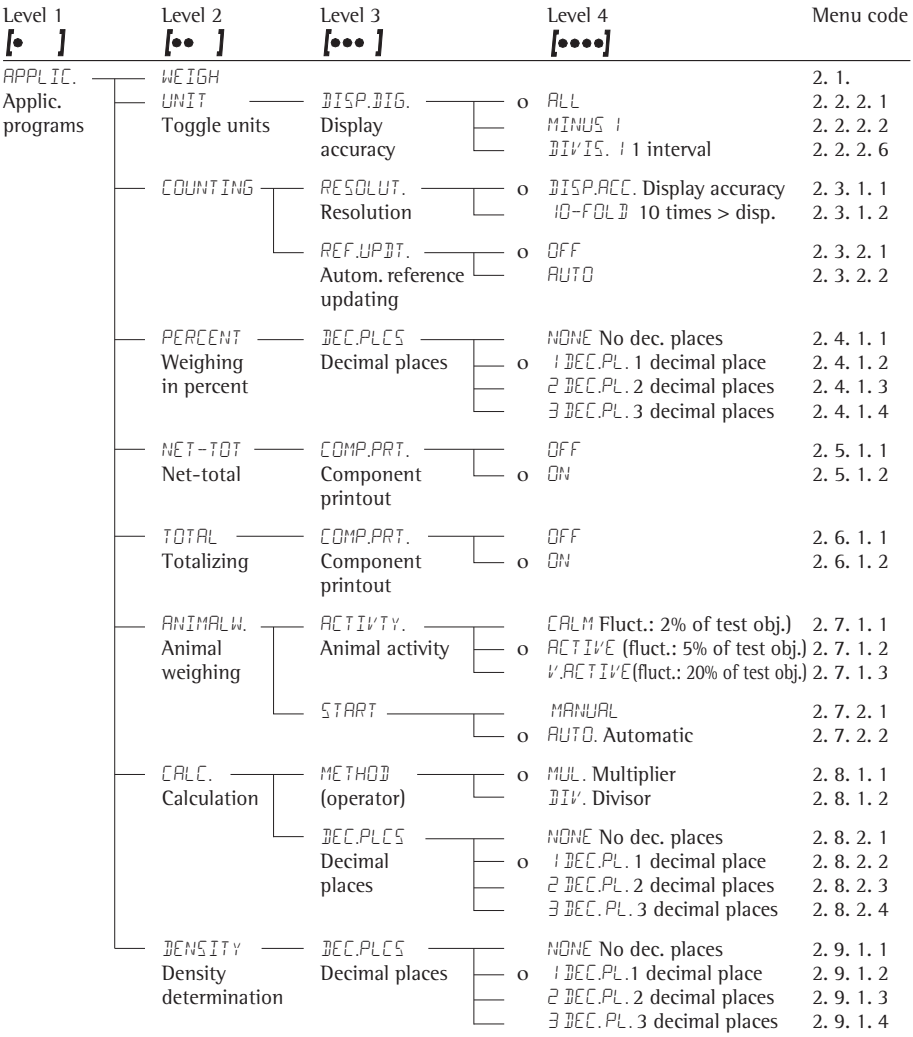
o = Factory setting √ = User-defined setting

Level 1 [•]	Level 2 [••]	Level 3 [•••]		Level 4 [••••]	Menu code
SETUP	BAL.SCAL. Balance parameters	AMBIENT Ambient conditions (Filter adaptation)		V.STABLE Very stable	1. 1. 1. 1
			o	STABLE	1. 1. 1. 2
				UNSTABL	1. 1. 1. 3
				V.UNSTBL. Very unstable	1. 1. 1. 4
		APP.FILT. Application filter	o	FINAL.RD. Final readout mode	1. 1. 2. 1
				FILLING Filling mode	1. 1. 2. 2
		STAB.RNG. Stability range		1/4 DIG. (digit)	1. 1. 3. 1
				1/2 DIG.	1. 1. 3. 2
				1 - DIGIT	1. 1. 3. 3
			o	2 - DIGIT	1. 1. 3. 4
				4 - DIGIT	1. 1. 3. 5
				8 - DIGIT	1. 1. 3. 6
		TARING Taring		W/O STB W/o stability)	1. 1. 5. 1
			o	W/ STAB After stability)	1. 1. 5. 2
		AUTOZER. Auto zero		OFF	1. 1. 6. 1
			o	ON	1. 1. 6. 2
		WT.UNIT Basic weight through unit		For list of units, see "Toggling between Weight Units"	1. 1. 7. 1 – 1. 1. 7. 23
		DISP.DIG. Display accuracy	o	ALL	1. 1. 8. 1
				MINUS 1	1. 1. 8. 2
				DIVIS. 1 1 interval	1. 1. 8. 6
		CAL./ADJ. Function of the (Cal) key	o	CAL.EXT. External cal./adj.	1. 1. 9. 1
				CAL.INT. Internal cal./adj.[1])	1. 1. 9. 2
				BLOCKED (Cal) key blocked	1. 1. 3. 3
		CAL.UNIT. Unit for calibration weight	o	GRAMS	1. 1.11. 1
				KILOGR. Kilograms	1. 1.11. 2
				POUNDS	1. 1.11. 3

[1]) Only on models with built-in motorized calibration weight


Level 1
[•]
Level 2
[••]
Level 3
[•••]
Level 4
[••••]
Menu code
SETUP
INTERF.
Interface
BAUD rate
600 1. 5. 1. 3
o 1200 1. 5. 1. 4
2400 1. 5. 1. 5
4800 1. 5. 1. 6
9600 1. 5. 1. 7
19200 1. 5. 1. 8
PARITY
Parity
o ODD 1. 5. 2. 3
EVEN 1. 5. 2. 4
NONE 1. 5. 2. 5
STOPBIT
No. of stop bits
o 1 BIT 1. 5. 3. 1
2 BITS 1. 5. 3. 2
HANDSHK.
Handshake mode
SFTWARE 1. 5. 4. 1
o HRDWARE 1. 5. 4. 2
NONE 1. 5. 4. 3
DATABIT
No. of data bits
o 7 BITS 1. 5. 5. 1
8 BITS 1. 5. 5. 2
DAT.REC. Communication mode
SBI (ASCII) 1. 5. 6. 1
o PRINTER (GLP-printout) 1. 5. 6. 2
PRNT.OUT
Printing fct.
PRINT
(manual/ automatic)
MAN. W/O W/o stability 1. 6. 1. 1
o MAN.WITH W/ stability 1. 6. 1. 2
AUT.W/O Autom. w/o stability 1. 6. 1. 3
AUT.WITH. Autom. w/ stability 1. 6. 1. 4
STOPAUT. Stop automatic printing
OFF Not possible 1. 6. 2. 1
o ON Use print key 1. 6. 2. 2
AUT.CYCL.
Time-dependent autom. printing
EACHVAL (1 display update) 1. 6. 3. 1
o AFTER 2 (2 display updates) 1. 6. 3. 2
TAR./PRT. Tare the balance after individual printout
OFF 1. 6. 4. 1
o ON 1. 6. 4. 2


