Operating instructions
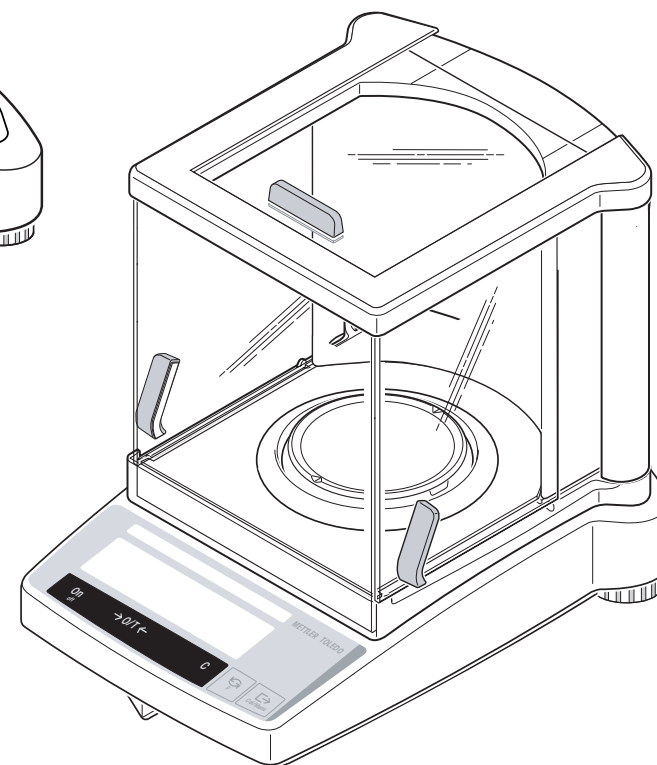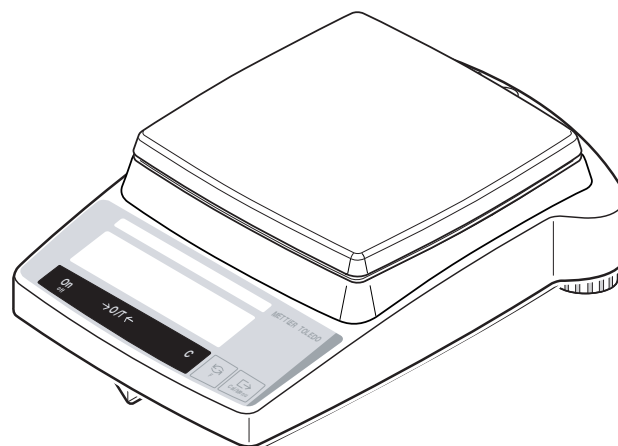
METTLER TOLEDO
Gold and carat balances (JEWELRY)
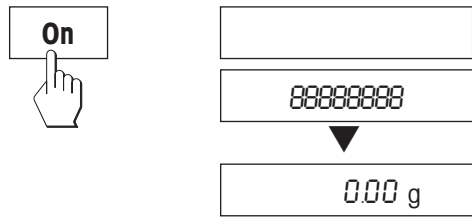- **JB-L-G, JB-G/FACT**
- **JB-L-C, JB-C/FACT**

METTLER TOLEDO

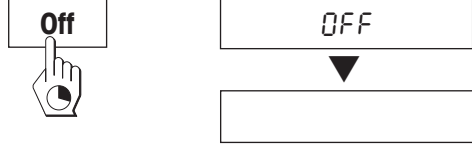**www.mt.com/jewelry**

Operating instructions in a nutshell

Press key instructions

Press key **briefly**

Press and **hold key down** until the desired display appears

▼ automatic sequence

Switching on

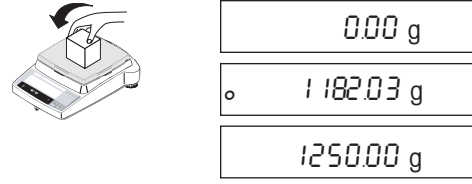| On |
|---|

88888888
▼
0.00 g

Switching off

Off

OFF
▼

Simple weighing

0.00 g
∘ 1182.03 g
1250.00 g

Adjustment options

Cal/Menu

MENU

⇨

⤺

CAL int	Cal
CAL E	Cal

⇨

⤺

FACT on	AutoCal
FACT oFF	

Taring

0.00 g
121.01 g

→0/T←

0.00 g

95.97 g

- 121.01 g

Piece counting*

→0/T←

0.00 g
12.07 g

F

SET 10	PCS

⤺

SET 20	PCS

⇨

20	PCS

244	PCS

⤺

147.25 g

Percent weighing*

0.00 g
12.07 g

F

SET 100 %

⇨

100.0 %

101.6 %
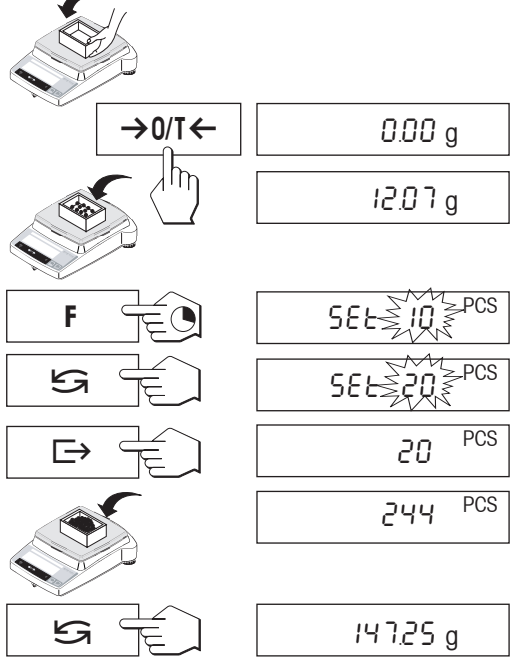
*These functions must be activated in the menu (section 4.3.3)

Unit switching*

⤺

22.00 g
0.78 oz

Contents

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

1.1 Introducing the JB line of balances

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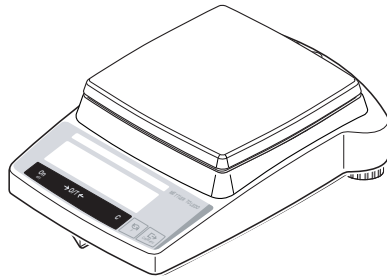
JB-L-C, JB-C/FACT
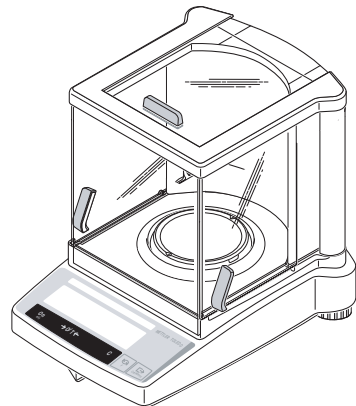
- The JB (JEWELRY) balance line ranges from high-resolution carat balances (JB-L-C, JB-C/FACT) with a readability of 0.01 ct / 0.01 g to 0.001 ct / 0.0001 g through to precision gold balances (JB-L-G, JB-G/FACT) with a readability of 0.01 g to 0.1 g. The weighing ranges extend from 140 g to 8.1 kg.
-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

