



KERN CPB

Version 1.1 5/2006

Operating Manual Counting balance

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1 Technical data

KERN	CPB 3K0.1	CPB 6K0.2	CPB 15K0.5	CPB 30 K1
<i>Readability (d)</i>	0,1 g	0,2 g	0,5 g	1 g
<i>Weighing range (max)</i>	3 kg	6 kg	15 kg	30 kg
<i>Reproducibility</i>	0,1 g	0,2 g	0,5 g	1 g
<i>Linearity</i>	± 0,4 g	± 0,8 g	± 1,5 g	± 3 g
<i>Stabilization time</i>	2 sec.	2 sec.	2 sec.	2 sec.
<i>Recommended adjusting weight (not supplied)</i>	3 kg (M1)	5 kg (M1)	10 kg (M1)	20 kg (M1)
<i>Weighing unit</i>	g	g	kg	kg
<i>Minimum piece weight</i>	0,05 g	0,1 g	0,25 g	0,5 g
<i>Reference quantity</i>	freely selectable			
<i>Net weight (kg)</i>	4.1 kg			
<i>Permissible ambient condition</i>	-10° C to 40° C			
<i>Humidity of air</i>	max. 80 % relative (not condensing)			
<i>Weighing plate, stainless steel</i>	225 x 275 mm			
<i>Dimensions of the housing (B x D x H)</i>	315 x 355 x 110 mm			
<i>Protection type</i>	IP54			
<i>Mains connection</i>	Mains adaptor 230 V, 50/60 Hz ; 9 V DC balance, 800 mA			
<i>Battery</i>	Operating time ca. 70 hrs. / Charging time ca. 12 hrs.			

2 Declaration of conformity



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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 marca CE

Dichiarazione di conformità 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 está 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 Scale: KERN CPB

Mark applied	EU Directive	Standards
	89/336/EEC EMC	EN 50081-1 EN 50082-1
	73/23/EEC Low Voltage	EN 60950