Level 1
[•]
Level 2
[••]
Level 3
[•••]
Level 4
[••••]
Menu code
SETUP
PRNT.OUT
Printing fct.
PRT.INIT.
Printing appli-
cation parameters
OFF
o ALL All parameters
MAINPAR. Main parameters
1. 6. 5. 1
1. 6. 5. 2
1. 6. 5. 3
FORMAT Line
format for printout
16 CHAR. 16 characters (w/o ID)
o 22 CHAR. 22 characters (w/ ID)
1. 6. 6. 1
1. 6. 6. 2
GLP Printout
as ISO/GLP-
compliant
o OFF
CAL.-ADJ. Only for calib./adj.
ALWAYS All printouts
1. 6. 7. 1
1. 6. 7. 2
1. 6. 7. 3
TIME
o 24 H 24-hour format
12 H 12-hour format “AM/PM”
1. 6. 8. 1
1. 6. 8. 2
DATE
o DD.MMM.YY Day/month/year
MMM.DD.YY Month/day/year
1. 6. 9. 1
1. 6. 9. 2
EXTRAS
Additional
functions
MENU
o CANEDIT Can change settings
RD.ONLY Read only
1. 8. 1. 1
1. 8. 1. 2
SIGNAL
Acoustic signal
OFF
o ON
1. 8. 2. 1
1. 8. 2. 2
KEYS
Keypad
o FREE
LOCKED
1. 8. 3. 1
1. 8. 3. 2
EXT.KEY
Function of the
external
switch
o PRINT
Z/TARE Tare
CAL. Enter
SELECT Select Menu
CF CF
ENTER Enter
1. 8. 4. 1
1. 8. 4. 2
1. 8. 4. 3
1. 8. 4. 4
1. 8. 4. 5
1. 8. 4. 6
ONMODE
Power-on
mode
o OFF/ON Off/on/standby
STANDBY On/standby
AUTO ON Auto on
1. 8. 5. 1
1. 8. 5. 2
1. 8. 5. 3
BACKLIT
Display
backlighting
OFF
o ON
1. 8. 6. 1
1. 8. 6. 2
RESET
Reset menu
MENU
Factory settings
YES Restore fcty. settings
o NO Do not restore settings
1. 9. 1. 1
1. 9. 1. 2

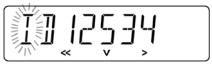
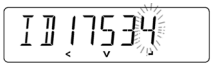

Level 1
[•]
Level 2
[••]
Level 3
[•••]
Level 4
[••••]
Menu code
APPLIC.
Applic. programs
WEIGH
2. 1.
UNIT
Toggle units
DISP.DIG.
Display accuracy
o ALL 2. 2. 2. 1
MINUS 1 2. 2. 2. 2
DIVIS. 1 1 interval 2. 2. 2. 6
COUNTING
RESOLUT.
Resolution
o DISP.ACC. Display accuracy 2. 3. 1. 1
10-FOLD 10 times > disp. 2. 3. 1. 2
REF.UPDT.
Autom. reference updating
o OFF 2. 3. 2. 1
AUTO 2. 3. 2. 2
PERCENT
Weighing in percent
DEC.PLCS
Decimal places
NONE No dec. places 2. 4. 1. 1
o 1 DEC.PL. 1 decimal place 2. 4. 1. 2
2 DEC.PL. 2 decimal places 2. 4. 1. 3
3 DEC.PL. 3 decimal places 2. 4. 1. 4
NET-TOT
Net-total
COMP.PRT.
Component printout
OFF 2. 5. 1. 1
o ON 2. 5. 1. 2
TOTAL
Totalizing
COMP.PRT.
Component printout
OFF 2. 6. 1. 1
o ON 2. 6. 1. 2
ANIMALW.
Animal weighing
ACTIVTY.
Animal activity
CALM Fluct.: 2% of test obj.) 2. 7. 1. 1
o ACTIVE (fluct.: 5% of test obj.) 2. 7. 1. 2
V.ACTIVE (fluct.: 20% of test obj.) 2. 7. 1. 3
START
MANUAL 2. 7. 2. 1
o AUTO. Automatic 2. 7. 2. 2
CALC.
Calculation
METHOD
(operator)
o MUL. Multiplier 2. 8. 1. 1
DIV. Divisor 2. 8. 1. 2
DEC.PLCS
Decimal places
NONE No dec. places 2. 8. 2. 1
o 1 DEC.PL. 1 decimal place 2. 8. 2. 2
2 DEC.PL. 2 decimal places 2. 8. 2. 3
3 DEC.PL. 3 decimal places 2. 8. 2. 4
DENSITY
Density determination
DEC.PLCS
Decimal places
NONE No dec. places 2. 9. 1. 1
o 1 DEC.PL. 1 decimal place 2. 9. 1. 2
2 DEC.PL. 2 decimal places 2. 9. 1. 3
3 DEC.PL. 3 decimal places 2. 9. 1. 4

ID Number for ISO/GLP-compliant Data Record

Level 1 [•]	Level 2 [••]	Level 3 [•••]	Menu code
INPUT ——— Input	ID NO. ———	ID input; max. 7 characters Permitted characters: 0 to 9; A to Z; dash/hyphen; space	3. 1.

Function of the Keys when Entering ID Numbers

Select Menu key: Press and hold to repeat

Display	Key	Display symbol	Function
	First position:		
	Enter	>	Go to next position
	Select Menu	V	Select current position
	CF	<<	Exit without saving changes
	Middle positions:		
	Select Menu	V	Select current position
	Enter	>	Go to next position
	CF	<	Go to previous position
	Last position:		
	Select Menu	V	Select current position
	CF	<	Go to previous position
	Enter	↵	Store and exit

Device Information

Level 1 [•]	Level 2 [••]	Level 3 [•••]	Example	Menu code
INFO Information	VERSION	Show software version	REL.32.05	4. 1.
	SER. NO.	Show serial number (To toggle focus between upper and lower display sections, press Select Menu)	1080 1234	4. 2.
	MODEL	Show model designation (to change focus from upper to middle to lower display section and back, press Select Menu)	ED62025	4. 3.

Display of Menu Items: Text or Codes

LANGUAG.	ENGLISH (factory setting)	5. 1.
	DEUTSCH (German)	5. 2.
	FRANC. (French)	5. 3.
	ITAL. (Italian)	5. 4.
	ESPANOL (Spanish)	5. 5.
	РУССКИЙ (Russian)	5. 6.
	POLSKI (Polish)	5. 7.
	CODES Menu shows codes (not texts)	5. 8.

Application Programs

Counting

Display symbol: ⁂

Purpose

With the Counting program you can determine the number of parts that each have approximately equal weight. To do this, a known number of parts (the reference sample quantity) is weighed first, and the individual piece weight (reference weight) is calculated from this result.
Thus the number of parts subsequently placed on the balance can be determined from their weight.

