PB 520

Operating Instructions

Precisa

THE BALANCE OF QUALITY
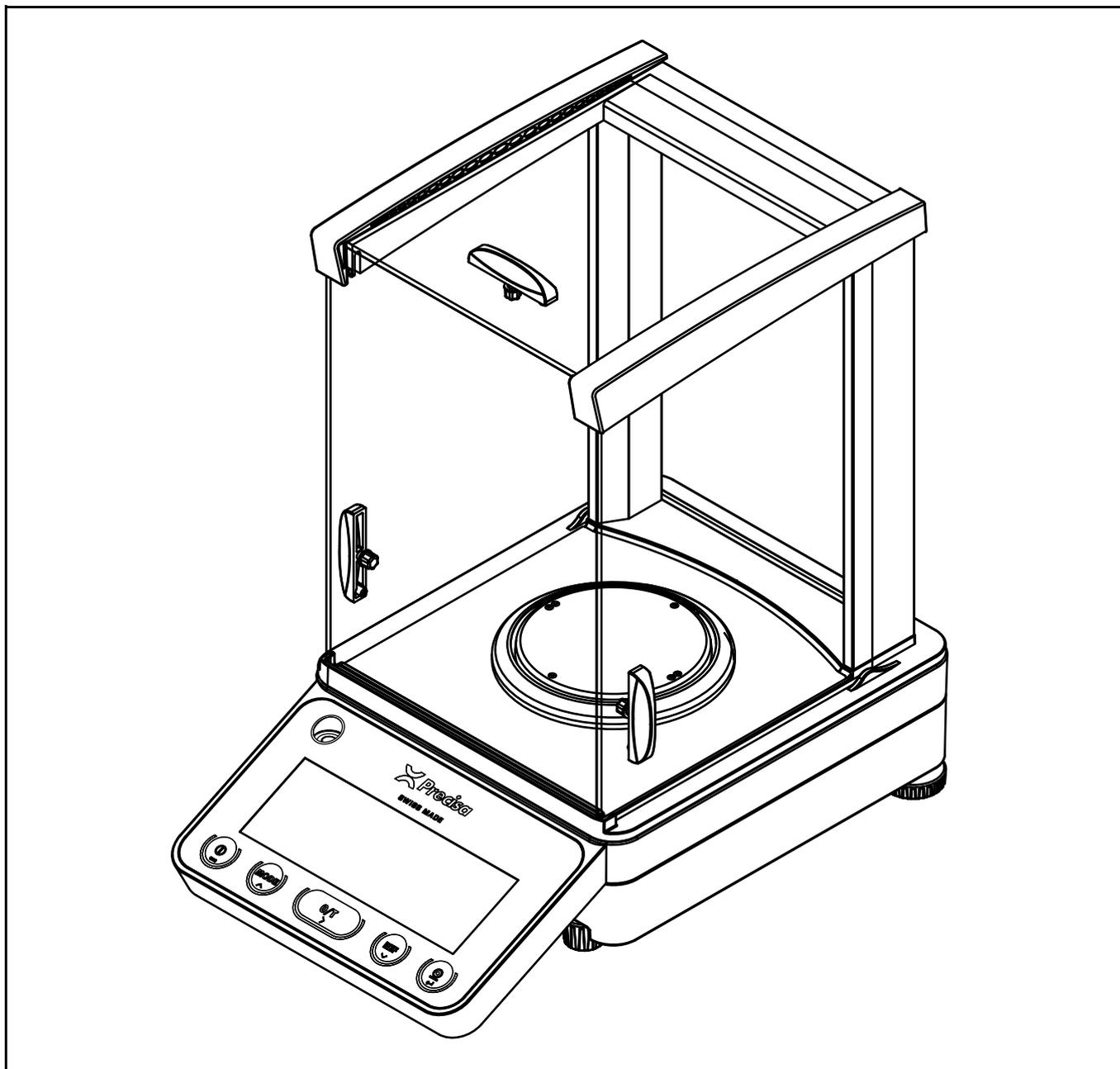
Declaration of conformity

Declaration of conformity for apparatus with CE mark
Konformitätserklärung für Geräte mit CE-Zeichen
Déclaration de conformité pour appareils portant la marque CE
Declaración de conformidad para aparatos con disitintivo CE
Dichiarazione di cofnromitá per apparecchi contrassegnati con la marcatura CE

English	We hereby declare that the product to which this declaration refers conforms with the following standards.
Deutsch	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.
Français	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.
Español	Manifestamos en la presente que el producto al que se refiere esta declaración est´´a de acuerdo con las normas siguientes
Italiano	Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.

Electronic Balance: Precisa Series 520 PT
Precisa Series 520 PB

Mark applied	EU Directive	Standards
CE	2014/30/EU 2014/35/EU	EN61326 EN61010

Date: 12.06.2020   Signature:

R. Grolimund R & D Manager

Precisa Gravimetrics AG , Moosmattstrasse 32 , Postfach 352 , CH-8953 Dietikon

Identification

Customer service

Precisa Gravimetrics AG
Moosmattstrasse 32
CH-8953 Dietikon

Tel. +41-44-744 28 28
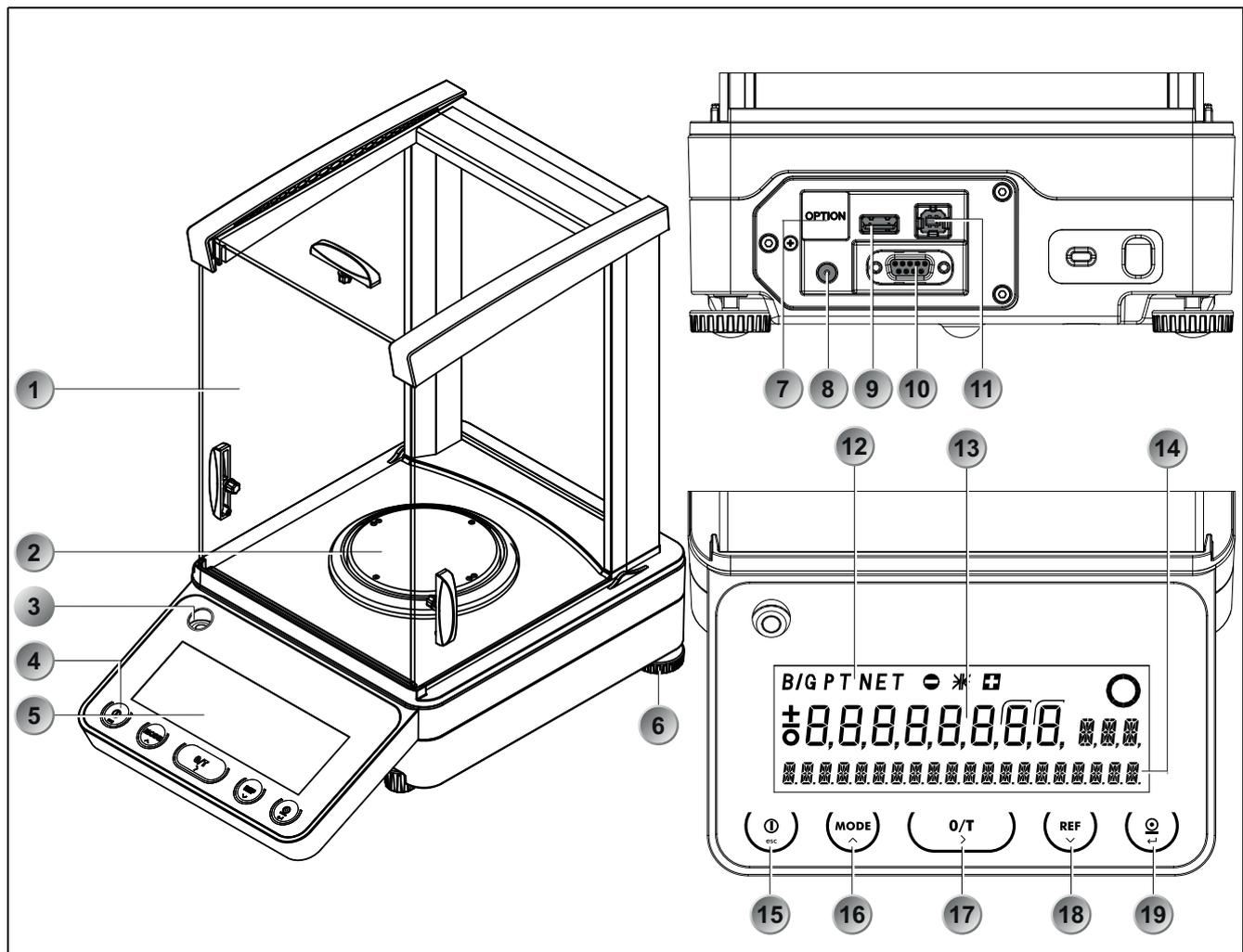Fax. +41-44-744 28 38
email **service@precisa.ch**

http://www.precisa.com
Refer to our website for information about local customer service centers and details of their addresses.
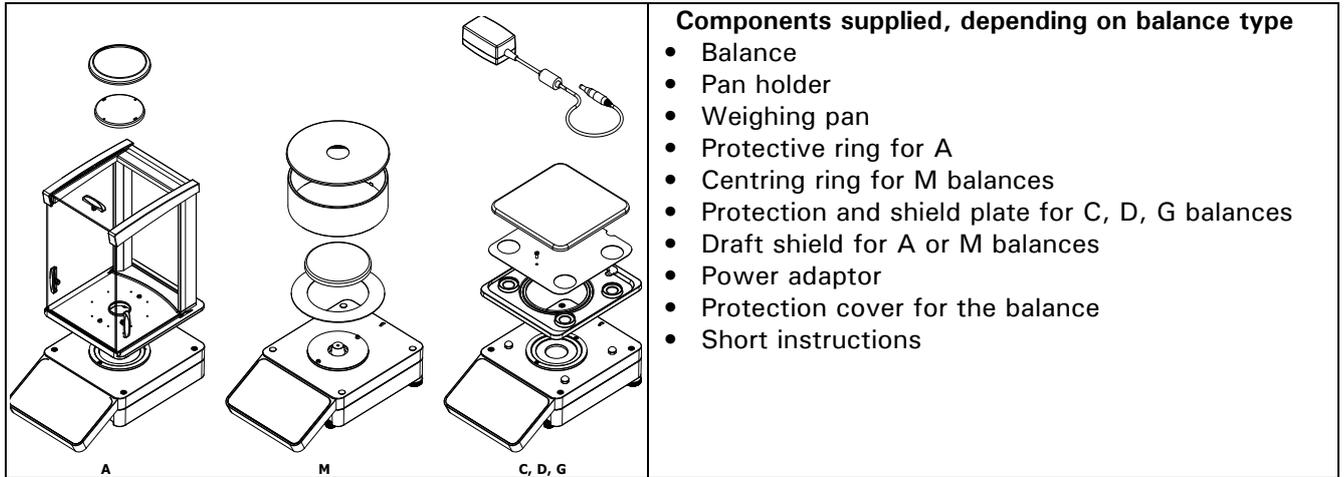
Copyright

1   Overview

No.	Description	No.	Description
1	Draft shield	11	USB device connector for connection to PC
2	Weighing pan	12	Symbol display
3	Levelling bubble	13	Measurement display
4	5-key control panel	14	Info display
5	Display	15	ON / OFF key
6	Adjustable feet	16	MODE key
7	Ethernet connector, optional	17	0 / T key
8	Connecting socket for power adaptor	18	REF key
9	USB host connector for connection of keyboard, bar-code reader, …	19	PRINT key
10	Serial interface connector, DB9 female		

2   Inspection and assembly

Inspect delivery for complete supply immediately on unpacking all components.

	Components supplied, depending on balance type
	• Balance • Pan holder • Weighing pan • Protective ring for A • Centring ring for M balances • Protection and shield plate for C, D, G balances • Draft shield for A or M balances • Power adaptor • Protection cover for the balance • Short instructions

The balance is delivered in partly dismantled condition. Assemble the individual components in the following sequence:
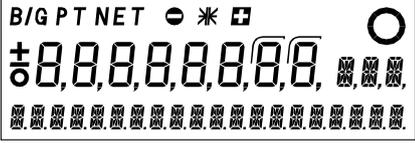
• Install the draft shield as described in the separate manual

• Place the weighing pan in position

• Insert the power adaptor cable plug into the socket at the rear of the balance.

🛈 **NOTE**
All parts must fit together easily. Do not apply force. Customer Service will be pleased to help you with any problems.

3   Firmware and serial number

After a reconnection of the balance to the mains and switching on for the first time after the short initialisation sequencethe the serial number as well as the firmware are showed in the display.

Display	Remark
Different informations	Initialistation sequence
B/G P T NET ⊖ ✳ ⊞ ○ ±⊙8,8,8,8,8,8,8,8, ⅏,⅏,⅏, ⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏,⅏.	All segments of the display must lit
9123456	Serial number: 9123456
01,00 P01 G00	Firmware: G00-0100.P01 G00: Hardwarecode 01,00: Version P01: Release
PB 320M	Balance name: PB 320M SCS PB: Model 320: Weighing range in g M: Code of readability

4   Data and parameters

The balances name, the model, the allowable weighing range, the readability and the self calibration system if installed are printed on the sales plate sticked to the side of the balance housing.
The available balances are divided into the main-groups of readability A, C, D, G and M. The letter in the name corresponds to the readability A = analytical, M = milligramme, C = centigramme, D = decigramme and G = gramme, where the number before is corresponding to the weighing range in grammes.

