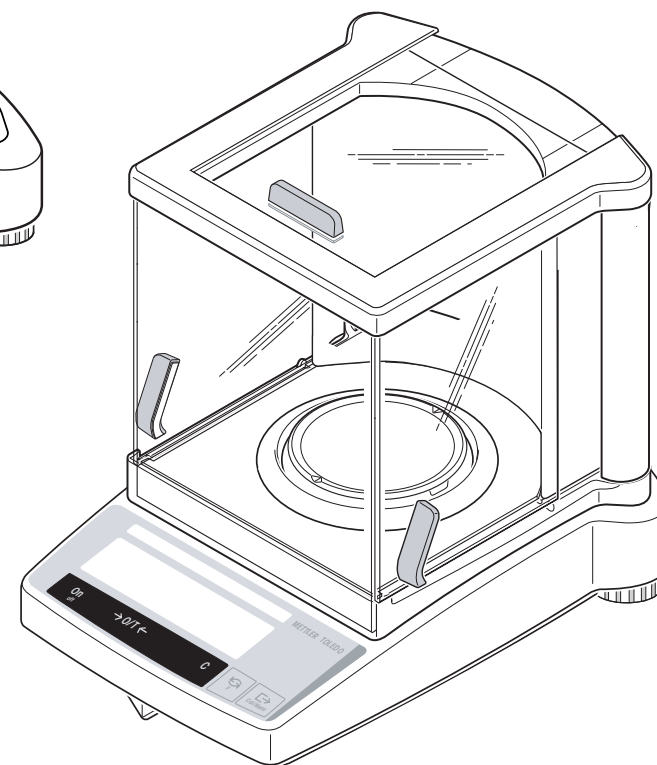
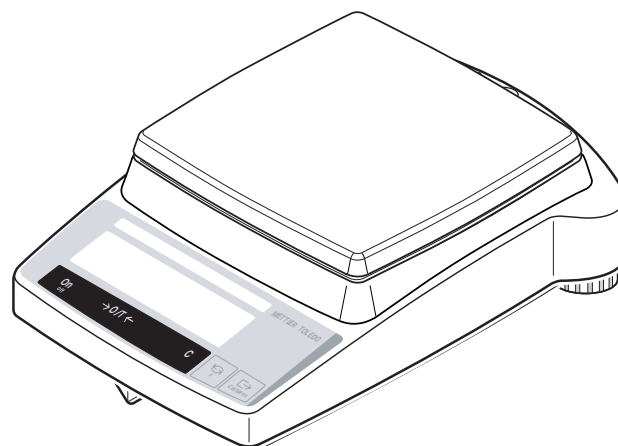


Operating instructions

METTLER TOLEDO

Gold and carat balances (JEWELRY)




- JB-L-G, JB-G/FACT
- JB-L-C, JB-C/FACT







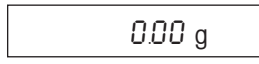
METTLER TOLEDO

www.mt.com/jewelry






Operating instructions in a nutshell

 Press key **briefly**
 Press and **hold key down** until the desired display appears
 automatic sequence

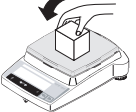
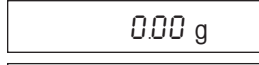
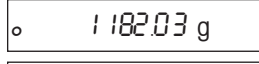
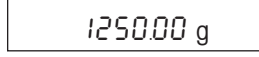
Switching on

 **On**







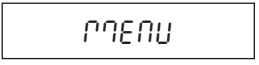


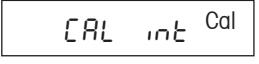


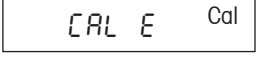
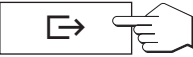

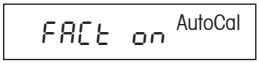


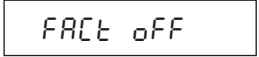
Switching off

 **Off**





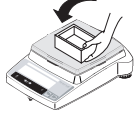
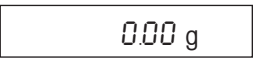
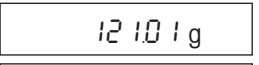

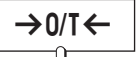

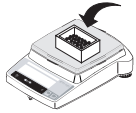
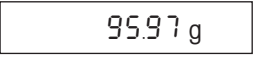

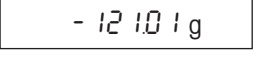
Simple weighing








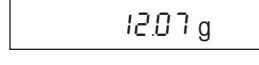








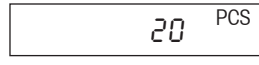
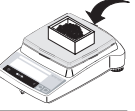


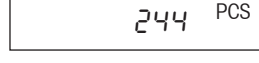


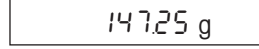
Adjustment options

 **Cal/Menu**
















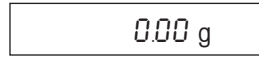
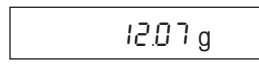






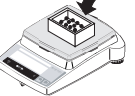
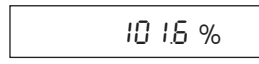
Taring




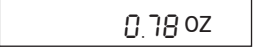
Piece counting*

Percent weighing*

Unit switching*

*These functions must be activated in the menu (section 4.3.3)

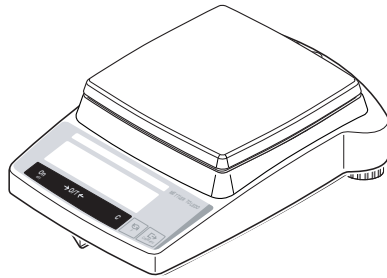
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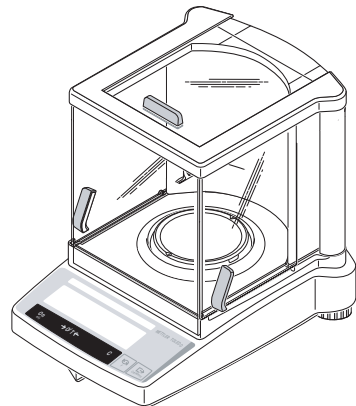
1 Getting to know JB balances (Gold and carat balances)

1.1 Introducing the JB line of balances

JB-L-G, JB-G/FACT



JB-L-C, JB-C/FACT



- The JB (JEWELRY) balance line ranges from high-resolution carat balances (JB-L-C, JB-C/FACT) with a readability of 0.01 ct / 0.01 g to 0.001 ct / 0.0001 g through to precision gold balances (JB-L-G, JB-G/FACT) with a readability of 0.01 g to 0.1 g. The weighing ranges extend from 140 g to 8.1 kg.
- The operation of all these balances is identical.

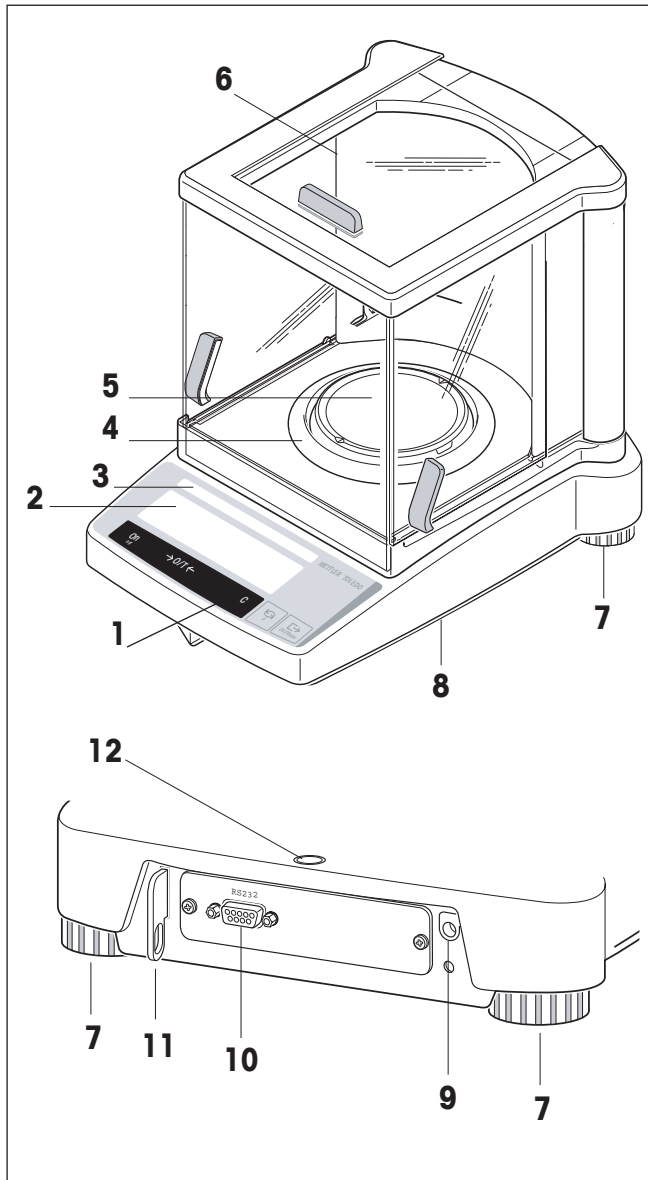
Balance features

- All JB-G/FACT and JB-C/FACT models have **FACT (Fully Automatic Calibration Technology)**, fully automatic, motorized adjustment (calibration) with internal weight.
- In addition to basic weighing operations such as **weighing**, **taring** and **adjusting** (calibration) the functions **"Piece counting"**, **"Percent weighing"** or can be activated.
- All JB-L-C and JB-C/FACT models are fitted with a glass draft shield in the factory; with JB-L-G and JB-G/FACT models a **draft shield** is available as an **optional extra**.
- All balances are fitted with an **RS232C interface** as standard.
- All JB-G/FACT and JB-C/FACT models have an **internal adjustment weight**.

Note

All JB balances are available as certified versions. Please ask your METTLER TOLEDO dealer for details.

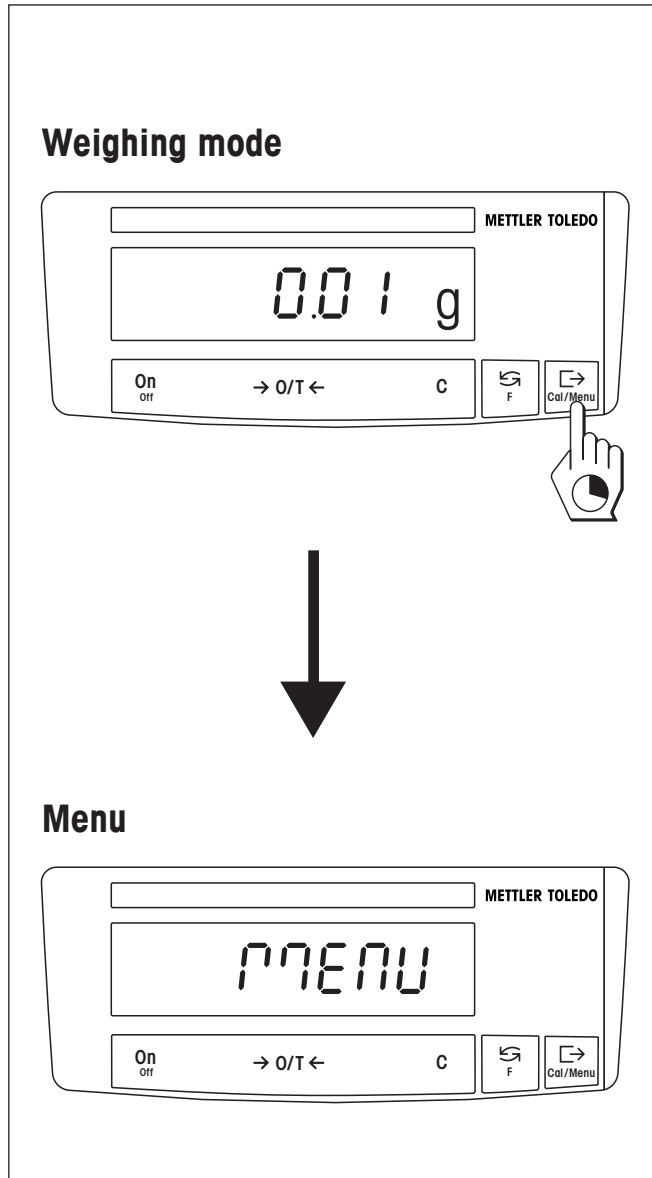
1.2 Layout of JB balances



- 1 Keys
- 2 Display with backlight
- 3 Model plate with the following data:
 - "Max": maximum capacity
 - "d": readability
 - "Min": minimum capacity (recommended minimum load; **only relevant for certified balances**)
 - "e": verification scale interval (smallest display increment tested during certification; **only relevant for certified balances**)
- 4 Draft shield element
- 5 Weighing pan
- 6 Draft shield (standard supply with models JB-C)
- 7 Leveling feet
- 8 Hanger opening for weighing below the balance (underside of balance)
- 9 AC adapter socket
- 10 RS232C interface
- 11 Lug for optional antitheft device
- 12 Leveling control

Housing, keys and display are identical for all JB balances.