Changing the Reference Sample Quantity

Activate function: Press the Select/Menu key
Select the desired reference sample quantity (1 to 100):
In increments of 1:
Press the Select/Menu key briefly
In increments of 10:
Press and hold the Select/Menu key.
The quantity is stored in battery-backed memory.

Reference Sample Updating

Automatic reference sample updating optimizes the counting accuracy. You can activate or deactivate this function in the menu.

Automatic reference sample updating is performed when the requirements, including the specified stability criterion, have been met.

The abbreviation OPT, for "optimizing", is displayed briefly with the new reference sample quantity.

Preparation

- Select the Counting application in the menu:
  see "Configuration."

- Set the following parameters:

APPLIC. Application program

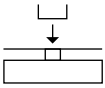
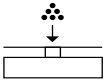
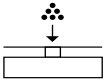
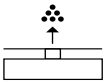
- COUNT.
  - RESOLUT. Resolution
    - o DISP.ACC. Display accuracy
    - 10-FOLD 10-fold higher
  - REF.UPDT. Autom. ref. sample updating
    - o OFF Off
    - AUTOM. Automatic

o = Factory setting

Printout: Counting

nRef + 10	: Reference sample quantity
wRef + 21.14 g	: Reference weight
Qnt + 500 pcs	: Calculated quantity

Example: Counting parts of equal weight
Parameter settings: APPLIC.: COUNT. (menu code 2. 3.)

Step	Key (or instruction)	Display/Data output
1. Place empty container on the balance		+ 22.6 g
2. Tare the balance	Tare	0.0 g
3. Add reference sample quantity to container (in this example: 20 pcs)		
4. Changing the reference sample quantity:	Select Menu	REF 10pcs
5. Select reference sample quantity: In increments of 1 (1, 2, 3, etc. to 100) In increments of 10 (10, 20, etc. to 100)	Repeatedly: Select Menu Press briefly Select Menu press and hold	 REF 20pcs
6. Confirm selected reference sample quantity and start application The current reference weight remains stored until a new reference is set or the power supply is interrupted	Enter	+ 20pcs * nRef 20 pcs wRef 1.07 g
7. Add desired number of pieces		+ 500pcs
8. If desired, print quantity		Qnt + 500 pcs
9. Toggle display between mean piece weight, weight, quantity	 Repeatedly: Select Menu	1.07 g ⚠* + 535.0 g * + 500pcs *
10. Unload the balance		– 2 pcs *
11. Repeat as needed, starting from Step 7		
12. Delete reference value	CF	0.0 g

Weighing in Percent

Display symbol: %

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

Changing the Reference Percentage
Activate function:
Press the Select Menu key
Select the desired reference (1 to 100):
In increments of 1: Press the Select Menu key briefly
In increments of 10: Press and hold the Select Menu key.

The percentage is stored in battery-backed memory.

Preparation

- Select the Weighing in percent application in the menu: see “Configuration.”

- Set the following parameters:

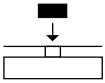
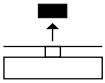
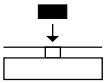
APPLIC. Application program
└ PERCENT Weighing in percent
  └ DEC.PLCS. Decimal places
    - NONE No decimal places
    - o 1 DEC.PL. 1 decimal place
    - 2 DEC.PL. 2 decimal places
    - 3 DEC.PL. 3 decimal places

o = Factory setting

Printout: Weighing in percent

pRef 100	: Reference percentage
Wxx% 111.6 g	: Reference weight net xx% for selected reference percentage
Prc + 94.9 %	: Calculated reference percentage

Example: Determining residual weight in percent
Parameter settings: APPLIC.: PERCENT (menu code 2. 4.)
Reference percentage: REF 100%

Step	Key (or instruction)	Display/Data output
1. Tare the balance	Tare	0.0 g
2. Information: Enter reference percentage (Changing the reference: see the previous page)	Select Menu	REF 100 %
3. Place sample equal to 100% on the balance (in this example: 111.6 g)		
4. Initialize the balance The current reference weight remains stored until a new reference is set or the power supply is interrupted	Enter	+ 100.0 % * pRef 100 % Wxx% 111.6 g
5. Remove sample (e.g., for drying)		
6. Place unknown weight on balance (in this example: 105.9 g)		+ 94.9 % *
7. If desired, print percentage		Prc + 94.9 %
8. Toggle display between weight and percentage	Repeatedly: Select Menu	+ 105.9 g * + 94.9 % *
9. Clear display of residual weight and reference percentage	CF	+ 105.9 g
10. If desired, print net residual weight		N + 105.9 g

Calculation

Display symbol: C

Purpose
With this application program you can calculate weight value using a multiplier or divisor. This can be used, for example, to determine the weight per unit area, or "gsm" weight (grams per square meter), of paper.

Setting the Factor or Divisor
Activate function:
Press the Select Menu key
Select a number of up to 7 digits and, if needed, one decimal point (0.000001 to 9999999):
In increments of 1: Press the Select Menu key briefly
To increase the value without pressing repeatedly:
Press and hold the Select Menu key.

The selected operator is stored in battery-backed memory.

Preparation

- Select the Calculation application in the menu:
  see "Configuration."

- Set the following parameters:

APPLIC. Application program
└ CALC. Calculation
  └ METHOD Operator
    ├ o MUL. Multiplier
    └ DIV. Divisor

  DEC.PLCS. Decimal places
    ├ NONE No decimal places
    ├ o 1 DEC.PL. 1 decimal place
    ├ 2 DEC.PL. 2 decimal places
    └ 3 DEC.PL. 3 decimal places

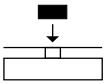
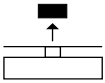
o = Factory setting

Printout: Calculation

```
Mul   +  1.2634    : Multiplier
Div   +  0.6237    : Divisor
Res   +    79.7 o  : Result
```

Example:
Calculating the weight per unit area of paper: An A4 sheet of paper is used in this example, with surface dimensions of 0.210 m × 0.297 m = 0.06237 m². To determine the weight per unit area, the total weight is divided by the surface.

Parameter settings:
APPLIC.: CALC..: METHOD: DIV. (menu code 2. 8. 1. 2)

Step	Key (or instruction)	Display/Data output
1. Tare the balance	(Tare)	0.00 g
2. Activate divisor input	(Select Menu)	_____0.
3. Set the divisor (in this example:0.06237): Position the decimal point,	(Enter), 5x (Select Menu), 2× (Enter),	__.00000
Enter numerals	Repeatedly or press and hold; (Select Menu), (Enter), etc.	__.06000 __.06237
4. Store the divisor and initialize the balance The current divisor remains stored in battery-backed memory until the setting is changed	(Enter)	+ 0.0 o Div 0.6237
5. Weight per unit area: Place an A4 sheet of paper on the balance		+ 79.7 o *
6. If desired, print result	(🖹)	Res + 79.7 o
7. Toggle display between weight and calculated value	Repeatedly: (Select Menu)	+ 4.97 g * + 79.7 o *
8. Unload the balance		+ 0.0 o *
9. Repeat as needed, starting from Step 5		

Animal Weighing/Averaging

Display symbol:

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

Changing the Number of Subweighing Operations
Activate function:
Press the Select/Menu key
Select the desired number of measurement (1 to 100):
In increments of 1: Press the Select/Menu key briefly
In increments of 10: Press and hold the Select/Menu key.