Balance features

- All JB-G/FACT and JB-C/FACT models have **FACT** (**F**ully **A**utomatic **C**alibration **T**echnology), 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
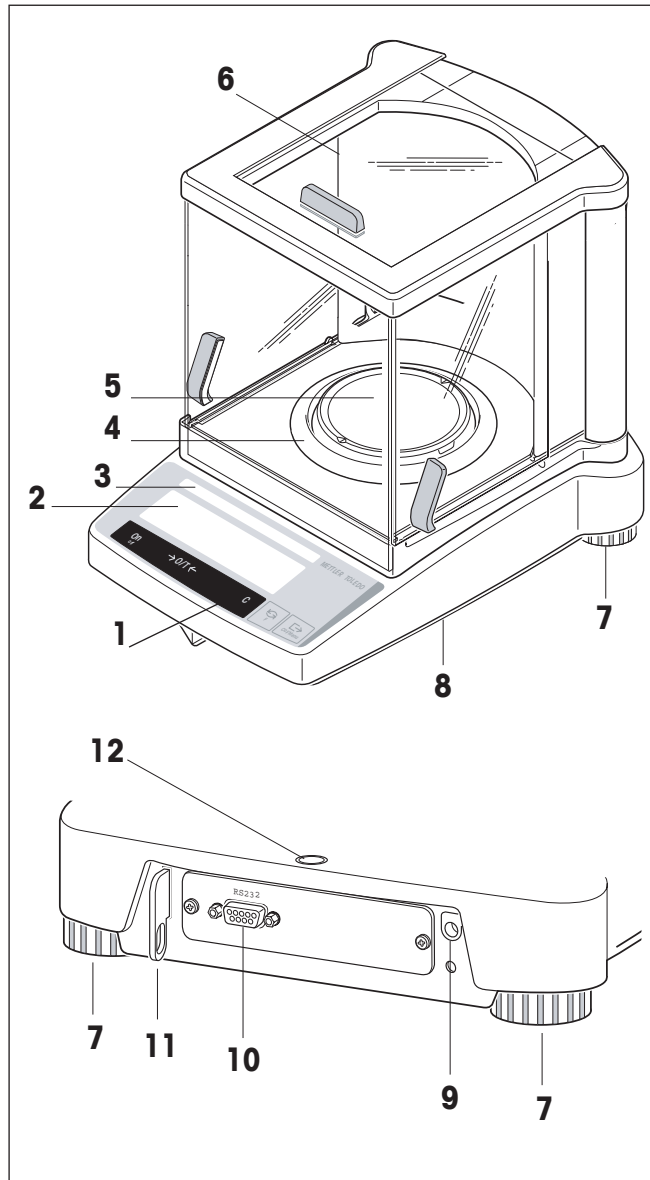
1 Keys

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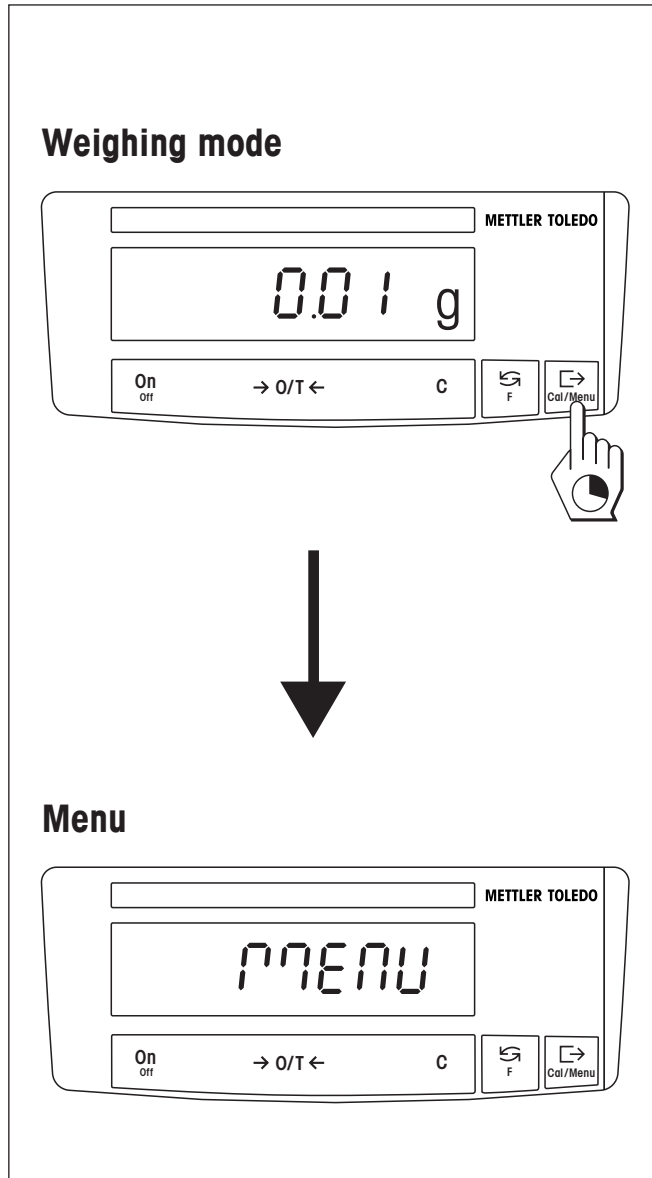
The balances have two operator control levels: the **weighing mode** and the **menu**. The function of each individual key depends on the operator control level and how long the key is pressed.

Weighing mode

Key functions in weighing mode			
Press briefly		**Press and hold down**	
On	• Switch on	**Off**	• Switch off balance (standby mode)
→0/T←	• Zero/tare		
C	• Cancel function		
⇆	• Switch • Change settings	**F**	• Call function A function must be activated in the menu, otherwise "F nonE" appears in the display
⇨	• Transfer weighing data via interface • Confirm settings	**Cal/Menu**	• Adjust (calibrate) • Show menu (hold key down until MENU appears)

Menu

Key functions in menu mode			
Press briefly		**Press and hold down**	
C	• Close menu (without saving changes)	----------	
⇆	• Change settings	----------	
⇨	• Select menu options	**Cal/Menu**	• Save changes and close menu

2   Startup

2.1   Unpacking / standard equipment
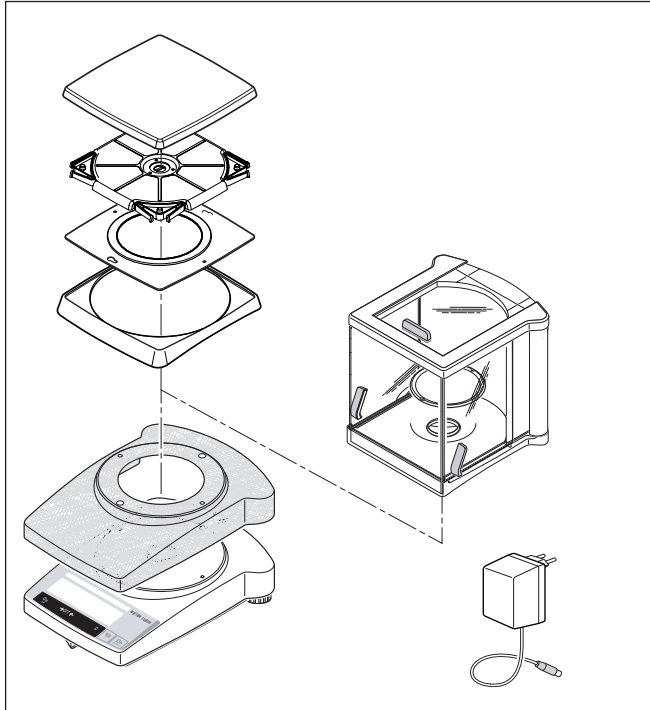
All balances are supplied in environmentally compatible packaging.