1.3 Overview of key functions



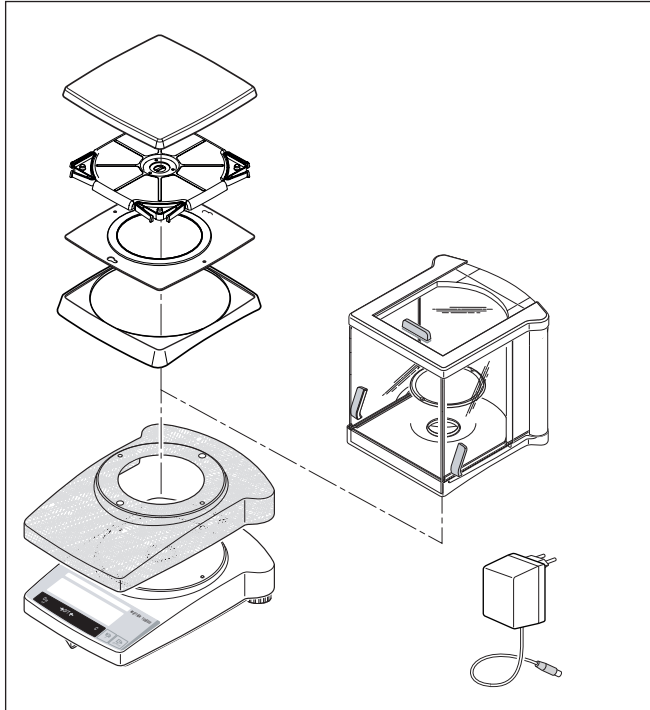
The balances have two operator control levels: the **weighing mode** and the **menu**. The function of each individual key depends on the operator control level and how long the key is pressed.

Key functions in weighing mode	
Press briefly	Press and hold down
On <ul style="list-style-type: none"> • Switch on →O/T← <ul style="list-style-type: none"> • Zero/tare C <ul style="list-style-type: none"> • Cancel function 	Off <ul style="list-style-type: none"> • Switch off balance (standby mode)
<ul style="list-style-type: none"> • Switch • Change settings 	F <ul style="list-style-type: none"> • Call function A function must be activated in the menu, otherwise "F nonE" appears in the display
<ul style="list-style-type: none"> • Transfer weighing data via interface • Confirm settings 	Cal/Menu <ul style="list-style-type: none"> • Adjust (calibrate) • Show menu (hold key down until MENU appears)

Key functions in menu mode	
Press briefly	Press and hold down
C <ul style="list-style-type: none"> • Close menu (without saving changes) 	-----
<ul style="list-style-type: none"> • Change settings 	-----
<ul style="list-style-type: none"> • Select menu options 	Cal/Menu <ul style="list-style-type: none"> • Save changes and close menu

2 Startup

2.1 Unpacking / standard equipment



All balances are supplied in environmentally compatible packaging.

The standard equipment for every balance comprises:

- **AC adapter**, to national codes
- **Transparent plastic protective cover**, fitted, to keep your balance clean at all times
- **Operating instructions**, to ensure optimum utilization of your balance's capabilities
- **CE declaration of conformity** (in separate brochure 11780294)

JB-L-G, JB-G/FACT:

- **Weighing pan 180 x 180 mm with pan support**
- **Base plate and intermediate plate for protective cover**, fitted

JB-L-C, JB-C/FACT:

- **Weighing pan \varnothing 80 mm with draft shield element**
- **Draft shield**
- **Carat pan**
- **Adjustment weight (only JB-L-C)**

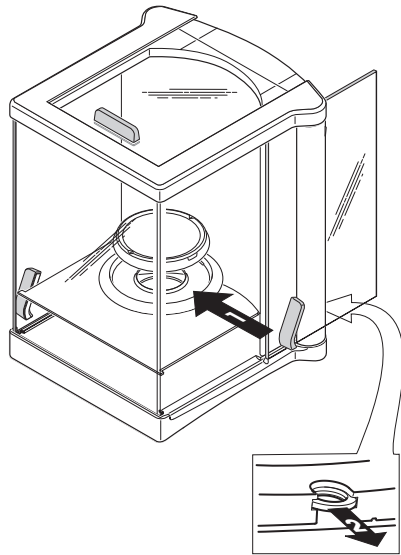
2.2 Cautionary notes



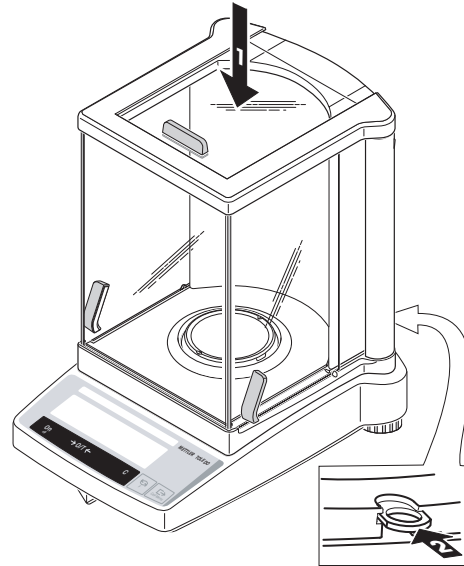
- JB balances must **not** be operated **in hazardous areas** with the standard-supply AC adapter.
- Before connecting the AC adapter, verify that the voltage printed on it corresponds to the local mains voltage. If this is not the case, please contact your local METTLER TOLEDO dealer.
- JB balances may only be used indoors and in a dry environment.
- For use with an certified (CSA or equivalent) power supply, which must have a limited and SELV circuit output.

2.3 Installing the draft shield

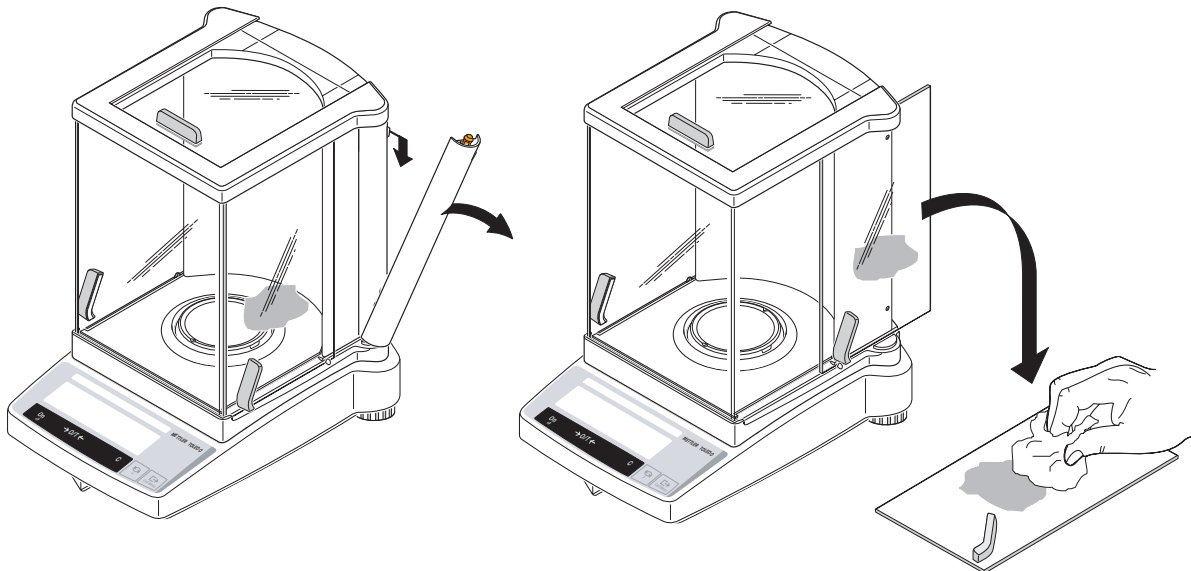
1



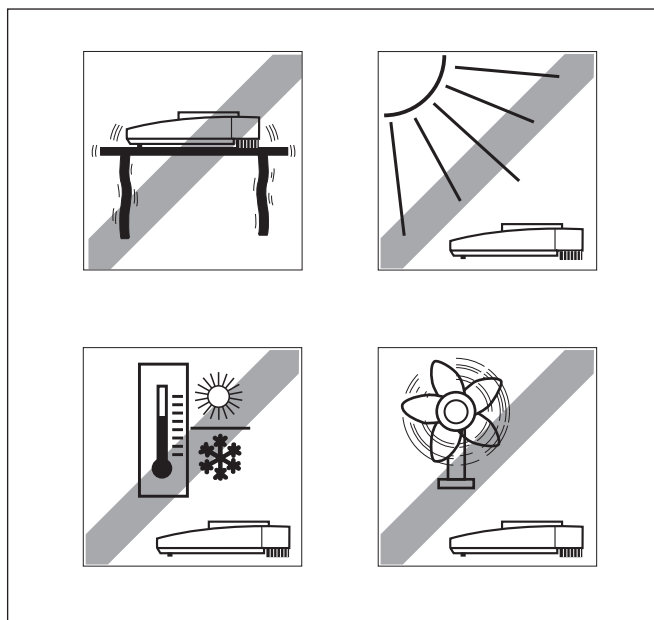
2



i



2.4 Setting up, leveling, preparations for weighing below the balance, connecting to power supply



The optimum location

The correct location makes an important contribution to the accuracy of the weighing results of high-resolution balances.

