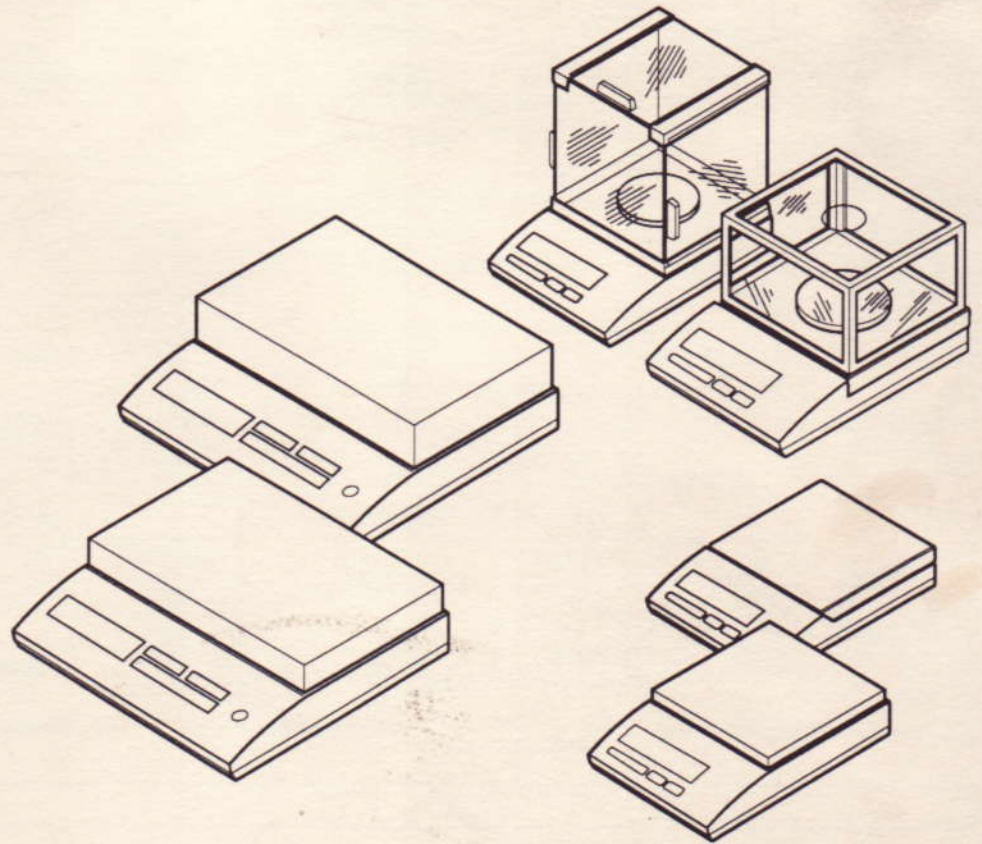


M

Operating instructions




METTLER TOLEDO
B balance line
AB/PB/SB



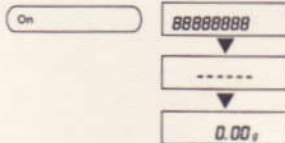
METTLER TOLEDO



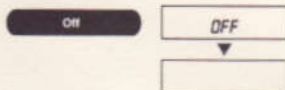
Short-form operating instructions

-  Press key **briefly**
-  Press and **hold** key until the desired display appears
-  Automatic procedure

Switching on



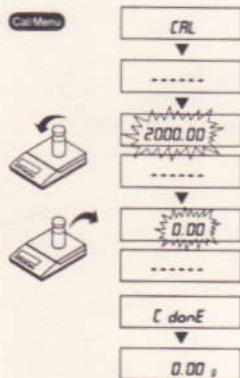
Switching off



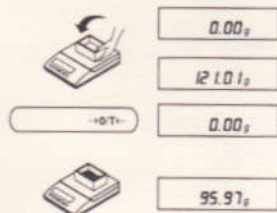
Simple weighing



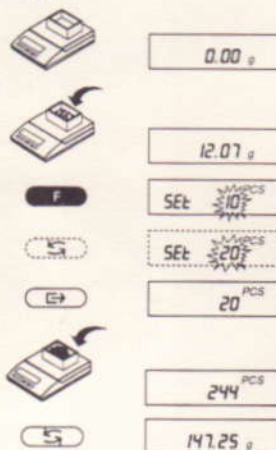
Calibration (adjusting)



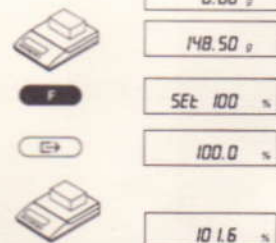
Taring



Piece counting*

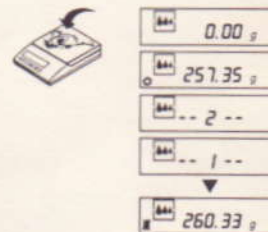


Percent weighing*

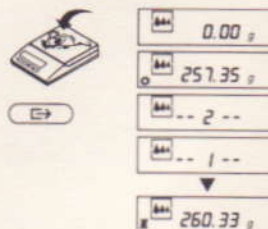


Dynamic weighing*

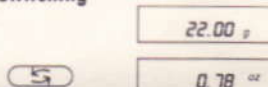
Automatic start (Dyn 1)



Manual start (Dyn 2)



Unit switching*



* These functions must be activated in the menu.

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1 Getting to know the B balance line

1.1 Introducing the B balance line

Several types of construction – uniform operation

The B balance line ranges from high-resolution analytical balances (AB balances) with a readability of 0.1 mg via precision balances (PB balances) up to industrial balances (SB balances) with a readability from 0.1 g to 1 g. The weighing ranges extend from 51 g to 32 kg.

The operation of all these balances is identical.