The selected number of measurements is stored in battery-backed memory.

Preparation

- Select the Animal weighing application in the menu:
  see "Configuration."

- Set the following parameters:

APPLIC. Application program
- ANIMALW. Animal weighing
  - ACTIVTY. Animal activity
    - CALM Stable readout
    - o ACTIVE Unstable
    - V.ACTIVE Very unstable readout
  - START
    - MANUAL
    - o AUTOM. Automatic

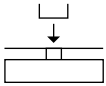
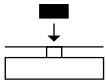
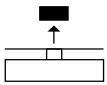
o = Factory setting

Printout: Animal weighing

`mDef 20`	: Number of subweighing operations
`x-Net + 410.1 g`	: Calculated average

Example: Determining animal weight with automatic start and 20 subweighing operations (measurements)

Parameter settings: APPLIC.: ANIMALW. (menu code 2. 7.)

Step	Key (or instruction)	Display/Data output
1. Place animal weighing bowl on the balance		22.6 g
2. Tare the balance	Tare	0.0 g
3. Change the number of subweighing operations:	Select Menu	REF 30
4. Set number of measurements: In increments of 1 (1, 2, 3, etc. to 100) In increments of 10 (10, 20, etc. to 100)	Repeatedly: Select Menu Press briefly Select Menu press and hold	REF 20
5. Confirm number of measurements and start automatic animal weighing The number of measurements remains stored in battery-backed memory until the setting is changed	Enter	+ 0.0 g *
6. Place first animal in bowl. The balance delays the start of measurements until the difference between 2 measurements meets the criterion		888 20 19 1
7. Read off the result The result is displayed with the "*" symbol (= calculated value) and remains displayed until the sample (animal) is removed from the load plate (bowl)		+ 410.1 g ⚠* mDef 20 x-Net + 410.1 g
8. Unload the balance		+ 0.0 g *
9. Weigh next animal (if des.) Next weighing series begins automatically		

Net-total Formulation

Display symbol:

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

Features
- Weigh up to 99 components from “0” to a defined total component weight.
- Store component weights (“Store xx comp.”), with
  – display zeroed automatically after value is stored, and
  – automatic printout
- Clear component memory following cancellation of the weighing sequence (by pressing CF) and printout of the total weight.
- Toggling between component weight and total weight by pressing and holding Select Menu (< 2 sec).
- Printout of the total of the individual component weights (**T–Comp**)

Preparation
- Select the Net-total application in the menu:
  see “Configuration.”
- Set the following parameters:

APPLIC. Application program
└ NET-TOTL. Net-total formulation
  └ COMP.PRT. Printout of components
    ├ OFF
    └ o ON

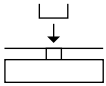
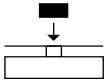
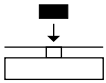
o = Factory setting

Printout: Net-total formulation

Comp 2+ 278.1 g	: Second component
T-Comp+ 2117.5 g	: Sum of components

Example: Counting parts into a container

Parameter settings:
APPLIC.: NET-TOT (menu code 2. 5.)

Step	Key (or instruction)	Display/Data output
1. Place empty container on the balance.		65.0 g
2. Tare the balance	Tare	0.0 g
3. Add first component		+ 120.5 g
4. Store component data	Enter	+ 0.0 g * NET Comp 1+ 120.5 g
5. Add next component		+ 70.5 g * NET
6. Store component data	Enter	+ 0.0 g * NET Comp 2+ 70.5 g
7. Weigh in further components as desired	Repeat steps 5 and 6	
8. Fill to desired final value view the current total weight value:	Select Menu	+ 191.0 g *
9. Print total weight and clear the component memory	CF	+ 2117.5 g T-Comp+ 2117.5 g

Totalizing

Display symbol: ⭳

Purpose
With this application program you can add values from successive, mutually independent weight values to a total that exceeds the capacity of the balance.

Features
- Totalizing memory for up to 99 values
- Store component weights (“Store xx comp.”), with automatic printout
- Toggle display between the current individual weight value and the value in totalizing memory by pressing Select Menu
- Printout of the total of the individual component weights (**S–Comp**)
- To close the application program and print the total weight: press CF

Preparation
- Select the Totalizing application in the menu:
  see “Configuration.”
- Set the following parameters:

APPLIC. Application program
└ TOTAL Totalizing
  └ COMP.PRT. Printout of components
    ├ OFF
    └ o ON

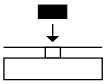
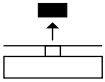
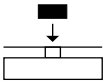
o = Factory setting

Printout: Totalizing

```
Comp 2+   278.1 g   : Second component
S-Comp+ 2117.5 g    : Totalizing memory
```

Example: Totalizing weight values

Parameter settings:
APPLIC.: TOTAL: COMP.PRT: ON (menu code 2. 6. 1. 2)

Step	Key (or instruction)	Display/Data output
1. Tare the balance	Tare	0.0 g
2. Place sample balance (in this example: 380 g)		+ 380.0 g
3. Store value in memory	Enter	+ 380.0 g * Comp 1+ 380.0 g
4. Remove sample		+ 0.0 g *
5. Place the next sample on the balance (in this example, 575 g)		+ 575.0 g *
6. Store value in memory	Enter	+ 955.0 g * + 575.0 g * Comp 2+ 575.0 g
7. View the value in totalizing memory	Select Menu	+ 955.0 g ⚠*
8. Weigh in further components as desired	Repeat steps 5 and 6	
9. Print total weight and clear the totalizing memory	CF	0.0 g S-Comp+ 2117.5 g

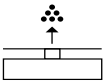
Mass Unit Conversion

Purpose
With this application program you can change the weight value displayed from the basic weight unit to any of 4 application weight units (see table on next page).

Features
- Set the basic unit and display accuracy in the Setup menu: see “Configuration.”
- Set the application weight units and display accuracies in the Application menu.
- These settings are stored in battery-backed memory.
- The basic unit is active when the balance is powered up.

Example: Change display from the basic unit (in this example, grams [g]) to pounds [lb] and then to Troy ounces [ozt].

Set the following parameters: APPLIC.: UNIT (code 2. 2.)