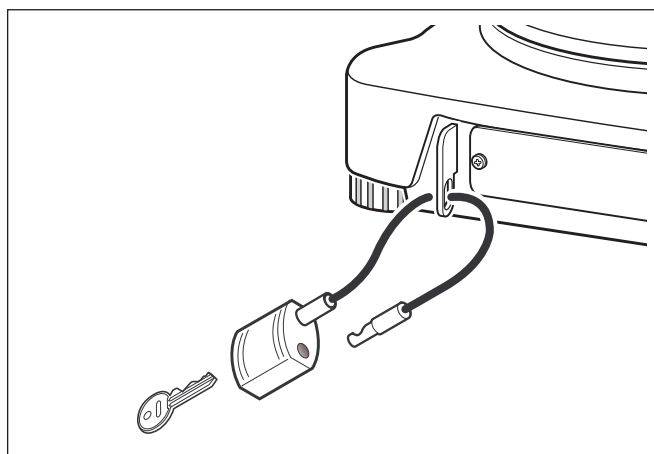
Hence, ensure a

- stable, vibration-free position as horizontal as possible

Avoid

- direct sunlight
- excessive temperature fluctuations
- drafts

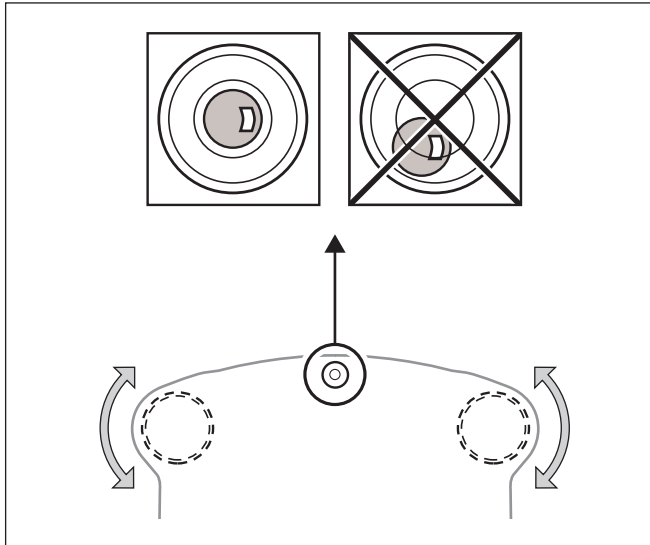
The best location is on a stable bench in a corner protected against drafts, as far away as possible from doors, windows, radiators or the louvers of air conditioners.



Antitheft device

JB balances are equipped with a lug for the optional antitheft device.

The antitheft device (cable with lock) is suitable for all models. It is available from METTLER TOLEDO under the order number 590101.



Leveling

JB balances have a spirit level and two adjustable leveling feet to compensate for slight irregularities in the surface of the weighing bench. The balance is exactly horizontal when the air bubble is in the middle of the level glass.

Procedure

Adjust the two leveling feet appropriately until the air bubble comes to rest exactly in the middle of the glass:

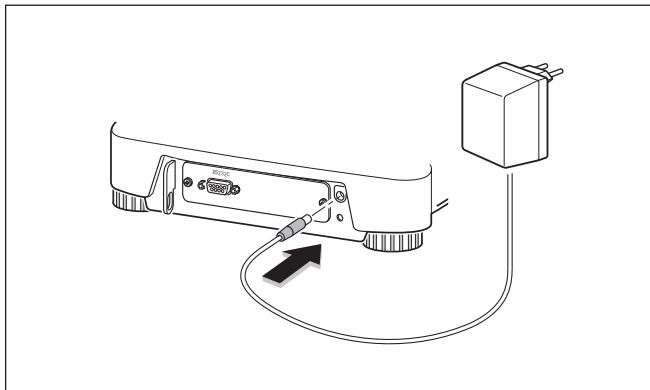
Air bubble at "12 o'clock"	turn both feet counterclockwise
Air bubble at "3 o'clock"	turn left foot clockwise, right foot counterclockwise
Air bubble at "6 o'clock"	turn both feet clockwise
Air bubble at "9 o'clock"	turn left foot counterclockwise, right foot clockwise

Note

The balance should be leveled and adjusted (Section 2.4) each time it is moved to a new location.

Preparations for weighing below the balance

To carry out weighing operations below the balance, the special cover on the underside of the balance must be slackened (care: when doing this the balance may only be laid on its side, not turned upside down!), turned through 180° and retightened. This exposes the opening for the hanger, making weighing below the balance possible.



Connecting the power supply

- Before connecting the AC adapter, check that the voltage printed on it corresponds to the local mains voltage. If this is not the case, please contact your local METTLER TOLEDO dealer.
- Plug the AC adapter into the AC adapter socket on the balance, and connect to the power supply.
- The balance performs a self-test. This test is finished when "OFF" appears.
- Press the «On» key briefly: the balance is in operational readiness. Before any work is performed with the balance, it must be adjusted (Section 2.5).

Notes

An optional AccuPac B-S Part no. 21254691 (rechargeable external battery) can be used to operate all JB balances independently of the mains power supply.

2.5 Adjusting (calibration)



To obtain accurate weighing results, the balance must be adjusted to match the gravitational acceleration at its location.

Adjusting is necessary

- before the balance is used for the first time
- at regular intervals during weighing service
- after a change of location

2.5.1 Fully automatic adjustment (calibration) FACT (only available on JB-C/FACT and JB-G/FACT models)

The **factory setting** is **fully automatic adjustment FACT** (Fully Automatic Calibration Technology) with the internal weight (see also Section 4.3.3). In this setting, you have no need worry about adjusting your balance. The balance adjusts itself automatically

- after the warm-up phase on connection to the power supply,
- when a change in the ambient conditions, e.g. the temperature could lead to a noticeable deviation in the measurement.

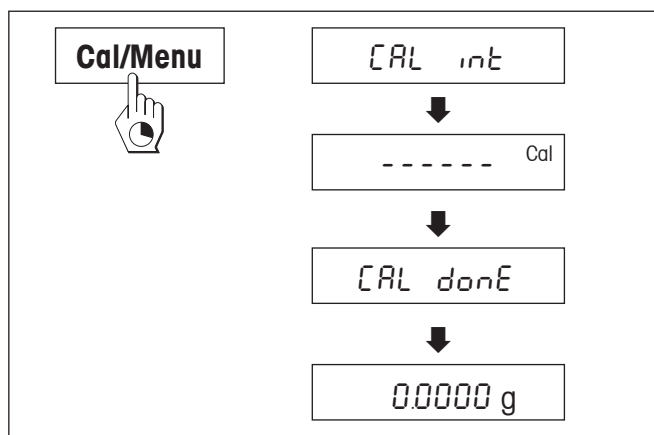
2.5.2 Manual adjustment (calibration)

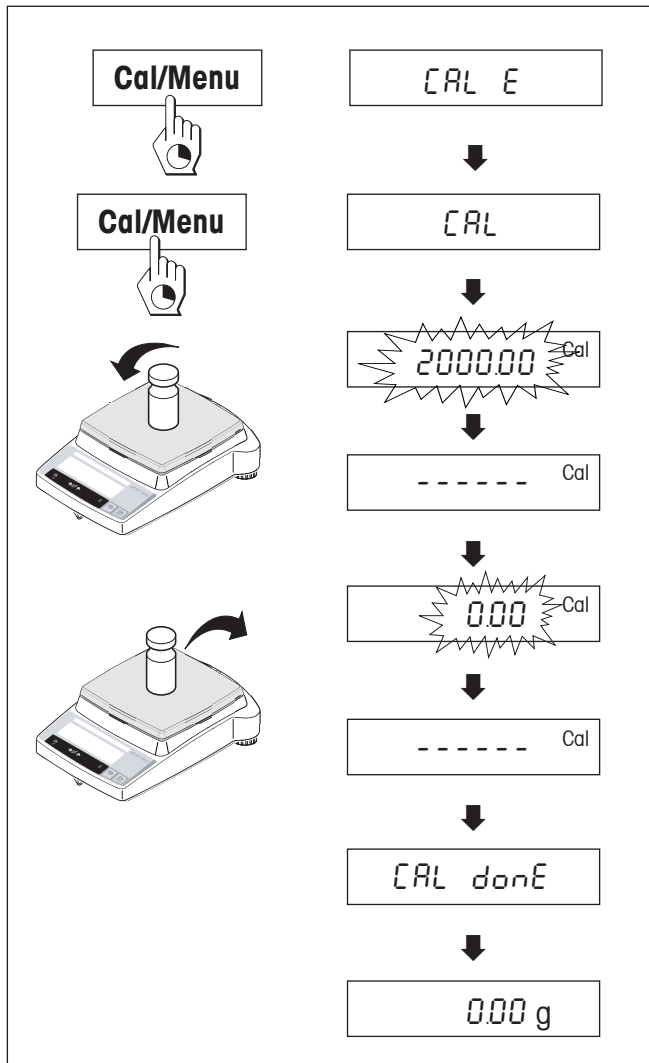
To obtain accurate results, the balance must be connected to the power supply for 30 minutes in order to reach operating temperature before adjusting.

Adjusting with internal weight (only available on JB-C/FACT and JB-G/FACT models)

- To carry out this operation, in the second menu option (Adjustment) select "CAL int" (=factory setting) (Section 4.1).
- Unload weighing pan
- Press and hold the «**Cal/Menu**» key down until "CAL" appears in the display, then release key.
- The balance adjusts itself automatically.

The adjusting is finished when the message "CAL done" appears briefly in the display, followed by "0.0000 g". The balance is again in weighing mode and ready for operation.





Adjusting with external weight

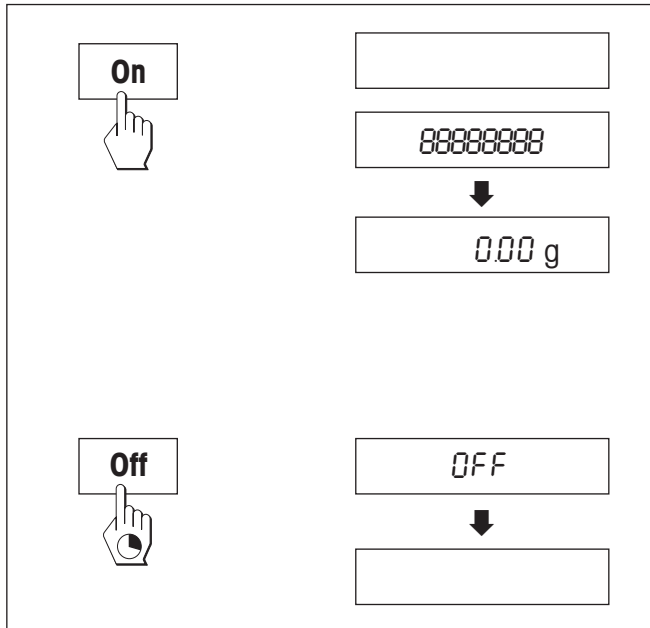
- To carry out this operation, in the second menu option (Adjustment) select "CAL E" (=factory setting) (Section 4.1).
 - Have required adjustment weight ready.
 - Unload weighing pan
 - Press and hold the «**Cal/Menu**» key down until "CAL" appears in the display, then release key. The required adjustment weight value flashes in the display.
 - Place adjustment weight in center of pan. The balance adjusts itself automatically.
 - When "0.00 g" flashes, remove adjustment weight.
- The adjusting is finished when the message "CAL done" appears briefly in the display, followed by "0.00 g". The balance is again in weighing mode and ready for operation.

Notes

- **JB-C/FACT** and **JB-G/FACT models** have an internal adjustment weight and adjust themselves automatically 2 times within 2 hours of connection to the power supply, thereafter periodically.
- Because of certification legislation, the **certified JB-L-G models cannot** be adjusted by the user.
- The adjustment procedure can be terminated at any time with the «C» key. The message "Abort" appears briefly to confirm that adjustment has been canceled, and the balance reverts to weighing mode.