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 ø 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.

7

2.3 Installing the draft shield
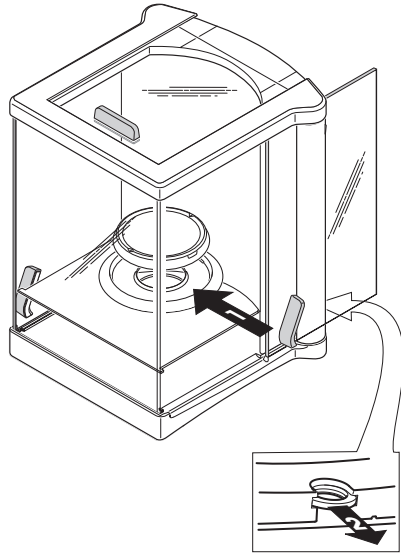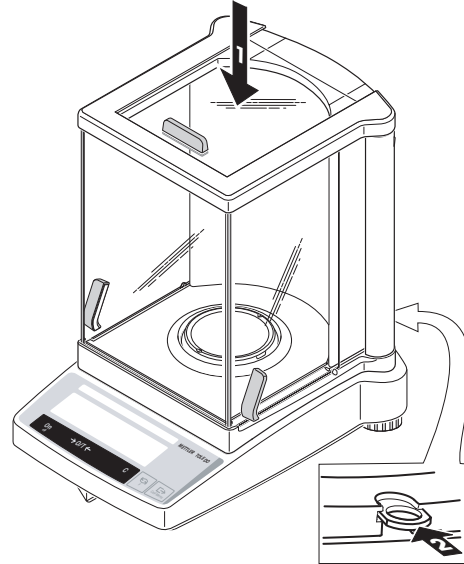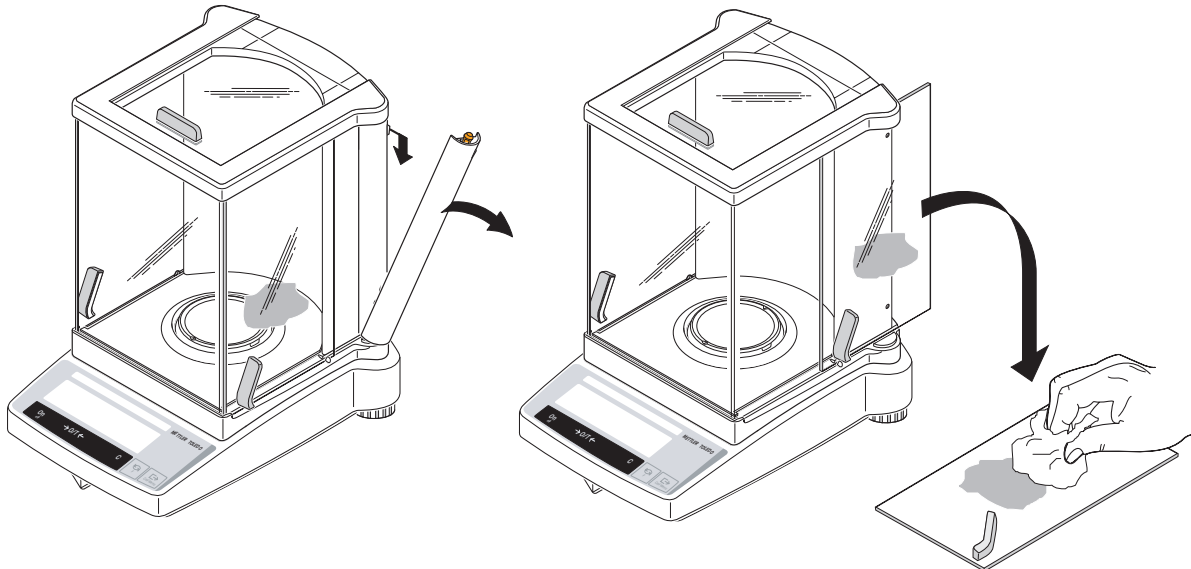
2.4 Setting up, leveling, preparations for weighing below the balance, connecting to power supply
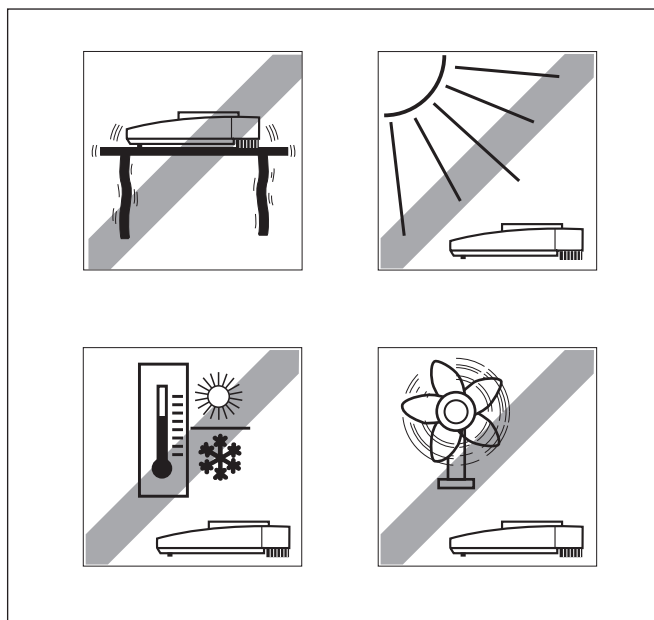
The optimum location

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 unter the order number 590101.
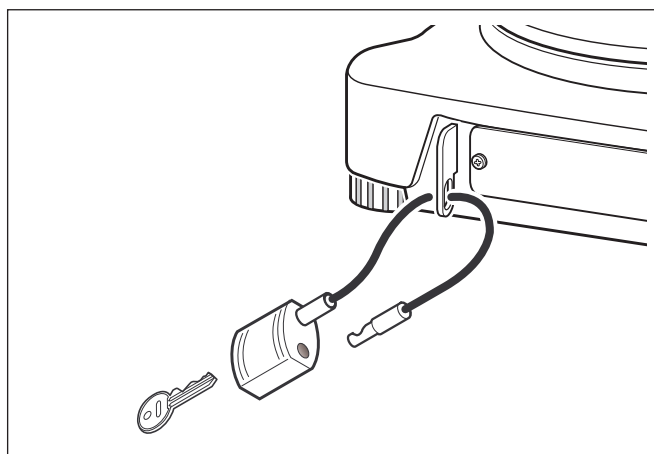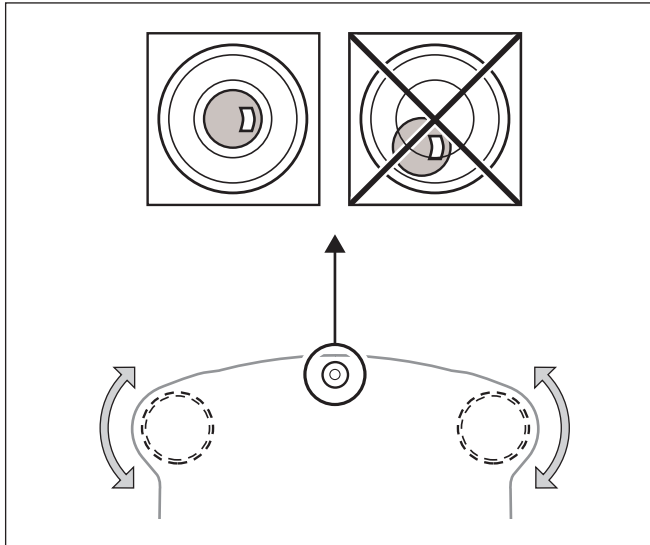
Leveling