Step	Key (or instruction)	Display/Data output
Preparation:		
1. Begin selection of an application weight unit	Select Menu	NONE o [•]
2. Select an application unit; in this example, pounds (see table on next page)	Repeatedly: Select Menu	POUNDS
3. Confirm the weight unit (pounds)	Enter	POUNDS o
4. Select the next application weight unit; in this example: Troy ounces (see table on next page)	Enter, Repeatedly: Select Menu	NONE o [••] TROY OZ.
5. Confirm weight unit (Troy ounces)	Enter	TROY OZ. o
6. Select other application units if desired (max. 4 total) (otherwise, confirm NONE by pressing Enter)		[•••]
7. Store selection	CF	0.00 g
Conversion:		
8. Place sample on balance		+ 100.00 g
9. Toggle unit for weight value	Repeatedly: Enter	+ 0.22046 lb + 3.5275 ozt

The following weight units are available in your BSA balance (only units permitted by national law are available):

Menu item	Unit	Conversion factor	Display symbol
1) USERDEF. [1])	Grams	1,00000000000	o
2) GRAMS (Factory setting)	Grams	1.00000000000	g
3) KILOGR.	Kilograms	0.00100000000	kg
4) CARATS	Carats	5.00000000000	o
5) POUNDS	Pounds	0.00220462260	lb
6) OUNCES	Ounces	0.03527396200	oz
7) TROY OZ.	Troy ounces	0.03215074700	ozt
8) HKTAEL	Hong Kong taels	0.02671725000	tl
9) SNG.TAEL.	Singapore taels	0.02645544638	tl
10) TWN.TAEL	Taiwanese taels	0.02666666000	tl
11) GRAINS	Grains	15.4323583500	GN
12) PENY.WT.	Pennyweights	0.64301493100	dwt
13) MILLIGR.	Milligrams	1000.00000000	mg
14) PT.P.LB.	Parts per pound	1.12876677120	o
15) CHN.TAEL	Chinese taels	0.02645547175	tl
16) MOMMES	mommes	0.26670000000	m
17) AUSTR.CT.	Austrian carats	5.00000000000	Kt
18) TOLA	Tola	0.08573333810	o
19) BAHT	Baht	0.06578947436	b
20) MESGHAL	Mesghal	0.21700000000	o
21) TONS	Tons	0.00000100000	t
22) LB/OZ [2])	Pounds : ounces	0.03527396200	lb oz
23) NEWTON	Newton	0.00980665000	N

[1]) = User-defined weight unit; can be loaded in the balance over an optional RS-232 or USB interface using a computer program.

[2]) = The format for display of pounds/ounces cannot be changed: xx:yy.yy x=lb, y=oz

⚠ Some weight units may be blocked from use in legal metrology, depending on national verification laws.

Density Determination

Display symbol: ΔΔ

Purpose
This application program lets you determine the density of solid substances using the buoyancy method.

Features
Press (Select Menu) to enter the density of the buoyancy liquid* at the corresponding temperature. See the next page for a table of density values for water. The factory setting is 1 g/cm².

The following formula is applied:

Density of sample =

$$\frac{\text{Weight in air}}{\text{(Weight in air – weight in water)}} \cdot \text{density of liquid}$$

When you start the density determination routine, the density of the liquid is displayed briefly. Positive and negative values can be stored for weight in air and weight in water. The weight in water must be less than the weight in air; otherwise, an error message is displayed.

You can have results displayed with one, decimal places, or no decimal places: see “Configuration.” Note: the sample holder and suspension wire used in the example below are not included with the balance.

Preparation
- Select the Density Determination application in the menu: see “Configuration.”
- Set the following parameters:

APPLIC. Application program
- DENSITY Density determination
  - DEC.PLCS. Decimal places
    - NONE No decimal places
    - o 1 DEC.PL. 1 decimal place
    - 2 DEC.PL. 2 decimal places*
    - 3 DEC.PL. 3 decimal places*

Note:
When three decimal places are shown, the third decimal place might be erroneous; for example, if corrections for air density and the particular density determination kit used are not considered.

* = With software versions 32.05 and later. For details on displaying the software version number, see page 25.
o = Factory setting

Printout for Density Determination

```
RhoFl   0.99823 o
Wa    +   20.0 g
Wfl   +   15.0 g
Rho         4.0 o
```

: Density of liquid (g/cm^3)
: Weight in air
: Weight in liquid
: Result: density of the sample

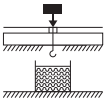
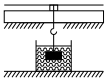
Table:

Density of H_2O at Temperature T (in °C)

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.99973	0.99972	0.99971	0.99970	0.99969	0.99968	0.99967	0.99966	0.99965	0.99964
11.	0.99963	0.99962	0.99961	0.99960	0.99959	0.99958	0.99957	0.99956	0.99955	0.99954
12.	0.99953	0.99951	0.99950	0.99949	0.99948	0.99947	0.99946	0.99944	0.99943	0.99942
13.	0.99941	0.99939	0.99938	0.99937	0.99935	0.99934	0.99933	0.99931	0.99930	0.99929
14.	0.99927	0.99926	0.99924	0.99923	0.99922	0.99920	0.99919	0.99917	0.99916	0.99914
15.	0.99913	0.99911	0.99910	0.99908	0.99907	0.99905	0.99904	0.99902	0.99900	0.99899
16.	0.99897	0.99896	0.99894	0.99892	0.99891	0.99889	0.99887	0.99885	0.99884	0.99882
17.	0.99880	0.99879	0.99877	0.99875	0.99873	0.99871	0.99870	0.99868	0.99866	0.99864
18.	0.99862	0.99860	0.99859	0.99857	0.99855	0.99853	0.99851	0.99849	0.99847	0.99845
19.	0.99843	0.99841	0.99839	0.99837	0.99835	0.99833	0.99831	0.99829	0.99827	0.99825
20.	0.99823	0.99821	0.99819	0.99817	0.99815	0.99813	0.99811	0.99808	0.99806	0.99804
21.	0.99802	0.99800	0.99798	0.99795	0.99793	0.99791	0.99789	0.99786	0.99784	0.99782
22.	0.99780	0.99777	0.99775	0.99773	0.99771	0.99768	0.99766	0.99764	0.99761	0.99759
23.	0.99756	0.99754	0.99752	0.99749	0.99747	0.99744	0.99742	0.99740	0.99737	0.99735
24.	0.99732	0.99730	0.99727	0.99725	0.99722	0.99720	0.99717	0.99715	0.99712	0.99710
25.	0.99707	0.99704	0.99702	0.99699	0.99697	0.99694	0.99691	0.99689	0.99686	0.99684
26.	0.99681	0.99678	0.99676	0.99673	0.99670	0.99668	0.99665	0.99662	0.99659	0.99657
27.	0.99654	0.99651	0.99648	0.99646	0.99643	0.99640	0.99637	0.99634	0.99632	0.99629
28.	0.99626	0.99623	0.99620	0.99617	0.99614	0.99612	0.99609	0.99606	0.99603	0.99600
29.	0.99597	0.99594	0.99591	0.99588	0.99585	0.99582	0.99579	0.99576	0.99573	0.99570
30.	0.99567	0.99564	0.99561	0.99558	0.99555	0.99552	0.99549	0.99546	0.99543	0.99540

Example: Determining the density of a solid using water as the buoyancy liquid.
The density of water at 20°C is 0.99823 g/cm^3.