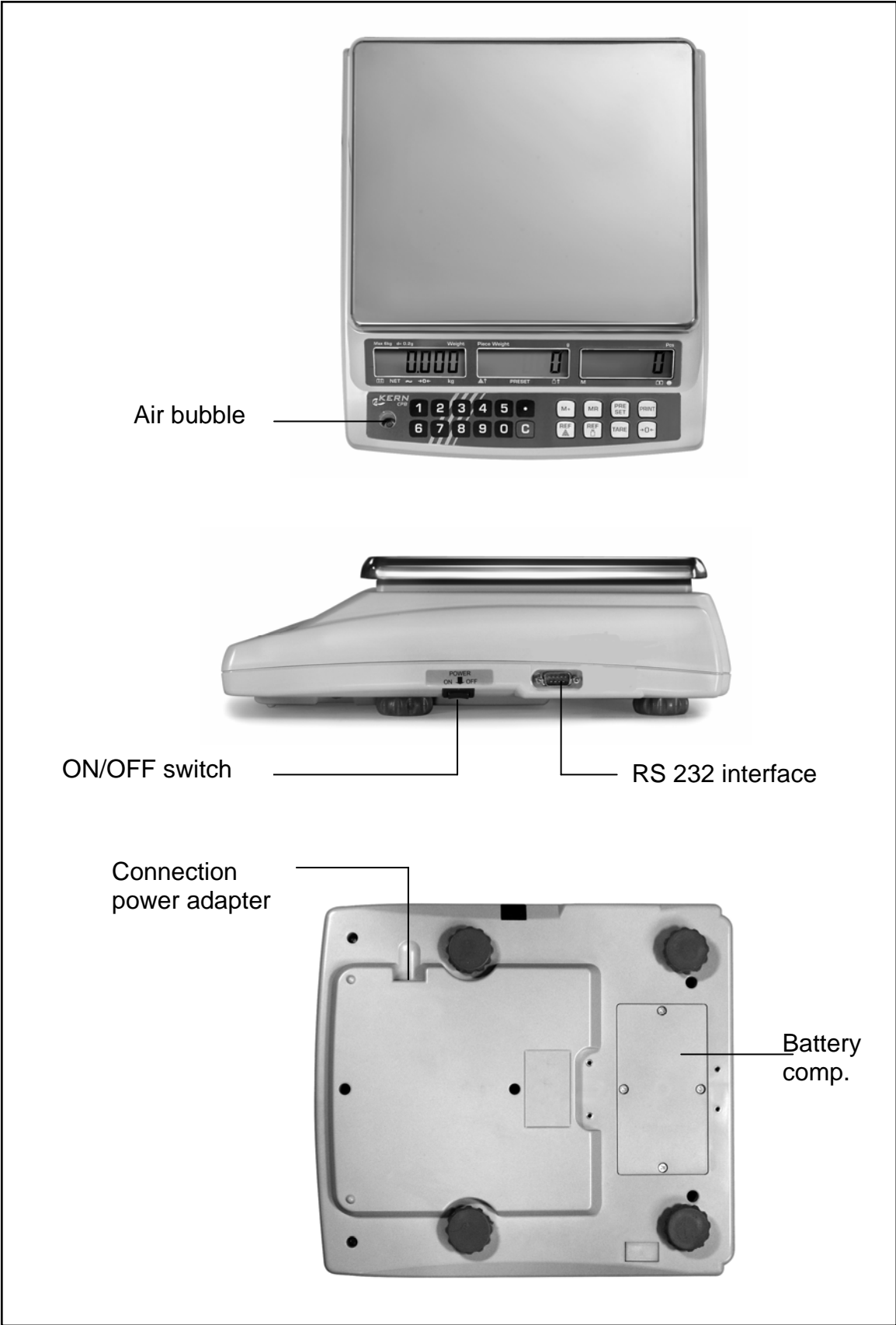
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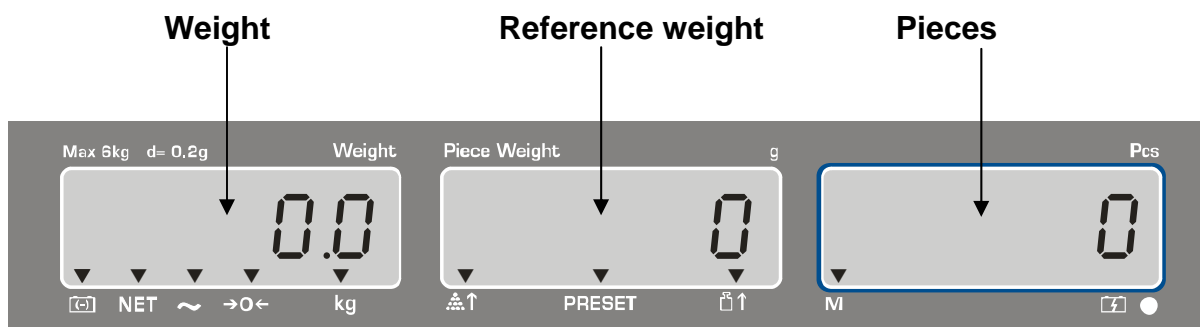
Gottl. KERN & Sohn GmbH
Management

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3 Device overview



3.1 Overview of display



3.1.1 Display weight

Here, the weight of your goods is displayed.

The arrows above the symbols show:

	Battery very low
NET	Net weight
	Stability display
→0←	Zeroing display
kg	Kilogram

3.1.2 Display reference weight

Here, the reference weight of a sample is displayed in [g]. This value is either entered by user or calculated by balance.

The arrows above the symbols show:

	Number of parts placed on balance too small
PRESET	Saved limit value
	Reference weight placed on balance too small

3.1.3 Display quantity











Here, all the parts placed on balance are immediately displayed by number.

The arrows above the symbols show:

M	Data in memory
----------	----------------

3.2 Keyboard overview



Choice	Function
	<ul style="list-style-type: none"> • Number keys
	<ul style="list-style-type: none"> • Delete key
	<ul style="list-style-type: none"> • Addition in total memory
	<ul style="list-style-type: none"> • Call up total memory
	<ul style="list-style-type: none"> • Enter/display limit value for tolerance check • Call up menu "Display background illumination"
	<ul style="list-style-type: none"> • Output to external device (printer) or PC
	<ul style="list-style-type: none"> • Enter reference weight through weighing
	<ul style="list-style-type: none"> • Numeric entry reference weight • Function /parameter selection
	<ul style="list-style-type: none"> • Taring key • Save
	<ul style="list-style-type: none"> • Zeroing key • Back to weighing mode

4 Basic Information (General)

4.1 Proper use

The balance you purchased is intended to determine the weighing value of material to be weighed. It is intended to be used as a “non-automatic“ balance, i.e. the material to be weighed is manually and carefully placed in the centre of the weighing plate. As soon as a stable weighing value is reached the weighing value can be read.