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.
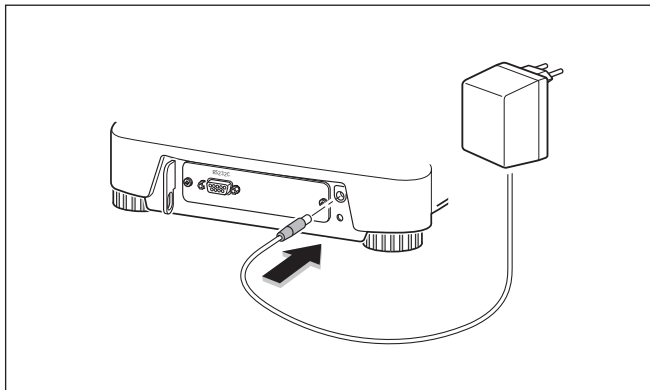
Connecting the power supply

→   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** (**F**ully **A**utomatic **C**alibration **T**echnologiy) 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.

Cal/Menu	$CAL\ E$
	↓
Cal/Menu	CAL
	↓
	200000 Cal
	↓
	$------$ Cal
	↓
	000 Cal
	↓
	$------$ Cal
	↓
	$CAL\ donE$
	↓
	000 g
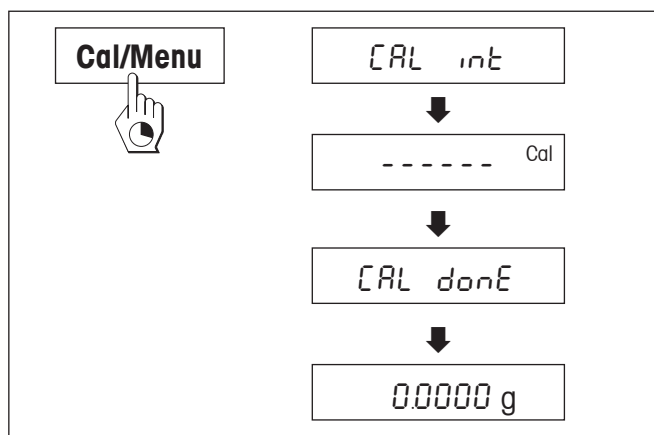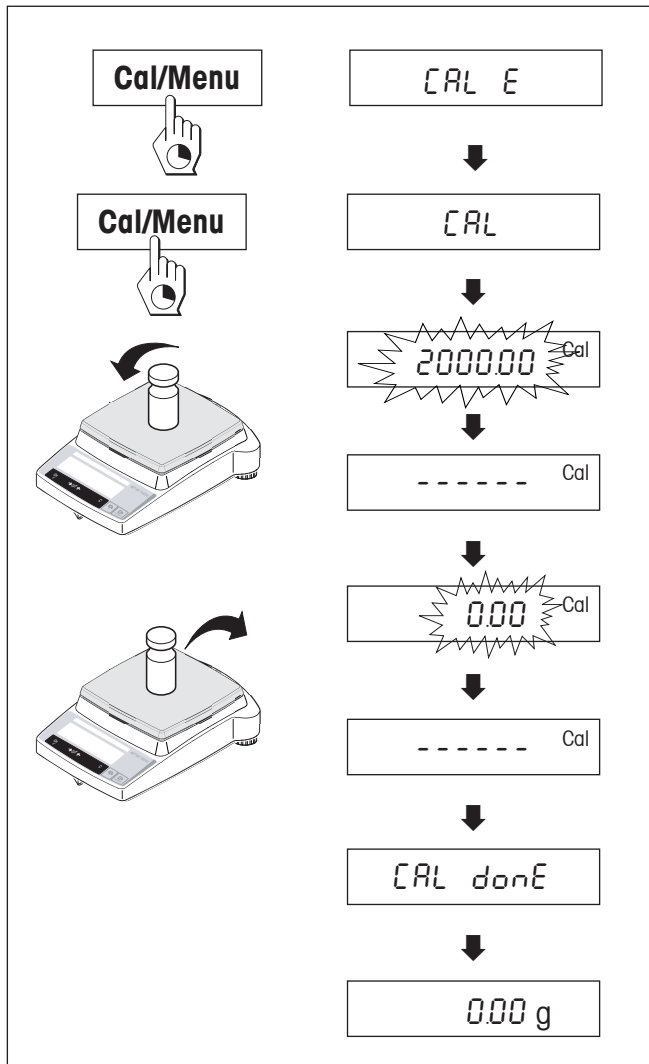
Adusting with external weight

→ 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 withhin 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

On

8888888

↓

0.00 g

Off

OFF

↓
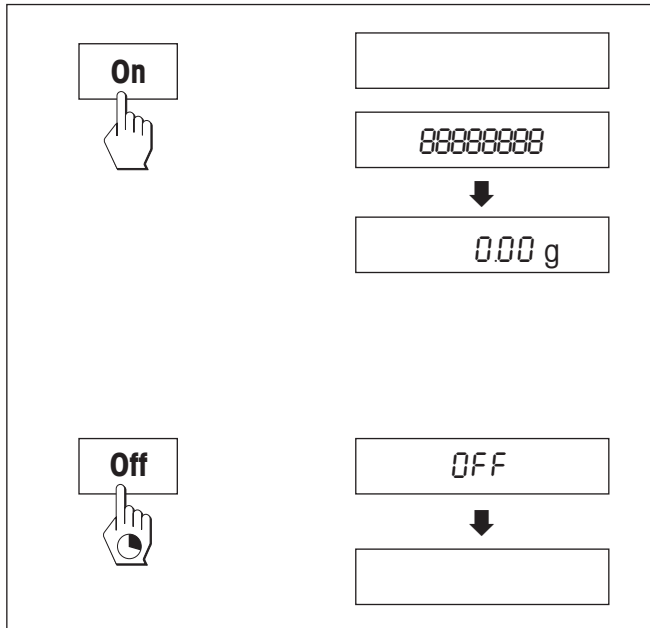
Switching on

→ 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

0.00 g

○ 1182.03 g

1250.00 g
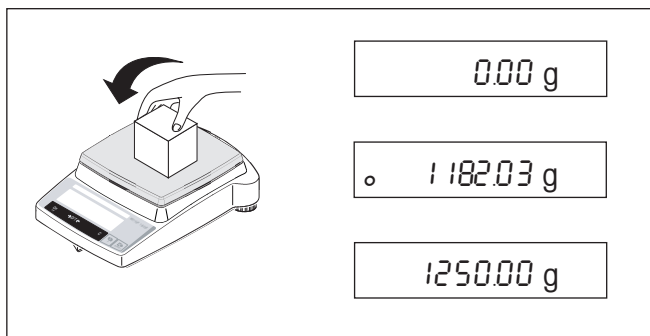
→ Place weighing sample on the weighing pan.