Parameter settings: APPLIC.: DENSITY: DEC.PLCS 1DEC.PL. (menu code 2. 9. 1. 2)

Step	Key (or instruction)	Display/Data output
1. Attach sample holder to suspension wire		
2. Tare the balance	Tare	0.0 g
3. Edit the stored density value	Select Menu	_ 1.00000
4. Enter the density of the liquid (in this example: 0.99823)	Select Menu repeatedly, briefly or press and hold; Enter, etc.	_0.99823
5. Save density value and start application The density value is stored in battery-backed memory	Enter	
6. Confirm "AIR" display	Enter	AIR ?
7. Determine the weight of the sample in air: Place sample on the balance		+ 20.0 g ?*
8. Store value for weight in air	Enter	
9. Remove sample from the balance		WATER ?
10. Determine weight in liquid: place sample in holder		
11. Confirm "WATER" display	Enter	0.0 g ?*
12. Immerse sample in liquid		+ 15.0 g ?*
13. Store value for weight in liquid, view result, and print	Enter	+ 4.0 o ?* RhoFl 0.6237 o Wa + 20.0 g Wfl + 15.0 g Rho 4.0 o
14. Delete result	CF	
15. Repeat as desired, starting from Step 5.		

ISO/GLP-compliant Printout/Record

Features
You can have device information, ID texts and date and time printed before (GLP header) and after (GLP footer) the values of a weighing series. These parameters include:

GLP header:
- Date
- Time at beginning of measurement
- Balance manufacturer
- Balance model
- Balance serial number
- Software version number
- Identification number of the current sampling operation

GLP footer:
- Date
- Time at end of measurement
- Field for operator signature

⚠ **Operating the Balance with a Verifiable ISO/GLP Printer:**
● Connect a Sartorius data printer designed for ISO/GLP documentation (e.g., the YDP03-0CE printer) to the balance.

Configuration
● Setting menu codes for the printout (see "Configuration"):
- ISO/GLP-compliant printout or record only for calibration/adjustment: SETUP: PRNT.OUT: GLP: CAL.-ADJ. (menu code 1. 6. 7. 2) or ISO/GLP-compliant printout or record always on: SETUP: PRNT.OUT: GLP: ALWAYS ON (code 1. 6. 7. 3)

- Line format for printout: include data ID codes (22 characters; factory setting): SETUP: PRNT.OUT: FORMAT: 22 CHAR. (menu code 1. 6. 6. 2)
- Formats for time: SETUP: PRNT.OUT: TIME: 24 H (menu code 1. 6. 8. 1) or SETUP: PRNT.OUT: TIME: 12 H (menu code 1. 6. 8. 2)

- Formats for date: SETUP: PRNT.OUT: DATE: DD.MMM.YY (menu code 1. 6. 9. 1) or SETUP: PRNT.OUT: DATE: MMM.DD.YY (menu code 1. 6. 9. 2)

⚠ No ISO/GLP-compliant record is output if any of the following settings are configured: SETUP: PRNT.OUT PRINT: AUT.W/O or AUT.WITH (menu code 1. 6. 1. 3, 1. 6. 1. 4,) or FORMAT: 16 CHAR. (menu code 1. 6. 6. 1)

Function Keys
Transfer header and first measured value: press (⊟)

> The header is included with the first printout/data record.

To output header and reference data automatically when an application program is active: press (Enter)

Exit the application:
1) To send the GLP footer: press (CF)
2) Quit application program: press (CF) again

The ISO/GLP-compliant printout can contain the following lines:

`--------------------`	Dotted line
`17-Jun-2008  10:15`	Date/time (beginning of measurement)
`SARTORIUS`	Balance manufacturer
`Mod.  BSA8201`	Model
`Ser. no.  10105355`	Balance serial number
`Ver. no.  00-32-07`	Software version
`ID  2690 923`	ID.
`--------------------`	Dotted line
`L ID`	Measurement series no.
`nRef  10 pcs`	Counting: reference sample quantity
`wRef  21.14 g`	Counting: reference weight
`Qnt +  567 pcs`	Counting result
`--------------------`	Dotted line
`17-Aug-2006  10:20`	Date/time (end of measurement)
`Name:`	Field for operator signature
	Blank line
`--------------------`	Dotted line

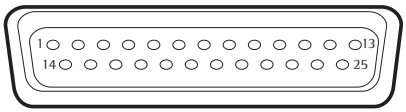
ISO/GLP-compliant printout for external calibration/adjustment:

`--------------------`	Dotted line
`17-Jun-2008  10:30`	Date/time (beginning of measurement)
`SARTORIUS`	Balance manufacturer
`Mod.  BSA8201`	Model
`Ser. no.  10105352`	Balance serial number
`Ver. no.  00-32-07`	Software version
`ID  2690 923`	ID.
`--------------------`	Dotted line
`Cal. Ext. Test`	Calibration/adjustment mode
`Set +  5000.0 g`	Calibration weight
`Diff. +  0.2 g`	Difference determined in calibration
`Cal. Ext. Complete`	Confirmation of completed calibration procedure
`Diff.  0.0 g`	Difference from target following adjustment
`--------------------`	Dotted line
`17-Aug-2006  10:32`	Date/time (end of measurement)
`Name:`	Field for operator signature
	Blank line
`--------------------`	Dotted line

Data Interface

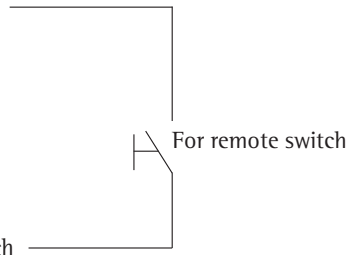
Purpose
Your balance comes equipped with an interface port for connection to a computer or other peripheral device. You can use an on-line computer to change, start and/or monitor the functions of the balance and the application programs.

Female interface connector



Pin Assignment Chart, 25-pin
female interface connector, RS-232:

Pin 1: Shield
Pin 2: Data output (TxD)
Pin 3: Data input (RxD)
Pin 4: Internal ground (GND)
Pin 5: Clear to Send (CTS)
Pin 6: Not connected
Pin 7: Internal ground (GND)
Pin 8: Internal ground (GND)
Pin 9: Not connected
Pin 10: Not connected
Pin 11: +12 V
(operating voltage
for Sartorius printer)
Pin 12: Reset _ Out *)
Pin 13: +5 V output
Pin 14: Internal ground (GND)
Pin 15: Universal remote switch
Pin 16: Not connected
Pin 17: Not connected
Pin 18: Not connected
Pin 19: Not connected
Pin 20: Data Terminal Ready (DTR)
Pin 21: Not connected
Pin 22: Not connected
Pin 23: Not connected
Pin 24: Not connected
Pin 25: +5 V output



*) = Hardware restart

Preparation
You can set these parameters for other devices in the Setup menu (see the chapter entitled “Configuring the Balance”).
You will also find a detailed description of the available data interface commands in the file “Data Interface Descriptions for BSA, ED, GK and GW Models”, which you can download from the Sartorius website (www.sartorius.com “Download Center”).