4.2 Improper Use

Do not use balance for dynamic weighings. In the event that small quantities are removed or added to the material to be weighed, incorrect weighing results can be displayed due to the “stability compensation“ in the balance. (Example: Slowly draining fluids from a container on the balance.)

Do not leave permanent load on the weighing plate. This may damage the measuring system.

Impacts and overloading exceeding the stated maximum load (max) of the balance, minus a possibly existing tare load, must be strictly avoided. Balance may be damaged by this.

Never operate balance in explosive environment. The serial version is not explosion protected.

The structure of the balance may not be modified. This may lead to incorrect weighing results, safety-related faults and destruction of the balance.

The balance may only be used according to the described conditions. Other areas of use must be released by KERN in writing.

4.3 Warranty

Warranty claims shall be voided in case

- Our conditions in the operation manual are ignored
- The appliance is used outside the described uses
- The appliance is modified or opened
- mechanical damage or damage by media, liquids, natural wear and tear
- The appliance is improperly set up or incorrectly electrically connected
- The measuring system is overloaded

4.4 Monitoring of Test Resources

In the framework of quality assurance the measuring-related properties of the balance and, if applicable, the testing weight, must be checked regularly. The responsible user must define a suitable interval as well as type and scope of this test. Information is available on KERN's home page (www.kern-sohn.com) with regard to the monitoring of balance test substances and the test weights required for this. In KERN's accredited DKD calibration laboratory test weights and balances may be calibrated (return to the national standard) fast and at moderate cost.

5 Basic Safety Precautions

5.1 Pay attention to the instructions in the Operation Manual

Carefully read this operation manual before setup and commissioning, even if you are already familiar with KERN balances.

5.2 Personnel training

The appliance may only be operated and maintained by trained personnel.

6 Transport and storage

6.1 Testing upon acceptance

When receiving the appliance, please check packaging immediately, and the appliance itself when unpacking for possible visible damage.

6.2 Packaging

Keep all parts of the original packaging in case you need to return the appliance. Only use original packaging for returning.

Before sending, disconnect all connected cables and loose/movable parts.

Attach possibly existing transport safeguards. Secure all parts, e.g. weighing plate, power unit etc., to prevent slipping and damage.

7 Unpacking, Setup and Commissioning

7.1 Installation Site, Location of Use

The balances are designed in a way that reliable weighing results are achieved in common conditions of use.

You will work accurately and fast, if you select the right location for your balance.

Therefore, observe the following for the installation site:

- Place the balance on a firm, level surface;
- Avoid extreme heat as well as temperature fluctuation caused by installing next to a radiator or in the direct sunlight;
- Protect the balance against direct draughts due to open windows and doors;
- Avoid jarring during weighing;
- Protect the balance against high humidity, vapours and dust;
- Do not expose the device to extreme dampness for longer periods of time. Non-permitted condensation (condensation of air humidity on the appliance) may occur if a cold appliance is taken to a considerably warmer environment. In this case, acclimatize the disconnected appliance for ca. 2 hours at room temperature.
- Avoid static charge of goods to be weighed or weighing container.

If electro-magnetic fields or static charge occur, or if the power supply is unstable major deviations on the display (incorrect weighing results) are possible. In that case, the location must be changed.

7.2 Unpacking

Carefully remove the balance from the packaging, remove plastic cover and setup balance at the intended workstation.

7.2.1 Setup

Level balance with foot screws until the air bubble of the water balance is in the pre-scribed circle.

7.2.2 Scope of delivery

Serial accessories:

- Balance
- Weighing plate
- Mains power supply
- Protective cover
- Internal battery
- Operating Manual

7.3 Mains connection


Power is supplied via the external mains power supply. The stated voltage value must be the same as the local voltage. Only use original KERN mains power supplies. Using other makes requires consent by KERN.

7.4 Battery power supply

The optionally supplied battery is charged with the supplied power supply.

Before the first use, the battery should be charged by connecting it to the mains power supply for at least 15 hours. The operating time of the battery is about 70h. Charging time until complete recharging ca. 12h.