The following specifications applies to all balances:

• **Mains connection**
  – 115V / 230V, +15% / -20%, 50 - 60Hz

• **Power consumption**
  – without peripheral appliances 18 VA

• **Allowable ambient conditions**
  – Temperature: 5°C ... 40°C
  – Relative humidity: 25%... 85%, non-condensing

• If you have any questions on the technical data or require detailed technical information on your balance, please contact your Technical Representative.

5   Below-balance weighing

Objects which, because of their size or shape, cannot be put on the scale, can be weighed by means of below-balance weighing.

Proceed as follows:

- Turn off the balance.
- Remove the weighing pan and the pan holder than turn the balance up side down.
- Remove the screw (1) on the underside of the balance.
- Hang the hook for weighing below (available as an accessory, see chapter 6 "Accessories") into the aperture (2) of the now visible metal casting (3).
- Place the balance over an opening.
- Replace the pan holder and the weighing pan.
- Level the balance (see chapter 9.6 "Levelling")
- Switch on the balance.
- Hang the object to be weighed on the hook and carry out the weighing.
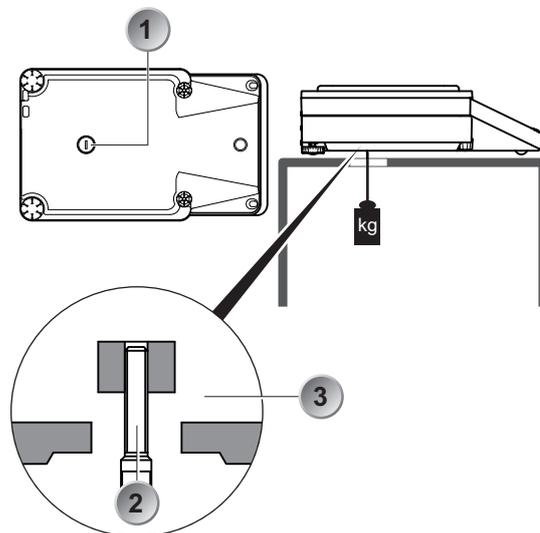
⚠ **WARNING**
Take care that the hooks used for the below-balance weighing are stable enough to hold the goods which you wish to weigh.

🛈 **NOTE**
Take care that no dirt or moisture can get into the balance with the weighing pan removed.
After completing the below-balance weighing, the opening in the floor of the balance must be closed again (dust protection).

6   Accessories

Accessory	Article number
APP: BEST Buoyancy Error Suppression Technology	350-8739-001
Printer LP4024, 230V / 115V	350-8391
Paper roll for Printer LP4024, set of 4 pieces	350-8392
Ribbon for Printer LP4024	PN 3953-013
Draft shield PB short	350-8742
Draft shield PB short + Weighing pan M* for M balances	350-8742-001
Remote display free-standing, incl. 1.5 m cable	350-8401-001
Remote display with wall bracket, incl. 1.5 m cable	350-8401-002
Signal Lamp, indicator with 3 lamps, green / red / yellow	350-8734
Horn for signal lamp	350-8533
Single foot switch USB for one function: tare, print, …	350-8747-001
Double foot switch USB for two functions: tare and print, tare and …	350-8747-002
Interface box, LAN Ethernet connection	350-8940-001
Interface box, WiFi connection	350-8940-002
Data cable DB9m-DB9f, 1.5m, (PC/Printer LP 4024, 1:1)	350-8672
USB cable A-B, 1.5m, (PC)	PN 3950-125
Hook for weighing below the balance	350-8744
Animal weighing bowl complete for 0.01g, 0.1g and 1g balances	350-8743
Carat bowl (for diamond weighing)	350-8322
Anti-theft device, mechanical	350-8555
Density kit for 0.1mg balances Container size Ø = 75mm, h = 100mm	350-8719
Density kit solids only (w/o Glass body and Hook) for 0.1mg balances Container size Ø = 75mm, h = 100mm	350-8720
Glass body 10ccm for density determination of liquids	350-7054
Downholder for samples with density < 1 g/cm3	350-7194
Protective cover 520 for the whole balance (0.1mg, 1mg), set of 5 pieces	350-8745-001
Protective cover 520 for the whole balance (0.01g, 0.1g, 1g), set of 5 pieces	350-8745-002

Check our website for more accessories and options on demand.

■ *Contents*

7   Your balance

7.1   Introduction

The balances are high-quality electronic precision balances and developed to operate simple and functional.

The versatile weighing programs allow you to use these balances not only for simple weighing procedures but also in a simple manner for carrying out various weighing applications such as, for example, percentage- or component counting weighings and document the measurements obtained accurately and unequivocally.

Virtually all models can be delivered in weights and measures approved.

The most important basic production features of the Precisa balances include:

• Simple-to-use multifunction control panel

• Large and bright display with multi-lines

• Anti-theft encoding with four-figure numerical code

• Storable user-configuration (UMM User Menu Memorized)

• ICM-Autocalibration (intelligent calibration mode)

• RS232/V24 serial interface for data transfer to PC or printers

• USB device interface for data transfer to PC

• USB host interface to attach a keyboard or bar code reader

• ISO- and GLP-compliant reporting of results of measurements

• Capacity and residual tare display

• Various application programs:
  Piece counting, Percentage weighing, Animal weighing, Dynamic weighing, Calculator, Check and reference weighings and lot others

• Statistics program

• Appliance for below-balance weighing

7.2   Correct use of the balance

The balance may only be used for the weighing of solid-materials and of liquids filled into secure containers.

The maximum allowable load of the balance must never be exceeded, otherwise the balance may be damaged.

In using the balance in combination with other appliances as well as with appliances produced by other manufacturers, the current regulations for the safe use of the relevant attachments and their application in accordance with instructions must be observed.

7.3   Conformity

The balance has been manufactured and tested in accordance with the standards and recommendations set out in the certificate of conformity in the delivered brief instructions manual.

The power adaptor produced for the operation of the balance and intended exclusively for this application, complies with the electrical protection class II.

7.4   Technical data

The most important technical data of the balance are mentioned in the delivered brief instructions manual. If you have any questions on the technical data or require detailed technical information on your balance, please contact your Technical Representative.

7.5   Useful tips on the Operating Instructions

Precisa balances are simple and functional to operate.

Nevertheless, you should read through these operating instructions in their entirety, so that you can make optimal use of the full potential and the diverse possibilities of the balance in your daily work.

These operating instructions contain guidance in the form of pictograms and keyboard diagrams, which should help you in finding the required information:

• Key names are presented in quotation marks and are accentuated by printing in semi-bold script: «**ON/ OFF**».

• In the explanation of the operating steps, the appropriate display for the current operating step is shown for clarity at the left alongside the list of operating steps:

Display shows	**List of the Operating steps**
	• Switch off balance.
LANGUAGE ENGLISH	• Switch on balance and depress «**MODE**» until the currently activated language is shown.
SPRACHE DEUTSCH	• Press «⏎» to start to change the language (the display will flash).
	• Press «⇑» or «⇓» repeatedly, until the desired language is flashing.
LANGUE FRANCAISE	• Press «⏎» to confirm the selected language.
	• Press «esc» in order to exit the menu.

8 Safety

8.1 Representations and symbols

Important instructions, which involve safety, are highlighted with the appropriate action:

⚠ DANGER
Warning of a possible danger, which can lead to death or to serious injuries.

⚠ WARNING
Warning of a possibly dangerous situation, which can lead to less severe injuries or damage.

❗ NOTE
Tips and important rules on the correct operation of the balance.

8.2 Safety recommendations

• When using the balance in surroundings with increased safety requirements the corresponding regulations must be observed.

• The balance may only be used with the power adaptor supplied exclusively for use with this balance.

• Before plugging in the power adaptor, make sure that the operating voltage stated on the power adaptor agrees with the mains voltage. If not, please refer to the Customer Service.

• If the power adaptor or its cable is damaged, the balance must immediately be disconnected from the electricity supply (pull out the power adaptor). The balance may only be operated with a power adaptor in perfect condition.

• If there is any reason to believe that it is no longer possible to operate the balance without danger, the balance must immediately be unplugged from the electricity supply (pull out power adaptor) and secured against inadvertent operation.

• In carrying out maintenance work, it is essential to heed the recommendations in chapter 18.3 "Cleaning".

• The balance must not be operated in an area subject to explosion risks.

• Take care when weighing liquids that no liquid is spilt into the inside of the balance or into connections on the rear of the equipment or the power adaptor.
If liquid is spilt on the balance, the latter must immediately be unplugged from the mains electricity supply (pull out power adaptor).
The balance may only be operated after it has first been re-checked by a Service technician.

• The operating instructions must be read by each operator of the balance and must be available at the workplace at all times.The balance may only be used for the weighing of solid-materials and of liquids filled into secure containers and for animal weighing and density determinations. The maximum allowable load of the balance must never be exceeded, otherwise the balance may be damaged.

• When using the balance in combination with other appliances, the current regulations for the safe use of the relevant attachments and their application in accordance with instructions must always be observed.

9 Set up

9.1 Unpacking the balance

The balances are delivered in an environmentally-friendly package, specifically developed for this precision instrument, which provides optimum protection for the balance during transportation.

ⓘ **NOTE**
Retain the original packaging in order to avoid transportation damages when shipping or transporting the balance and to allow the balance to be stored in the best conditions if it is out of operation for an extended period.

In order to avoid damage, attention must be given to the following points when unpacking the balance:

• Unpack the balance carefully. It is a precision instrument.

• When outside temperatures are very low, the balance should first be stored for some hours in the unopened transport package in a dry room at normal temperature, so that no condensation settles on the balance when unpacking.

• Check the balance immediately after unpacking for externally visible damage. If you should find transport damage, please inform your Services representative immediately.

• If the balance is not to be used immediately after purchase but only at a later time, it should be stored in a dry place where fluctuations in temperature are as low as possible (see chapter 9.3 "Storage").

• Read through these operating instructions, even if you already have experience with balances, before you work with the balance and pay attention to the safety recommendations (see chapter 8 "Safety").

9.2 Transport and shipping

Your balance is a precision instrument. Treat it with care.

Avoid shaking, severe impacts and vibration during the transportation.

Take care that there are no signification temperature fluctuations during the transportation and that the balance does not become damp (condensation).

ⓘ **NOTE**
The balance should preferably be dispatched and transported in the original packaging to avoid transportation damage.

9.3 Storage

If you would like to take the balance out of service for an extended period, disconnect it from the electricity supply, clean it thoroughly (see chapter 18.3 "Cleaning") and store it in a place which meets the following conditions:

• No violent shaking, no vibrations

• No significant temperature fluctuations

• No direct solar radiation

• No moisture

ⓘ **NOTE**
The balance should preferably be stored in the original packaging, since this provides optimum protection for the balance.

9.4 Choosing a suitable location

The balance location must be chosen in such a way as to guarantee perfect operation of your balance, so that the allowable ambient conditions and prerequisites are met and maintained:

• Protect the balance from direct solar radiation

- Avoid temperature fluctuations
- Put the balance on a solid, firm and preferably vibration-proof, horizontal base and the balance cannot be shaken or knocked over,
- Protect the balance from drafts
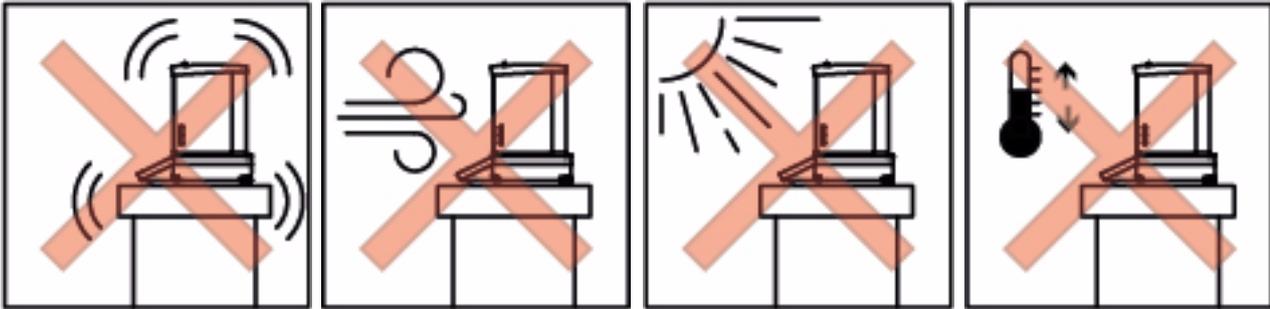
🛈 **NOTE**
With difficult conditions (where the balance may be easily shaken or subject to vibration) the balance can nevertheless provide accurate results through suitable adjustment of the stability control (see chapter 11.6 "Weighing mode").

