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Operating instruction
Counting scale

KERN CWS

Version 1.0
12/2006
GB

CWS-BA-e-0610

GB

KERN CWS

Version 1.0 12/2006

Operating instruction

Counting scale

Table of Contents

1 Technical data

KERN	*CWS 3K0.5*	*CWS 6K1*	*CWS 15K2*	*CWS 30 K5*
Readability (d)	*0.5 g*	*1 g*	*2 g*	*5 g*
Weighing range (max)	*3 kg*	*6 kg*	*15 kg*	*30 kg*
Reproducibility	*0.5 g*	*1 g*	*2 g*	*5 g*
Linearity	*± 0.5 g*	*± 1.0 g*	*± 2 g*	*± 5 g*
Stabilization time	*2 s*	*2 s*	*2 s*	*2 s*
Recommended adjustment weight, not added (class)	*3 kg (M1)*	*6 kg (M1)*	*15 kg (M1)*	*30 kg (M1)*
Weighing unit	*g*	*g*	*g*	*g*
Minimum piece weight	*0.05 g*	*0.1 g*	*0.25 g*	*0.5 g*
Warming up time (operating temperature)	*30 min*	*30 min*	*30 min*	*30 min*
Reference piece numbers for piece count	*5, 10, 25, 50, 100, optional*			
Net weight (kg)	*4.7 kg*			
Permissible ambient condition	*-10° C to 40° C*			
Humidity of air	*15% - 85% (non-condensing)*			
Weighing plate, stainless steel	*300 x 210 mm*			
Dimensions of the housing plastic material (B x D x H)	*315 x 331 x 126 mm*			
Mains connection	*Adapter 230 V, 50 Hz, balance 7.5 V/700 mA*			
Rechargeable battery (optional)	*Operating time ca. 80 hrs. / loading time ca. 15 hrs.*			
Interface	*RS232C*			
Auto OFF function	*After 5 min without change of load*			

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 conformitá 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 Scale: KERN CWS

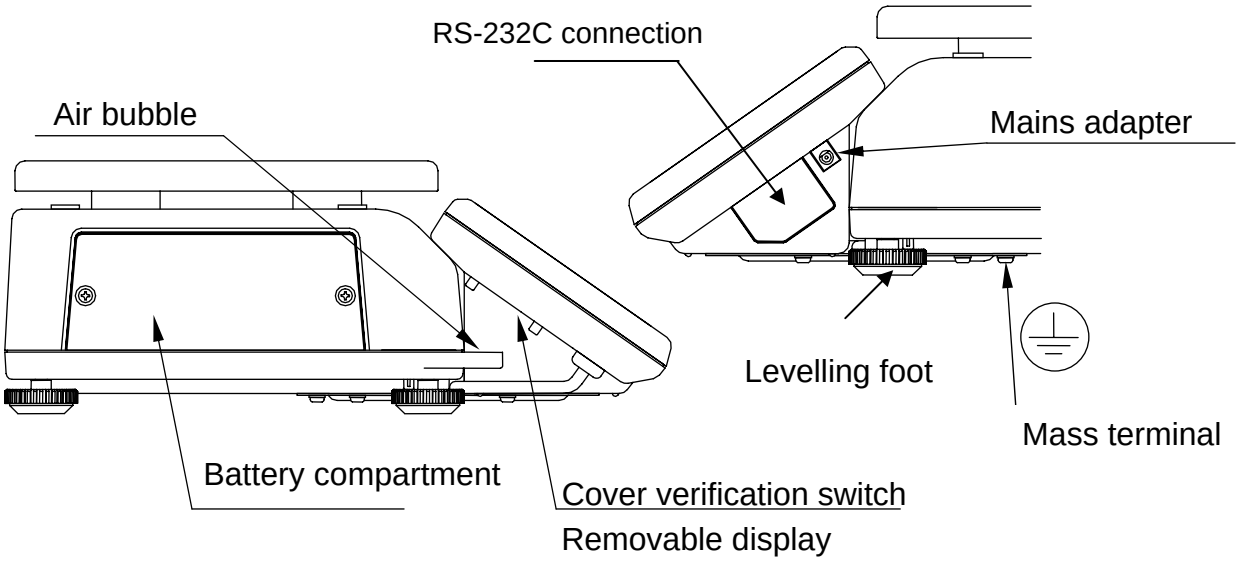
Mark applied	EU Directive	Standards
CE	89/336/EEC EMC	EN 61326 1997+A1 : 1998, +A2 : 2001, +A3 : 2003 Class A
	73/23/EEC LVD	EN 60950