→ Wait until the stability detector "○" disappears.

→ Read the result.

13

3.3   Taring

→ Place empty container on the balance.

$$0.00 \text{ g}$$

$$121.01 \text{ g}$$

→ The weight is displayed.

→0/T←

$$0.00 \text{ g}$$
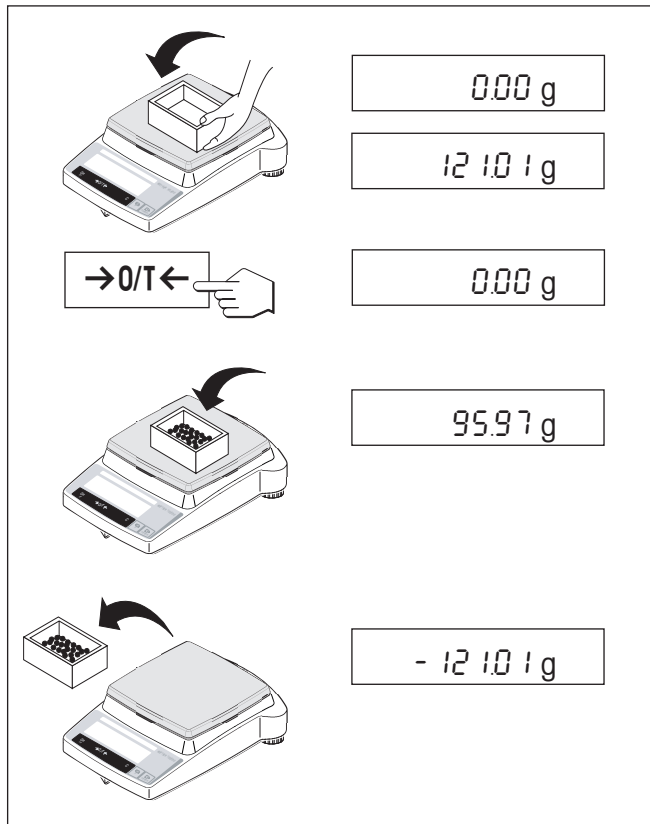
→ Tare: press the « →0/T← » key briefly.

$$95.97 \text{ g}$$

→ Add weighing sample to container. The net weight is now displayed.

$$- 121.01 \text{ g}$$

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 « →0/T← » 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).

1 Reset	2 Adjustment [1]	3 FACT [1] [2]	4 Protokol [1] [3]	5 Function	6 Weighing mode	7 Vibration adapter [1]	8 Weighing unit 1 [2]
rESEt	CAL int Cal	FACt on AutoCal	Prot on AutoCal	F nonE PCS	Std	UniuErS	Unit 1 g
LiSt	CAL E Cal	FACt oFF	Prot oFF	F 100% / F count	robuSt / doS	StAbLE / unStAbLE	Unit 1 bt / Unit 1 kg ...

8 Weighing unit 1 units:
Unit 1 bt, Unit 1 kg, Unit 1 to, Unit 1 mg, Unit 1 cl, Unit 1 ct, Unit 1 ttl, Unit 1 lb, Unit 1 S tl, Unit 1 oz, Unit 1 H tl, Unit 1 ozt, Unit 1 m, Unit 1 GN, Unit 1 mo, Unit 1 dwt

16 Handshake [6]	15 Bit/Parity [6]	14 Baud rate [6]		11 Peripheral unit	10 Autozero [2]	9 Weighing unit 2 [4]
HS OFF	7b-E	bd 2400		PrintEr	A2Ero	Unit 2 g
HS HArd / HS SoFt	7b-odd / 7b-no	bd 1200 / bd 4800		HoSt	no A2Ero	Unit 2 cl / Unit 2 kg ...
	8b-no	bd 600 / bd 9600	13 Send mode [5] / 12 Send format [5]	2d iSPLAY		
		bd 19200	S. oFF / SICS			
			S. Cont / S. Stb / PrN			

9 Weighing unit 2 units:
Unit 2 cl, Unit 2 kg, Unit 2 m, Unit 2 mg, Unit 2 mo, Unit 2 ct, Unit 2 dwt, Unit 2 lb, Unit 2 GN, Unit 2 oz, Unit 2 ozt

Menu option

Factory setting

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.

Cal/Menu	0.0 1 g
	ꭥЕПШ
	⬇
	r E5Et

Select menu options

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

⇨	r E5Et
	Un it 1 g

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).

↩	Un it 1 g
	Un it 1 kg

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.

Cal/Menu	StorEd
	0.0 1 g

Abort

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

| C | |
| | 0.0 1 g |

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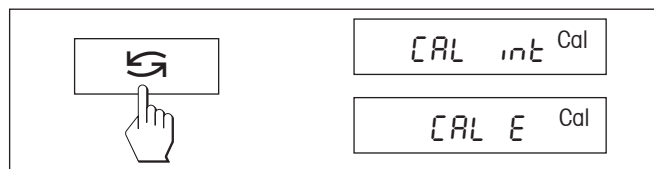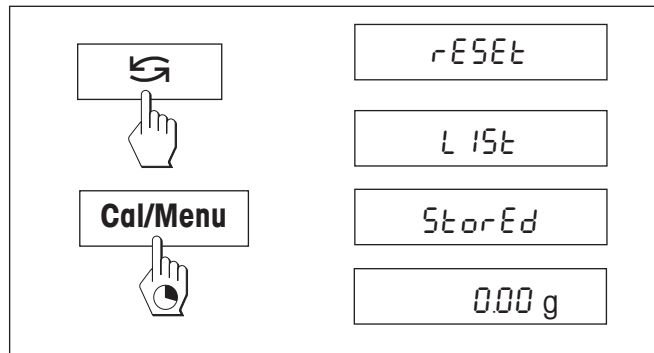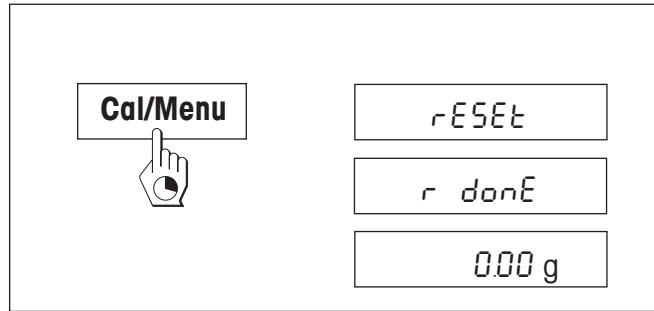
4.3.1 Reset or recording of balance settings (1st menu option "RESET")

Reset balance settings

Cal/Menu	rESEt
	r donE
	0.00 g

→ 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.

⇆	rESEt
	L ISt
Cal/Menu	StorEd
	0.00 g

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.