Performance capabilities

In addition to **basic weighing operations** such as weighing, taring and calibration (adjusting), the following **functions** can be activated (section 5):

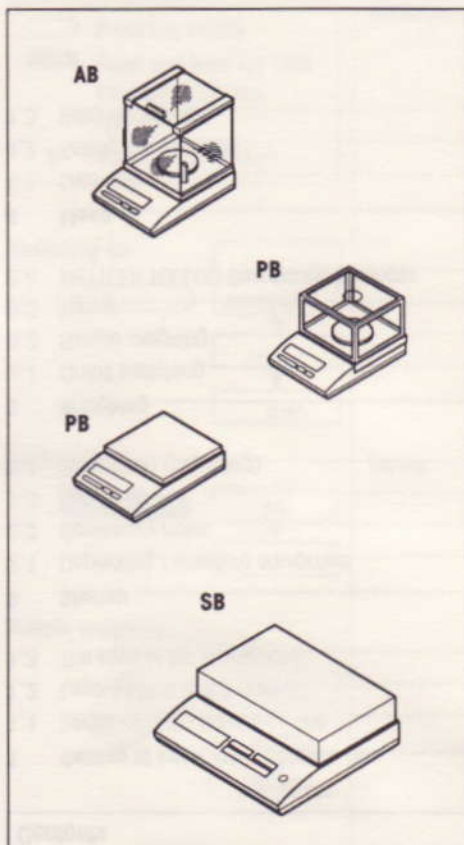
- Piece counting
- Percent weighing
- Dynamic weighing for unstable weighing samples, e.g. animals.

B balances can be optimally matched to the ambient conditions through appropriate setting of the **vibration adapter** (section 4.3).

METTLER TOLEDO DeltaRange balances also have a movable fine range with 10 times smaller display increments (section 3.4).

Notes

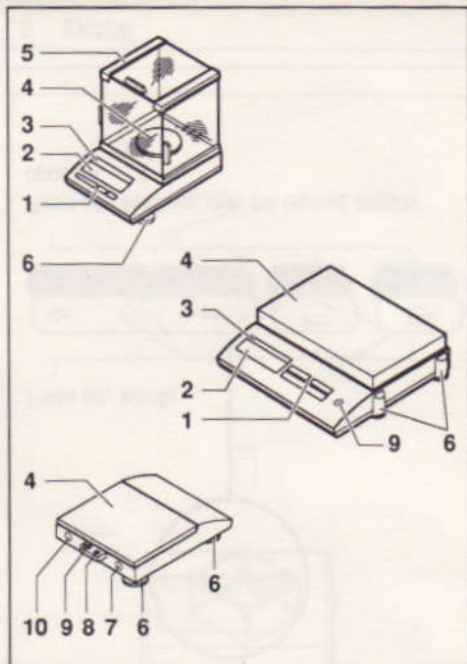
- Certified versions of the B balances are also available, please ask your METTLER TOLEDO dealer for details.
- All B balances can be fitted with the optional LocalCAN universal interface. You thus not only have a wide range of METTLER TOLEDO optional equipment available, but you can also attach all computers and printers with RS-232C to your balance (section 6.2).
- If you wish to build on what you have learned about weighing in these operating instructions, you will find valuable tips in the booklet "Weighing the right way" ME-720906.



1.2 Layout of the B balances

- 1 Keys
- 2 Display
- 3 Model plate (with details of max., min., e and d for certified balances)
- 4 Weighing pan/platform
- 5 Draft shield
- 6 Levelling feet
- 7 AC adapter socket
- 8 Provision for antitheft device
- 9 Levelling control
- 10 Device for fitting the LocalCAN universal interface

Display, keys and operation are identical for all B balances.



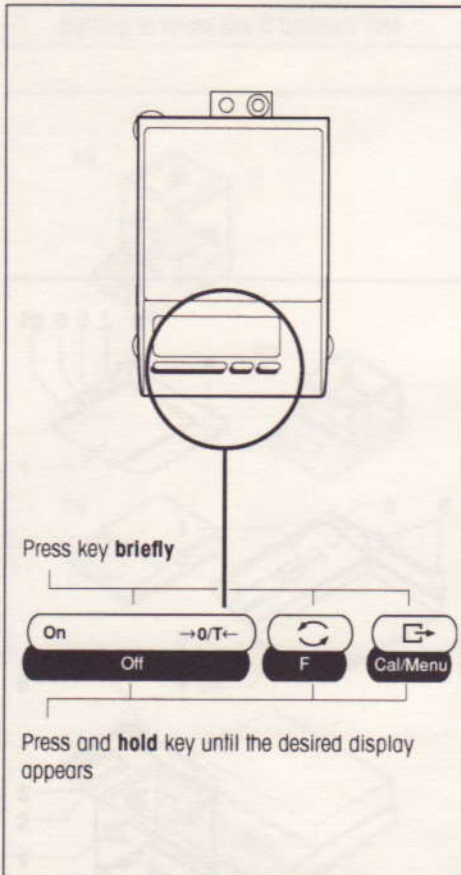
1.3 The keys of the B balances

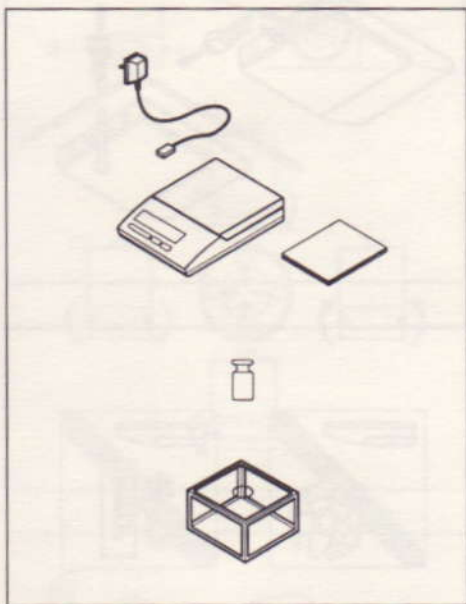
B balances have two operator control levels: the **weighing mode** and the **menu**. The keys have different meanings, depending on the operator control level and how long a key is pressed.