3 Weighing

3.1 On/off switching



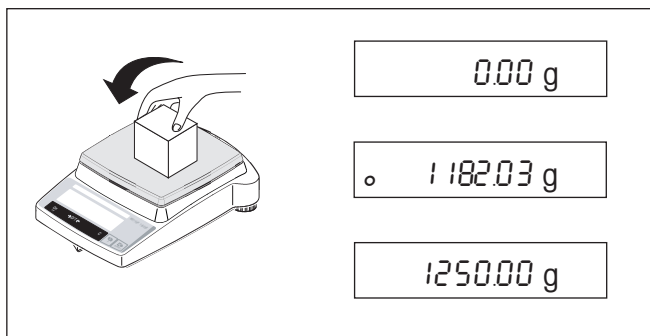
Switching on

- Remove any load from weighing pan and press «**On**» key briefly.
The balance performs a display test (all segments in the display light up briefly).
When zero is displayed, the balance is ready for operation.

Switching off

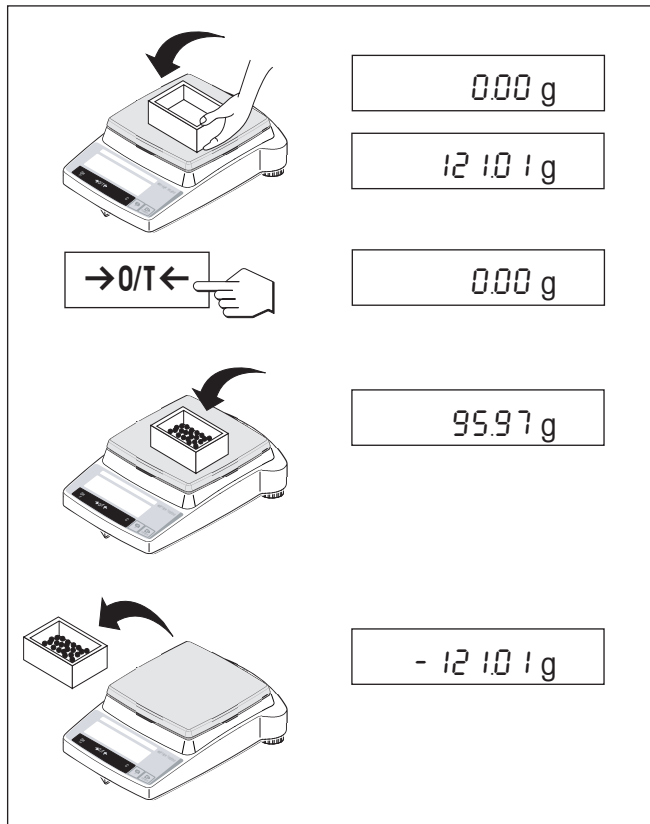
- Press and hold the «**Off**» key down until "OFF" appears in the display. Release the key.

3.2 Simple weighing



- Place weighing sample on the weighing pan.
- Wait until the stability detector "o" disappears.
- Read the result.

3.3 Taring



- Place empty container on the balance.
- The weight is displayed.
- Tare: press the « $\rightarrow 0/T \leftarrow$ » key briefly.
- Add weighing sample to container. The net weight is now displayed.

If the container is removed from the balance, the tare weight will be shown as a negative value. The tare weight remains stored until the « $\rightarrow 0/T \leftarrow$ » key is pressed again or the balance is switched off.

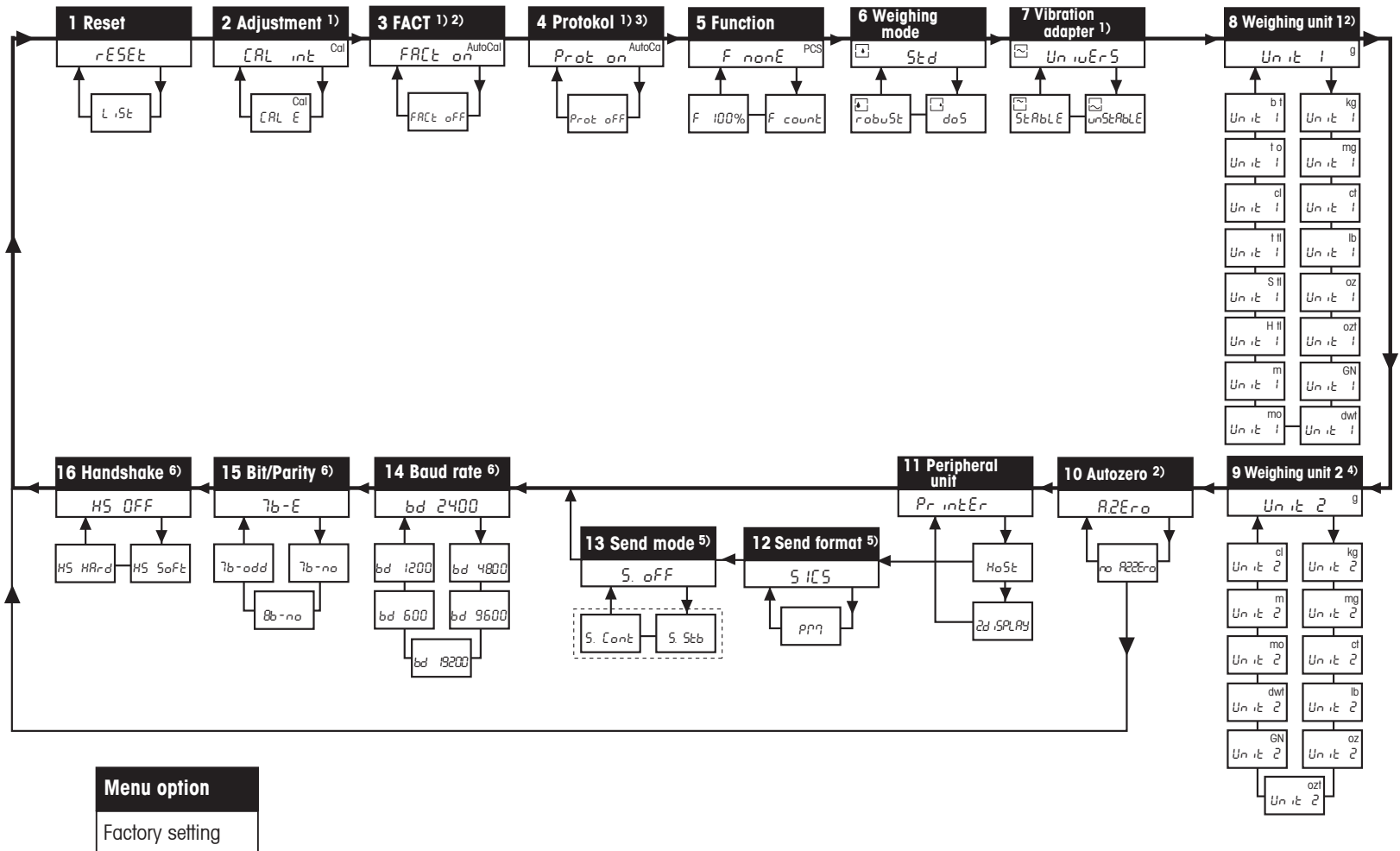
4 Menu

4.1 Overview

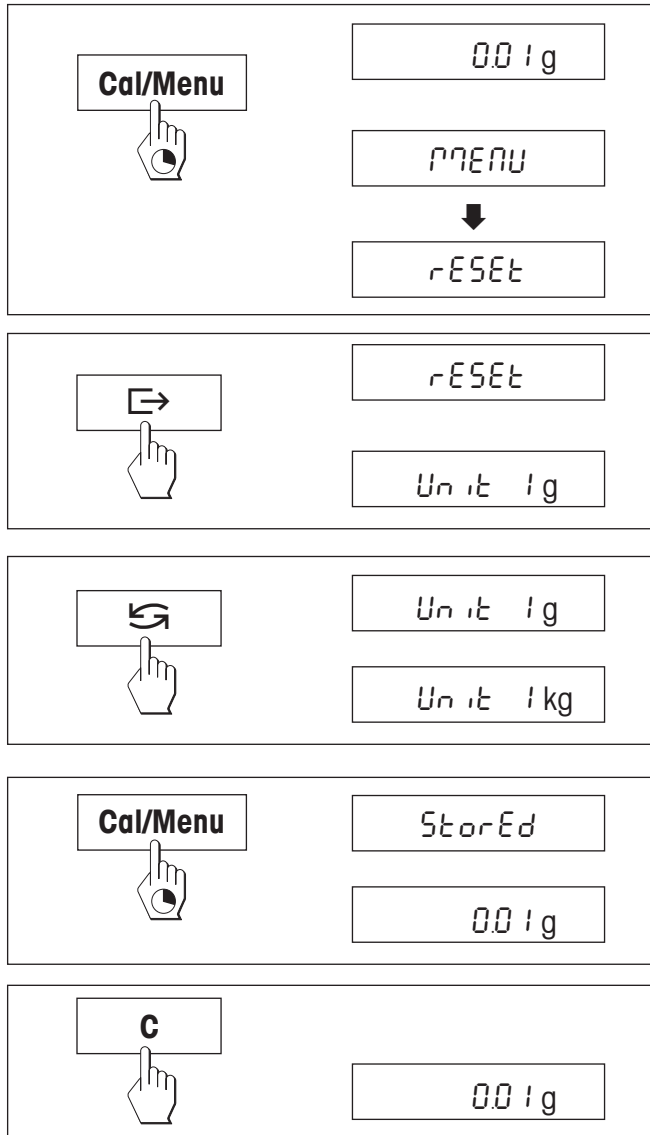
In the menu you can change the weighing unit (for certified balances, only if the national certification law allows), select additional functions and carry out various settings. A description of the individual menu options is given in Section 4.3.

Notes

- 1) This menu option is only available on JB-C/FACT and JB-G/FACT models.
 - 2) With certified balances, this menu option has a fixed setting and cannot be changed.
 - 3) These menu option is only shown if "FACT on" (Factory setting) has been selected in menu option 3 (FACT).
 - 4) With certified balances, only those weighing units allowed by the appropriate national weights and measures legislation may be selected.
- Factory setting:
 JB-G: "g"
 JB-C: "ct"
- 5) This menu option is only shown if "Host" has been selected in menu option 11 (Peripheral unit).
 - 6) These menu options are only shown if "Host" or "Printer" has been selected in menu option 11 (Peripheral unit).



4.2 Menu operation



Opening the menu

In weighing mode, press and hold down the «**Cal/Menu**» key until "MENU" appears in the display. Release the key: the 1st menu option is displayed.

Select menu options

The «`→`» key is used to select individual menu options with their current settings one after the other.

Change settings

The «`←`» key is used to change the setting at the selected menu option. Every time the key is pressed, the next setting is displayed. Once the desired setting appears in the display, the next menu option can be selected (see above) or you can close the menu (see following sections).

Saving settings and closing the menu

Hold the «**Cal/Menu**» key down until "StorEd" appears in the display. Release the key and the balance reverts to weighing mode. All changes are saved.