⇆	CAL int ^{Cal}
	CAL E ^{Cal}

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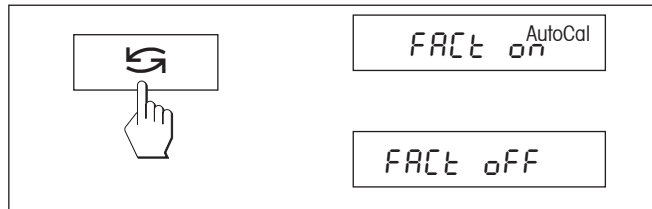
4.3.4 Protocol (4th menu option) (only available on JB-C/FACT and JB-G/FACT models)

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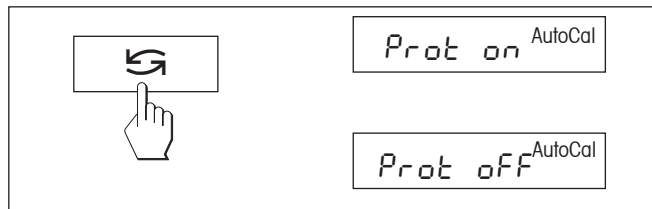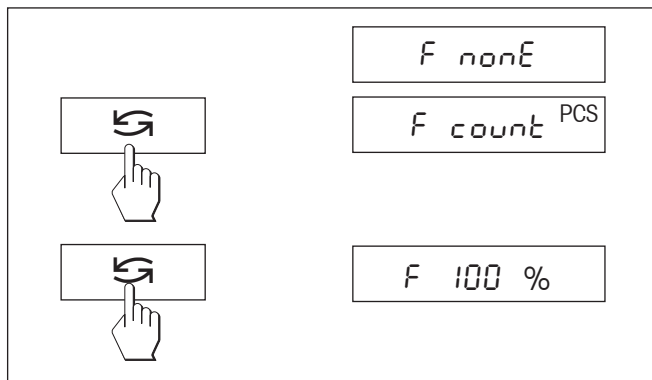
4.3.5 Functions (5th menu option / Operating Section 5)

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
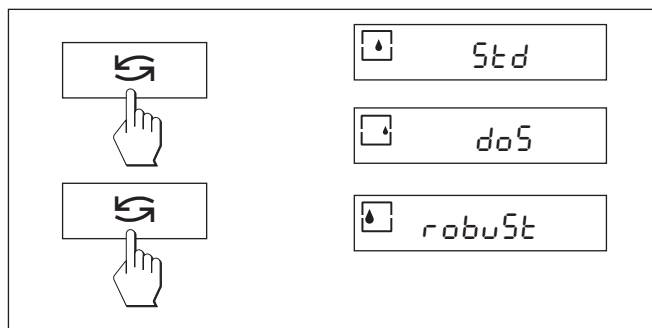
4.3.6 Weighing mode (6th menu option)

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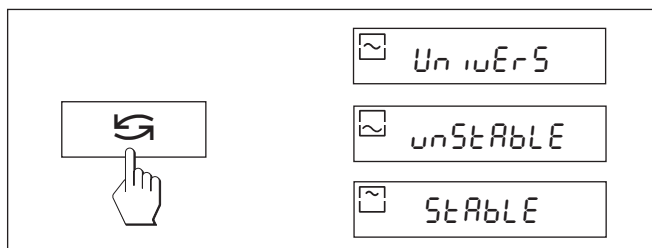
4.3.7 Vibration adapter (7th menu option) (only available on JB-C/FACT and JB-G/FACT models)

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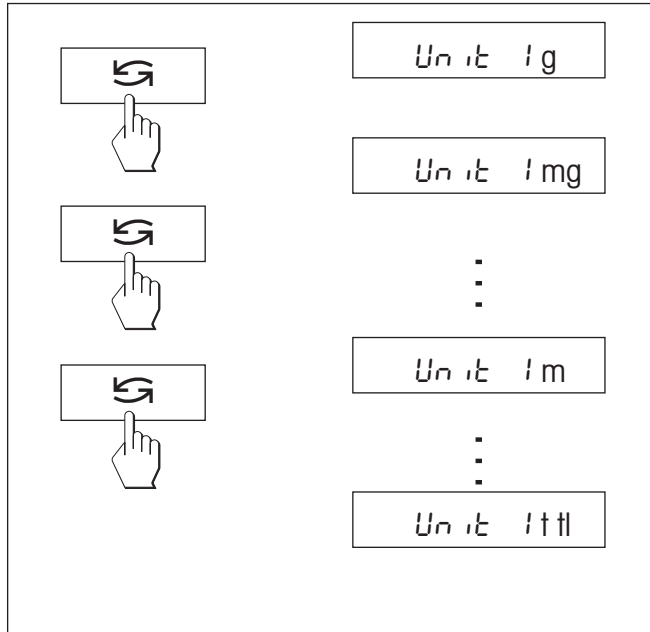
4.3.8 Weighing unit 1 (8th menu option "UNIT 1")

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 tlt = 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 «⇆» 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" und "t tl").
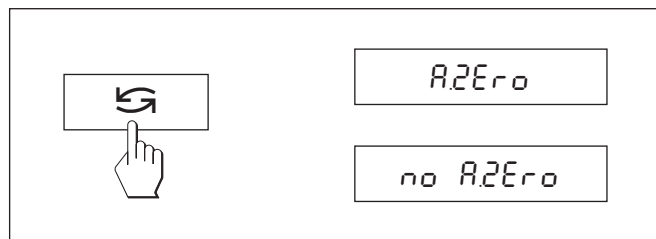
4.3.10 Autozero (10th menu option)

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).

```
  A.2Ero

 no A.2Ero
```

Note

With certified balances, this setting is possible only with a resolution of e = 10d.
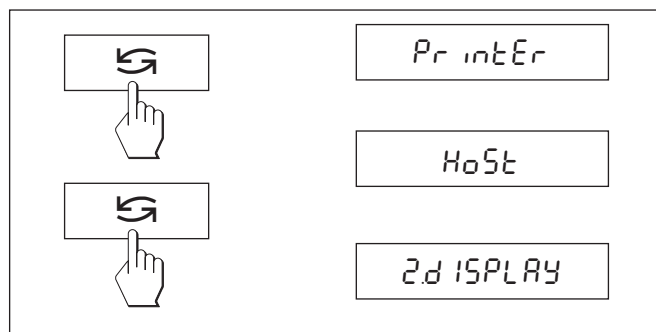
4.3.11 Peripheral unit (11th menu option)