Weighing mode (operation)	
Press briefly	Press and hold
(On) • Switch on (->0/T<-) • Tare	(Off) • Switch off
(S) • Switch (S) • Change settings	(F) • Call function A function must be activated in the menu, otherwise "no F" appears in the display.
(E) • Print (E) • Confirm settings	(Cal Menu) • Calibrate (adjust) (Cal Menu) • Call menu



Menu (called up with Cal Menu)	
Press briefly	Press and hold
(->0/T<-) • Abort	—
(S) • Change settings	—
(E) • Select menu options	(Cal Menu) • Store and quit menu





2.1 Unpacking / standard equipment

All B balances are supplied in an environmentally harmless package. The standard equipment of the B balances includes

- **AC adapter**, to national codes,
- **operating instructions**, to allow optimum utilization of the capabilities of your balance,
- **calibration weight**, with AB balances only,
- **draft shield**, mounted with AB balances, for mounting by user in the case of PB balances with a round weighing pan.

Note

Calibration weights can be ordered from METTLER TOLEDO for all other B balances, see section 6.2.



2.2 Cautionary notes

- B balances may not be operated in hazardous areas.
- Before attachment of the AC adapter, check whether the imprinted voltage value matches the local supply voltage. If it does not, contact your local dealer.

2.3 Setting up

The optimum location

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

Hence, ensure a

- stable, vibration-free position as horizontal as possible.

Avoid

- direct sunlight,
- excessive temperature fluctuations,
- drafts.

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

Note

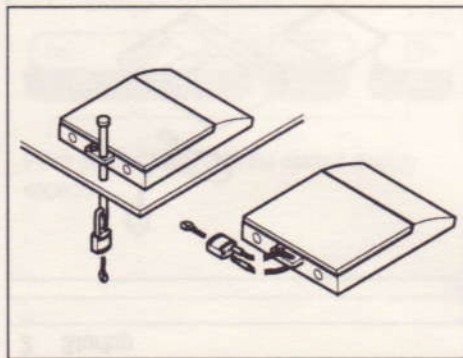
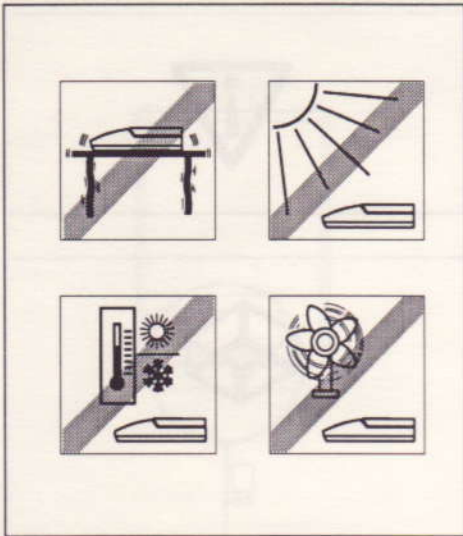
If vibrations can not be prevented, the balance can still provide accurate results if the vibration adapter is set accordingly, see section 4.3.

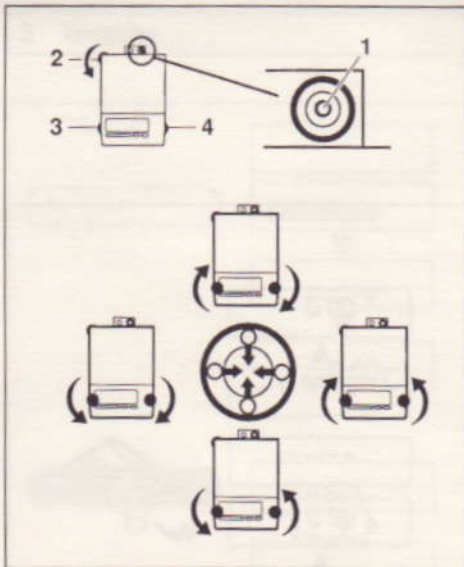
Antitheft device

B balances have provision for the attachment of an antitheft device.

The following antitheft devices are available:

- | | |
|-------------------------------|-----------|
| • Bolt with lock (for AB, PB) | ME-229175 |
| • Cable lock | ME-590101 |





Leveling

B balances have a level control and adjustable leveling feet to compensate for slight irregularities in the weighing bench surface. The balance is exactly horizontal when the air bubble **1** is in the middle.

Procedure

With balances with only 2 adjustable leveling feet, you have only to follow the instructions under **point 3**.

1. Screw in left rear leveling foot **2** fully.
2. Hold balance down at front left and right to position it on the rear right foot and the two front feet, note the air bubble in this position.
3. Now turn the two front leveling feet **3** and **4** as shown in the illustration or described in the table so that air bubble **1** is in the middle.

Air bubble at "12 o'clock" turn both leveling feet clockwise

Air bubble at "3 o'clock" turn left leveling foot clockwise, right leveling foot counterclockwise

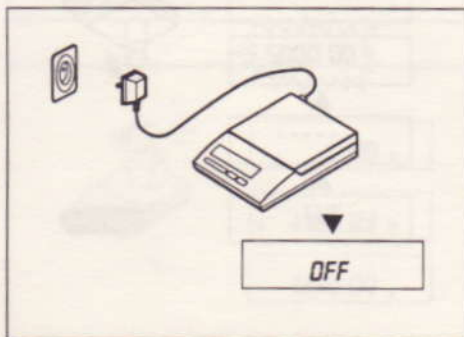
Air bubble at "6 o'clock" turn both leveling feet counterclockwise

Air bubble at "9 o'clock" turn left leveling foot counterclockwise, right leveling foot clockwise

4. After the balance has been leveled with the front leveling feet, unscrew the rear leveling foot **2** to the same level.