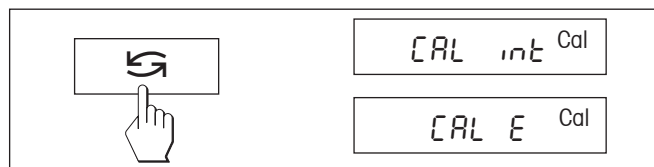
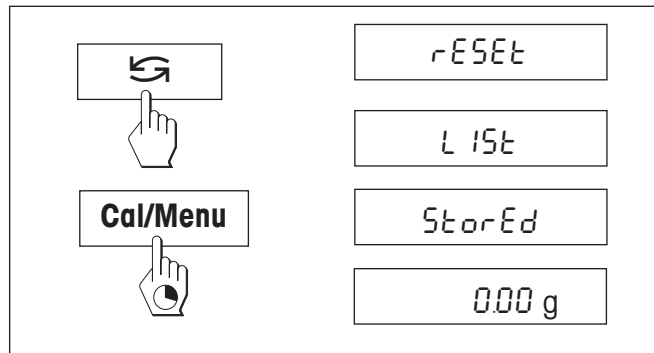
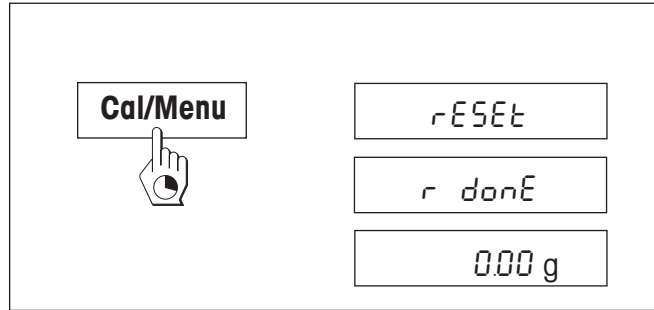
Abort

Press the «**C**» key briefly. The balance reverts to weighing mode. Changes are not saved.

Note

If no entry is made within 45 seconds, the balance reverts to weighing mode. Changes are not saved.

4.3 Description of menu options



4.3.1 Reset or recording of balance settings (1st menu option "RESET")

Reset balance settings

→ Select "Reset", press and hold down the «**Cal/Menu**» key until the message "r donE" confirms that all menu settings have been reset. The balance then reverts to weighing mode and works with the **factory settings** (Section 4.1).

Recording balance settings

→ Select "List" and hold down the «**Cal/Menu**» key until the message "StorEd" is displayed.

The current balance settings are transmitted to the peripheral device connected to the optional interface. To do this the setting "Printer" must always be selected at the 11th menu option (Peripheral unit). The current balance settings are saved at the same time.

4.3.2 Adjustment (2nd menu option) (only available on JB-C/FACT and JB-G/FACT models)

Under this menu item you can select whether you wish to adjust the balance using the internal or the external adjustment weight.

Adjusting with internal adjustment weight

Adjusting with external adjustment weight

4.3.3 FACT (3rd menu option) (only available on JB-C/FACT and JB-G/FACT models)

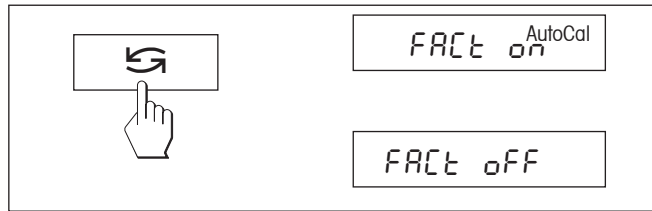
In this menu option you can switch the fully automatic internal adjustment (calibration) FACT on or off.

FACT switched on

This is the **factory setting**. The balance adjusts (calibrates) itself fully automatically.

FACT switched off

Note: With the certified versions of balances, this option can not be selected, i.e. FACT is always active



4.3.4 Protocol (4th menu option) (only available on JB-C/FACT and JB-G/FACT models)

This menu item can be used to switch the printing of the FACT fully automatic adjustment (calibration) on or off.

Note: This menu item can only be selected if FACT is switched on and does not affect the printing of adjustments with an internal or external adjustment weight (Section 4.3.3).

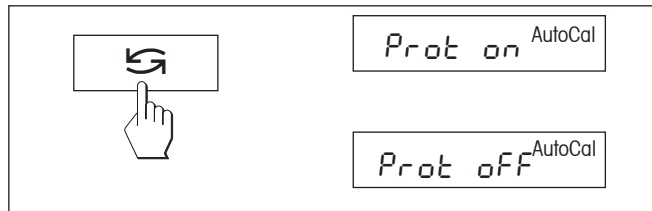
Protocol switched on

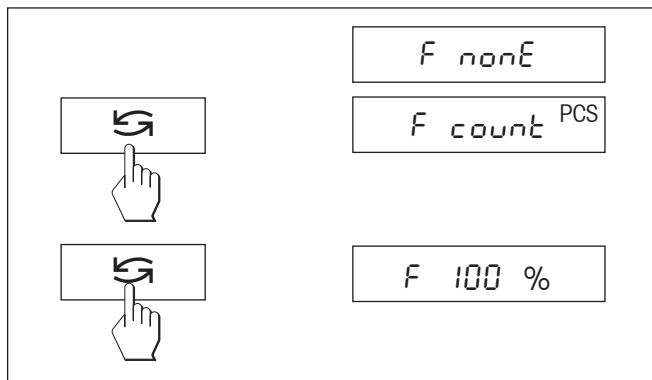
A record is printed out after every automatic adjustment of the balance (FACT).

Note: The protocol is printed out without a line for signatures.

Protocol switched off

This is the factory setting. If the balance adjusts automatically (FACT), a protocol is not printed out.

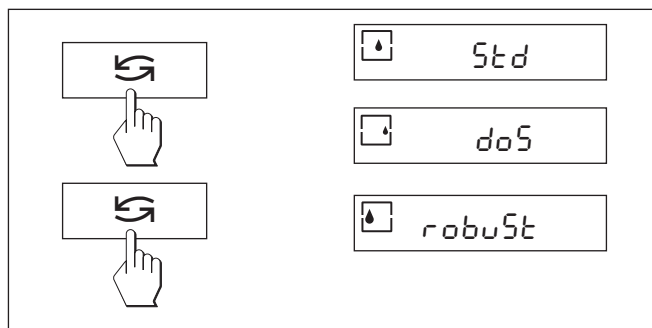




4.3.5 Functions (5th menu option / Operating Section 5)

In addition to simple weighing, the following functions can be selected:

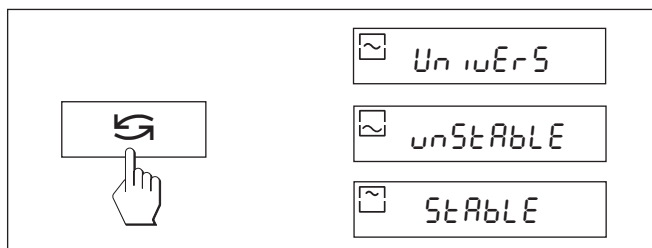
- F nonE No function, simple weighing (factory setting)
- F count Piece counting
- F 100 % Percent weighing



4.3.6 Weighing mode (6th menu option)

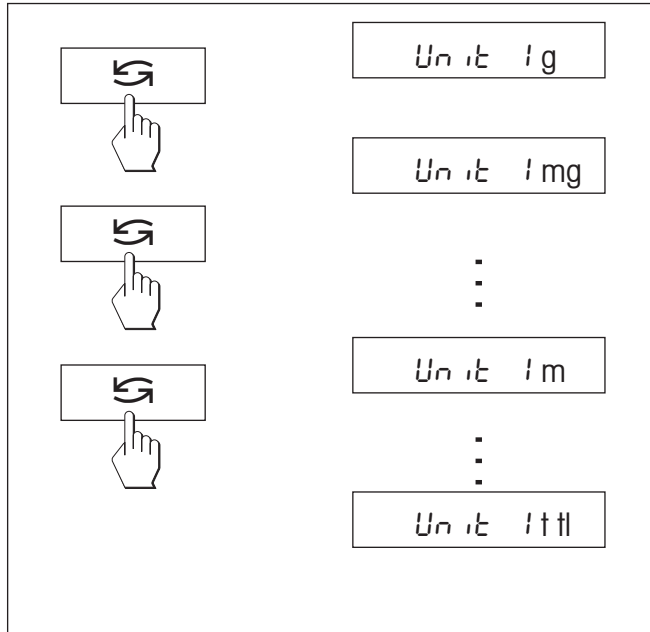
This setting allows you to adapt the balance to the weighing mode. Select "Std" (standard) for all normal weighing processes or "doS" (dispensing) for dispensing liquid or powdery weighing samples. In this setting, the balance responds very quickly to smallest weight changes.

When set to "robust" (absolute weighing), the balance responds only to greater weight changes, and the weighing result is very stable.



4.3.7 Vibration adapter (7th menu option) (only available on JB-C/FACT and JB-G/FACT models)

The vibration adapter can be used to match your balance to the ambient conditions (vibrations, drafts at location). If you work in surroundings which are practically free from temperature fluctuations, drafts, and vibrations, select "StABLE". On the other hand, if you work in surroundings where the conditions are constantly changing, select "unStABLE". For normal ambient conditions, select "UnivErS" (Standard). This is the factory setting.



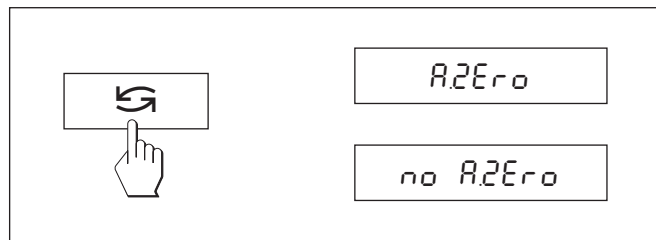
4.3.8 Weighing unit 1 (8th menu option "UNIT 1")

Depending on requirements, the balance can operate with the following units (possible with certified balances only if permitted by national weights and measures legislation):

Unit	Conversion factor	Comments
g gram		factory setting with JB-G balances
kg kilogram	1 kg = 1000 g	
mg milligram	1 mg = 0.001 g	
ct carat	1 ct = 0.2 g	factory setting with JB-C balances
lb pound	1 lb = 453.59237 g	
oz ounce	1 oz = 28.349523125 g	
ozt troy ounce	1 ozt = 31.1034768 g	
GN grain	1 GN = 0.06479891 g	
dwt pennyweight	1 dwt = 1.55517384 g	
mo momme	1 mom ≈ 3.75 g	
m Mesghal	1 msg = 4.6083 g	
H tl Hong Kong tael	1 tlh = 37.429 g	
S tl Singapore tael	1 tls ≈ 37.7993641666667 g	The Malaysian tael has the same value
t tl Taiwan tael	1 tft = 37.5 g	
cl tical	1 tical ≈ 16.3293 g	
t o tola	1 tola = 11.6638038 g	
b t baht	1 baht = 15.16 g	

4.3.9 Weighing unit 2 (9th menu option "UNIT 2")

If it is required to show the weighing results in weighing mode in an additional unit by pressing the «G» key, the desired second weighing unit can be selected in this menu option. The same weighing units are available as under "UNIT 1", with the exception of the tael units ("H tl", "S tl" and "t tl").



4.3.10 Autozero (10th menu option)

This menu option allows you to switch the automatic zero correction on or off. When it is switched on, the zero point is automatically corrected for drift or contamination of the weighing pan.

The following settings are available:

Autozero switched on

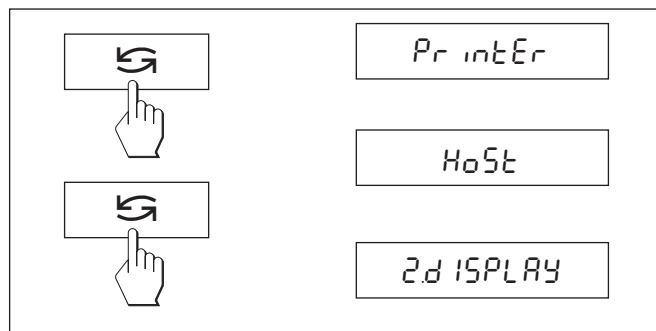
The zero point is automatically corrected.

Autozero switched off

The zero point is not automatically corrected. This setting is advantageous for special applications (e.g. evaporation measurements).

Note

With certified balances, this setting is possible only with a resolution of $e = 10d$.