AUTO-OFF function after 15 min to protect the battery.

If an arrow shows in the weight display [▼] above the battery symbol  the capacity of the battery will soon be exhausted. The balance will be ready to operate for about another 10 hrs., then it will switch off automatically. Connect the power adaptor as soon as possible to change the battery.

The LED display below the parts counting window informs you about the charge status of the battery.

red: Battery is almost discharged

green: Battery is completely discharged

yellow: Battery should be charged over a longer period (over night)

7.5 Connection of peripheral devices

Before connecting or disconnecting of additional devices (printer, PC) to the data interface, always disconnect the balance from the power supply.

With your balance, only use accessories and peripheral devices by KERN, as they are ideally tuned to your balance.

7.6 Initial Commissioning

A warming up time of 5 minutes after switching on stabilizes the measuring values.

The accuracy of the balance depends on the local acceleration of gravity.



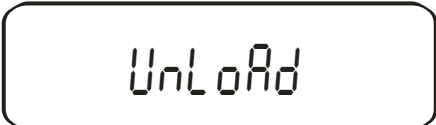



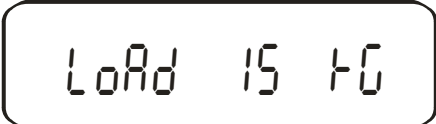
Strictly observe hints in chapter Adjustment.

7.7 Adjustment with external weight

As the acceleration value due to gravity is not the same at every location on earth, each balance must be coordinated - in compliance with the underlying physical weighing principle - to the existing acceleration due to gravity at its place of location (only if the balance has not already been adjusted to the location in the factory). This adjustment process must be carried out for the first commissioning, after each change of location as well as in case of fluctuating environment temperature. To receive accurate measuring values it is also recommended to adjust the balance periodically in weighing operation.

Procedure when adjusting:

Observe stable environmental conditions. A warming up time of ca. 10 minutes is required for stabilization. Ensure that there are no objects on the weighing plate.

Operation	Display
Activate function "[F1] [CAL]", see chapt. 10	
 Ensure that there are no objects on the weighing plate.	
 Zero point will be saved.	 The balance will suggest a weighing value for adjusting weight. However, you may enter a value of your choice via the number keys.
 Confirm weighing value	 Carefully place adjusting weight in the centre of the weighing plate

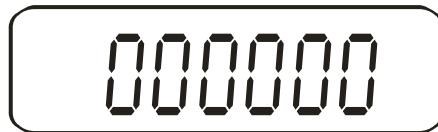
Wait until the stability display shows:



Adjustment process is started.

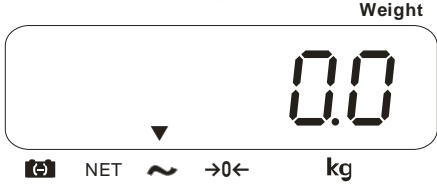

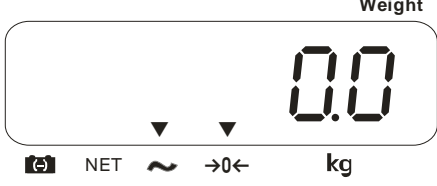
The process of adjustment is completed.

Remove adjusting weight, balance will return into weighing mode automatically. In case of an adjustment error or incorrect adjusting weight the display will show an error message; repeat adjustment process.

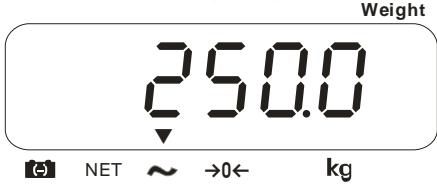


8 Weighing

8.1 Switch on/off and set zero

Operation	Display
<p>1. Switch on balance</p> <p>Press ON/OFF switch and hold briefly (at the bottom right side of the balance)</p> <p>The balance will carry out a self-test</p>	<p>As soon as the weight display shows "0" in all the three display windows your balance is ready to weigh.</p>  <p>The display shows "0.0" in the weight window. A single arrow points down to the ~ symbol. The symbols NET, ~, and →0← are visible at the bottom.</p>
<p>2. Zeroing</p> 	 <p>The display shows "0.0" in the weight window. Two arrows point down to the ~ symbol. The symbols NET, ~, and →0← are visible at the bottom.</p> <p>The zero display and the arrow above the „→0←“ symbol are displayed.</p>