Note

The balance must be relevelled each time it is moved to a new location.

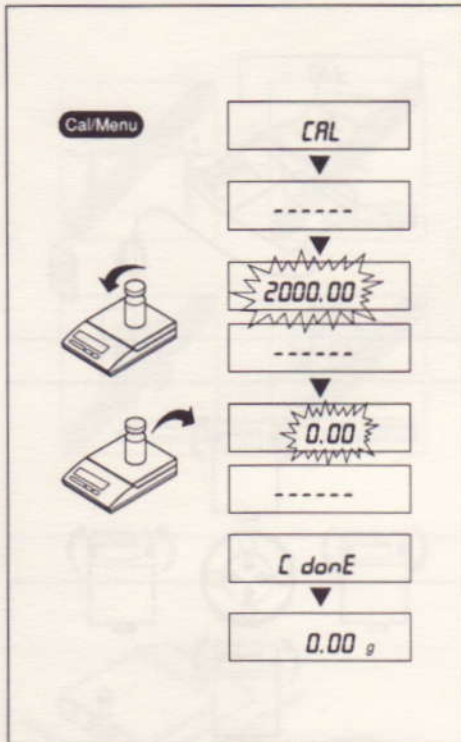


Connecting to the power supply

- Before connection of the AC adapter, check that the imprinted voltage value matches the local supply voltage. If this is not the case, please contact your local METTLER TOLEDO dealer.
- Plug AC adapter into AC adapter socket of the balance and connect to the power supply.
- The balance performs a self-test. The test is finished when "OFF" appears.
- Press **On** briefly: balance is in operational readiness. Before any work is performed with the balance, it should be calibrated (adjusted).

Note

The PP-B10 PowerPack (rechargeable, external battery) can be used to operate all B balances independently of the power supply (section 5.2).



2.4 Calibration (adjusting)

To obtain accurate weighing results, the balance must be matched to the acceleration due to gravity at its location.

Calibration is necessary

- before the balance is used for the first time,
- at regular intervals during weighing operations,
- after a change in location.

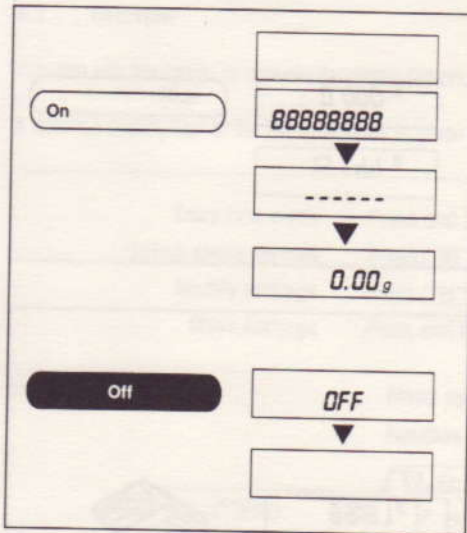
Procedure

- Have required calibration weight ready (section 6.1).
- Remove any load from weighing pan.
- Press and hold **Cal/Menu** until "CAL" appears in the display, release key. The required calibration weight value flashes in the display.
- Place calibration weight in center of pan. The balance calibrates itself.
- When "0.00" flashes, remove calibration weight. The calibration (adjusting) is finished when "0.00 g" appears in the display. The balance is again in the weighing mode and ready for operation.

Notes

- Depending on national certification specifications, the calibration may be locked with certified balances after the installation.
- To obtain accurate results, before calibrating the balance must be switched on for 20 - 30 minutes so that the operating temperature will be reached.

3 Weighing



3.1 On/off switching

Switching on

- Remove any load from weighing pan and press **On** briefly. The balance performs a display test. When zero is displayed, the balance is ready for operation.

Switching off


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

3.2 Simple weighing

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


3.3 Taring

→ Place empty container on the balance, the weight is displayed.

→ Tare: press  briefly.

→ Add weighing sample to container, the net weight is 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  is again pressed or the balance is switched off.

Note

With METTLER TOLEDO DeltaRange balances, the fine range with its 10 times smaller display increments is again available after every taring operation.

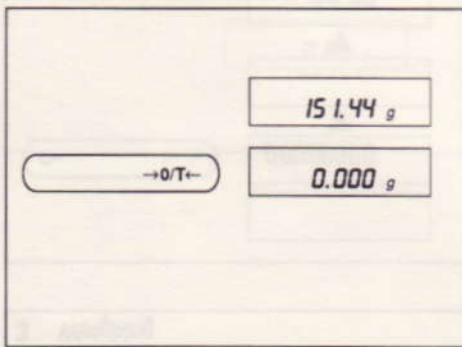
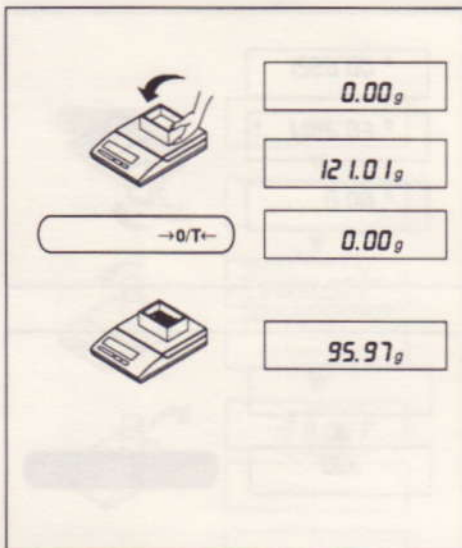
3.4 METTLER TOLEDO DeltaRange balances

METTLER TOLEDO **DeltaRange balances** have a movable fine range with 10 times smaller display steps. In this range there is always an additional decimal place in the display.