Date: 10.01.2007

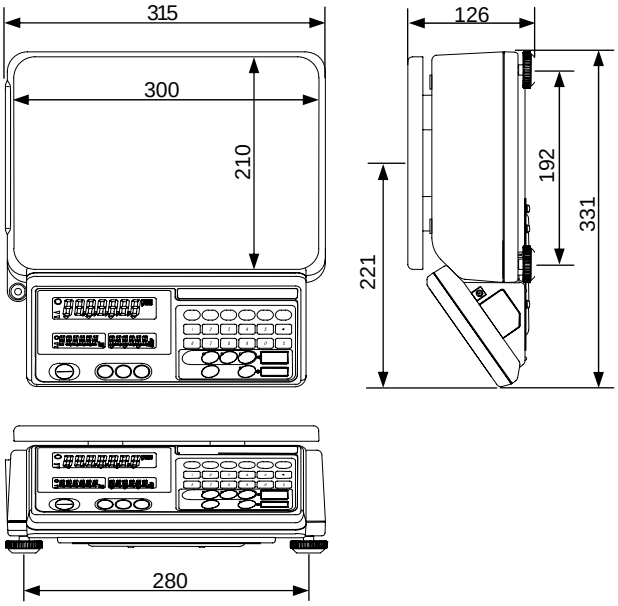
Signature:

Gottl. KERN & Sohn GmbH
Management

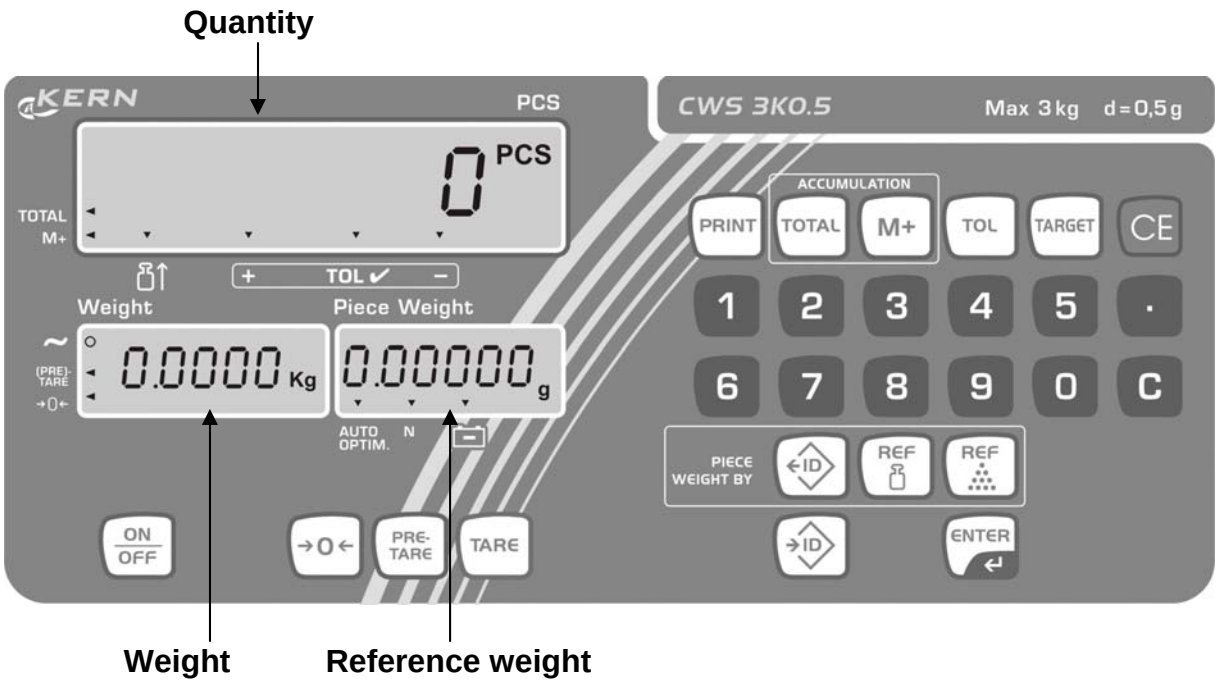
3 Appliance overview



3.1 Dimensions:



3.2 Overview visual displays / keyboard



3.2.1 Display quantity

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

Overlay ◀ indicates:

TOTAL	Display sum total
M+	Adding-up weighing data
⚖↑	Placed goods to be weighed too light
+	Goods to be weighed above tolerance limit
TOL ✓	Goods to be weighed within tolerance range
-	Goods to be weighed below tolerance limit

3.2.2 Display weight

Here, the weight of your goods is displayed.