9.5   Connecting the balance to the mains

The following safety recommendations must be observed when connecting the balance to the mains:

⚠ **DANGER**
The balance may only be operated with the power adaptor supplied.
Check before connecting the power adaptor to the mains supply that the operating voltage stated on the balance or on the power adaptor agrees with the local mains voltage.
If the operating voltage is not the same as the mains voltage, the balance or the power adaptor must on no account be connected to the mains supply. Contact the Customer Service.

9.6   Levelling

To function properly, the balance must be precisely horizontal.

The balance is fitted with one spirit level and two adjustable feet for level-control, with the aid of which it is possible to compensate for small height differences and/or unevennesses in the surface on which the balance is standing.

The two screw feet must be adjusted so that the air bubble is precisely in the centre of the sight glass of the bubble level.

Incorrect	**Correct**
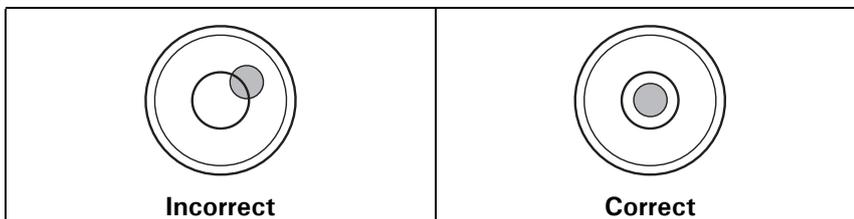
🛈 **NOTE**
In order to get exact measurements, the balance must again be carefully levelled after each relocation.

9.7   Calibration of the balance

ⓘ **NOTE**
Make sure the balance has been connected to mains at least for one hour for class II balances or for 3 hours for class I balances before the first weighing or any calibration.

Since the Earth's gravity is not the same everywhere, each balance must – in accordance with the underlying physical weighing principle – be adjusted to compensate for the gravity at each location. This adjustment process, known as "calibration", must be carried out on initial installation and after each subsequent relocation. In order to get exact measurements, it is recommended moreover, that the balance should also be calibrated periodically.

ⓘ **NOTE**
The balance must be calibrated on initial installation and after every relocation.
If you work in accordance with "Good Laboratory Practice GLP" observe the prescribed intervals between calibrations (adjustments).

Calibration is effected in the configuration menu. Depending on the balance model, this may be done externally, internally or automatically (see chapter 11.5 "Calibration functions").

With the aid of the "Intelligent Calibration Mode" the balance can itself determine the size of the calibration weight, which enables an exact calibration with different size weights (in 10 g, 50 g, 100 g and 500 g steps, depending on implementation).

9.8   Dual Range and Floating Range balances

With the Dual Range balances, weighing is always first carried out in the fine range, which is 10 times more precise. When the fine range is exceeded the balance switches automatically into the coarse range.

The Floating Range balances have a fine range (10 times more precise), which moves over the entire weight range. By pressing the tare key «**0/T**» the fine range can be called up as often as required over the entire weight range.

9.9   Standardized balance

The standardized balances are provided with the EC/OIML certification or meet the local standardization regulations.

The balance range and certain functions of the weighing output differ from the standard program in the case of the standardized balances – in accordance with the EC/OIML provisions.

ⓘ **NOTE**
If a circle appears in the main-display of a standardized balance, the indicated value is unstandardized.
In balances of class (1) the circle also stands for the warm-up phase.
Your Customer Service will be happy to assist you at any time if you have any questions on the standardization of the balance or on working with standardized balances.

10 Modes of operation and operating

10.1 Switching on the balance

• Press «**ON/OFF**» to switch on the balance.
The balance carries out a self-diagnosis in order to check the most important functions. After completion of the start-up process (approximately ten seconds) "Zero" appears in the display.

The balance is ready for operation and is in the weighing mode.

10.2 Auto-Standby Mode

The balance is equipped with an Auto-Standby mode, which can be activated or deactivated in the configuration menu. If the Auto-Standby mode is activated, the balance automatically switches to Standby some time after the last weighing or key operation (current-saving function).

The delay before switching to Standby is defined in the configuration menu (see Chapter 11.6 "Weighing mode").

• Press any button or put on a weight in order to switch the balance from the Standby mode back to the weighing mode again.

10.3 Setting and storing the configuration

To learn how to store the current balance configuration, set the factory configuration or load a previews stored user configuration, see Chapter 11.13 "Set Configuration".

10.4 Significance of the two main menus

The balance has two main menus available: the configuration menu and the application menu.

The basic-program of the balance is defined in the **configuration menu**. With this, you can either work with the basic-configuration programmed ex-works, or define and store a user-configuration adapted to your specific needs.

In the **application menu**, you define a working program, which is suited to the specific weighing problem.

10.5 Activating the two main menus

10.5.1 Activating the configuration menu

• Press «**ON/OFF**» to switch on the balance.
• Continue to hold down the «**MODE**» button during the start-up process (approximately 10 seconds), until the currently set language appears, than release the key.
• Now you are in the configuration menu.

10.5.2 Activating the application menu

• After the start-up process has finished, press «**MODE**» until "MENU" appears on the display, than release the key.
• Now you are in the application menu.

10.6 How the menu control operates

The configuration menu and the application menu each have a main path and sub-paths in which the parameters for the different functions and programs of the balance are defined.

Moving in the menu path:
• «⇨»:   In path to the right
• «⇩»:   In path downwards
• «⇦»:   In path to the right or or start input
• «esc»: In path to the left or exit the menu from the main path

Input:

- «⇑», «⇓»:   Change value of the current position
- «⇒»:   Change one position to the right or rollover to the first position
- «esc»:   Terminate input without changes
- «⏎»:   Terminate input and save new value

• SET DATA PRINT		
Main path	**Sub-path 1**	**Sub-path 2**
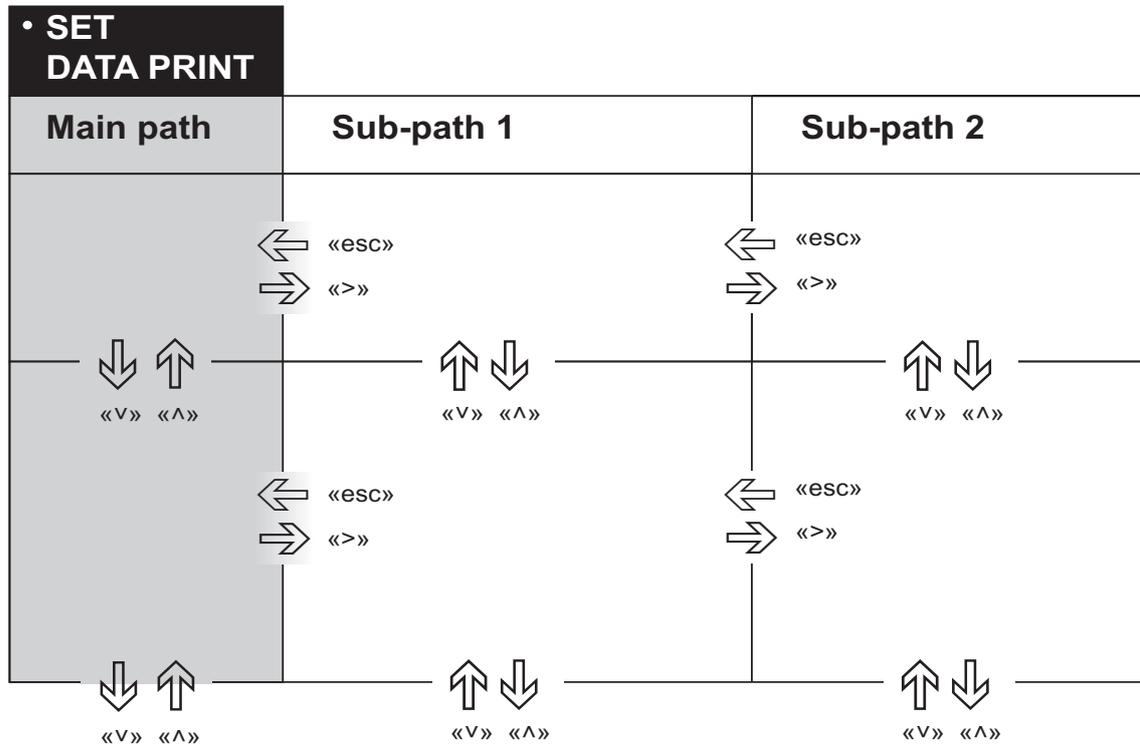
10.6.1 Operating in the weighing mode

	Name	Function during weighing
⏻ esc	**«ON/OFF»**	• Switching the balance on and off
MODE ∧	**«MODE»**	• Calling up the configuration menu and the application menu • Switches between the Basic program and the chosen application
0/T ›	**«0/T»**	• Initiate Tare Function and/or Calibration Function
REF ∨	**«REF»**	• Run application (see Chapter 12 "Working with the application menu")
⊙ ↵	**«PRINT»**	• Start print function

❗ **NOTE**
For the operation of the **«0/T»** and «**PRINT**» see Chapter 15 "Special operating keys".

For an illustration of the method of operation see Chapter 17 "Practical examples".

10.6.2 Operation in the programming mode

Keys	Designation	Function in programming mode
① esc	«esc»	• In the main menu path: leaves the menu • In a sub menu paths: left movement within the menu • During intput: Interrupts the input
0/T >	«⇒»	• In a menu paths: Right movement within the menu • During intput: Right movemnt
MODE ∧ REF ∨	«⇑» «⇓»	• In a menu paths: Up/Down movement within the menu • During intput: Change selected parameter
⊙ ↵	«↵»	• In a menu paths: Selects a paramater • During intput: Stores selected parameter

> **⚠ NOTE**
>
> For the operation of the **«0/T»** and «**PRINT**» see Chapter 15 "Special operating keys".

For an illustration of the method of operation see chapter 17 "Practical examples".

10.6.3 Display

The display has three sections.
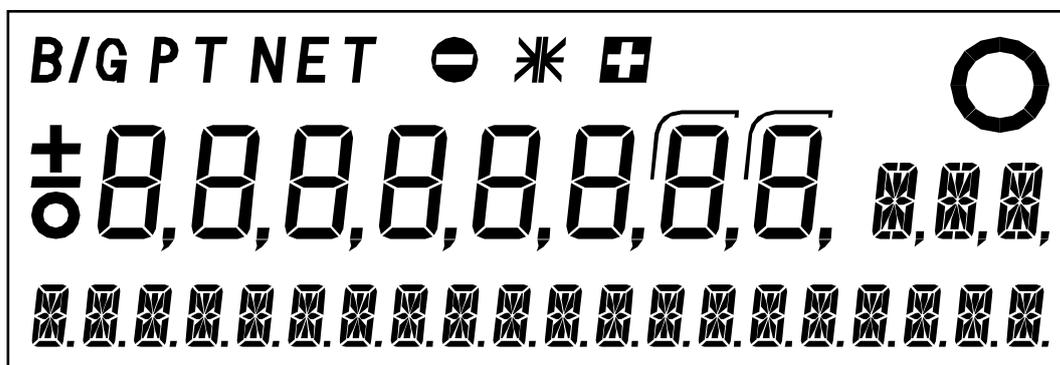
The upper section contains various symbols about the current conditions, the check weigher symbols „+ ",
„– " and „→II←" and the big circel of the stability indicator.

The middle display section includes the 3 symbols „+ ",„-" and „o", the 8-digit measurement display, the two symbols to mark the auxiliary displayed decicmals and the 3 characters to display the measuring unit and other information.

The lower line serves as a 20-character info-line in connection with the cursor keys for controlling the working programs.

10.6.4 Stability indicator

The stability indicator appears after each weight change as a black annulus, which decreases with increasing stability. Basically, a weight value is considered to be stable and thus valid if the indicator (black ring) is no longer visible. In case the inidator decreases only very slow or not at all, this means the weighing is disturbed e.g. by drafts, vibrations of the location or other influences.

11 Working with the configuration menu

This chapter describes the configuration menu and its functions.
To activate the menu, see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

11.1 Structure of the configuration menu

The basic adjustment of the balance is defined in the configuration menu:

Menu	Definable functions
LANGUAGE	Display language (E, G, F)
UNIT-1	Unit in which the weighing results are displayed
SET DATA PRINT	Print formats; Type of values to be printed (individual values, continuous print-out, time or load change dependent values, date, time, user, etc.)
SET CALIBRATION	Calibration method
SET WEIGHING MODE	Stability mode (Quality of the balance location), Auto-Standby mode, zero correction, tare method (rapid or standard tare)
SET RS 232	Set the parameters for the RS 232 interface like baud rate, parity and handshake.
SET USB DEVICE	Set the operation mode of the USB device connection.
SET USB HOST	Set the operation mode of the USB host connection.
SET DATE AND TIME	Date and time (standard format or American format p.m. and a.m.)
PASSWORD	Password protection for defining the menus
THEFTCODE	Activating/deactivating and changing the anti-theft code
KEY TONE	Tone of feedback when pressing a key
ADVICE TONE	Tone to announce advices or info from balance
BACKLIGHT	Display backlight
SET KONFIGURATION	Store or recall a configuration

Printing conventions used in this document:

• The settings in the sub-paths pre-programmed in the works are printed in **bold** in these operating instructions.

• For greater clarity, only that part of the menu tree which corresponds to the function is shown with each description of the function.