The balance operates in the fine range

- after switching on,
- after every taring operation.

If the fine range is exceeded (section 6.1), the balance display automatically switches to greater display steps.



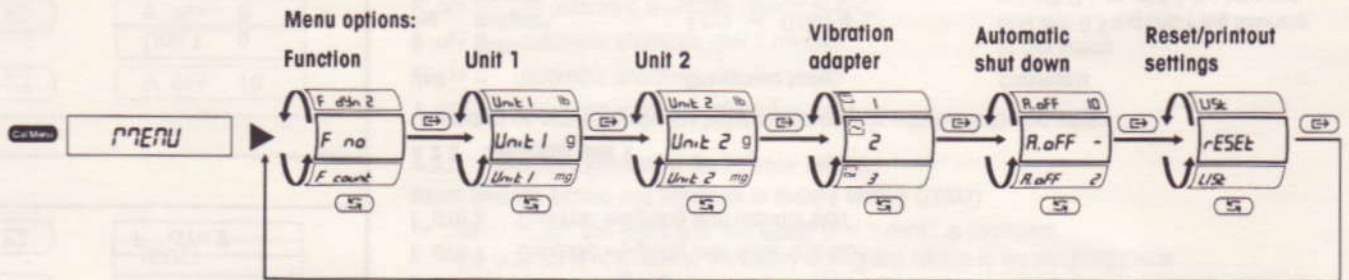
4 Menu

4.1 Overview

You can use the menu to activate functions (F) and change the balance settings.

A detailed description of the menu options is given in sections 4.2 and 4.3.

- Entry into menu** Press and hold **Cal Menu** until "MENU" appears in the display. Release key, the 1st menu option "F..." appears.
- Select menu options** Press **↔** briefly. Press key repeatedly to view the current balance settings.
- Modify settings** Press **↔** repeatedly until the desired setting appears.
- Store settings** Press and hold **Cal Menu** until "StorEd" appears. Release key, the balance returns to the weighing mode.



Abort Press **←0T→** briefly. The balance returns to the weighing mode without storing the changes.

Note If no entry is made within 45 seconds, the balance returns to the weighing mode without storing the changes.

4.2 Setting the functions

4.2.1 F... – Selecting function of F key

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


F no	No function, simple weighing (factory setting)
F count	Piece counting
F 100 %	Percent weighing
F dYn 1	Dynamic weighing with automatic start
F dYn 2	Dynamic weighing with manual start

4.2.2 Selecting unit 1

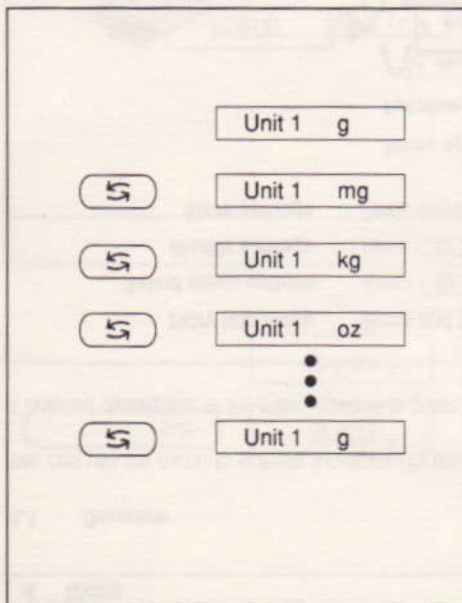
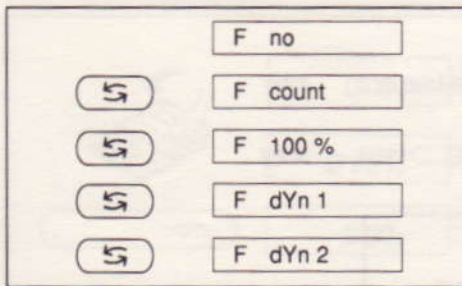
Depending on requirements, the balance can operate with the following units:

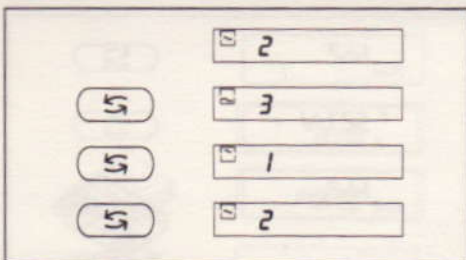
Unit	Conversion factor	Comments
g	gram	factory setting
mg	milligram	only with 0.1 mg and 1 mg balances
kg	kilogram	not with 0.1 mg and 1 mg balances
lb	pound	not with 0.1 mg balances
oz	ounce	
ozt	troy ounce	
GN	grain	not with 0.1 g and 1 g balances
dwt	pennyweight	
ct	carat	not with 1 g balances
mo	momme	
m	Mesghal	
S tl	Singapore taels	
H tl	Hong Kong taels	
t tl	Taiwan taels	

4.2.3 Selecting unit 2

If the weighing result in the weighing mode should be displayed in another unit by pressing  (see section 5.4), the appropriate unit must be selected here.

Toels cannot be selected in unit 2.



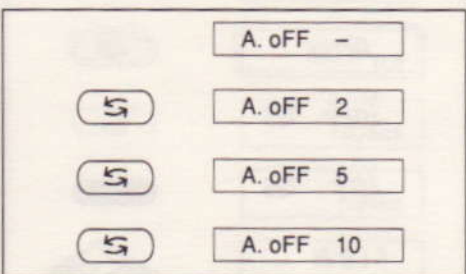


4.3 Balance settings

4.3.1 Setting the vibration adapter

You can use the vibration adapter to match the balance to the ambient conditions.

- 2 Setting with normal balance surroundings (factory setting).
- 3 Setting with unstable balance surroundings. The balance operates slower but is less sensitive to external influences (drafts, vibrations, etc.).
- 1 Setting with very stable balance surroundings. The balance operates very quickly but is sensitive to external influences (drafts, vibrations, etc.).