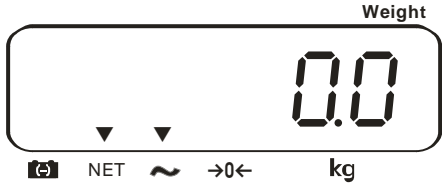

8.2 Simple weighing

Operation	Display
<p>Place goods onto weighing plate</p>	<p>Read weighing result</p>  <p>The display shows "250.0" in the weight window. A single arrow points down to the ~ symbol. The symbols NET, ~, and →0← are visible at the bottom.</p> <p>If weighing values are stable the arrow will be displayed above the ~ - symbol.</p>
<p>If the goods are heavier than the weighing range, the display will show "QL" (=Overload), and a whistle is sounded.</p>	


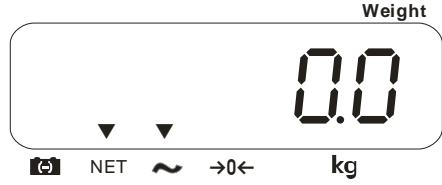
8.3 Weighing with taring

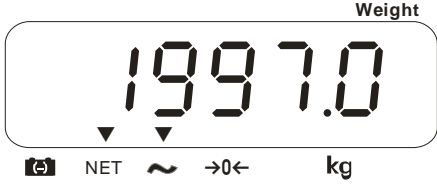
The dead weight of any weighing container may be tared away by pressing a button, so that the following weighings show the net weight of the goods to be weighed.

8.3.1 Determination of the tare weight by weighing

Operation	Display
Place empty tare container on the weighing plate. The total weight of the container is displayed.	
Reset display to "0": 	 <p>The weight of the container is now internally saved. Zero display and the arrow above the "NET" symbol are displayed.</p>
Place the goods to be weighed into the tare container.	Read the weight of the goods on the display. 

The taring process can be repeated any number of times, e.g. when adding several components for a mixture (adding).


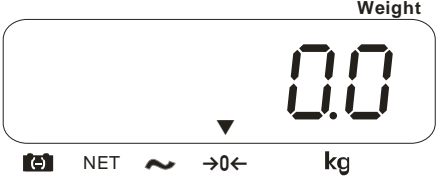

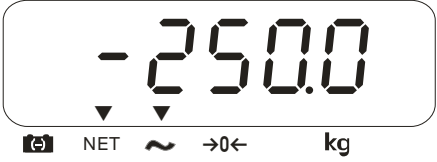
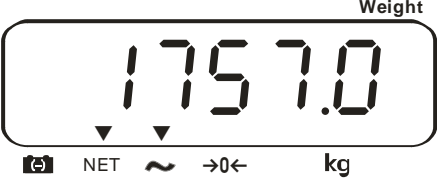
Reset display to "0": 	 <p>The total weight of the container is tared away.</p>
--	--

<p>Add more components into the weighing container (adding).</p>	<p>Now read off the weight of the added item to be weighed on the display.</p> 
--	---

NOTE:

The balance is able to only store one taring value at a time. When the balance is unloaded the saved taring value is displayed with negative sign. Remove all items from the weighing plate in order to delete the stored tare value and subsequently press the TARE key. The taring process can be repeated any number of times. The limit is reached when the whole weighing range is exhausted.


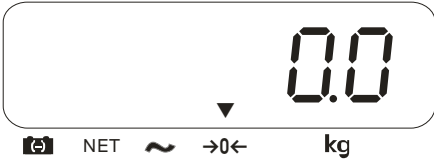

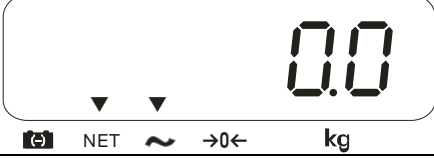

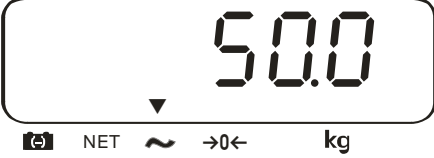
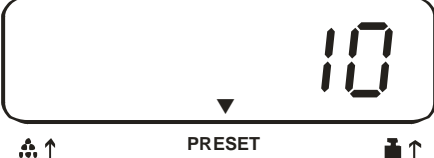