The many and versatile properties of these balances can be fully utilized for printing out records of the results when you connect your balance to a Sartorius data printer. The recording capability for printouts makes it easy for you to work in compliance with ISO/GLP.

Troubleshooting Guide

Error codes are shown on the main display for approx. 2 seconds. The program then returns automatically to the previous mode.

Display	Cause	Solution
No segments appear on the display	No AC power is available	Check the AC power supply
	The power supply is not plugged in	Plug in the power supply
HIGH	The load exceeds the balance capacity	Unload the balance
LOW or ERR 54	Something is touching the weighing pan	Move the object that is touching the weighing pan
APP.ERR.	Cannot store data: Load on weighing pan too light or no sample on pan while application is active	Increase load
DIS.ERR.	Data output not compatible with output format	Change the configuration in the operating menu
PRT.ERR.	Interface port for printer output is blocked	Reset the menu factory settings, or Contact your local Sartorius Service Center
ERR 02	Calibration parameter not met; e.g.: – balance not tared – load on weighing pan	Calibrate only when zero is displayed – Press (Tare) to tare the balance – Unload the balance
ERR 10	The (Tare) key is blocked when there is data in the second tare memory (net-total); only 1 tare function can be used at a time	Press (CF) to clear the tare memory and release the tare key
ERR 11	Tare memory not allowed	Press (Tare)
The weight readout changes constantly	Unstable ambient conditions (excessive vibration or draft) at the place of installation	Set up the balance in another area
	A foreign object is caught between weighing pan, pan support and balance housing	Remove the foreign object
The weight readout is obviously wrong	The balance was not calibrated/adjusted	Calibrate/adjust the balance
	Balance not tared before weighing	Tare or zero the balance before weighing

If any other errors occur, contact your local Sartorius Service Center.
Contact information: Please point your Internet browser to: http://www.sartorius.com

Care and Maintenance

Service
On request, Sartorius can offer you an individual service contract.

Repairs
Repair work must be performed by trained service technicians. Any attempt by untrained persons to perform repairs may result in considerable hazards for the user.

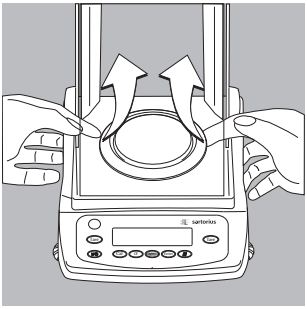
Cleaning

- Unplug the AC adapter from the wall outlet (mains supply). If you have an interface cable connected to the balance port, unplug it from the port.

⚠ Make sure that no liquid enters the balance housing.

⚠ Do not use aggressive cleaning agents (solvents or similar agents).

- After cleaning, wipe down the balance with a soft, dry cloth.



On analytical balances remove and clean the weighing pan as follows:

- Reach beneath the shield disk and lift it carefully, together with the pan support, to avoid damaging the weighing system.

⚠ Make sure that no liquid enters the balance housing.

Cleaning Stainless Steel Surfaces
Clean all stainless steel parts regularly. Remove the stainless steel weighing pan and thoroughly clean it separately. Use a damp cloth or sponge to clean stainless steel parts on the balance.
You can use any household cleaning agent that is suitable for use on stainless steel. Clean stainless steel surfaces only by wiping them down. Then rinse the equipment thoroughly, making sure to remove all residues. Afterwards, allow the equipment to dry. If desired, you can apply oil to the cleaned surfaces as additional protection.

Recycling

Safety Inspection
If there is any indication that safe operation of the balance is no longer warranted:

● Turn off the power and disconnect the equipment from AC power immediately.

> Lock the equipment in a secure place to ensure that it cannot be used for the time being.

Notify your nearest Sartorius Service Center. Repair work must be performed by trained service technicians.

We recommend having the power supply inspected by a certified electrician at regular intervals, according to the following checklist:

– Insulating resistance: > 7 megaohms measured with a constant voltage of at least 500 volts at a 500 K-ohm load
– Leakage current: < 0.05 mA measured with a properly calibrated multimeter

Information and Instructions on Disposal and Repairs
Packaging that is no longer required must be disposed of at the local waste disposal facility. The packaging is made of environmentally friendly materials that can be used as secondary raw materials.

The equipment, including accessories and batteries, does not belong in your regular household waste. The EU legislation requires its Member States to collect electrical and electronic equipment and disposed of it separately from other unsorted municipal waste with the aim of recycling it.

In Germany and many other countries, Sartorius AG takes care of the return and legally compliant disposal of its electrical and electronic equipment on its own. These products may not be placed with the household waste or brought to collection centers run by local public disposal operations – not even by small commercial operators.

For disposal in Germany and in the other Member States of the European Economic Area (EEA), please contact our service technicians on location or our Service Center in Goettingen, Germany:

Sartorius AG
Service Center
Weender Landstrasse 94-108
37075 Goettingen, Germany

In countries that are not members of the European Economic Area (EEA) or where no Sartorius affiliates, subsidiaries, dealers or distributors are located, please contact your local authorities or a commercial disposal operator.

Prior to disposal and/or scrapping of the equipment, any batteries should be removed and disposed of in local collection boxes.

Sartorius AG, its affiliates, subsidiaries, dealers and distributors will not take back equipment contaminated with hazardous materials (ABC contamination) – either for repair or disposal. Please refer to the accompanying leaflet/manual or visit our Internet website (www.sartorius.com) for comprehensive information that includes our service addresses to contact if you plan to send your equipment in for repairs or proper disposal.

Overview

Specifications

Specifications

Built-in motorized calibration weight		All models with the designation suffix BSA...-CW
AC power source/power requirements, voltage, frequency		AC adapter 230 V or 115 25 V, +15% to – 20%, 48–60 Hz
Power consumption	VA	maximum 16; typical 8 (STNG6)
Approx. hours of operation with the YRB05Z rechargeable battery pack (backlighting on)	h	35

Ambient Conditions

The specifications given here are ensured under the following ambient conditions:

Operating temperature range	+10 to +30°C (273 to 303 K, 50 to 86°F)
Allowable ambient operating temperature	+5 to +40°C (41 to 104°F)

Proper functioning is ensured within an ambient operating temperature range of 5 to 40°C (41 to 104°F).