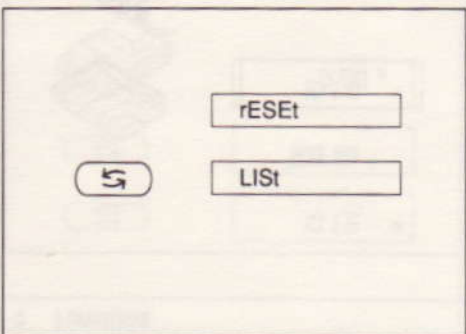


4.3.2 A.oFF – automatic shutdown

The automatic shutdown extends the operating time in line-independent operation with the PP-B10 PowerPack considerably.

When the automatic shutdown is activated, the balance switches itself off if no weighing has been performed during the specified time.

- A.oFF – no automatic shutdown (factory setting)
- A.oFF 2 automatic shutdown after 2 minutes
- A.oFF 5 automatic shutdown after 5 minutes
- A.oFF 10 automatic shutdown after 10 minutes



4.3.3 Reset and printout of the balance setting

Reset balance setting and functions to factory setting (rESEt)

→ Select "rESEt" and press and hold **Cal Menu** until "r donE" is displayed.

The balance is now reset to the factory setting and returns to the weighing mode.

F no no function activated

Unit 1 g

Unit 2 g

2 normal balance surroundings

A.oFF – no automatic shutdown

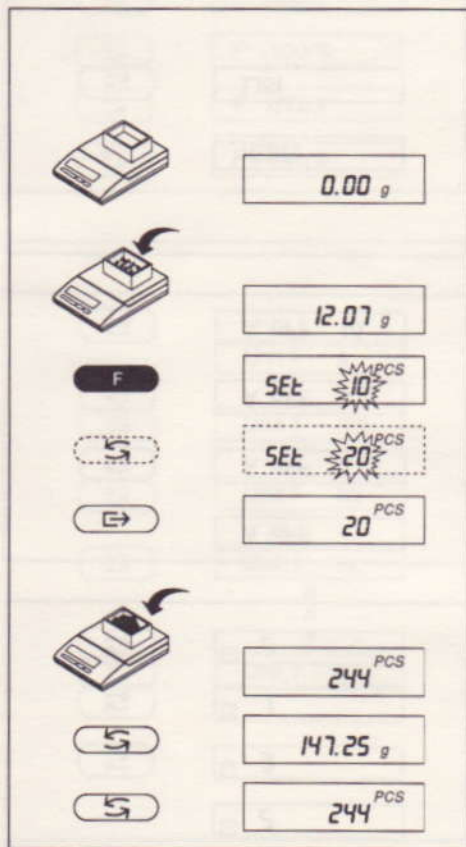
Printing out the balance setting (LISt)

→ Select "LISt" and press and hold **Cal Menu** until "StorEd" is displayed.

The current balance setting is printed out and stored.

The selection "LISt" appears only when a LocalCAN universal interface is installed.

5 Functions



5.1 Piece counting

Requirement

The function "F count" must be activated in the menu, see section 4.

→ Place empty container on the balance and tare: press **←0T→** briefly.

Setting the reference

A reference weight (reference) must first be entered for piece counting.

- Add reference parts to container, possible reference numbers are 10, 20, 30, 50, 100 and 5.
- Press and hold **F** until "SEt ... PCS" is displayed.
- Press **5** repeatedly until the display matches the loaded reference number.
- Press **E** briefly to confirm reference. The current piece number (PCS = pieces) is displayed.

Notes

- If no entry is made within 45 seconds, the balance returns to the weighing mode.
- The current reference weight remains stored until the reference is reset or the power supply is interrupted.

Counting / switching

- Add weighing sample to the container and read piece number.
- Press **5** briefly, the weight is displayed.
- Return to display of the piece number: press **5** again.

5.2 Percent weighing

Requirement

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

Set target weight

- Place target weight in center of pan.
- Press and hold **F** until "SEt 100 %" appears in the display.
- Press **↵** briefly to confirm. The target weight is specified.

Notes

- If no entry or confirmation is made within 45 seconds, the balance returns to the weighing mode.
- 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 **↵** briefly, the weight is displayed.
- Return to display in percent: press **↵** briefly again.

The diagram shows a sequence of operations on a balance scale. It starts with the display at 0.00 g. A target weight of 148.50 g is placed on the pan. Pressing the 'F' button changes the display to 'SEt 100 %'. Pressing the '↵' button sets the target weight, and the display shows '100.0 %'. A weighing sample is then placed on the pan, and the display shows '10 1.6 %'. Pressing the '↵' button displays the weight of the sample as '150.88 g'. Pressing the '↵' button again returns the display to '10 1.6 %'.


5.3 Dynamic weighing

Dynamic weighing is suitable for the weighing of unstable weighing samples, e.g. animals. The mean value of the weighing results is determined over a specified time period (weighing time). The more unstable the weighing sample, the longer the selected weighing time.

Requirement

"F dYn 1" for automatic start or "F dYn 2" for manual start must be activated in the menu (section 4).

Factory setting is a weighing time of 3 seconds ($t = 3^*$).


The display shows the symbol .