Overlay ◀/○ indicates:

~	Stability display
PRE-TARE	Stored tare value
→0←	Zeroing display

3.2.3 Display reference weight

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

Overlay ▼ indicates:

AUTO OPTIM.	Automatic reference optimisation (weight within ACAI range, see chpt. 15.1)
N	Number of additions in summation memory
(-)	Battery power supply

3.3 Keyboard overview

Choice	Function
	• Transmit counting, weight or reference data
	• Call up total memory
	• Addition in total memory
	• Display of set tolerance limit • Subtraction in summation memory
	• Set/retrieve acoustic fill to target (AWA function chpt. 15.2))
	• Delete reference weight
	• Number keys
	• Deletes input of numeric key
	• Retrieve reference weight from memory
	• Store reference weight in ID memory
	• Numeric entry reference weight
	• Enter reference weight through weighing
	• Confirm/store input
	• Turn on/off balance
	• Zeroing key • Back to weighing mode
	• Numeric input tare value
	• Taring key

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 weighing. 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 damage 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.

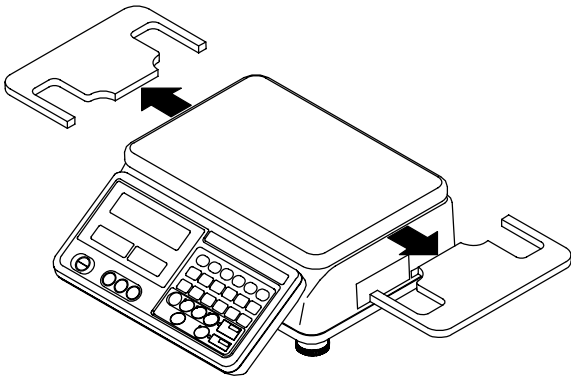
Therefore, observe the following for the installation site:

- 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.

Major display deviations (incorrect weighing results) may be experienced should electromagnetic fields (e.g. due to mobile phones or radio equipment), static electricity accumulations or instable power supply occur. Change location or remove source of interference.

7.2 Unpacking

Carefully remove the balance from the packaging, remove packing material and place balance at the intended workstation.



7.2.1 Placing

Level balance with foot screws until the air bubble of the water balance is in the prescribed circle.

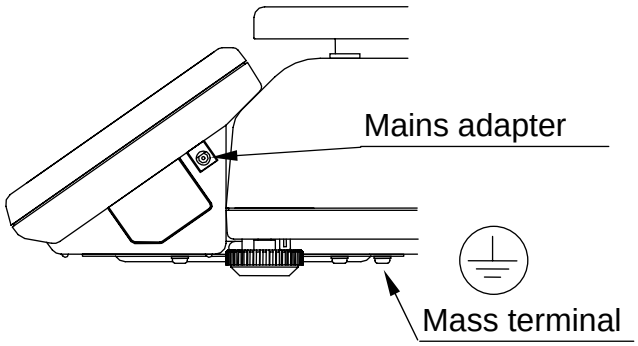
7.2.2 Scope of delivery

Serial accessories:

- Balance
- Weighing plate
- Detachable display part
- Mains power supply
- Operating Manual

7.3 Mains connection

Power is supplied via the external mains adapter. The stated voltage value must be the same as the local voltage.
Only use original KERN mains adapters. Using other makes requires consent by KERN.
Connect the housing to earth, if there is a suspicion that static electricity could pose a problem.