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

  HoSt

 2.dISPLAY
```

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).

21

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: ␣␣␣␣␣1.67890␣g   S. Cont: S␣␣␣␣␣1.67890␣g
                                          SD␣␣␣␣1.39110␣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 «⤓» 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)!

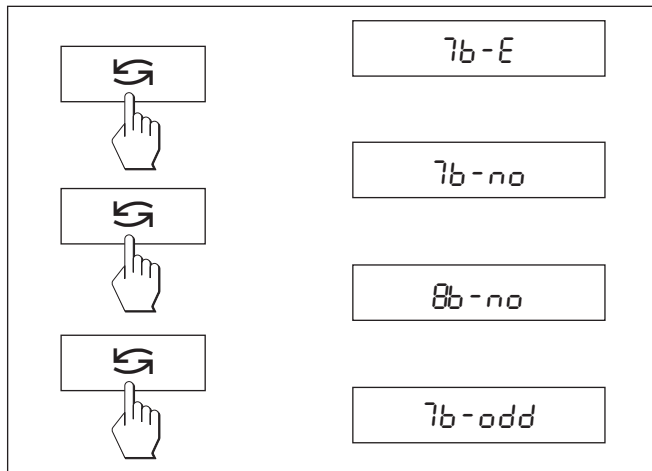At this menu option you can set the character format for the attached peripheral device.

7b–E   7 data bits/even parity

7b–no   7 data bits/no parity

8b–no   8 data bits/no parity

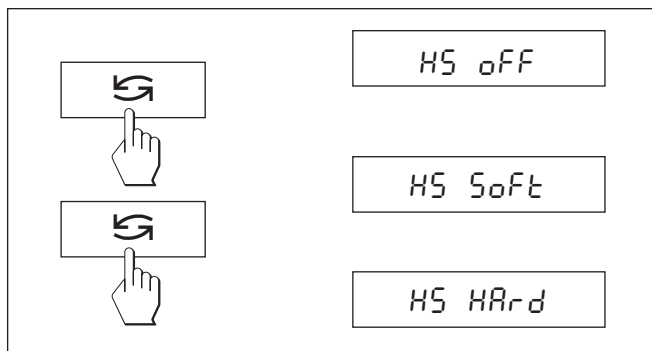7b–odd   7 data bits/odd parity

### 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

→0/T←	0.00 g
F	SEt 10 PCS
⇆	SEt 20 PCS
⇥	20 PCS
	240 PCS
⇆	144.81 g
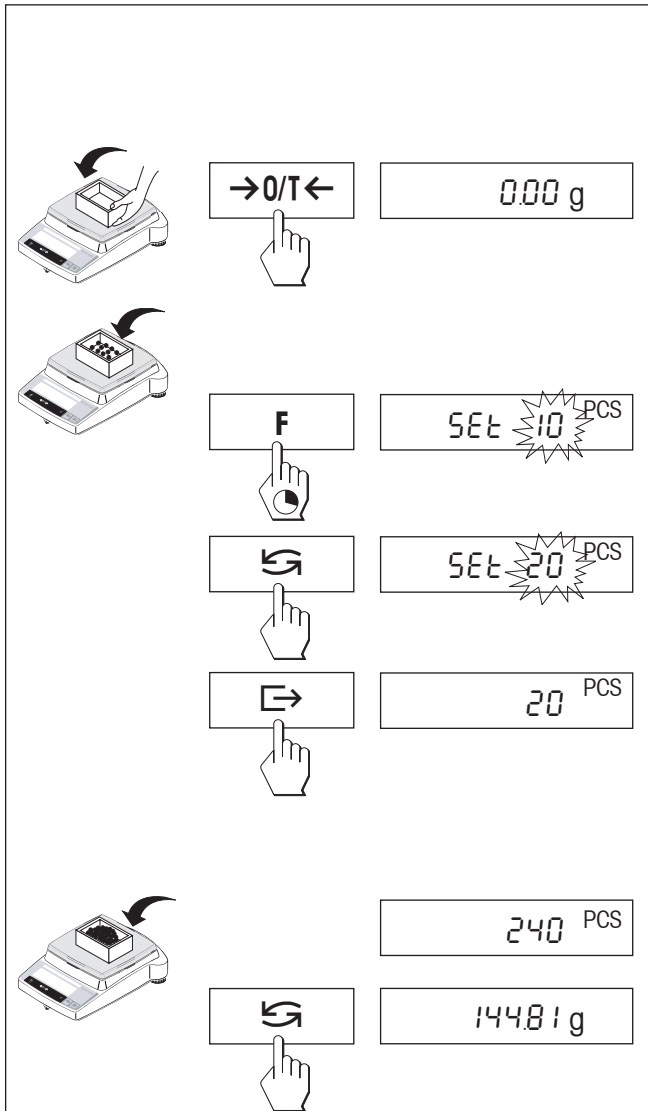
Requirement

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.
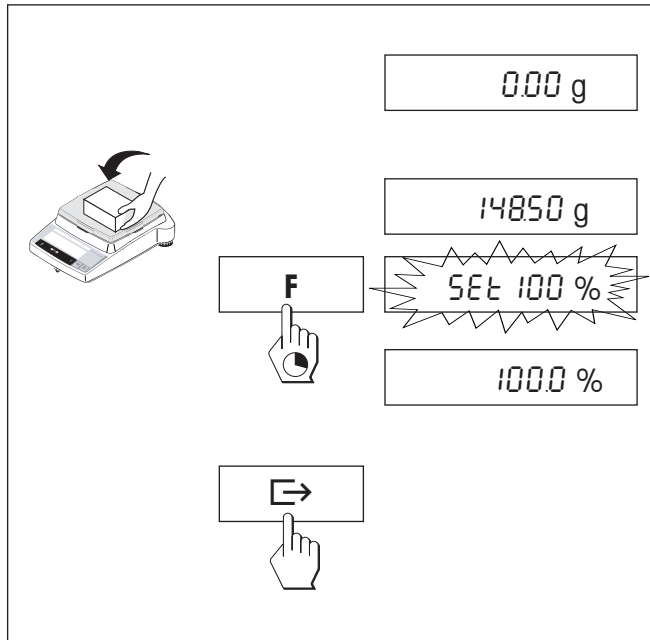
Switching between piece count and weight display

→ 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

0.00 g
1485.0 g
F   SEt 100 %
100.0 %
⇨

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.

101.6 %
⮌   150.88 g
⮌   101.6 %
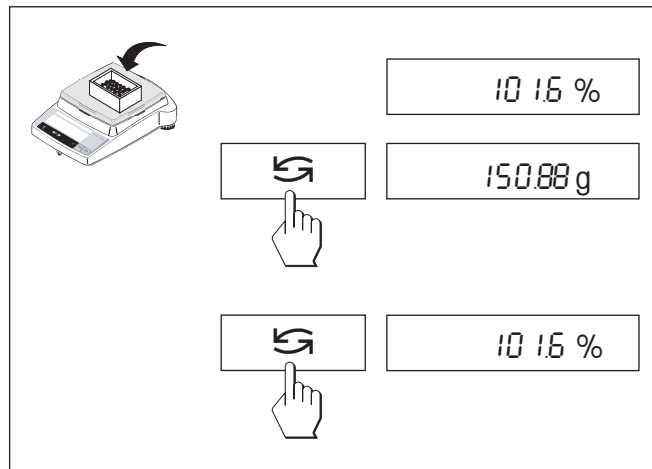
Percent weighing / switching

→ 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 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).

⟲	64.71 g
	64710 mg
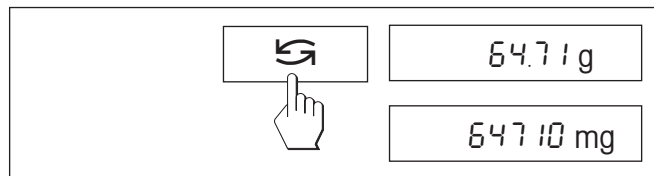
→   The «⟲» key can be used at any time to toggle between the two weighing units selected in the menu ("UNIT 1" and "UNIT 2").

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 Barex
- 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 unter 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 JB703-C/FACT	JB1203-L-C JB1203-C/FACT	JB1603-L-C JB1603-C/FACT	JB2503-L-C5 [1] JB2503-C5/FACT [1]	JB2502-L-C [2] 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 JB-C/FACT	100 g, external [3] 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 m³)	381/436/495 mm (0.082 m³)	381/436/495 mm (0.082 m³)	381/436/495 mm (0.082 m³)	381/436/495 mm (0.082 m³)
Weighing pan	∅ 80 mm	∅ 80 mm	∅ 80 mm	∅ 100 mm	∅ 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 JB-G/FACT	external [1] built-in	external [1] built-in	external [1] built-in	external [1] built-in	external [1] 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).
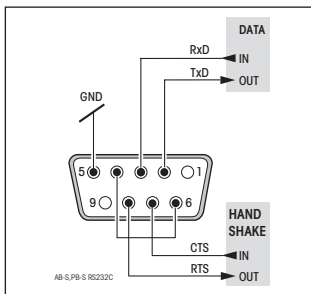
You will find a detailed description of the available interface commands in the brochure "Reference Manual MT-SICS Basic-S balances 11780447" downloadable from the Internet under **www.mt.com/sics-classic.**

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_RL_F (ASCII 13 dec., 10 dec.).

The characters C_RL_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 ⇥ (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

AC adapter (universal)   11120270
(EU, USA, AU, UK)
100–240 V, 50-60 Hz, 0.3 A
12 VDC, 0.84 A

Adjustment weights
Available as OIML weights (E1, E2, F1,
with calibration certificate) For further
details see **www.mt.com/weights**