8.3.2 Numeric entering of tara weight

Operation	Display
<p>Remove all items from the weighing plate.</p> 	
<p>Enter your tara weight via number keys.</p>  <p>Confirm</p>	 <p>The tara weight is displayed as negative value</p>
<p>Put on tare container & goods to be weighed</p>	<p>The net weight of the goods to be weighed is displayed.</p> 

9 Parts counting

With parts counting you can either count parts into a container or remove parts from a container. To count a greater number of parts the average weight per part has to be determined with a small quantity (reference quantity). The larger the reference quantity, the higher the counting exactness. High reference must be selected for small parts or parts with considerably different sizes.

9.1 Determination of the reference weight by weighing

Operation	Display
<p>Set your balance at zero</p> 	<p>Weight</p> 
<p>Tare the weighing container:</p> 	<p>Weight</p> 
<p>Determine the reference unit:</p> <p>Place a known number of parts on the balance as reference weight</p> <p>If the "Weight" display is stable, enter the number of parts via number keys.</p> <p>Confirm within 5 sec:</p>  <p>The reference weight has been determined</p> <p>The reference quantity is displayed in the "Quantity" display</p>	<p>Weight</p>  <p>Piece weight</p>  <p>Piece weight</p>  <p>Pcs</p> 

Count the items:

Now you can place the parts to be counted onto the weighing plate. All quantity parameters of your goods to be weighed are displayed:

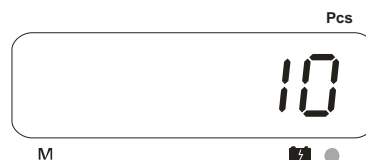
Weight placed on balance:



Reference weight:



Quantity placed on balance:



9.2 Numeric entering of the reference weight

If you know the reference weight/piece you can enter this via number keys.

Determine reference weight:

Enter reference weight via number keys

Confirm within 5 sec:



Count the items:

Now you can place the parts to be counted onto the weighing plate. All quantity parameters of your goods to be weighed are displayed:

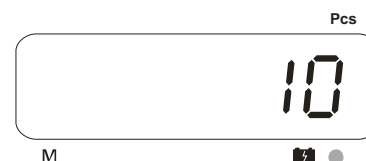
Weight placed on balance:



Reference weight:



Quantity placed on balance:






9.3 Automatic reference optimization

To optimize the reference weight, automatically add further parts whose number is smaller than that of the saved reference quantity. An acoustic signal is sounded when reference optimization is carried out. Automatic reference optimization will be deactivated as soon as the number of added parts exceeds the saved reference quantity.


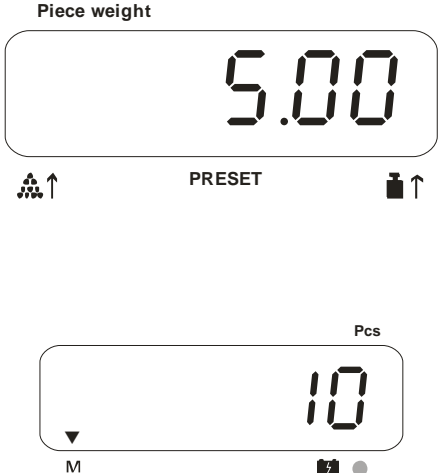
9.4 Tolerance check for pieces counting

An acoustic signal is sounded as soon as the number of parts placed on the balance reaches or exceeds a pre-set limit.

<p>Determine limit value:</p> <p>Enter limit value via number keys</p> <p>Confirm within 5 sec:</p> 	 <p>The arrow above the PRESET symbol shows a saved limit value.</p>
<p>Delete limit value:</p> <p>Enter limit value "0" and confirm</p> 	

9.5 Manual total memory

This function allows you to execute several weighing procedure. After that, the total parts counting and the number of weighing procedures will be displayed.

<p>Activate function „F4 AU OFF“, see chapt.10</p>	
<p>1. Weighing:</p> <ul style="list-style-type: none"> • Select a reference weight • If you are using a weighing container use the TARE key for taring • Enter the desired quantity for the first weighing • Add weighing value into the memory  <ul style="list-style-type: none"> • Unload your balance 	 <p>The arrow above the M symbol indicates a saved value.</p>

2. Weighing:

- Enter desired quantity for the second weighing
- Add weighing value into the memory



Add and weigh more parts if needed as described above. Please note that the balance must be unloaded between the individual weighing procedures.