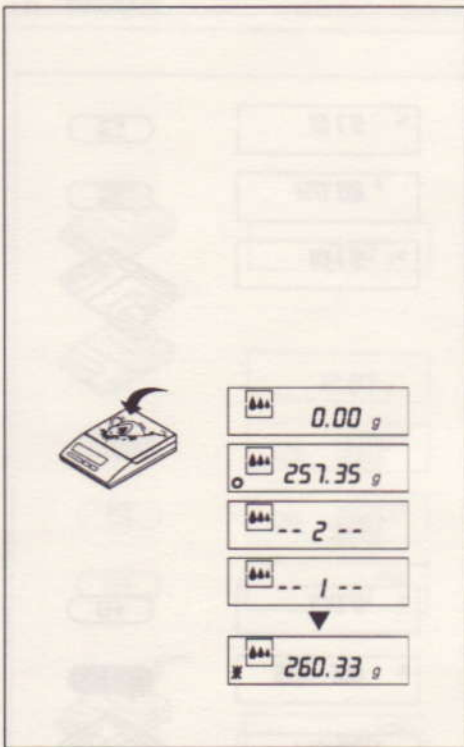
Dynamic weighing with automatic start (F dYn 1)

- Place container on the balance and tare.
- Load weighing sample. As soon as the balance is relatively stable, weighing starts automatically. During the weighing time, a "count down" runs in the display.
- Read off result.

The result of the dynamic weighing is indicated by * (= computed value) and remains in the display until the weighing sample is removed from the weighing pan.

Note


- The weighing cycle with the same weighing sample can be restarted with the  key.



Dynamic weighing with manual start (F dYn 2)

→ Place container on the balance and tare.

→ Add weighing sample to container.


→ Start weighing with .


During the weighing time, a "count down" runs in the display.


→ Read off result.

The result of the dynamic weighing is indicated by * (= computed value) and remains in the display until the weighing sample is removed from the weighing pan.

Changing the weighing time

→ Press and hold  until "t = 3" appears in the display.

→ Press  repeatedly until the desired weighing time appears.
Possible values are 3", 5", 10", 20", 1", 2".

→ Press  briefly to confirm selection.

Notes


- If no entry is made within 45 seconds, the balance returns to the weighing mode.
- The set weighing time remains stored until it is reset or the power supply fails.

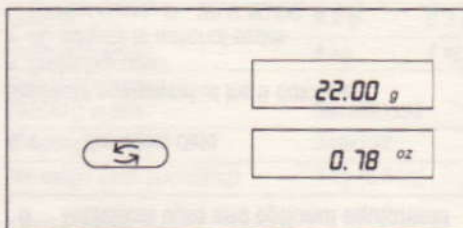
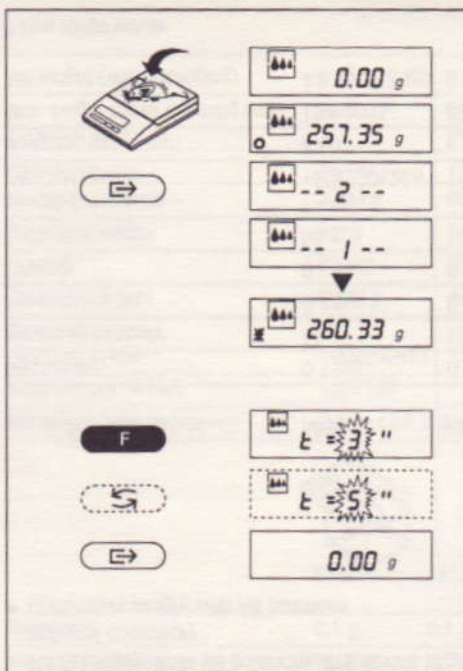
5.4 Switching weight units

Requirement

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

Switching between unit 1 and unit 2

→ Press  briefly.



6 Technical data and optional equipment

6.1 Technical data

Standard equipment of the B balances

- Protective cover
- AC adapter to national codes (power supply 9 - 20 V AC/DC, 6 VA)
- Device for weighing below the balance for AB and PB balances. With SB balances, this device is an optional accessory.
- Calibration weight with AB balances

Degree of protection against dust and water corresponds

- with AB and PB balances IP 54
- with SB balances IP 55

The technical data are in compliance with the following **ambient conditions**:

- Ambient temperature 10 °C ... 30 °C
- Relative atmospheric humidity 15 % ... 85 %, noncondensing



AB54



AB104

AB204



PB153

PB303

PB303
DeltaRange

PB302



PB602

PB1502

	AB54	AB104	AB204	PB153	PB303	PB303 DeltaRange	PB302	PB602	PB1502
Readability	0.1 mg	0.1 mg	0.1 mg	1 mg	1 mg	1 mg*/10 mg	10 mg	10 mg	10 mg
Maximum capacity	51 g	101 g	210 g	151 g	310 g	60 g*/310 g	310 g	610 g	1510 g
Repeatability (s)	0.1 mg	0.1 mg	0.1 mg	0.5 mg	0.5 mg	0.2 mg*/0.5 mg	5 mg	5 mg	5 mg
Linearity	0.2 mg	0.2 mg	0.2 mg	2 mg	2 mg	2 mg*/10 mg	20 mg	20 mg	20 mg
Calibration weight	50 g	100 g	200 g	100 g	200 g	200 g	200 g	500 g	1000 g
Overall dimensions (WxDxH) in mm	190x290x265	190x290x339		190x290x193			190x290x62		
Weighing pan in mm	ø 80	ø 80		ø 100			180x166		
Max. height above weighing pan	159 mm	232 mm		118 mm					
Net weight (with packaging)	4.6 kg (7.3 kg)	5 kg (8.1 kg)		3 kg (5 kg)			2.5 kg (4.5 kg)		

* Fine range values



Technical data	PB3002	PB3002 DeltaRange	PB801	PB1501	PB3001	PB5001	PB8001	PB8000
Readability	10 mg	10 mg*/100 mg	0.1 g	0.1 g	0.1 g	0.1 g	0.1 g	1 g
Maximum capacity	3100 g	600 g*/3100 g	810 g	1510 g	3100 g	5100 g	8100 g	8100 g
Repeatability (s)	5 mg	2 mg*/5 mg	0.05 g	0.05 g	0.05 g	0.05 g	0.05 g	0.3 g
Linearity	30 mg	20 mg*/100 mg	0.1 g	0.1 g	0.1 g	0.1 g	0.1 g	0.5 g
Calibration weight	2000 g	2000 g	500 g	1000 g	2000 g	2000 g	4000 g	2000 g
Overall dimensions (WxDxH) in mm	190x290x62					190x290x80		
Weighing pan in mm	180x166					175x166		
Net weight (with packaging)	2.5 kg (4.5 kg)					2.7 kg (4.2 kg)		