• You will find the entire menu tree for the configuration menu in Chapter 19 "Menu trees".

• Explanations of the menu functions are printed in *italics*.

11.2 Language-function

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• LANGUAGE	
LANGUAGE **ENGLISH**	*Selecting a language*
SPRACHE DEUTSCH	
LANGUE FRANCAISE	
DIL TURKCE	
IDIOMA ESPANOL	

In order to alter the language, proceed as follows:

• Switch off balance.

• Switch on balance and depress «**MODE**» until the currently activated language is shown.

• Press «⏎» to start to change the language (the display will flash).

• Press «⇑» or «⇓» repeatedly, until the desired language is flashing.

- Press «⏎» to confirm the selected language.
- Press «esc» to exit the menu.

11.3 Selecting the weight unit

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• UNIT-1		
UNIT-1	**g**	*Gram*
	kg	*Kilogram*
	-----	*-----*
	Bht	*Baht*

The balance can show results in different units, although with some balances display is not possible in milligrammes or kilogrammes because of the corresponding weight range.

Display	Weight unit	Conversion to grammes
g	Gram	
(mg)	Milligram	0.001 g
(kg)	Kilogram	1000 g
GN	Grain	0.06479891 g
dwt	Pennyweight	1.555174 g
ozt	Troy ounce	31.10347 g
oz	Ounce	28.34952 g
Lb	Pound	453.59237 g
ct	Carat	0.2 g
C.M.	Carat Metric	0.2 g
tLH	Tael Hong Kong	37.4290 g
tLM	Tael Malaysia	37.799366256 g
tLT	Tael Taiwan	37.5 g
mo	Momme	3.75 g
t	Tola	11.6638038 g
Bht	Baht	15.2 g

11.4 Print functions

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• SET DATA PRINT			
	AUTO-START	ON/**OFF**	*Start print automatically on switching on/off*
	MODE	UNSTABLE	*Individual print, each value*
		STABLE	*Individual print, stable value*
		LOADCHANGE	*Print after load changes*
		CONTINUOUS	*Continuous print after every integration time*
		TIMEBASE	*Continuous print with time basis*
	TIMEBASE	2.0	*Time basis (in seconds) freely selectable*
	SET PRINTFORMAT		*DATE AND TIME* *ON/**OFF***
			BALANCE-ID *ON/**OFF***
			PRODUCT-ID *ON/**OFF***
			GROSS AND TARE *ON/**OFF***
			UNITS *ON/**OFF***
			OPERATOR-ID *ON/**OFF***
			LINEFEED ***OFF**/1/2/../9/FROMFEED*
			PRODUCT *ttt…*

		PRODUCTMODE	*HOLD*
			DELETE
			COUNT
		OPERATOR	*ttt...*

„SETR PRINTFORMAT"
- „UNITS":   All momentarily active units are printed out
- „LINEFEED":   The specified numbers of lines are printed out or a formfeed is performed at the end of each printout

„PRODUCT ttt..."
A product name can set alphanumerically.

„PRODUCTMODE"
- „HOLD":   The product name keeps unchanged
- „DELETE":   The product name is deleted after each printout
- „COUNT":   The product name keeps unchanged and add by a counter, which is incremented by 1 after each printout

„OERATOR ttt..."
A name for the operator can setalphanumerically.

> **🛈 NOTE**
>
> When a peripheral device (for example a printer) is connected, the balance interface must be configured accordingly, see Chapter 11.7 "RS232 interface", chapter 11.8 "USB Device interface" and chapter 11.9 "USB Host interface".

11.5 Calibration functions

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

● SET CALIBRATION			
	MODE	OFF	*Closed*
		EXTERNAL	*External*
		EXT.-DEF.	*External with user-defined weight („DEF. n.nnn g")*
		INTERNAL	*with internal weight*
		AUTO	*Automatic (AUTOCAL)*
	DEF.	**0.000 g**	*Calibration weight for EXT.-DEF. mode*
	AUTOCAL.	**TIME/TEMP.**	*Auto-calibration on time and temperature*
		TEMPERATURE	*Auto-calibration on temperature*
		TIME	*Auto-calibration on time*
	AUTOCAL.-TIME	6 h	*Time for auto-calibration*
	AUTO-WARNING	ON/**OFF**	*Shows a message if the balance recognizes a significant temperature change and therefore a calibration is recommended*
	REPORT	**ON**/OFF	*Printout calibration report*

For the calibration of the balance see Chapter 9.7 "Calibration of the balance" and Chapter 18.1 "Calibration".

> **🛈 NOTE**
>
> The works setting depends on the model of balance. The internal calibration modes are only available if the self calibration system (SCS) is installed.

11.6 Weighing mode

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• **SET WEIGHING MODE**			
	FLOATINGDISPLAY	0.08 **0.16** 0.32	*Input integration time (in seconds)*
	STABILITY	LOW **MEDIUM** HIGH	*Setting the stability control (instability of the balance location)*
	FILTERPROFILE	**STD.** DOSING CONST.	*Adapting the balacnce to your application*
	VALUE RELEASE	V. FAST FAST **STD.** SLOW V. SLOW	*Adapting the balacnce to your application*
	AUTO-STANDBY	**OFF** 0.5 MIN. 1 MIN. 5 MIN. 10 MIN.	*Auto-Standby not active or active after nn minutes*
	AUTO-ZERO	**ON**/OFF	*Automatic zero correction on/off*
	QUICK-TARE	ON/**OFF**	*Quick-Tare on/off*
	ZERO-RANGE	**0.320 g**	*Maximum weight to performe a zero function*
	LOAD CHG.	**5.000 g**	*This minimum load change must have taken place in order to recognize an action what is triggered by a load change*

„FLOATINGDISPLAY"

The value set for „FLOATINGDISPLAY" defines the period after which each new measurement is displayed.

For the definition of this period, the quality of the balance location is crucial. The stability control must also set appropriately. Choose:

 – For an optimum balance location:„0.08"
 – For a good balance location:„0.16"
 – Fro a critical balance location:„0.32"

🛈 NOTE

The value of the Floating Display is a function of the stability control and the balance location. For balance location, see chapter 9.4 "Choosing a suitable location".

„STABILITY"

The value set for the stability control depends on the quality of the balance location and must be correctly chosen in order to obtain optimum, reproducible results. Take advantage of the stability indicator to find the best settings and location, see chapter 10.6.4 "Stability indicator". Choose:

 – For an optimum balance location:„LOW"
 – For a good balance location:„MEDIUM"
 – For a critical balance location: „HIGH"

„FILTERPROFILE"

In order to adapt the balance most effective for your particular application, various filter profiles are available. Choose:

 – „STD.":   Suitable for most applications and ideal for single weighings. It is an adaptive filter type.
 – „DOSING":   Works with a short delay and optimzed timing behaviour, particularly when dosing powder and liquid samples. It is an adaptive filter type.

– „CONST.": Some applications, as evaporation processes, demand a filter behaviour which is linear in time. A therewith associated longer settling time is irrelevant.

„VALUE RELEASE"

The speed of the measuring value release determines how rapidly the balance considers the measurement to be stable and releases its value. The slower you allow the balance to do this, the more you benefit of a high repeatability of the measuring.

„AUTO-STANDBY"

The Auto-Standby mode turns off the balance automatically, if:

• the balance is tared and has shown "Zero" for at least 5 minutes

• the balance has received no remote control command via the interface for at least 5 minutes,

• the automatic zero correction „AUTO-ZERO" is activated.

It is possible to re-start the balance after it has been switched off by an automatic Auto-Standby:

• Briefly press any key

• Put a weight on the balance

• Make a remote control command via the interface

„AUTO-ZERO"

If the automatic zero correction „AUTO-ZERO" is activated, the balance always gives a stable zero (e.g. even with fluctuations in room temperature).

„QUICK-TARE"

Tares the balance immediately when «0/T» is pressed or when the remote control command for taring is received, regardless of whether a stable weight value is reached or present.

„ZERO-RANGE"

Defines the maximum weight value at which the balance performs a zero function instead of normal taring when the «0/T» key is pressed or the remote control command for taring is received. This value can be adjusted to ensure that a small load is stored as tare and appears accordingly on a printout.

11.7 RS232 interface

● SET RS 232			
	BAUDRATE	300	*Select baud rate*
		600	
		1200	
		2400	
		4800	
		9600	
		19200	
		38400	
		57600	
	PARITY	7-EVEN-1STOP	*Select parity*
		7-ODD-1STOP	
		7-NO-2STOP	
		8-NO-1STOP	
		8-EVEN-1STOP	
		8-ODD-1STOP	
	HANDSHAKE	**NO**	*Select handshake function*
		XON-XOFF	
		HARDWARE	

Ensure the settings for baudrate, parity and handshake match with the peripheral device connected (see chapter 16 "Data transfer").

11.8 USB Device interface

• SET USB DEVICE			
	MODE	**COM-PORT** HID-PORT	*Select standard COMPORT (RS232) oder HID-PORT function*
	BAUDRATE	300 600 1200 2400 4800 **9600** 19200 38400 57600	*In mode COM-PORT: Select baud rate*
	PARITY	7-EVEN-1STOP 7-ODD-1STOP 7-NO-2STOP **8-NO-1STOP** 8-EVEN-1STOP 8-ODD-1STOP	*In mode COM-PORT: Select parity*
	HANDSHAKE	**NO** XON-XOFF	*In mode COM-PORT: Select handshake function*
	KEYBOARD LANGUAG.	**ENG** GER FRA TUR SPA	*In mode HID-PORT: Select character set for the PC according the English, German, French, Turkish or Spain keyboard of the PC*
	FORMAT	**LINES** TABLE	*In mode HID-PORT: Select output format in lines mode or in table mode with a tab stop for each column*
	COLUMN FOR o OFF	ON/**OFF**	*In mode HID-PORT: Select output of a separate column for the identification*
	COLUMN FOR< > OFF	ON/**OFF**	*In mode HID-PORT: Select output of a separate column for the „ < " and „ > " indication of the check weigher*
	UNIT	**ON**/OFF	*In mode HID-PORT: Disable output of the weight unit*

„MODE"
- „COMPORT": The USB connetion acts like a standard RS232 interface and appears on the PC in the COM interfaces.
  Ensure the settings for baudrate, parity and handshake match with the settings in the PC.
- „HID-PORT": Direct connection to a PC. The values transfered from the balance looks like for the PC as they are input via a computer keyboard.

11.9 USB Host interface

• SET USB HOST			
	MODE	**KEYBOARD** SCANNER FOOT SWITCH FLASH DRIVE	*Select function depending on waht is connected*
	KEYBOARD LANGUAG.	**ENG** GER FRA TUR SPA	*In mode KEYBOARD: Select character set for the PC according the English, German, French, Turkish or Spain keyboard of the PC*

	SCANNER LANGUAGE	**ENG**	*In mode SCANNER:*
		GER	*Select character set for the PC according the*
		FRA	*English, German, French, Turkish or Spain key-*
		TUR	*board of the PC*
		SPA	
	DEVICE TYPE	**SINGLE**	*In mode FOOT SWITCH:*
		DOUBLE	*Select the type of the foot switch*
	FUNCTION	**PRINT**	*In mode FOOT SWITCH - SINGLE type:*
		TARE	*Select the function of the foot switch*
		OFF	
	FUNCTION L.	PRINT	*In mode FOOT SWITCH - DOUBLE type:*
		TARE	*Select the function of the **left** foot switch*
		OFF	
	FUNCTION R.	**PRINT**	*In mode FOOT SWITCH - DOUBLE type:*
		TARE	*Select the function of the **right** foot switch*
		OFF	
	GUARD	**ON**/OFF	*In mode FLASH DRIVE:*
			With ON an error message appears if the flash drive is not installed while data printing is initiated

„MODE"

- „KEYBOARD": In case a computer keyboard is connected.
  If Product-ID is ON, entries over the keyboard and the scanner will be assigned to the product-id and will be shown in the info line of the balance display, see Chapter 11.4 "Print functions".
- „SCANNER": In case a bar code scanner is connected. If Product-ID is ON, entries over the keyboard and the scanner will be assigned to the product-id and will be shown in the info line of the balance display, see Chapter 11.4 "Print functions".
- „FOOT SWITCH": In case a single or double foot switch is connected
-
- „FLASH DRIVE": In case a flash drive (memory stick) is connected, the protokoll as set in „SET DATA PRINT" is saved as a text file „sssssss.TXT", where „ssssss" is the serial number of the balance, e.g. „1234567.TXT".

11.10 Date and time

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

● **SET DATE AND TIME**			
	DATE	[DD.MM.YY]	*Set date and time*
	TIME	[HH.MM.SS]	
	FORMAT	**STANDARD**/US	

ⓘ **NOTE**
The date and time display continues in the event of a power failure. If this is not the case, the balance bak-kup battery is exhausted and must be replaced by the customer service.

11.11 Password protection

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• PASSWORD			
PASSWORD – – – –	DATA-PROTECTION	**OFF**	*No protection*
		MED	*The configuration menu is protected*
		HIGH	*The configuration menu and the application menu are protected*
	NEW PASSWORD	––––	*Enter new password*

The password protection permits you to protect the application menu and/or the configuration menu against unintentional changes. If a protection is activated, only after entering the correct, four-figure password changes can be made.