This process can be repeated 99 times or until the weighing range of the balance is exhausted.

Display of you saved weighing data:



Total weight, number of weighing procedures as well as total parts counting appear 2 sec. If you connect a printer you can also print the data by pressing the PRINT key.

Total weight placed on balance:



Number of weighing procedures:



Total parts counting placed on balance:



To delete you saved weighing data:




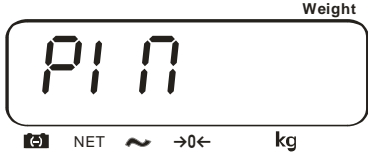

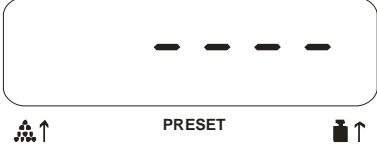






9.6 Automatic total memory







Execution see chapt. 9.5; the individual weighing values are automatically added into total memory without pressing the **M+** key.

Activate function „F4 RU on“, see chapt. 10

10 Menu

10.1 Navigation in the menu


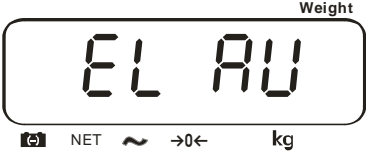


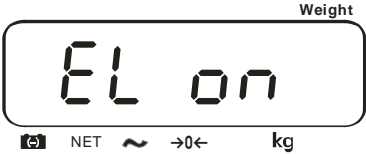
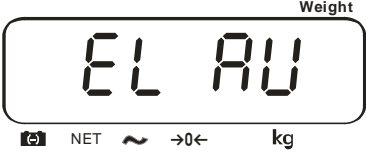

Operation	Display
<p>Call up menu: Switch on balance and during self-check press the TARE key</p> 	
<p>Use the number keys to enter password: Either</p> <ul style="list-style-type: none"> • Default password "0000" <p>or</p> <ul style="list-style-type: none"> • Personal password, enter under function [F5 Pi n]  <p>Confirm</p>	<p>Piece weight</p>  <p>The first function [F1 CAL] is displayed:</p> 
<p>Function selection:</p>  <p>Further pressing the REF  key will call up the various functions of the menu (see table chapter 10.2)</p>	 <p style="text-align: center;">↓</p> 
<p>Confirm function:</p> 	<p>The current menu item is displayed</p>

<p>Parameter selection:</p> 	<p style="text-align: right;">Weight</p>  <p>NET ~ →0← kg</p> <p style="text-align: center;">↓</p> <p style="text-align: right;">Weight</p>  <p>NET ~ →0← kg</p>
<p>Save your selection</p> 	
<p>Return to weighing mode:</p> 	<p style="text-align: right;">Weight</p>  <p>NET ~ →0← kg</p>

10.2 Menu overview

Display	Choice	Description of function
F1 CAL		Adjustment, see chap. 7.7
F2 dI	INC 1	Display smallest increment
	INC 2	
	INC 5	
	INC 10	
F3 Cnt		not documented
F4 RU	RU on	Automatic total memory see chapt 9.6
	RU off	Manual total memory see chapt 9.5
	P Cnt	Continuous printout without adding
F5 RZOn	0.5d	Setting Auto-Zero range (standard setting 1D)
	1d	
	2d	
	4d	
F6 PIN		<p>Enter personal password:</p> <ul style="list-style-type: none"> • Press TARE key [PIN 1] • Password entry via number keys • Confirm with TARE key [PIN 2] • Repeat password and confirm with TARE key [done]
F7 SPD	7.5	<p>Display speed: Insensitive but slow</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">Sensitive and fast</p>

11 Display background illumination

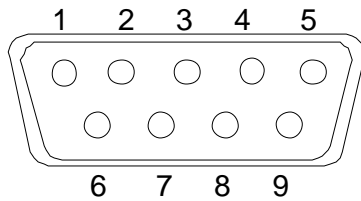
Operation	Display
 <p>Hold down for 4 sec</p>	<p>The current setting is displayed:</p> 
<p>To select your setting:</p>  <p>Press until your desired setting is displayed</p>	<ol style="list-style-type: none"> 1. Background illumination off  2. Background illumination on  3. Automatic background illumination on when weighing pade is loaded 
<p>Saving your settings:</p> 	