	SB8001	SB12001	SB16001	SB16001 DeltaRange	SB24001 DeltaRange	SB32001 DeltaRange	SB8000	SB16000	SB32000
Readability	0.1 g	0.1 g	0.1 g	0.1 g*/1 g	0.1 g*/1 g	0.1 g*/1 g	1 g	1 g	1 g
Maximum capacity	8100 g	12100 g	16100 g	3200 g*/16100 g	4800 g*/24100 g	6400 g*/32100 g	8100 g	16100 g	32100 g
Repeatability (s)	0.1 g	0.1 g	0.1 g	0.1 g*/1 g	0.1 g*/1 g	0.1 g*/1 g	1 g	1 g	1 g
Linearity	0.2 g	0.3 g	0.3 g	0.3 g*/0.5 g	0.3 g*/0.5 g	0.3 g*/0.5 g	0.2 g	0.3 g	0.4 g
Calibration weight	4 kg	4 kg	8 kg	4 kg	8 kg	8 kg	4 kg	4 kg	8 kg
Overall dimensions (WxDxH) in mm	381x321x92				381x321x118		381x321x92		381x321x118
Weighing pan in mm	349x232				349x232		349x232		349x232
Net weight (with packaging)	7 kg (8.5 kg)				8.8 kg (10 kg)		7.5 kg (8.5 kg)		8.8 kg (10 kg)

* Fine range values

6.2 Optional equipment

Calibration weights

Available as OIML weights (E1, E2, F2, with certificate) or as calibration weight (not OIML).

50 g, 100 g, 200 g, 500 g, 1000 g, 2000 g, 5000 g, 10000 g.

Protective covers and draft shields

Please specify balance model when ordering.

AC adapters

Euro	ME-228063
US	ME-228064
UK	ME-228066
Japan	ME-228065
Australia (table model)	ME-228190

PowerPack

Line-independent, rechargeable external power source,

for 10 hours weighing operation PP-B10

Hook for weighing below the balance

(only for SB models)

SB models with low platform	ME-230033
SB models with high platform	ME-230034

Density kits

• For determination of solids	ME-33360
• For determination of liquids with displacement body	ME-33360+ ME-210260

Transport case

For all PB models, with space for balance and PowerPack

ME-224009

Antitheft devices

• Bolt and lock (for AB, PB)	ME-229175
• Cable lock	ME-590101

Interface and interface accessories

All B balances can be fitted with the optional LocalCAN universal interface. This interface not only enables the balance to communicate with peripherals such as printers, auxiliary displays and all computers with an RS-232C interface: In a trice you can expand the balance to a small system since this new general-purpose interface allows the operation of several peripherals simultaneously.

LocalCAN universal interface

for peripherals LC-B

METTLER TOLEDO peripherals can be attached directly, for third-party peripherals you also need an LC cable.

Auxiliary displays

• Upright and wall model	LC-PD *
• Stand model	LC-PDS *

Foot switch

LC-FS *

Printer for normal paper

• Application printer	LC-P45 *
• Printer	LC-P43 *

Connection cables (LC cables) for

- Devices with RS-232C, 25-pin, (m/T), such as IBM-XT and compatible or third-party printer etc. LC-RS25 *
- Devices with RS-232C, 9-pin, (m), such as IBM-AT and compatible LC-RS9 *
- METTLER CL devices LC-CL *

Extension cables

- 2 m LC-LC2 *
- 5 m LC-LC5 *




Branching cables

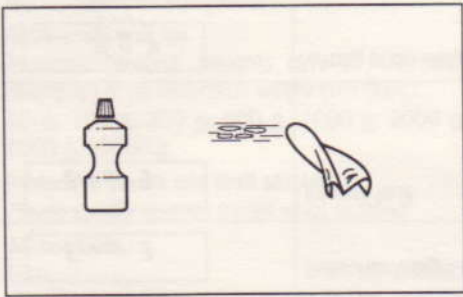
- T branching cable LC-LCT *

* These instruments or cables require the LC-B universal interface.

7 Appendix

7.1 What if...?

Error/error message	Cause	Rectification
	Overload	→ Remove sample from weighing pan, rezero (tare). If overload appears when balance switched on, recalibrate (readjust) balance.
	Underload	→ Remove sample from weighing pan, rezero. → Check whether weighing pan is positioned properly. If underload appears when balance switched on, recalibrate (readjust) balance.
<i>Error 1</i>	No stability <ul style="list-style-type: none"> • in taring or calibration (adjusting) • when reference weight for piece counting or percent weighing is placed on the pan 	→ Wait for stability before pressing key. → Ensure more stable ambient conditions.
<i>Error 2</i>	No or wrong calibration weight on pan	→ Place required calibration weight in center of pan.
<i>Error 3</i>	Reference weight or reference number too small	→ Increase reference weight or piece number.
<i>Error 9</i>	Internal fault	→ Switch off/on, disconnect from supply. → Calibrate (adjust). If the fault can not be rectified, inform customer service.
	Wrong or no weighing pan	→ Mount correct weighing pan.



7.2 Preventive maintenance

Servicing

Regular servicing of your balance by a service engineer extends its life. Ask your METTLER TOLEDO dealer for details of the servicing possibilities.

Cleaning

The balance housing and the weighing pan are made of high-grade, resistant materials. All usual cleaning agents can thus be used.

Soiled protective covers can be replaced for all balance types, see optional equipment in section 6.2.

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P705133

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

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