„DATA-PROTECTION"

- „OFF.":   Any operator can change the balance configuration and application menus.
- „MED":   Only the configuration menu is protected against unintentional changes.
- „HIGH":   Both the configuration menu and the application menu are protected against unintentional changes.

! NOTE
The password protection is deactivated in the factory settings.
The **factory programmed password** can be found on our website at the dealer loggin. It is always valid, at the same time with your new selected password. Keep a record of your **own password**.

11.12 Anti-theft encoding

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• THEFTCODE		
THEFTCODE ––––	THEFT-PROTECTION ON/**OFF**	*Switch encoding on/off*
	NEW CODE ––––	*Enter a new code*

The balance can be protected against theft by using a freely selectable, four-digit numerical code.

„THEFT-PROTECTION"

- „OFF.":   The balance can be switched on again and operated after interruption of the power supply without entering a code.
- „ON":   The balance requires the entry of the four-figure code after each interruption to the power supply.

If the theft protection is „ON":

- If the four-digit code is input incorrectly, the balance is blocked.
- If the balance is blocked, it must first be turned off and turned on again and unblocked by entering the correct four-figure code.
- After eight consecutive incorrect entries the display will read "NO ACCESS, CALL SERVICE". In this case, only service can unblock the balance again.

! NOTE
The anti-theft-encoding is deactivated in the factory settings.
The **pre-programmed code** set at the factory is: **8 9 3 7**
This code is the same for all balances. For reasons of security you should therefore always select your own code.
Keep your personal code in a safe place.

11.12.1 Key tone

• **KEY TONE**	
KEY TONE **6**	*Select key tone*

If the key tone is set, a short audio signal sounds each time a key is pressed.

11.12.2 Key tone

• **ADVICE TONE**	
ADVICE TOINE **6**	*Select advice tone*

If the *advice* tone is set, a short audio signal sounds to highlight an info or advice from the balance.

11.12.3 Backlight

• **BACKLIGHT**	
BACKLIGHT **6**	*Set display backlight*

11.13 Set Configuration

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• **SET CONFIGURATION**		
	LOAD FACTORY CONFIG.	*Load factory configuration*
	LOAD USER CONFIG.	*Load user configuration*
	STORE USER CONFIG.	*Store the current configuration as user configuration*

🛈 **NOTE**
Load factory configuration overwrites the current settings but does not delete any stored user configuration.

12 Working with the application menu

This chapter explains which working programs the balance has and how these are operated (see also Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates").

If «PRINT» is operated in an application, a report corresponding to the application is printed out.

12.1 Structure of the application menu

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

The working programs of the balance are called up using the application menu and adapted to the user's needs:

Menu	Definable functions
SET APP.	Select application program
SETUP APPLICATION	Specify parameters for the application program selected
AUTO-START ON/OFF	The selected application program can, if required, be loaded automatically every time the balance is switched on
SET STATISTICS	Statistics and storage functions
SET CHECK +/-	Define nominal weight and limits for comparison weighing
RESOLU. REDUCT.	Enables a reduction of the resolution/visible decimal places

Printing conventions:

• The settings for the sub-menus programmed in works are printed in **bold** in these operating instructions

• For a greater clarity, only that part of the menu tree which corresponds to this application is shown with each application description.

• You will find the complete menu tree for the application menu in Chapter 19.2 "Application menu tree".

• Explanations of the menu functions are printed in *italics*.

12.2 Selecting a working program

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the application menu.

• SELECT APPLICATION	
SET APP. **OFF**	*Normal weighing*
UNITS	*Different weight units*
COUNT	*Piece counting*
PERCENT	*Percent weighing*
CALCULATOR	*Conversions*
NET-TOTAL	*Add weighing results with intermediate tare*
SUM	*Add weighing results without intermediate tare*
ANIMAL	*Animal weighing*
DYN.-WEIGHT	*Dynamique weighing at unstable locations (e.g. on a boat)*
DENSITY	*Density determination*
DIAGNOSTICS	*Diagnostics functions*

In this function-field, select the desired working program.

If a working-program is selected in the "SET APP." menu, then only those sub-menus, which contain functions and parameters necessary to define the chosen working program are shown in the "SETUP APPLICATION" menu.

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

12.3 Changing application / weighing mode

To activate an application, it must first be selected in the application menu (see Chapter 12.2 "Selecting a working program").

- Press the «**MODE**» button.
  If "MENU" appears immediately, no application has yet been selected. Otherwise the display will show the names of the other activated applications you can switch to as e.g. "UNITS", "COUNT", …,"CHECK" or "WEIGHING" for switching back to weighing mode.
  Other information can displayed as e.g. when the reduction of the resolution is activated.
- Release the «**MODE**» button as soon as the required application is displayed.
- The balance has now switched over to the application and mostly the «**REF**» button has a defined function. NOTE, in the weighing mode the «**REF**» button has no function.

12.4 Application "UNITS"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the application menu.

● SETUP APPLICATION			
UNITS	UNIT-2	mg	*Milligram*
		-----	*-----*
		OFF	*not active*
	UNIT-3	GN	*Grain*
		-----	*-----*
		OFF	*not active*
	UNIT-4	ct	*Carat*
		-----	*----*
		OFF	*not active*

> 🛈 **NOTE**
>
> For basic operation, Unit 1 is defined in the configuration menu (standard unit for all weighings, if the working-program "UNITS" is not called up, see Chapter 11.3 "Selecting the weight unit").

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

- Press the «**REF**» button until the desired unit appears on the display.
- Release the «**REF**» button.

12.5 Application "COUNT"

● SETUP APPLICATION			
COUNT	REFERENCE	5	*Reference-number of pieces = 5*
	REF. OPTIMIZATION	MODE	**PARTS-TOL.<5%**
			PARTS-TOL.>5%
			OFF
		INFO	ON/**OFF**
	REF.ACCURACY	0.01d	*Round the value of the reference piece weight*
		0.1d	*according the readability of the balance (1d =*
		1d	*digit displayed at place most right)*

With the aid of the „COUNT" program you can count items of uniform weight (screws, bearings, coins, etc.)..

> 🛈 **NOTE**
>
> Depending on the weight and tolerances of the objects to be counted, you should count a representative number of items for the regulation of the reference-weight.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

• Tare the balance.

• Place e.g. 5 objects on the weighing pan.

• Press the «**REF**»-button until the reference quantity, e.g. „5 PCS" appears on the display.

• If the reference quantity is correct release the «**REF**»-button.
  If the reference quantity does not match keep the «**REF**»-button pressed until further pre-defined reference quantity values appears like 1, 10, 25, 50, … To adjust to any other value briefly release and press the «**REF**»-button to increase the current displayed value by 1 each time.
  As soon as the displayed value matches release the «**REF**»-button.

12.5.1 „REF. OPTIMIZATION"

The reference optimization gradually improves the average value of the reference-piece weight and thus the counting. If an optimization is performed, briefly a little circle appears to the left in the weighing indicator. When optimizing the overlying number is taken as the new reference piece number and with this new basis, the reference piece weight is recalculated.

While recording a piece counting measurement series (statistic) no optimization is performed.

Basically no optimized will performed when the fix value of the reference piece weight was entered via the keyboard or a remote control command or received from a reference scale.

„REF. OTIMIZATION - MODE OFF"

No optimized is performed

„REF. OTIMIZATION - MODE PARTS-TOL.<5%"

The individual parts weights should vary less than 5% of each other.
Condition for carrying out the reference optimization:
  – The balance is stable
  – The current number of pieces is min. 3 PCS larger than the last reference sample quantity.
  – The current quantity is a maximum 10x as big as the last reference sample quantity.
  – The current internally calculated piece count (e.g. 23:27 PCS) does not deviate more than /-0.3 PCS from the nearest whole number (here 23 PCS).

Advantage: Because for every optimization level up to 10 times the amount of the previous piece may be placed, a few intermediate stages (e.g.: 5 PCS, PCS 50, 500 PCS) to reach up the total amount required piece. This enables a fast and yet accurate counting.

„REF. OTIMIZATION - MODE PARTS-TOL. >5%"
The individual parts Weights vary widely.
Condition for carrying out the reference optimization:
  – The balance is stable
  – The current number of pieces is min. 1 PCS (PCS to 20), respectively. 3 PCS (from 21 PCS) larger than the last reference sample quantity.
  – The current quantity is a maximum 2x as big as of the last reference sample quantity.
  – The current internally calculated piece count (eg 23:27 PCS) does not differ by more than +/- 0.3 PCS from the nearest whole number (here 23 PCS).

„REF. OPTIMIZATION - INFO ON/OFF"

This menu does not appear when the reference optimization is off. Otherwise additional info are displayed on the display.

12.5.2 „REF. ACCURACY"

The "Ref. Accuracy "defines the accuracy with which the weight is taken on the scale. Since the scale can measure internally more accurate than it indicates, it makes sense to take the weight with a higher resolution than that of the scales display. Choose:

„REF. ACCURACY - 0.01d"

Recommended for very small parts weights.
The weight is taken with 100 times the resolution of the weighing indicator (= 0.01Digit).
E.g.: 5 PCS on the scale, the display value 15:12 g, internally measured value 15.1234 g
Weight for calculating is 15.1234 g, this gives a reference piece weight of 3.02468 g / PCS

„REF. ACCURACY - 0.1d"

Recommended for small parts weights.
The weight is taken with 10 times the resolution of the weighing indicator (= 0.1Digit).
E.g.: 5 PCS on the scale, the display value 15:12 g, internally measured value 15.1234 g
Weight for calculating is 15.123 g, this gives a reference piece weight of 3.02460 g / PCS

„REF. ACCURACY - 1d"

The weight is taken with the resolution of the weighing indicator (= 1Digit).
E.g.: 5 PCS on the scale, the display value 15:12 g, internally measured value 15.1234 g
Weight for calculating is 15.12 g, this gives a reference piece weight of 3.02400 g / PCS

12.6 Application "PERCENT"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the application menu.

• SETUP APPLICATION			
PERCENT	DECIMALS	**AUTO**	*Enter number of decimal places.*
		0	*The number of places that can be selected*
		1	*after the decimal point depends on the*
		2	*balance model.*
		etc.	

With the aid of the "PERCENT" program you can display and print out the weight of different measurements as a percentage of a previously defined reference weight.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

• Place the reference weight on the weighing pan.

• Press the «**REF**»-button until "REFERENCE 100%" appears on the display.

• Release the «**REF**»-button.

12.7 Application "CALCULATOR"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the application menu.

• SETUP APPLICATION			
CALCULATOR	NAME	nnnnn	*Calculation name, max. 5 characters*
	FACTOR	1.0000000E+0	*Conversions factor*
	MODE	**F * WEIGHT**	*Multiplication of the factor by the weight or di-*
		F / WEIGHT	*vision of the factor by the weight*
	DECIMALS	0	*Definition of number of decimal places are to be shown in the result.*
	DISPLAY-TEXT	nnn	*Unit shown in the display, max. 3 characters.*
	PRINTER-TEXT	nnnnnnn	*Unit being printed, max. 8 characters.*

With the aid of the „CALCULATOR" application the current measurement is converted in accordance with the factor assigned and the result shown or printed out after pressing the Print key. Thus, for example, you can convert and display the weights of sample materials of known size directly into "gram per cubic metre".

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

• Press the «**REF**» button until „CALCULATION name" appears on the display.

• Release the «**REF**» button.

12.8 Application "NET-TOTAL"

There is no Setup menu for this application.

With the aid of the „NET-TOTAL" application you can add individual weighings, where the balance is tared to zero again before each individual weighing.

Functions of the application:

«STO n»:   - Take stable value and add to the sum of the components.
                         - Tare balance.
                         - Short acustic confirmation

«WAIT i»:   Value not stabilized yet

«RES»:   - Reset

«INF»:   - Display of:
                     - Total weight
                     - Residual capacity
                     - Individual components
               - Exit info with «**MODE**»-button.

Note:

By pressing the «**MODE**»-button you can switch to display the total load, e.g. to fill-up to a specific weight. Press the «**MODE**»-button again to go back to the „NET-TOTAL" application and its display.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode") and see Chapter 13 "Statistics" for a detailed example how to operat the application.

• Place something on the weighing pan.

• Press the «**REF**»-button until the desired function flashes on the display.

• Release the «**REF**»-button.

12.9 Application "SUM"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the application menu.

There is no Setup menu for this application.

With the aid of the „SUM" application, you can add individual weighings, without the balance being tared to zero before each individual weighing.

Functions of the application:

«STO n»:   - Take stable value and add to the sum of the components.
                         - Short acustic confirmation

«WAIT i»:   Value not stabilized yet

«RES»:   - Reset

«INF»:   - Display of:
                     - Total weight
                     - Residual capacity
                     - Individual components
               - Exit info with «**MODE**»-button.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode") and see Chapter 13 "Statistics" for a detialed example how to operat the application.

• Place something on the weighing pan.

• Press the «**REF**»-button until the desired function flashes on the display.

• Release the «**REF**»-button.

12.10 Application "ANIMAL"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the Application menu.

• SETUP APPLICATION			
ANIMAL	MEASURETIME	**4**	*Enter time in seconds*

With the aid of the „ANIMAL" program you can weigh living animals accurately, even if they move on the scale-pan.