Antitheft device   00590101
Cable with lock

Auxiliary display (RS232C)
- Auxiliary display   **12120057**
- Auxiliary display RS-AD-L7   72213564
  with backlit
- Auxiliary display RS-AD-7   72213565
  without backlit

Carat pan
- XS, ø 50 mm x 20 mm, aluminium   12102565
- S, ø 80 mm x 20 mm, aluminium   12102645
- M, ø 90 mm x 30 mm, aluminium   12102646
- L, ø 90 mm x 45 mm, aluminium   12102647

Density kit (for JB-L-C, JB-C/FACT only)   11120267
For determination of solids

Draft shield   11137468
Draft shield with sliding doors *
"mg" (165 mm)
    * JB-G Balances require the weighing
    pan Ø 175 mm   11103680

Interface cable
- 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

Printer, Application printer (RS-P28/11)   11124309
Plain-paper printer, 24 characters, with
additional functions (time, date, statistic)

Protective cover   11103681
For all JB models (1 piece)

Software
LabX direct balance   11120340
(Simple data transfer)

Transport case   11101050
For all JB-G/JB-C models
(Draft shield 165 mm / 141 mm)

6.5   Dimensional drawings

All dimensions in millimeters (mm)

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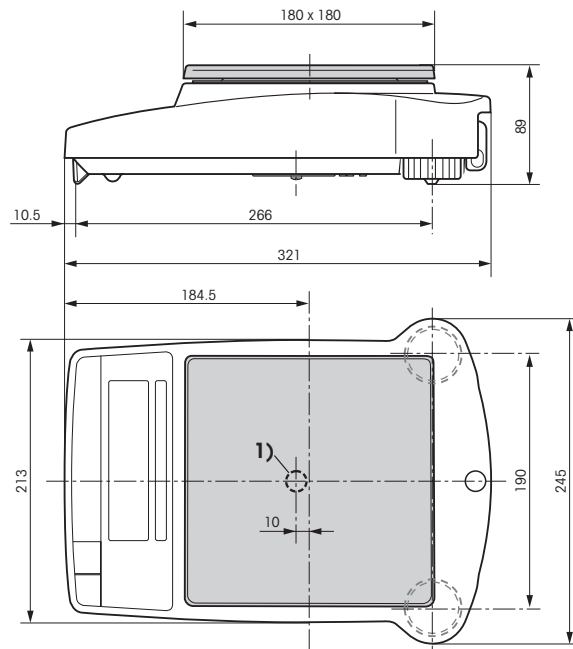
Carat balance with draft shield "mg" (165 mm)

1) Opening for hanger
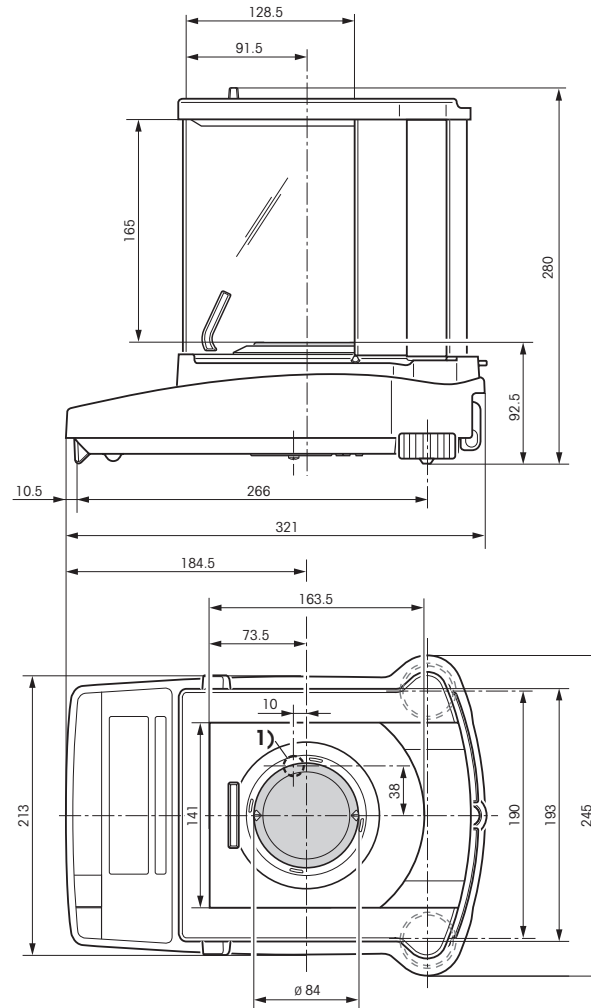
7 Appendix

7.1 Typical printouts from METTLER TOLEDO RS-P28 printer

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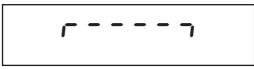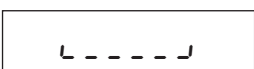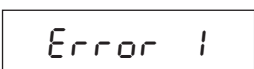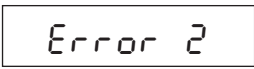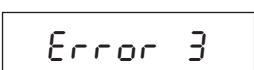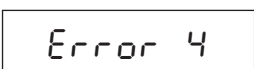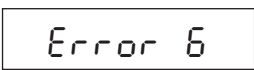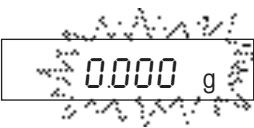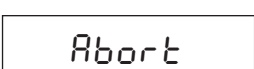
Function: **Piece counting**
Printout with reference weight

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


            27.000 g
                27 PCS
```

Function: **Statistics**

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

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.
Error 1	No stability • 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
Error 2	Wrong adjustment weight on pan or none at all	→ Place required adjustment weight in center of pan.
Error 3	Reference number for piece counting too small	→ Increase number of reference pieces.
Error 4	Internal fault	→ Contact METTLER TOLEDO customer service.
Error 6	No standard calibration	→ Contact METTLER TOLEDO customer service.
0.000 g	Wrong weighing pan or pan missing	→ Mount correct weighing pan.
Abort	Adjustment aborted with the «**C**» key	

7.3   Maintenance and cleaning

Service

Regular servicing of your balance by a service technician pro-
longs 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 com-
  ponents, 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 Was-
te 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 authori-
ty 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.

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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.