4.3.11 Peripheral unit (11th menu option)

At this menu option you can select the peripheral device connected to the optional RS232C interface. The balance automatically saves the appropriate settings (Section 4.3.12 – 4.3.16) for every peripheral device.

Printer Connected to a printer.

Host Connection to any desired peripheral device.

Aux. display Connection of an optional auxiliary display unit (communications parameters cannot be selected).

4.3.12 Send format (12th menu option)

Note: This menu option is only available if you have selected the setting "Host" in the 11th menu option (Peripheral unit)!

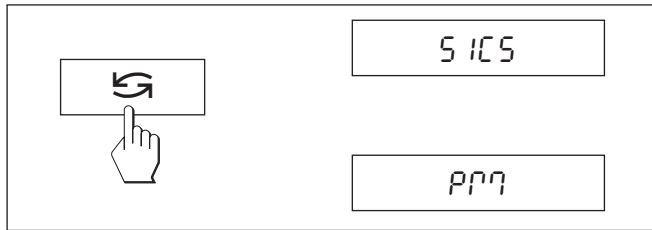
At this menu option you specify the data transfer format.

"SICS": The MT-SICS data transfer formats are used. Please refer to the "MT-SICS Reference Manual Basic-S balances 11780447" downloadable from the Internet (www.mt.com/sics-classic). More Information please find in the Section 6.3.

"PM"*: The following PM balance data transfer formats are used:

S. Stb: $\underbrace{}_1 . 67890 \underbrace{}_g$ S. Cont: $S \underbrace{}_1 . 67890 \underbrace{}_g$
 $SD \underbrace{}_1 . 39110 \underbrace{}_g$

* unidirectional, no MT-SICS commands are accepted.



4.3.13 Send mode (13th menu option)

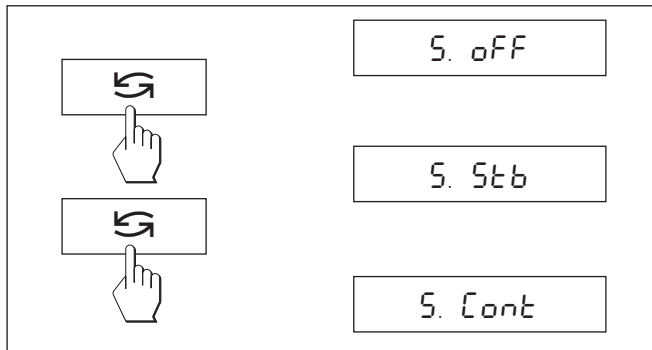
Note: This menu option is only available if you have selected the setting "Host" in the 11th menu option (Peripheral unit)!

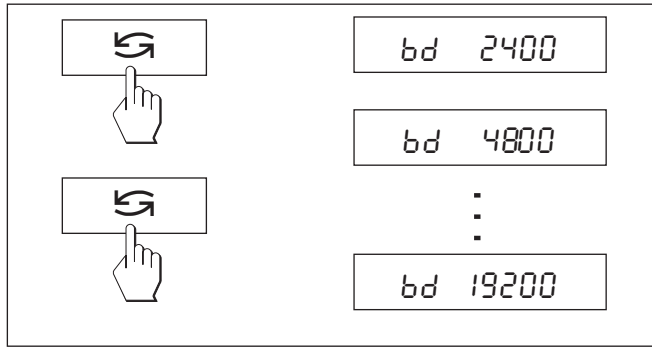
At this menu option you specify how data is transmitted to a peripheral device.

S. oFF Send mode switched off

S. Stb The next possible stable value will be transferred after the «E→» key has been triggered.

S. Cont All values are transferred automatically.



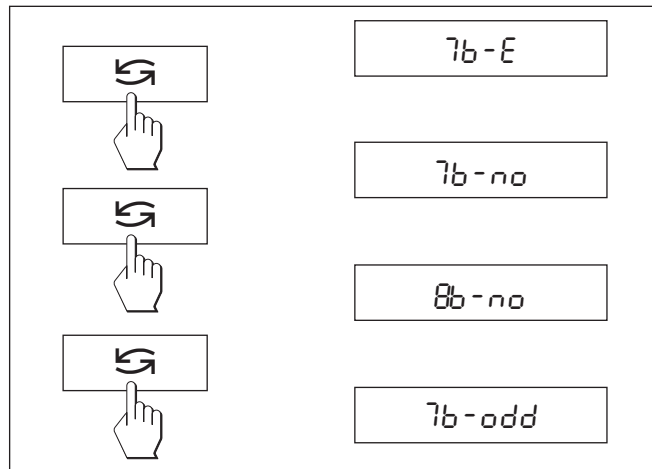


4.3.14 Baud rate (14th menu option)

Note: This menu option is only available if you have selected the setting "Host" in the 11th menu option (Peripheral unit)!

The baud rate (data transfer rate) determines the speed of transmission via the serial interface. The unit is the baud (bd) = 1 bit/second.

The following settings are available: 600 bd, 1200 bd, 2400 bd, 4800 bd, 9600 bd and 19200 bd. For problem-free data transmission the sending and receiving devices must be set at the same value.

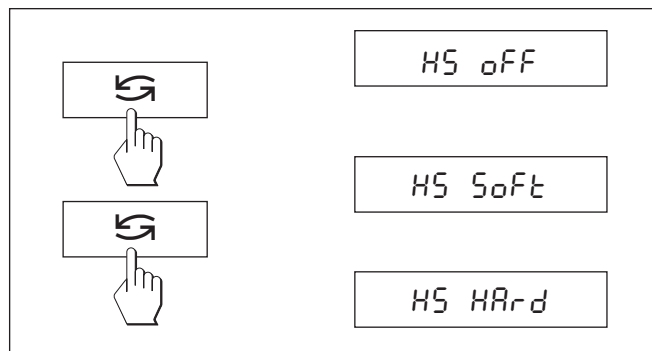


4.3.15 Bit/Parity (15th menu option)

Note: This menu option is only available if you have selected the setting "Host" in the 11th menu option (Peripheral unit)!

At this menu option you can set the character format for the attached peripheral device.

- 7b-E 7 data bits/even parity
- 7b-no 7 data bits/no parity
- 8b-no 8 data bits/no parity
- 7b-odd 7 data bits/odd parity



4.3.16 Handshake (16th menu option)

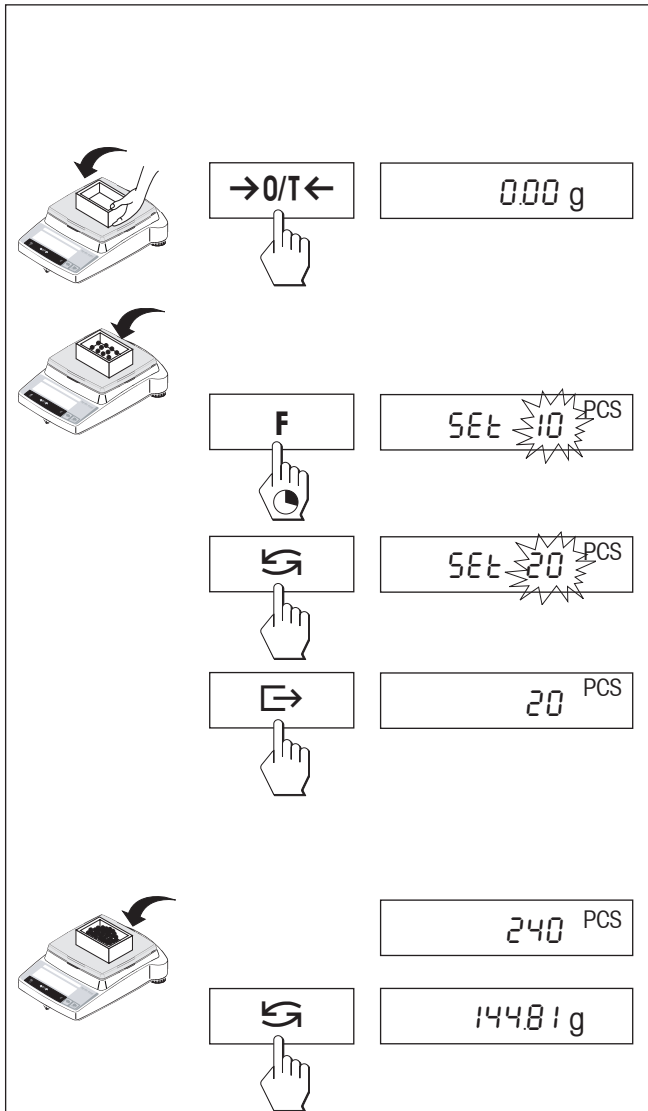
Note: This menu option is only available if you have selected the setting "Host" in the 11th menu option (Peripheral unit)!

This menu option allows you to match the data transmission to different serial receivers.

- HS oFF No handshake
- HS SoFt Software handshake (XON/XOFF)
- HS HARd Hardware handshake (RTS/CTS)

5 Functions

5.1 Piece counting



Requirement

The function "F count" must be activated in the menu (Section 4).

→ Place empty container on the balance and tare by briefly pressing the «**→0/T←**» key.

Setting the reference: a reference weight must first be entered for piece counting:

→ Add a number of reference pieces to container. Possible numbers* are 5, 10, 20, 50, 100 and "no" (this setting deactivates the piece counting function). * **approved balances** min.10

Caution: Take into account minimum values: min. reference weight = 10d (10 digits), min. piece weight* = 1d (1 digit)! * **approved balances** min.3e

Note: 1 digit corresponds to 1 display increment.

→ Hold the «**F**» key down until "SEt ... PCS" is displayed.

→ Repeatedly press the «**↺**» key until the display equals the number of reference pieces entered.

→ Confirm the number of reference pieces with the «**↻**» key (or wait 7 seconds, in which case the number is adopted automatically). The current number of pieces (PCS = pieces) is displayed.

Note: The current reference weight remains stored until the reference setting is changed or the power supply is interrupted.

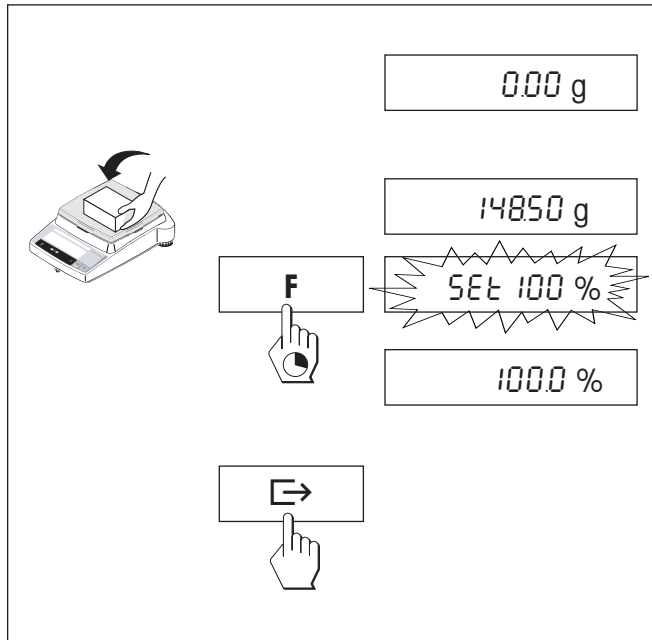
Switching between piece count and weight display

→ Add weighing sample to the container and read off number of pieces.

→ Press the «**↺**» key. The weight is displayed.

→ Return to the piece count display by pressing the «**↻**» key again.