The balance measures continuously throughout the period defined by the user in the Setup menu, averages the stored values at the end of the measuring period and displays average-measurement thus obtained.

Functions of the application:

«MANUAL»: - Manual release of the measurement.
«AUTO»: - Start automatic release of the measurement with a second delay after each load-change.
«STOP»: - Stop automatic measurement.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

• Place the animal on the weighing pan.

• Press the «**REF**»-button until the desired function flashes on the display.

• Release the «**REF**»-button.

12.11 Application "DYN.-WEIGHT"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the Application menu.

• SETUP APPLICATION			
DYN.-WEIGHT	MEASURETIME	**4**	*Enter time in seconds*

With the aid of the „DYN.-WEIGHT" program you can use the balance on locations or in circumstances where a normal weighing normaly is not possible becasue the balance can not stabilize, e.g. on a boat.

The balance measures continuously throughout the period defined by the user in the Setup menu, averages the stored values at the end of the measuring period and uses this value as the current weight.

Functions of the application:

«MANUAL»: - Manual release of the measurement.
«AUTO»: - Start automatic release of the measurement with a second delay after each load-change.
«STOP»: - Stop automatic measurement.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

• Press «**0/T**» to tare the balance. The average value is calculated and taken as the current tare.

• Place the weight on the weighing pan.

• Press the «**REF**»-button until the desired function flashes on the display.

• Release the «**REF**»-button.

12.12 Application "DENSITY"

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the Application menu.

• SETUP APPLICATION			
DENSITY	MODE	SOLID ON bOTTOM	*Solid body*
	MODE	**SOLID IN AIR**	*Solid (under-floor)*
	MODE	LIQUID	*Measure liquids*
	MODE	SOLID POROUS	*Solid porous bodies*
	INDEX	ON/**OFF**	*Index on/off*
	REFERENCE	8.000	*Reference for index*
	TIMEBASE	0.0	*Time base for repeat in seconds*
	REF. DENSITY	0.998205	*Density of the liquid used for the measurement (set at works for water at 20°C)*
	TEMPERATUR	20.0 C	*Temperature of the water used for the measurement*
	DECIMALS	3	*Decimal places for density calculation*

You can carry out density determinations with the aid of the "DENSITY" program. For this, different modes of density determinations can be selected.

🛈 NOTE

A Density Measurement Set (see Chapter 6 "Accessories") is available as an optional extra. But you can also determine the density of solids without this accessory.

• **Functions of the application on initialization:**

«OK»:   - Accept current reference density

«CAL»:   - Calculate reference density of the measuring liquid

«T-H2o»:   - Set reference density to water at nn.n °C

«20.0C»:   - Set reference density to water at nn.n °C

• **Functions of the application on measurement:**

«AIR», etc   - Invitation to measure the corresponding value

«<–>»:   -"Switch" from index to density

«SET»:   - Executes corresponding step

«STO»:   - Stores corresponding value (statistics)

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

• Press the «**REF**»-button until the desired function flashes on the display.

• Release the «**REF**»-button.

The program leads the operator through the individual operating steps.

12.12.1Density determination "Solid on bottom mode"

A temperature-controlled reference-liquid (water) is poured into a bowl, placed on the scale pan and tared.

The solid is then placed into the liquid and weighed. Subsequently, the solid is suspended so that it is still completely immersed in the water, but no longer touches the base. It is weighed again.

From the weights, the balance determines the density of the solid.

12.12.2Density determination "Solid in air mode"

With this weighing method, the solid is weighed with the aid of under-floor weighing (see Chapter 5 "Below-balance weighing").

The solid is then placed in the temperature-controlled reference liquid (water) so that it does not touch the

base of the bowl, but is nevertheless fully immersed in the water. Weighing is again carried out.

From the weights, the balance determines the density of the solid.

12.12.3 Density determination "Liquid mode"

The density of a liquid is determined using this method of weighing.

The procedure is exactly the same as with the density determination by the "Solid in air" method. A glass object with a volume of 10 cm^3 or 100 cm^3 is used as the solid (available as accessories, see Chapter 6 "Accessories").

12.12.4 Density determination "Solid porous mode"

The density of a porous solid is determined with this method of weighing.

In order to carry out such measurements, you will require the Density Determination Kit (see Chapter 6 "Accessories"). The instruction manual supplied with this kit describes the procedure for the density-measurement.

12.13 Application "DIAGNOSTICS"

There is no Setup menu for this application.

The diagnostics contains an automatic repeatability test, where the internal weight is measured 10 times, and the standard deviation is calculated from this and logged.

Operation:
Start the application (see Chapter 12.3 "Changing application / weighing mode").

Display	Step
+0,0000 g REPEATABILITY TEST	Press «**REF**», „REPEATABILITY TEST" appears in the display, than release the «**REF**» button.
-- 0000 ESC MEASUREMENT 1	The balance carries out a Zero measurement (-- 0.000 g is shown flashing).
-- INT ESC MEASUREMENT 1	The internal weight, if available, is applied and measured (-- Int is shown flashing).
-- LLLL ESC MEASUREMENT 1	In case no internal weight (SCS) is available place an weight onto the balance (-- LLLL is shown flashing).
-- 0000 ESC MEASUREMENT 2	The balance carries out a Zero measurement again.
-- INT / LLLL ESC MEASUREMENT 2	The internal weight is applied and measured again or place the same weight as before again.
	The balance repeats this measurements for 10 cycles.
+0,00008 g ESC STANDARD-DEV.	The standard deviation of the measurement is calculated and displayed and a report is printed.
	Press «**esc**» to exit the repeatability test at anytime.

13 Statistics

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the application menu.

• SET STATISTICS			
STATSITICS	MODE	**OFF**	*Statistics program off*
	STATISTICS		*Statistics only*
	RECORDER		*Data storage only*
	STAT./RECORDER		*Statistics and storage*
	COUNT	**100**	*Number of values to be stored automatically (1..999).*
	RECORDING	MANUAL	*With «STO i» function key*
	TIMEBASE		*on a time basis*
	LOADCHANGE		*after every weight change*
	TIMEBASE	**2.0**	*Time base for "storage" in seconds*

With „MODE" you may define whether only the statistics-program, only the storage-program or both programs simultaneously should be used.

The „COUNT" defines the number of measurements after which automatic storage is to be terminated.

With „RECORDING" you can choose between „MANUAL" storing a weight value by pressing the «REF»-button, storing the value afer each „LOADCHANGE" or storing every value measured after a defined period with „TIMEBASE".

The „TIMEBASE" defines the time span for the recording of data in accordance with „RECORDING TIMEBASE" (for example, every 2.0 seconds).

🛈 NOTE

In storing the first value a range of ±50% is determined. Subsequent values must be within this range otherwise an error message will be issued.

Functions of the application:

«STO i»: - Take value, start/stop of automatic recording

- Short acoustic confirmation

«AUTO i»: - Automatic recording is running

«WAIT i»: - Value not stabilized yet

«RES»: - Before a new series of measurements the storage must be reset using «RES». An acoustic signal sounds and the measurement counter is reset.

«INF»: - Change the display to the info display.
Displayed information:
- „Average value (MEAN)"
- „Standard deviation (STDE.)"
- „Relative standard deviation (STDE.-%)"
- „Maximum (MAX.)"
- „Minimum (MIN.)"
- „Total (TOT.)"
- „individual values"

- Exit info with «MODE»-button.

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

Display   **Step**

✛ 3,4780   g
STO 0   RES   INF

• Press «REF» to store the first measurement.

Display	**Step**

✦ 3,4785 g STO 1 RES INF	• For „MANUAL" recoding press «**REF**» shortly to store a second measurement. For „LOADCHANGE" recoding just place a new load. For „TIMEBASE" recodingwait until the time period set is over.
✦ 3,4775 g STO 2 RES INF	• Store a third measurement in the same manner as for the second measurement.

Retrieve the parameters:

✦ 3,4775 g MEAN 3.4780 g	• Press «**REF**» until „INF" flashes to show the info display with: Average measurement, Standard deviation, ... • (Press «⇑» or «⇓» to change to next information or «**esc**» to exit the info display.
✦ 3,4775 g STDE. 0.0005 g	Standard deviation
✦ 3,4775 g STDE.-% 0.01 %	Relative standard deviation
✦ 3,4775 g MAX 3.4785 g	Maximum
✦ 3,4775 g min 3.4770 g	Minimum
✦ 3,4775 g TOT. 10.4340 g	Minimum
✦ 3,4775 g 1= 3.4780 g	Measurement 1
✦ 3,4775 g 2= 3.4785 g	Measurement 2, etc.
✦ 3,4775 g STO 3 RES INF	• Press «**esc**» to exit the info display.

Clear measurements:

✦ 3,4775 g STO 3 RES INF	• Press «**REF**» until „RES" flashes. An acoustic signal sounds and the measurement counter is reset.
✦ 3,4775 g STO 0 RES INF	Measurement cleared, balance ready for new statistics.

A statistics log is printed by pressing the «**PRINT**» key.

14   Check-Weighing

See Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates" for the activation of the Application menu.

• SET CHECK +/-			
CHECK +/-	MODE	**OFF**	*Check weighing off*
		g	*Check weighing for weights in grams*
		PCS	*Check weighing in pieces*
	NOM.	**100.000 g**	*Enter nominal weight in grams or*
		100 PCS	*enter nominal number for pieces*
	TOLERANCE	**g**	*Choose to set limits as weight, in pieces or*
		PCS	*in percent of nominal*
		%	
	TO	**10000.0 g**	*Upper limit in grams*
	TO	100 PCS	*Upper limit in pieces*
	TOL. +	1.0000 %	*Upper limits in percent of nominal*
	TO	**10000.0 g**	*Lower limit in grams*
	TO	100 PCS	*Lower limit in pieces*
	TOL.-	1.0000 %	*Lower limits in percent of nominal*
	SET INDICATION	RANGE -	**50% .. TU**
			0% .. TU
		SYMBOLS	**PERMANENT**
			STABLE
		TONE	**OFF**
			FILLING AID
			STABLE -
			STABLE OK
			STABLE +
			STABLE - / +

With the aid of the „CHECK +/-" program you can check each measurement for its agreement with a defined reference-value plus/minus allowable deviations. The weiging range is divided into three ranges, the „-" range from zero to TU, the „OK" range from TU to TO and the „+" range from TO to the maximum weighing capacity. In the display the symbols „+", „–" and „→II←" are displayed according the settings for „SET IN-DICATION". →II←" lights up when the measurement is in the „ok" range within the specified tolerances TU and TO. „+" lights up when the measurement is in the „+" range from TO to the maximum weighing capacity . „–" lights up when the measurement is in the „-" range from zero or 50% of the nominal value to TU.

SET INDICATION - RANGE -"
  – „RANGE 50% .. TU": Defines the „-" range for the indication of symbol and tone is in the range from 50% of the nominal value to TU.
  – „RANGE   0% .. TU": Defines the „-" range for the indication of symbol and tone is in the range from zero (0% of the nominal value) to TU.

„SET INDICATION - SYMBOLS"
  – „PERMANENT": Indication of symbols independent the measured weight value is stabilized or not
  – „STABLE": Indication of symbols only when the measured weight value is stabilized

„SET INDICATION - TONE"
  – „OFF": No sound
  – „FILLING AID": Sound to support fillingin in to a nominal weight
  – „STABLE -": Sound when the weigh is stable and the measurement in the „-" range
  – „STABLE OK": Sound when the weigh is stable and the measurementin the „OK" range
  – „STABLE +": Sound when the weigh is stable and the measurement in the „+" range
  – „STABLE - / +: Sound when the weigh is stable and the measurement in the „-" or „+" range.

ⓘ **NOTE**
As an accessory, a signal light is available for this type of display (see accessories).

Operation:

Start the application (see Chapter 12.3 "Changing application / weighing mode").

Display	Step
Display	**Step**
⊹ 0,0000 g CHECK +/-	Press «**MODE**» until „CHECK +/-" appears, now the check application is activated.

14.1   Resolution reduction

To activate the menu see Chapter 10.5 "Activating the two main menus" and Chapter 10.6 "How the menu control operates".

• RESOLU. REDUCT.	
RESOLU. REDUCT. **OFF**	*No reduction*
MAX. 1	*Reduction maximal 1 decimal place*
MAX. 2	*Reduction maximal 2 decimal places*
MAX. 3	*Reduction maximal 3 decimal places*
MAX. 4	*Reduction maximal 4 decimal places*

The resolution reduction gives the opportunity to achive a stable reading faster, in cases where not the full resolution or readability is need.

Operation:

• Keep «**MODE**» pressed until "CHANGE RESOLUTION" appears in the display, than release the key.

• The resolutuion has changed to the next possible stage according the maximal possible reduction of the decimal places.

15 Special operating keys

15.1 The Tare key «0/T»

- **Effects taring**
  - Ensure that the balance is in the weighing mode
  - Briefly press **«0/T»**
  - The balance performs a tare operation.

- **Effects a calibration**
  - Ensure that the balance is in the weighing mode
  - Keep **«0/T»** pressed until "CALIBRATION" is displayed
  - Release **«0/T»**
  - The balance carries out a calibration in accordance with the settings in the configuration menu (see Chapter 11.5 "Calibration functions") and reports these by means of a printout.