12 Data output RS 232 C

12.1 Technical data

- ASCII Code
- 8 data bits
- no parity bit
- Baud rate 4800 Baud

12.2 Pin allocation of the balance output socket (front view)



Pin 2: Receive data
 Pin 3: Transmit data
 Pin 5: Signal ground

12.3 Data format

- Normal data output: or

Example:

GS	1,234 kg	Gross weight (NT for net weight)
U.W.	123 g	kg/g
PCS	10	Qty.
<lf>		
<lf>		2 line indents

- Data output total memory: and

Example:

<lf>		1 line indent
TOTAL		
sö§ hi#eäu	5	
Wgt	1,234 kg	
PCS	10	Qty.
<lf>		1 line indent

13 Service, maintenance, disposal

13.1 Cleaning

Before cleaning, please disconnect the appliance from the operating voltage.

Please do not use aggressive cleaning agents (solvents or similar agents), but a cloth dampened with mild soap suds. Ensure that no liquid penetrates into the device and wipe with a dry soft cloth.

Loose residue sample/powder can be removed carefully with a brush or manual vacuum cleaner.

Spilled weighing goods must be removed immediately.

13.2 Service, maintenance

The appliance may only be opened by trained service technicians who are authorized by KERN.

Before opening, disconnect from power supply.

13.3 Disposal

Disposal of packaging and appliance must be carried out by operator according to valid national or regional law of the location where the appliance is used.

14 Instant help

In case of an error in the program process, briefly turn off the balance and disconnect from power supply. The weighing process must then be restarted from the beginning.

Fault	Possible cause
<i>The displayed weight does not glow.</i>	<ul style="list-style-type: none"> • <i>The balance is not switched on.</i>
	<ul style="list-style-type: none"> • <i>The mains supply connection has been interrupted (mains cable not plugged in/faulty).</i>
	<ul style="list-style-type: none"> • <i>Power supply interrupted.</i>
	<ul style="list-style-type: none"> • <i>Batteries are inserted incorrectly or empty</i>
	<ul style="list-style-type: none"> • <i>No batteries inserted.</i>
<i>The displayed weight is permanently changing</i>	<ul style="list-style-type: none"> • <i>Draught/air movement</i>
	<ul style="list-style-type: none"> • <i>Table/floor vibrations</i>
	<ul style="list-style-type: none"> • <i>Weighing plate has contact with other objects.</i> • <i>Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)</i>
<i>The weighing value is obviously incorrect</i>	<ul style="list-style-type: none"> • <i>The display of the balance is not at zero</i>
	<ul style="list-style-type: none"> • <i>Adjustment is no longer correct.</i>
	<ul style="list-style-type: none"> • <i>Great fluctuations in temperature.</i> • <i>Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)</i>

Error message	Description	Possible causes
Err 4	<i>Zeroing only in the permitted range (4% of the max. weighing range) and not for overload/underload</i>	<ul style="list-style-type: none"> • <i>Object on the weighing plate</i> • <i>Overload when zeroing</i> • <i>Improper adjustment</i> • <i>Damaged weighing cell</i> • <i>Damaged electronics</i>
Err 5	<i>Keyboard error</i>	<ul style="list-style-type: none"> • <i>Improper operation of the balance</i>
Err 6	<i>Value outside the A/D changer range</i>	<ul style="list-style-type: none"> • <i>Weighing plate not installed</i> • <i>Damaged weighing cell</i> • <i>Damaged electronics</i>
FAIL H or FAIL L	<i>Adjustment error</i>	<ul style="list-style-type: none"> • <i>Improper adjustment</i> • <i>Deviation to factory adjustment > 10%</i>
Err 8	<i>Adjustment error</i>	<ul style="list-style-type: none"> • <i>Improper adjustment</i> • <i>Incorrect adjusting weight</i> • <i>Balance unstable</i>
Err 9	<i>Weighing result unstable</i>	<ul style="list-style-type: none"> • <i>Draught/air movement</i> • <i>Table/floor vibrations</i>

Should other error messages occur, switch balance off and then on again. If the error message remains inform manufacturer.