5.2 Percent weighing



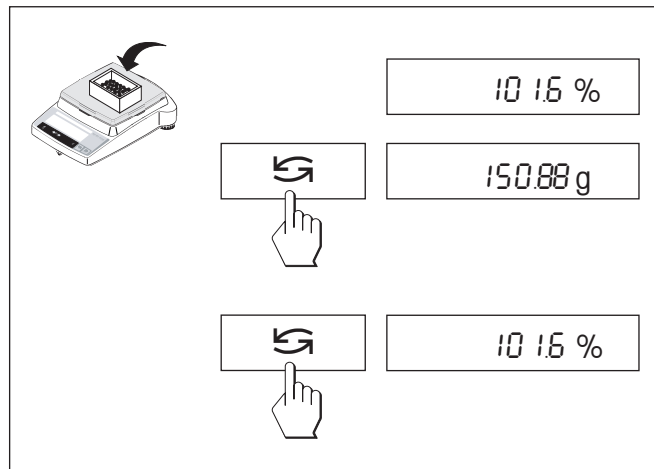
Requirement

The function "F 100 %" must be activated in the menu (Section 4).

Set target weight

- Target weight (Reference weight, which corresponds to 100 %) in center of pan.
- Hold the «F» key down until "SEt 100 %" is displayed.
- Press the «↵» key to select "SEt 100 %" or "SEt no %" (Percent weighing deactivated).
- The «↵» key can be used briefly to confirm or automatic acceptance after 7 seconds. The target weight is specified.

Note: The current target weight remains stored until a new target weight is set or the power supply is interrupted.



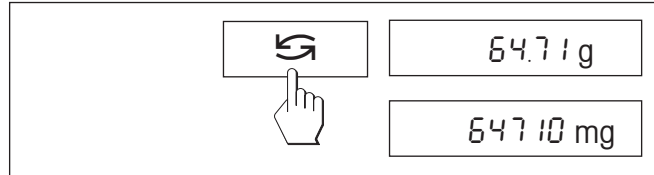
Percent weighing / switching


- Place weighing sample in center of pan.
The weight of the sample is displayed as a percentage of the target weight.
- Press the «↵» key, The weight is displayed. (Unit 1 and Unit 2, if activated).
- Return to display in percent: pressing the «↵» key again.

5.3 Switching weight units

Requirement

Different weight units must be activated in the menu for unit 1 and unit 2 (Section 4).



→ The «» key can be used at any time to toggle between the two weighing units selected in the menu ("UNIT 1" and "UNIT 2").

Notes:

- Switching between weight units may be blocked with **certified balances**, depending on national weights and measures legislation.

6 Technical data, optional equipment

6.1 Technical data

Standard equipment of JB balances

- Protective cover, transparent, made from Borex
- AC adapter to national codes
100–240 V, 50–60 Hz, 0.3 A / 12 VDC, 0.84 A
Balance power input: 8–14.5VAC, 50/60Hz, 6VA
or 9.0–20 VDC, 6W
- Built-in RS232C interface
- Draft shield with JB-C models
- All models can weigh below balance.

Materials

- Housing: die-cast aluminum, painted
- Weighing pan:
Chromium-nickel steel X2CrNiMo 17 13 2 (1.4404)

Protection

- Protected against dust and water
- Pollution degree: 2
- Installation category: class II
- EMC: see declaration of conformity
(separate brochure 11780294)

Ambient conditions

The technical data are valid under the following ambient conditions:

- Ambient temperature 10 °C ... 30 °C
- Relative humidity 15 % ... 80 % at 31 °C
linear decreasing to
50 % at 40 °C
noncondensing

Operability is assured at ambient temperatures between 5 and 40 °C.

Technical data carat balances	JB703-L-C	JB1203-L-C	JB1603-L-C	JB2503-L-C5 ¹⁾	JB2502-L-C ²⁾
	JB703-C/FACT	JB1203-C/FACT	JB1603-C/FACT	JB2503-C5/FACT ¹⁾	JB2502-C/FACT ²⁾
Readability	0.001 ct / 0.001 g	0.001 ct / 0.001 g	0.001 ct / 0.0001 g	0.005 ct / 0.001 g	0.01 ct / 0.001 g
Maximum Load	700 ct / 140 g	1200 ct / 240 g	1600 ct / 320 g	2550 ct / 510 g	2550 ct / 510 g
Taring Range	0 ... 700 ct	0 ... 1200 ct	0 ... 1600 ct	0 ... 2550 ct	0 ... 2550 ct
Repeatability (sd)	0.001 ct / 0.001 g	0.001 ct / 0.001 g	0.001 ct / 0.0001 g	0.005 ct / 0.001 g	0.005 ct / 0.001 g
Linearity	0.001 ct / 0.001 g	0.001 ct / 0.001 g	0.002 ct / 0.0004 g	0.005 ct / 0.002 g	0.005 ct / 0.002 g
Sensitivity drift (10 °C ... 30 °C)	2.5 ppm/ °C	2.5 ppm/ °C	2.5 ppm/ °C	6 ppm/ °C	6 ppm/ °C
Typical stabilization time	3 s	3 s	4 s	3 s	3 s
Adjustment weight	JB-L-C 100 g, external ³⁾ JB-C/FACT built-in	200 g, external ³⁾ built-in	200 g, external ³⁾ built-in	200 g, external ³⁾ built-in	200 g, external ³⁾ built-in
Backlight	yes	yes	yes	yes	yes
External dimensions of balance (W/D/H)	245/321/280 mm	245/321/280 mm	245/321/280 mm	245/321/280 mm	245/321/280 mm
External dimensions of packaging (W/D/H)	381/436/495 mm (0.082 m ³)	381/436/495 mm (0.082 m ³)	381/436/495 mm (0.082 m ³)	381/436/495 mm (0.082 m ³)	381/436/495 mm (0.082 m ³)
Weighing pan	ø 80 mm	ø 80 mm	ø 80 mm	ø 100 mm	ø 100 mm
Max. height above weighing pan	165 mm	165 mm	165 mm	165 mm	165 mm
Net weight (with packaging)	5.9 kg (8.6 kg)	5.9 kg (8.6 kg)	5.9 kg (8.6 kg)	5.9 kg (8.6 kg)	5.9 kg (8.6 kg)

¹⁾ no certified models available

²⁾ only certified models available

³⁾ included

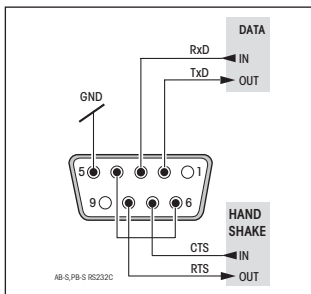
Technical data gold balances	JB2002-L-G JB2002-G/FACT	JB3002-L-G JB3002-G/FACT	JB4002-L-G JB4002-G/FACT	JB6001-L-G JB6001-G/FACT	JB8001-L-G JB8001-G/FACT
Readability	0.01 g	0.01 g	0.01 g	0.1 g	0.1 g
Maximum Load	2100 g	3100 g	4100 g	6100 g	8100 g
Taring Range	0 ... 2100 g	0 ... 3100 g	0 ... 4100 g	0 ... 6100 g	0 ... 8100 g
Repeatability (sd)	0.01 g	0.01 g	0.01 g	0.1 g	0.1 g
Linearity	0.02 g	0.02 g	0.02 g	0.1 g	0.1 g
Sensitivity drift (10 °C ... 30 °C)	6 ppm/ °C	6 ppm/ °C	6 ppm/ °C	10 ppm/ °C	10 ppm/ °C
Typical stabilization time	2 s	2 s	2 s	2 s	2 s
Adjustment weight JB-L-G	external ¹⁾	external ¹⁾	external ¹⁾	external ¹⁾	external ¹⁾
JB-G/FACT	built-in	built-in	built-in	built-in	built-in
Backlight	yes	yes	yes	yes	yes
External dimensions of balance (W/D/H)	245/321/89 mm	245/321/89 mm	245/321/89 mm	245/321/89 mm	245/321/89 mm
External dimensions of packaging (W/D/H)	381/436/273 mm (0.045 m ³)	381/436/273 mm (0.045 m ³)	381/436/273 mm (0.045 m ³)	381/436/273 mm (0.045 m ³)	381/436/273 mm (0.045 m ³)
Weighing pan	180 x 180 mm	180 x 180 mm	180 x 180 mm	180 x 180 mm	180 x 180 mm
Net weight (with packaging)	3.8 kg (4.9 kg)	3.8 kg (4.9 kg)	3.8 kg (4.9 kg)	3.8 kg (4.9 kg)	3.8 kg (4.9 kg)

¹⁾ Optional equipment

6.2 Interface

RS232C interface and interface accessories

Every JB balance is fitted with an RS232C interface for attachment to a peripheral device (e.g. printer or PC with a 9-pin male connector). Matching to a different device can be carried out in the menu (Sections 4.3.11 – 4.3.16).



You will find a detailed description of the available interface commands in the brochure "Reference Manual MT-SICS Basic-S balances 11780447" downloadable from the Internet under www.mt.com/sics-classic.

The wide range of features of the B-S balances regarding documentation of the results can not be exploited to the full until a printer, e.g. the RS-P26 or LC-P45 from METTLER TOLEDO is attached.

6.3 MT-SICS Interface commands and functions

Many of the balances and scales used have to be capable of integration in a complex computer or data acquisition system.

To enable you to integrate balances in your system in a simple manner and utilize their capabilities to the full, most balance functions are also available as appropriate commands via the data interface.

All new METTLER TOLEDO balances launched on the market support the standardized command set "METTLER TOLEDO Standard Interface Command Set" (MT-SICS). The commands available depend on the functionality of the balance.

Basic information on data interchange with the balance

The balance receives commands from the system and acknowledges the command with an appropriate response.

Command formats

Commands sent to the balance comprise one or more characters of the ASCII character set. Here, the following must be noted:

- Enter commands only in uppercase.
- The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec., in this description represented as `␣`).
- The possible input for "text" is a sequence of characters of the 8-bit ASCII character set from 32 dec to 255 dec.
- Each command must be closed by $C_{R}L_{F}$ (ASCII 13 dec., 10 dec.).

The characters $C_{R}L_{F}$, which can be inputted using the Enter or Return key of most entry keypads, are not listed in this description, but it is essential they be included for communication with the balance.

Example

S – Send stable weight value

Command	S	Send the current stable net weight value.
Response	S␣S␣WeightValue␣Unit	Current stable weight value in unit actually set under unit 1.
	S␣I	Command not executable (balance is currently executing another command, e.g. taring, or timeout as stability was not reached).
	S␣+	Balance in overload range.
	S␣-	Balance in underload range.

Example

Command	S	Send a stable weight value.
Response	S␣S␣␣␣␣␣␣␣␣␣100.00␣g	The current, stable weight value is 100.00 g.

The MT-SICS commands listed below is a selected list of available commands. For additional commands and further information please refer to the Reference Manual "MT-SICS Basic-S balances 11780447" downloadable from the Internet under www.mt.com/sics-classic.

S – Send stable weight value

Command **s** Send the current stable net weight value.

SI – Send value immediately

Command **SI** Send the current net weight value, irrespective of balance stability.

SIR – Send weight value immediately and repeat

Command **SIR** Send the net weight values repeatedly, irrespective of balance stability.

Z – Zero

Command **z** Zero the balance.

@ – Reset

Command **@** Resets the balance to the condition found after switching on, but without a zero setting being performed.

SR – Send weight value on weight change (Send and Repeat)

Command **SR** Send the current stable weight value and then send continuously the stable weight value after every weight change.
The weight change must be at least 12.5 % of the last stable weight value, minimum = 30d.

ST – Send stable weight after pressing \Rightarrow (transfer) key

Command **ST** Inquiry of actual status of the ST function.