🛈 **NOTE**
A calibration can be cancelled with «**ON/OFF**».

15.2 The Print key «PRINT»

- **Print out an individual value or a report**
  - Ensure that the balance is in the weighing mode
  - Briefly press «**PRINT**»
  - The individual value or report will be printed out.

- **Reset product counter to 1**
  - Ensure that the balance is in the weighing mode
  - Keep «**PRINT**» pressed until "RESET PROD.-COUNTER" is displayed
  - Release «**PRINT**»
  - The product counter will be reset to 1.

- **Print out a balance status**
  - Ensure that the balance is in the weighing mode
  - Keep «**PRINT**» pressed until "PRINT STATUS" is displayed
  - Release «**PRINT**»
  - The balance status will be printed out.

- **Print out the application-setup**
  - Ensure that the balance is in the weighing mode
  - Keep «**PRINT**» pressed until "PRINT APPLICATIONS" is displayed
  - Release «**PRINT**»
  - The application-setup will be printed out.

- **Print out the calibrations information**
  - Ensure that the balance is in the weighing mode
  - Keep «**PRINT**» pressed until "PRINT CALIBRATIONS" is displayed
  - Release «**PRINT**»
  - Information on the last 50 calibrations is printed. The time and date, as well as the temperature in the balance at the time of calibration in degrees Celsius. If more than 50 calibrations have been performed, the oldest are deleted.

- **Print out the firmware update history**
  - Ensure that the balance is in the weighing mode
  - Keep «**PRINT**» pressed until "PRINT FIRMWARE HIST" is displayed
  - Release «**PRINT**»
  - Information on the firmware which has been loaded together with the time and date is printed.

15.3 The Mode key «MODE»

- **Enter the application menu**
  - Keep «**MODE**» pressed until "MENU" appears in the display, than release the key.
  - Now you are in the application menu.
- **Change the resolution**
  - Ensure the resolution deduction is activated
  - Ensure that the balance is in the weighing mode
  - Keep «**MODE**» pressed until "CHANGE RESOLUTION" appears in the display, than release the key.
  - The resolutuion has changed to the next possible stage according the maximal possible reduction of the decimal places.
- **Switch to an other application / program**
  - Ensure at least one application is activated
  - Ensure that the balance is in the weighing mode
  - Press «**MODE**» to show all other active applications:
    If you are in normal weighing and for example the count application, the statistics program and the check weighing program and are activated "COUNT", "STATISTIC", "CHECK" and "MENU" appears in the info-line one after the other.
    If you start from the count application,"WEIGHING" is displayed instead of "COUNT" to switch to the normal weighing mode.
    Other information can displayed as e.g. when the reduction of the resolution is activated.
  - Release the «**MODE**» button as soon as the required application is displayed.

16 Data transfer

For data-transfers to peripheral devices, the balance is equipped with an RS232/V24-interface and an USB interface.

Before the data-transfer, the peripheral device interface must match with the RS232 or USB interface in the balance configuration menu (see chapter 11.7 "RS232 interface" and chapter 11.8 "USB Device interface").

• **Handshake**
The handshake is set to „NO" (none) at the factory. It can be set to software handshake „XON-XOFF", or to hardware handshake „HARDWARE".

• **Baud rate**
Possible baud rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 baud.

• **Parity**
Possible parity: 7 even 1 stop, 7 odd 1 stop, 7 no 2 stop, 8 no 1 stop, 8 even 1 stop, 8 odd 1 stop.

Pos.	0	1	2	3	4	5	6	7	8	9	10
7-even-1	SB	1.DA	2.DA	3.DA	4.DA	5.DA	6.DA	7.DA	PB	SP	-
7-odd-1	SB	1.DA	2.DA	3.DA	4.DA	5.DA	6.DA	7.DA	PB	SP	-
7-no-2	SB	1.DA	2.DA	3.DA	4.DA	5.DA	6.DA	7.DA	1.SP	2.SP	-
8-no-1	SB	1.DA	2.DA	3.DA	4.DA	5.DA	6.DA	7.DA	8.DA	SP	-
8-even-1	SB	1.DA	2.DA	3.DA	4.DA	5.DA	6.DA	7.DA	8.DA	PB	SP
8-odd-1	SB	1.DA	2.DA	3.DA	4.DA	5.DA	6.DA	7.DA	8.DA	PB	SP

SB: Start bit   PB: Parity bit
DA: Data bit   SP: Stop bit

• **Display**

S		D7	D6	D5	D4	D3	D2	D1	D0		U	U	U

The data-transfer takes place in ASCII code:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	…	…	…
B	B	B	S	D7	D6	D5	D4	D3	D2	D1	DP	D0	B	U	…	CR	LF

B	Blank (space)
S	Sign (+ , – , space)
DP	Decimal point
D0…D7	Digits
U …	Unit (only if the weight is stable, otherwise no unit is sent)
CR	Carriage return
LF	Line feed

> ⓘ **NOTE**
>
> Unused positions are filled with spaces. The decimal point DP can be between D0 and D7.
>
> If the value format is user defined, the format is not as mentioned above!

16.1 Connection scheme

• **Standard, duplex connection including lines for optional hardware handshake with the peripheral device**

Balance	DB 9 female	D25 / D9	Peripheral device
RS 232 out	2 ⟶	3 / 2	RS 232 in
RS 232 in	3 ⟵	2 / 3	RS 232 out
GND	5 ⟶	7 / 5	GND
CTS	4 ⟵	20 / 4	DTR (only needed for hardware handshake)
DTR	8 ⟶	5 / 8	CTS (only needed for hardware handshake)

16.2 Remote control-commands

Command	Function
ACKn	Acknowledge n = 0 off; n = 1 on
CAL	Start calibration
D..........	Describe weight display (right-aligned)
DN	Reset weight display
@.........	Describe Info display
@N	Reset Info display
In	Set FLOATINGDISPLAY time n n = 0 t = 0.08 s n = 1 t = 0.16 s n = 2 t = 0.32 s
N	Reset balance
OFF	Switch off balance
ON	Switch on balance
PCxxxx	Enter anti-theft code
PDT	Print out date and time
PRT	Print function, like pressing the «**PRINT**» key
PST	Print status report
Pn (ttt.t)	Set print mode: n = 0 individually print each value (unstable) n = 1 Individually print each value (stable) n = 2 Print after change of load n = 3 Print after each integration period n = 4 Print on time basis in s (ttt.t)
R%k	Set current weight = 100% with k = 0...7 decimal places (k = A: use automatic positioning of decimal point)
REF%k rrr	Set reference weight rrr for 100% with k = 0...7 decimal places (k = A: use automatic positioning of decimal point)
Rnnn	Set current weight = nnn items
REFrrr	Set reference weight rrr for 1 item
Sn	Set stability n n = 0 low n = 1 medium n = 2 high
SDTttmmjjhhmmss	Set date and time (German) (Tag, Monat, Jahr, Stunde, Minute, Sekunde)
SDTmmddyyhhmmss	Set date and time (English) (Month, Day, Year, Hour, Minutes, Seconds)
T (ttt)	Tare or set tare to a specific value
Uxnn	Set unit x (1...4) of the balance with nn (0 = g, 1 = mg, 2 = kg, ...)
UxS	Switch balance to unit x (1...4)
ZERO	Zero balance (provided weight is stable and within the zero position range)

🛈 NOTE

Each remote control-command must terminate with «CR» «LF». The commands are acknowledged if required.

16.2.1 Examples for the remote control

Input	Description of the function executed
D − − − − −	Five dashes are displayed
DTEST123	tESt123 is displayed
D	The display is dark
T100	-100.000 g (Tare set to 100 g)
T1	-1.000 g (Tare set to 1g)
T	Balance is tared

17   Practical examples

17.1   Changing the configuration menu

See Chapter 10.5.1 "Activating the configuration menu", for the activation of the configuration menu.

17.1.1 Setting the choice of language

• In order to alter the display language, proceed as follows:

| SPRACHE DEUTSCH |

or

| LANGUE FRANCAISE |

or

| LANGUAGE ENGLISH |

• Press «⇑» or «⇓» repeatedly, until the curretn set language is displayed.

| LANGUAGE ENGLISH |

• Press «⏎» to start to change the language (the display will flash).
• Press «⇑» or «⇓» repeatedly, until the desired language is flashing.
• Press «⏎» to confirm the selected language.

• Press «⇑» or «⇓» again until the next setting appears. Change the setting in the same way.
• Press «**esc**» to exit the menu.

17.1.2 Setting the Weight unit

In order to alter the weight unit, proceed as follows:

| UNIT-1 9 |

• Press «⇑» or «⇓» repeatedly, until the curretn set unit is displayed.

| UNIT-1 OZ |

• Press «⏎» to start to change the unit (the unit e.g. „g" will flash).
• Press «⇑» or «⇓» repeatedly, until the desired unit is flashing.
• Press «⏎» to confirm the selected unit.

• Press «⇑» or «⇓» again until the next setting appears. Change the setting in the same way.
• Press «**esc**» to exit the menu.

17.1.3 Setting the Print functions

In order to alter the print parameters proceed as follows:

| SET DATA PRINT |

• Press «⇑» or «⇓» repeatedly, until "SET DATA PRINT" is displayd.

| AUTO-START OFF |

• Press «⇨», "AUTO-START …" will appear.

| … … |

• Press «⇑» or «⇓» repeatedly, until the desired setting is displayed.

| MODE STABLE |

• Press «⏎» to start to change the setting (the setting e.g. „STABLE" will flash).
• Press «⇑» or «⇓» repeatedly, until the desired mode e.g. „TIMEBASE" is flashing.

| MODE TIMEBASE |

• Press «⏎» to confirm the selected setting.

• Press «⇑» or «⇓» again until the next print function appears. Change the setting in the same way.
• Press «esc» to exit to „SET DATA PRINT".
• Press «⇑» or «⇓» again until the next setting appears. Change the setting in the same way.

• Press «esc» to exit the menu.

17.1.4 Activation of password protection

The possibilities for setting the password protection are described in Chapter 11.11 "Password protection".
In order to activate password protection, proceed as follows:

PASSWORD ----	• Press «⇑» or «⇓» repeatedly, until "PASSWORD ----" appears.
PASSWORD ❙000	• Press «⏎» to enter the password. The first digit of the password will flash. • Enter the first digit with «⇑» or «⇓».
PASSWORD ❙200	• Press «⇨», the second digit flashes. Enter the second digit with «⇑» or «⇓».
PASSWORD ❙234	• In the same way enter the third and fourth digit of the password. • Press «⏎» to confirm the password.
DATA-PROTECTION OFF	• Press «⇨», "DATA-PROTECTION …" will appear.
DATA-PROTECTION OFF	• Press «⏎» to start to change the setting (the setting e.g. „OFF" will flash). • Press «⇑» or «⇓» repeatedly, until the desired setting e.g. „ON" is flashing. • Press «⏎» to confirm the setting
NEW PASSWORD ❙234	• Press «⇑» or «⇓» until "NEW PASSWORD 1234" appears.
NEW PASSWORD ❙32❙	• Press «⏎» to start to change the password • Your own new password can now be entered in a similar manner to the foregoing.
NEW PASSWORD 432❙	• Press «⏎» to confirm the new password.
PASSWORD ----	• Press «esc» to exit „DATA-PROTECTION".

• Press «⇑» or «⇓» again until the next setting appears. Change the setting in the same way.
• Press «**esc**» to exit the menu.

17.2 Selection of an application program

See Chapter 10.5.2 "Activating the application menu" for the activation of the application menu.

17.2.1 Setting for Counting by weighing

For Setup, see Chapter 12.5 "Application "COUNT""
To count uniformly heavy objects such as coins, screws or similar things, proceed as follows:

SET APP. OFF	• Press «⇑» or «⇓» repeatedly, until the currently set application appear
SET APP. OFF	• Press «⏎» to start to change the setting (the currently set application e.g. „OFF" will flash). • Press «⇑» or «⇓» repeatedly, until the desired application „COUNT" is flashing.
SET APP. COUNT	• Press «⏎» to confirm the application.

SETUP APPLICATION	• Press «⇑» or «⇓» repeatedly, until "SETUP APPLICATION" appears. • Press «⇒» to go into the menu to setup for the count application.
REFERENCE 5 PCS	
REFERENCE 0005 PCS	• Press «⏎» to enter the reference number. The first digit of the number will flash. • Enter the first digit with «⇑» or «⇓». Press «⇒», the second digit flashes. Enter the second digit with «⇑» or «⇓».
REFERENCE 0020 PCS	• In the same way enter the remaining digits of the number. • Press «⏎» to confirm the number.
REFERENCE 0020 PCS	• Press «**esc**» to exit „SETUP APPLICATION. • Press «**esc**» to exit menu.

• The balance has switched direct into the counting application.

• Place the set number of objects on the weighing pan. The reference weight for the count will be defined by briefly pressing the «**REF**»-button.

18 Maintenance and servicing

18.1 Calibration

The calibration of the balance is fixed in the configuration menu (see Chapter 9.7 "Calibration of the balance" and Chapter 11.5 "Calibration functions").