Specifications for Individual Models

Model		BSA224S, BSA224S-CW	BSA124S, BSA124S-CW
Weighing capacity		220 g	120 g
Readability		0.0001 g	0.0001 g
Tare range (subtractive)		220 g	120 g
Repeatability (std. deviation)	≤±	0.0001 g	0.0001 g
Linearity	≤±	0.0002 g	0.0002 g
Response time (average)	s	2.5	2.5
Sensitivity drift within +10 to +30°C	≤±/K	$2 \cdot 10^{-6}$	
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.1–0.4 s (depends on filter level selected)	
External calibration weight (of at least accuracy class...)	g	200 (E2)	100 (E2)
Net weight, approx.:	kg	4.4 | 4.8	
Weighing pan size	mm	90 ∅	
Whg. chamber height	mm	230	
Dimensions (W × D × H)	mm	230 × 310 × 330	

Model		BSA623S, BSA623S-CW	BSA423S, BSA423S-CW	BSA323S, BSA323S-CW	BSA223S, BSA223S-CW
Weighing capacity		620 g	420 g	320 g	220 g
Readability		0.001 g	0.001 g	0.001 g	0.001 g
Tare range (subtractive)		620 g	420 g	320 g	220 g
Repeatability (std. deviation)	≤±	0.001 g	0.001 g	0.001 g	0.001 g
Linearity	≤±	0.002 g	0.002 g	0.002 g	0.002 g
Response time (average)	s	1.3	1.1	1	1
Sensitivity drift within +10 to +30°C	≤±/K	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$3.3 \cdot 10^{-6}$
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.05–0.4 s (depends on filter level selected)			
External calibration weight (of at least accuracy class...)	g	500 (E2)	200 (E2)	200 (F1)	100 (F1)
Net weight, approx:	kg	3.2|3.6			
Weighing pan size	mm	115 ∅			
Dimensions (W × D × H)	mm	230 × 310 × 305			

Model		BSA6202S, BSA6202S -CW	BSA4202S, BSA4202S -CW	BSA3202S, BSA3202S -CW	BSA2202S, BSA2202S -CW	BSA822, BSA822-CW
Weighing capacity	g	6200	4200	3200	2200	820
Readability	g	0.01	0.01	0.01	0.01	0.01
Tare range (subtractive)	g	6200	4200	3200	2200	820
Repeatability (std. deviation)	≤±g	0.01	0.01	0.01	0.01	0.02
Linearity	≤±g	0.02	0.02	0.02	0.02	0.03
Stabilization time (typical)	s	1.1	1.1	1.1	1.1	1.0
Sensitivity drift within +10 to +30°C	≤±/K	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$2 \cdot 10^{-6}$	$5 \cdot 10^{-6}$
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.05–0.4 s (depends on filter level selected)				
External calibration weight (of at least accuracy class...)	g	5000 (E2)	2000 (E2)	2000 (F1)	2000 (F1)	500 (F2)
Net weight, approx:	kg	3.1|3.5	3.1|3.5	3.1|3.5	3.1|3.5	2|2.6
Weighing pan size	mm	180 × 180	180 × 180	180 × 180	180 × 180	150 ∅
Dimensions (WxDxH)	mm	230 × 310 × 91				230×310×87

Model		BSA8201, BSA8201-CW	BSA5201, BSA5201-CW	BSA2201, BSA2201-CW
Weighing capacity	g	8200	5200	2200
Readability	g	0.1	0.1	0.1
Tare range (subtractive)	g	8200	5200	2200
Repeatability (std. deviation)	≤±g	0.1	0.1	0.1
Linearity	≤±g	0.3/0.1	0.3/0.1	0.3/0.1
Response time (average)	s	1	1	1
Sensitivity drift within +10 to +30°C	≤±/K	$10 \cdot 10^{-6}$	$10 \cdot 10^{-6}$	$15 \cdot 10^{-6}$
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.05–0.4 s (depends on filter level selected)		
External calibration weight (of at least accuracy class...)	g	5000 (F2)	5000 (F2)	2000 (F2)
Net weight, approx.:	kg	2.7 | 3.5	2.7 | 3.5	2.7 | 3.5
Weighing pan size	mm	180 × 180		
Dimensions (WxDxH)	mm	230 × 310 × 91		

Accessories

Product **Order No.**

Data printer **YDP03-0CE**
with date, time, statistics evaluation, transaction counter functions and LCD

Remote display, reflective **YRD03Z**
(for connection to data interface port)

External rechargeable battery pack **YRB05Z**
With battery-level indicator (LED); can be recharged using the AC adapter (charge time for completely discharged battery pack: 15 hours); see "Specifications" for hours of operation.
To recharge the battery pack: Unplug the AC adapter from the balance and plug it into the battery pack

SartoCollect **YSC02**
data transfer software for direct transmission of weight values to another program (e.g., MS Excel)

Product

Density determination kit
- for BSA224S, BSA124S **YDK01B**

Standard Operating Procedure
optimum use of your balance in quality-management systems **YSL07E**

Data cable
- for connecting a computer with a USB port **YCC01-USBM2**
- for computer connection, 25-pin **7357312**
- for computer connection, 9-pin **7357314**

Adapter cable **6965619**
from D-Sub 25-pin male connector to D-Sub 9-contact female connector; length: 0.25 m

	Order No.
Universal remote control switch for remote control of the following functions: (⊟), (Tare), (Cal) or a function key (see "Configuration" for details):	
Foot switch with T-connector	**YFS01**
Hand switch with T-connector	**YHS02**
T-connector Note: The T-connector is not intended for connecting multiple intelligent peripheral devices, such as PCs or YDP03-0CE printers.	**YTC01**
Ionizing blower for eliminating static electricity	
– 220 V	**YIB01-0DR**
– 110 V	**YIB01-0UR**
Stat-Pen anti-static device for eliminating electrostatic charges on samples and containers (100 V to 230 V, 50/60 Hz)	**YSTP01**
In-use dust cover	
– for models with a rectangular weighing pan	**Information available on request**
– for models with a round weighing pan (150 mm diameter)	

CE Marking

The balance complies with the following EC Directives and European Standards:

Directive 2004/108/EC:
"Electromagnetic compatibility (EMC)"

EN 61326-1	Electrical equipment for measurement, control and laboratory use EMC Requirements
Part 1:	General requirements Defined immunity to interference: Industrial areas, continuous, unmonitored operation Limitation of emissions: Residential areas, Class B

Important Note:
The operator shall be responsible for any modifications to Sartorius equipment or connections of cables not supplied by Sartorius and must check and, if necessary, correct these modifications. On request, Sartorius will provide information on the minimum operating specifications (in accordance with the Standards listed above for defined immunity to interference).

Directive 2006/95/EC:
"Electrical equipment designed for use within certain voltage limits"

Applicable European Standards:

EN 61010	Safety requirements for electrical measurement, control, and laboratory equipment Part 1: General requirements

If you use electrical equipment in installations and under ambient conditions subject to stricter safety standards than those described in the manual, you must comply with the provisions as specified in the applicable regulations for installation in your country.

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The status of the information,
specifications and illustrations
in this manual is indicated
by the date given below.
Sartorius AG reserves the
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technology, features,
specifications and design of the
equipment without notice.

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