SU – Send stable weight value with currently displayed unit

Command **SU** As the "s" command, but with the currently displayed unit.

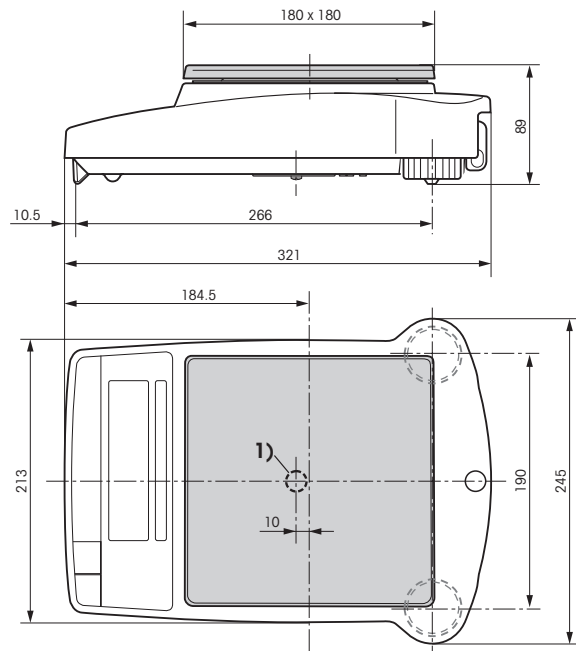
6.4 Optional equipment

<p>AC adapter (universal) 11120270 (EU, USA, AU, UK) 100–240 V, 50–60 Hz, 0.3 A 12 VDC, 0.84 A</p>	<p>Carat pan</p> <ul style="list-style-type: none"> • small, ø 80 mm x 20 mm, aluminium 12102645 • medium, ø 90 mm x 30 mm, aluminium 12102646 • large, ø 90 mm x 45 mm, aluminium 12102647 	<p>Printer, Report printer (RS-P26) 12120788 Plain-paper printer, 24 characters with additional functions (time, date)</p>
<p>AccuPac B-S 21254691 Rechargeable external power source for 15 hours weighing operation with no mains connection</p>	<p>Density kits (for JB-L-C, JB-C/FACT only) 00033360 For determination of solids</p>	<p>Protective cover 11103681 For all JB models (1 piece)</p>
<p>Adjustment weights 111795461 Available as OIML weights (E1, E2, F1, with calibration certificate) For further details see METTLER TOLEDO Weights brochure or see www.mt.com/weights</p>	<p>Draft shield 11137468 Draft shield with sliding doors * "mg" (165 mm) * JB-G Balances require the weighing pan ø 175 mm 11103680</p>	<p>Software 11120340 LabX direct balance (Simple data transfer)</p>
<p>Antitheft device 00590101 Cable with lock</p>	<p>Interface cable</p> <ul style="list-style-type: none"> • RS9–RS25: (m/f), length 2 m 11101052 • RS9–RS9: (m/f), length 1 m 11101051 • RS9–RS9: (m/m), length 1 m 21250066 • RS232-USB Converter cable 11103691 	<p>Transport case 11101050 For all JB-G/JB-C models (Draft shield 165 mm / 141 mm)</p>
<p>Auxiliary display (RS232C)</p> <ul style="list-style-type: none"> • Auxiliary display 12120057 • Auxiliary display RS-AD-L7 with backlit 72213564 • Auxiliary display RS-AD-7 without backlit 72213565 	<p>Printer, Application printer (LC-P45) 00229119 Plain-paper printer, 24 characters, with additional functions (time, date, statistic, multiplier etc.)</p>	

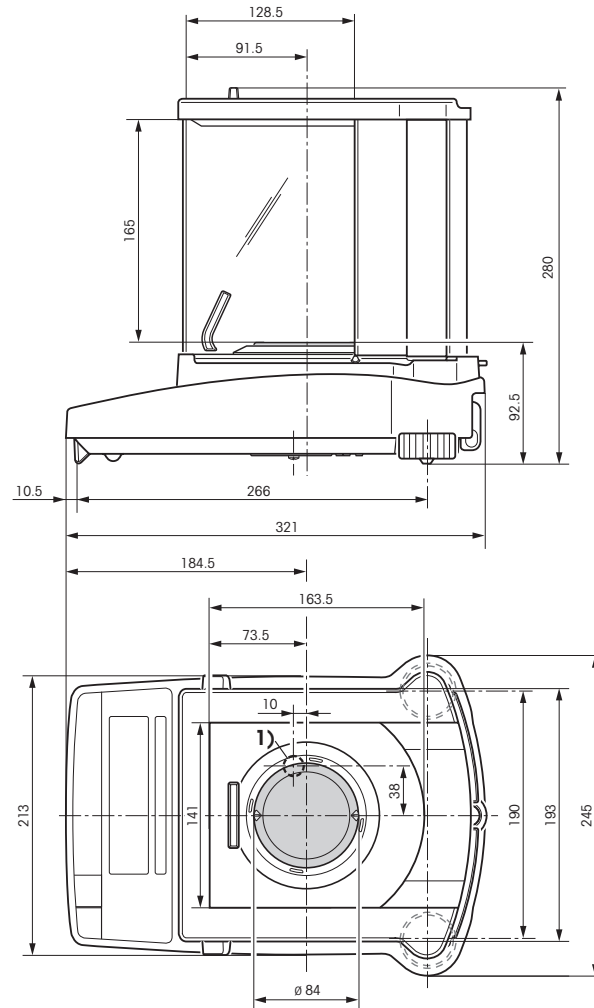
6.5 Dimensional drawings

All dimensions in millimeters (mm)

Gold balance



Carat balance with draft shield "mg" (165 mm)



1) Opening for hanger

7 Appendix

7.1 Typical printouts from METTLER TOLEDO RS-P26, LC-P45 printers

Function: **Adjusting (FACT)**

```
- BALANCE CALIBRATION -
12.02.2006      09:30:10

METTLER TOLEDO
Type:          JB3002-G/FACT
SNR:           1118015657
SW:            1.20

Internal Cal. done

----- END -----
```

Function: **Adjusting (external)**

```
- BALANCE CALIBRATION -
12.02.2006      09:40:16

METTLER TOLEDO
Type:          JB3002-L-G
SNR:           1118015657
SW:            1.20

Weight ID: .....
Weight:        2000.00 g

External Cal. done

Signature:

----- END -----
```

Function: **Percent weighing**

```
----- % - WEIGHING -----
Ref.          10.008 g
100.00        %

60.01         g
599.59        %
```

Function: **List**

Printout of the current balance settings

```
--- LIST OF SETTINGS ---
12.02.2006      09:42:12

METTLER TOLEDO
Type:          JB3002-G/FACT
SNR:           1118015657
SW:            1.20

-----
Application:
Dynamic A

-----
Weighing Parameters:
Weighing Mode Standard
Unit 1         g
Unit 2         g
A.Zero        On

-----
Peripheral Devices:
P.Device      Printer
Baud          2400
Bit/Parity    7b-even
Handshake     Off

P.Device      Host
Sendmode      Off
Baud          9600
Bit/Parity    8b-no
Handshake     Soft
```

Function: **Piece counting** Printout with reference weight

```
---- PIECE COUNTING ----
APW:           0.99460 g
Out of:        10 PCS

27.000 g
27 PCS
```

Function: **Verification of the calibration (adjustment) with external weight.**

Function is triggered via the printer. ¹⁾

```
----- BALANCE TEST -----
12.02.2006      09:52:12

METTLER TOLEDO
Type:          JB3002-G/FACT
SNR:           1118015657
SW:            1.20

Weight ID: .....

Target : .....
Actual : .....199.98 g
Diff   : .....

External test done

Signature:

----- END -----
```

Function: **Statistics** Function is triggered via the printer. ¹⁾

```
12.02.2006      10:44:07
ID              666
SNR:            1118015657
1              1100.15 g
2              1600.10 g
3              1699.95 g
n              3
x              1466.733 g
s              321.372 g
srel           21.91 %
min.           1100.15 g
max.           1699.95 g
dif.           599.80 g
----- END -----
```

Function: **Multiplier**

Function is triggered via the printer. ¹⁾

```
12.02.2006      08:23:22
ID              242
SNR:            1118015657

Factor          1.65
                588.43 g
*              970.9095
```

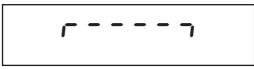
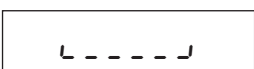
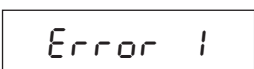
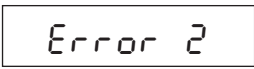
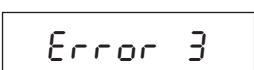
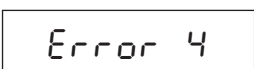
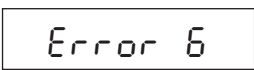
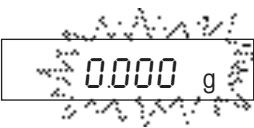
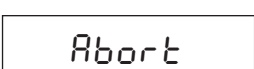
Notes

The operating instructions for the LC-P45 include a description of the functions that are triggered via that printer.

The **RS-P26** prints all reports in **English**. This applies also to the **LC-P45** reports that originate in the balance. In the case of reports triggered by the **LC-P45**, the following languages may be selected: **German, English, French, Spanish** or **Italian**.

¹⁾ Only possible with LC-P45.

7.2 What if ...?

Error/Error message	Cause	Rectification
	Overload	→ Remove sample from weighing pan, zero again (tare).
	Underload	→ Check whether weighing pan is positioned properly.
	No stability <ul style="list-style-type: none"> • in taring or adjusting (calibration) • when reference weight for piece counting is placed on pan 	→ Wait for stability before pressing key. → Ensure more stable ambient conditions. → Remove weighing pan and clean if necessary
	Wrong adjustment weight on pan or none at all	→ Place required adjustment weight in center of pan.
	Reference number for piece counting too small	→ Increase number of reference pieces.
	Internal fault	→ Contact METTLER TOLEDO customer service.
	No standard calibration	→ Contact METTLER TOLEDO customer service.
	Wrong weighing pan or pan missing	→ Mount correct weighing pan.
	Adjustment aborted with the «C» key	

7.3 Maintenance and cleaning



Service

Regular servicing of your balance by a service technician prolongs its working life. Ask your METTLER TOLEDO dealer for details of servicing options.

Cleaning

Every now and then, clean the weighing pan, draftshield element, draftshield (depending on the model), housing and terminal of your balance using a damp cloth. Your balance is made of high-quality, durable materials and can therefore be cleaned with a standard, mild cleaning agent.



Please observe the following notes

- On no account use cleaning agents, which contain solvents or abrasive ingredients, as this can result in damage to the terminal overlay.
- After working with chemicals, it is advisable to wash or clean the weighing pan and the bottom plate (if draft shield fitted).
- Although all materials are of high quality, corrosion may occur if corrosive substances are deposited on chrome steel for an extended period of time (and if air is excluded, for example by a coating of grease).
- Ensure that no liquid comes into contact with the balance or the AC adapter!
- Never open the balance or AC adapter – they contain no components, which can be cleaned, repaired or replaced by the user.
- Soiled protective covers can be replaced on all balance types (see Optional equipment).



Disposal

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements. Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

**To protect your METTLER TOLEDO product's future:
METTLER TOLEDO Service assures the quality, measuring accuracy and preservation of value of all
METTLER TOLEDO products for years to come.
Please send for full details about our attractive terms of service.
Thank you.**



* 1 1 7 8 0 9 5 3 *

Subject to technical changes and to the availability
of the accessories supplied with the instruments.