Possible types of calibration, depending on the model of balance:

• External calibration by means of ICM (Intelligent Calibration Mode)

• External calibration with freely selectable weight

• Internal calibration

• Automatic calibration

> **⓵ NOTE**
>
> The calibration can be interrupted at any time by pressing «**ON/OFF**».

18.1.1 External calibration by means of ICM

Depending on the type of balance, calibration weights in steps of 10 g, 50 g, 100 g and 500 g can be used, where the calibration weight must correspond to the precision of the balance.

For an external calibration by means of ICM, "SET CALIBRATION MODE EXTERNAL" must be selected in the configuration menu (see Chapter 11.5 "Calibration functions").

`CALIBRATION`	• Switch to "WEIGHING" with the «**MODE**»-key • Press «**0/T**» until "CALIBRATION" appears.
`- - 0000   g`	• The balance carries out a Zero measurement (0.000 g is shown flashing)
`- - 2000   g`	• After the zero measurement the display flashes with the recommended calibration weight • Place the calibration weight on the pan
`- - 2000   g`	• The display flashes first rapidly than slowly
`+ 2000   g`	• Calibration is complete when the display stops flashing

18.1.2 External calibration with freely selectable weight

For an external calibration with user-definable weight, "SET CALIBRATION MODE EXT. -DEF." must be selected in the configuration menu (see Chapter 11.5 "Calibration functions").

Then, the effective value of the calibration weight (DEF. n'nnn g) must be entered with up to tenfold precision compared with the balance.

> **⓵ NOTE**
>
> If calibration is carried out with the free weight, then only this weight may be used.

Then proceed as follows:

`CALIBRATION`	• Switch to "WEIGHING" with the «**MODE**»-key • Press «**0/T**» until "CALIBRATION" appears.
`- - 0000   g`	• The balance carries out a Zero measurement (0000 g is shown flashing)
`- - 372   g`	• After the zero measurement the display flashes with the previously entered calibration weight • Place the calibration weight on the pan

| `- - 372    g` | • The display flashes first rapidly than slowly |

| `÷ 372.15    g` | • Calibration is complete when the display stops flashing (the exact weight is shown) |

18.1.3 Internal calibration

For an internal calibration with the built-in calibration weight "SET CALIBRATION MODE INTERNAL" must be selected in the configuration menu (see Chapter 11.5 "Calibration functions").

Then proceed as follows:

• Switch to "WEIGHING" with the «**MODE**»-key

• Press **«0/T»** until "CALIBRATION" is shown.

• The calibration is finished after a certain period of time.

18.1.4 Automatic calibration

For an automatic calibration with the built-in calibration weight "SET CALIBRATION MODE AUTO" must be selected in the configuration menu (see Chapter 11.5 "Calibration functions").

The balance now calibrates itself automatically every 24 hours and/or after each temperature change of 3 degrees Celsius, depending on the definition in the configuration menu "SET CALIBRATION AUTOCAL".The time of the automatic calibration is as determined in the configuration menu under "SET CALIBRATION AU-TOCAL. -TIME n h" (e.g. 6 h for 06.00 o'clock in the morning).

ⓘ **NOTE**
For the automatic calibration by time and by time/temp. the date and time of the balance must first be correctly set (see Chapter 11.10 "Date and time").
The calibration can also be effected manually any time while auto-calibration is activated.
The automatic calibration then takes place only if no weight is placed on the pan for at least five minutes.
It is recommended, that the time for the auto-calibration be set at a time outside the normal business hours (for example, in the early morning).

18.2 Firmware update

Our balances are instruments which are being continuously advanced and improved. For this reason, it is possible to update to the latest version of the instrument firmware from the internet.

In order to update your firmware, you need to download the Universal Download Tool from the website and install it onto a PC with Windows.

The firmware for the balance can also be downloaded from the Downloads area on the website. This can then be loaded into the instrument with the aid of the Universal Download Tool.

18.3 Cleaning

The balance must be treated carefully and cleaned regularly. It is a precision instrument.

⚠ **DANGER**
For maintenance work, the balance must be separated from the power supply (remove power adaptor plug from socket). Also ensure that the balance cannot be reconnected to the power supply during the work by a third party.
Take care during cleaning that no liquid penetrates into the balance. If liquid is spilt on the balance, the latter must immediately be disconnected from the electricity supply and must only be used again after it has first been checked by a Service Engineer.
The connections of the balance and the power adaptor must not come into contact with liquids.

Regularly dismantle the weighing pan and the weighing pan holder and remove any dirt or dust from under the weighing pan and on the balance housing with a soft brush or a soft, lint-free cloth, moistened with a

mild soap solution.

The weighing pan and the holder can be cleaned under running water. Take care that both parts are completely dry before they are re-installed on the balance.

⚠ WARNING
Never use solvents, acids, alkalis, paint thinners, scouring powders or other aggressive or corrosive chemicals for cleaning, since these substances attack the surfaces of the balance housing and can cause damage.

The regular maintenance of the balance by your Service Representative will guarantee unlimited function and reliability over many years and will extend the lifespan of the balance.

18.4 Error messages

The balance shows a description of the fault in the info-line.

🛈 NOTE
If an error occurs without a description of the error in the info-line, the Customer Service must be called.

18.4.1 Notes on correcting faults

The following table shows faults and their possible causes. If you cannot clear the fault using the table, please contact the Customer Service..

Fault	Possible cause
Weight display does not light	• Balance not switched on • Connection to power adaptor is interrupted • Power supply has failed (interruption to current) • The power adaptor is defective
"OL" is shown in display	• The weight range has been exceeded (Observe information on the maximum weight range)
"UL" is shown in display	• The weight range is below the range of the balance (Scale pan or scale pan holder missing)
The weight display fluctuates continuously	• The draft is too strong at the balance location • The balance support is vibrating or varying • The scale pan is touching a foreign body • The time chosen for FLOATINGDISPLAY is too short • The material being weighed is absorbing moisture • The material being weighed is being blown away or is evaporating • Strong temperature variations in the material being weighed
Results of weighing are clearly incorrect	• The balance was not correctly tared • The balance is not correctly levelled • The calibration is no longer correct • There are strong temperature variations
There is no display or only dashes	• The stability control (Balance functions) is set too sensitively • The time selected for „FLOATINGDISPLAY" is unsatisfactory
Configuration menu cannot be changed	• The password lock is activated in the configuration menu
The display flashes continuously during calibration	• The balance location is not stable enough (Interrupt calibration with «**ON/OFF**» and re-locate the balance in a better position) • Use of an inprecise calibration weight (only applies to external calibration)

19 Menu trees

19.1 Configuration menu tree

● **LANGUAGE**	
LANGUAGE	**ENGLISH**
SPRACHE	DEUTSCH
LANGUE	FRANCAISE
DIL	TURKCE
IDIOMA	ESPANOL

● **UNIT-1**	
UNIT-1	**g**
	mg
	kg
	...
	Bht

SET DATA PRINT		
AUTOSTART	ON/**OFF**	
MODE	UNSTABLE	
	STABLE	
	LOADCHANGE	
	CONTINUOUS	
	TIMEBASE	
TIMEBASE	**2.0**	
SET PRINTFORMAT	DATE AND TIME	ON/**OFF**
	BALANCE-ID	ON/**OFF**
	PRODUCT-ID	ON/**OFF**
	GROSS AND TARE	ON/**OFF**
	UNITS	ON/**OFF**
	OPERATOR-ID	ON/**OFF**
	LINEFEED	**OFF**/1/2/../9/FORMFEED
	PRODUCT	ttt...
	PRODUCTMODE	**HOLD**
		DELETE
		COUNT
	OPERATOR	ttt...

● **SET CALIBRATION**	
MODE	OFF
	EXTERNAL
	EXT.-DEF.
	INTERNAL
	AUTO
DEF.	**0.000 g**
AUTOCAL.	TIME/TEMP.
	TEMPERATURE
	TIME
AUTOCAL.-TIME	**6 h**
AUTO-WARNING	ON/**OFF**
REPORT	**ON**/OFF

● **SET WEIGHING MODE**	
FLOATINGDISPLAY	0.08
	0.16
	0.32
STABILITY	LOW
	MEDIUM
	HIGH
FILTERPROFILE	**STD**
	DOSING
	CONST.

VALUE RELEASE	V. FAST	
	FAST	
	STD	
	SLOW	
	V. SLOW	
AUTO-STANDBY	**OFF**	
	0.5 MIN	
	1 MIN	
	5 MIN	
	10 MIN	
AUTO-ZERO	**ON**/OFF	
QUICK-TARE	ON/**OFF**	
ZERO-RANGE	**0.320 g**	
LOAD-CHG.	**5.000 g**	

• SET RS232

BAUDRATE	300	
	600	
	1200	
	2400	
	4800	
	9600	
	19200	
	38400	
	57600	
PARITY	7-EVEN-1STOP	
	7-ODD-1STOP	
	7-NO-2STOP	
	8-NO-1STOP	
	8-EVEN-1STOP	
	8-ODD-1STOP	
HANDSHAKE	**NO**	
	XON-XOFF	
	HARDWARE	

• SET USB DEVICE

MODE	**COM-PORT**	
	HID-PORT	
BAUDRATE	300	*In mode COM-PORT*
	600	
	1200	
	2400	
	4800	
	9600	
	19200	
	38400	
	57600	
PARITY	7-EVEN-1STOP	*In mode COM-PORT*
	7-ODD-1STOP	
	7-NO-2STOP	
	8-NO-1STOP	
	8-EVEN-1STOP	
	8-ODD-1STOP	
HANDSHAKE	**NO**	*In mode COM-PORT*
	XON-XOFF	
KEYBOARD LANGUAG.	**ENG**	*In mode HID-PORT*
	GER	
	FRA	
	TUR	
	SPA	
FORMAT	**LINES**	*In mode HID-PORT*
	TABLES	
COLUMN FOR o	ON/**OFF**	*In mode HID-PORT*
COLUMN FOR < >	ON/**OFF**	*In mode HID-PORT*
UNIT	**ON**/OFF	*In mode HID-PORT*

• **SET USB HOST**			
	MODE	**KEYBOARD**	
		SCANNER	
		FOOT SWITCH	
		FLASH DRIVE	
	KEYBOARD LANGUAG.	**ENG**	*In mode KEYBOARD*
		GER	
		FRA	
		TUR	
		SPA	
	SCANNER LANGUAGE	ENG	*In mode SCANNER*
		GER	
		FRA	
		TUR	
		SPA	
	DEVICE TYPE	**SINGLE**	*In mode FOOT SWITCH*
		DOUBLE	
	FUNCTION	**PRINT**	*In mode FOOT SWITCH SINGLE type*
		TARE	
		OFF	
	FUNCTION L.	PRINT	*In mode FOOT SWITCH DOUBLE type*
		TARE	
		OFF	
	FUNCTION R.	**PRINT**	*In mode FOOT SWITCH DOUBLE type*
		TARE	
		OFF	
	GUARD	ON/OFF	*In mode FLASH DRIVE*

• **SET DATE AND TIME**		
	TIME	[HH.MM.SS]
	DATE	[DD.MM.YY]
	FORMAT	**STANDARD**/US

• **PASSWORD**			
PASSWORD	−−−−	DATA-PROTECTION	**OFF**
			MED
			HIGH
		NEW PASSWORD	− − − −

• **THEFTCODE**			
THEFTCODE	−−−−	THEFT-PROTECTION	ON/**OFF**
		NEW CODE	− − − −

• **KEY TONE**	
KEY TONE	6

• **ADVICE TONE**	
ADVICE TONE	6

• **BACKLIGHT**	
BACKLIGHT	6

• **SET CONFIGURATION**	
	LOAD FACTORY CONFIG.
	LOAD USER CONFIG.
	STORE USER CONFIG.

19.2 Application menu tree

● SET APP.	
	OFF
	UNITS
	COUNT
	PERCENT
	CALCULATOR
	NET-TOTAL
	SUM
	ANIMAL
	DYN.-WEIGHT
	DENSITY
	DIAGNOSTICS

● AUTO-START	
AUTO-START	**ON**/OFF

● SETUP APPLICATION	
	Menu depends on the current application, see Chapter 12 "Working with the application menu"

● SET STATISTICS		
	MODE	**OFF**
		STATISTICS
		RECORDER
		STAT./RECORDER
	COUNT	**100**
	RECORDING	**MANUAL**
		TIMEBASE
		LOADCHANGE
	TMEBASE	**2.0**

● SET CHECK +/-				
	MODE	**OFF**		
		g		
		PCS		
	NOM.	**100.000** g		
		100 PCS		
	TOLERANCE	**g**		
		PCS		
		%		
	TO	**120.000** g		
	TO	120 PCS		
	TOL. +	1.0000%		
	TU	**80.000** g		
	TU	80 PCS		
	TUL.-	1.0000%		
	SET INDICATION		RANGE -	50% .. TU
				0% .. TU
			SYMBOLS	PERMANENT
				STABLE
			TONE	**OFF**
				FILLING AID
				STABLE -
				STABLE OK
				STABLE +
				STABLE - / +

● RESOLU. REDUCT.	
RESOLU. REDUCT.	**OFF**
	MAX.1
	MAX.2
	MAX.3
	MAX.4