7.4 Initial Commissioning

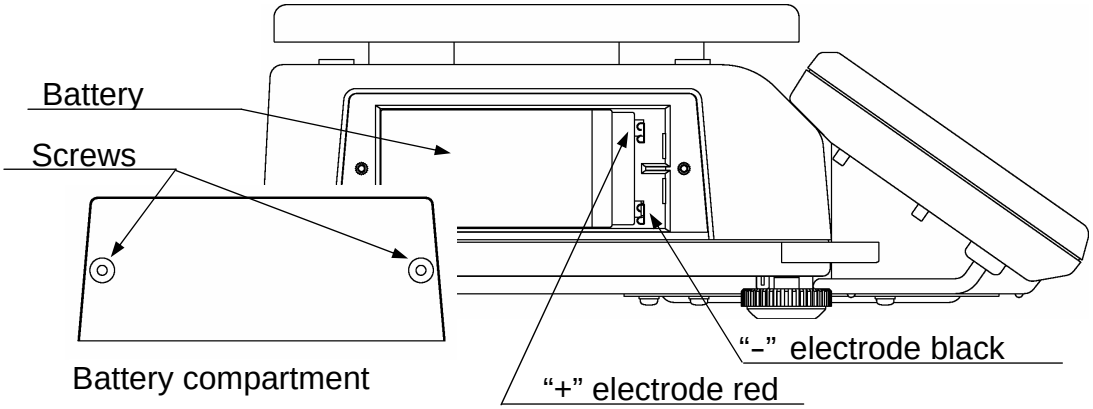
In order to obtain exact results with the electronic balances, your balance must have reached the operating temperature (see warming up time chap. 1). During this warming up time the balance must be connected to the power supply (mains, accumulator or battery).

The accuracy of the balance depends on the local acceleration of gravity.
Strictly observe hints in chapter Adjustment.

7.5 Storage battery operation (optional)

Installation:

1. Disconnecting the power pack from the balance
2. Unscrew both M3 screws and remove the cover of the battery compartment.
3. Connect wires in the battery compartment to the battery
   Connect red wire to positive (+/red) terminal and black wire to negative (-/black) terminal. Otherwise there is a danger of explosion.
4. Insert battery in compartment and reattach the cover with the help of the screws.
5. Turn on the balance and check whether the balance is working normally.



Loading the battery

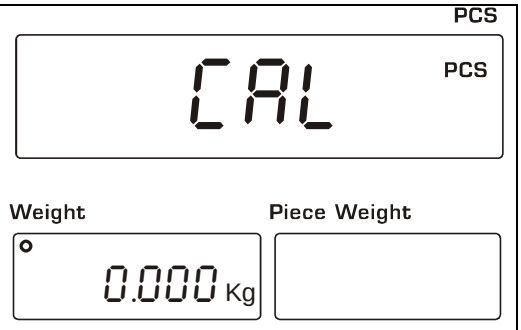
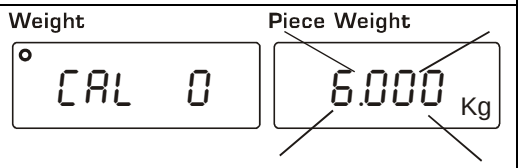
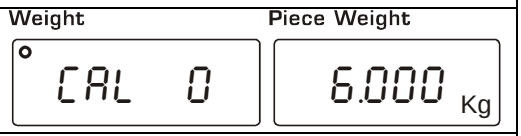
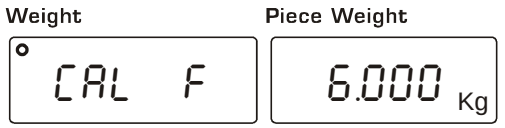
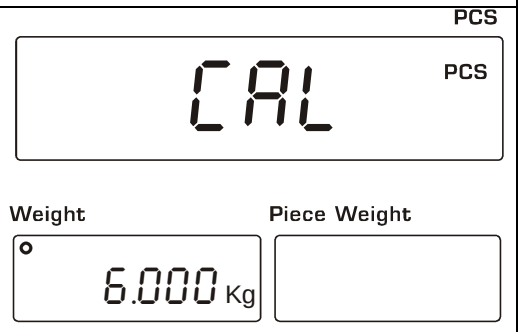
Use the provided power pack for battery charging.
Before the first use, the battery should be charged by connecting it to the mains power supply for at least 15 hours.

- The display [Lo BAT] indicates that the capacity of the battery is nearly exhausted. Connect the power adaptor as soon as possible to change the battery.
- Whilst working in battery mode, [▼] will be displayed above the battery symbol
- It is possible to use the balance during charging
- Charge the battery at a temperature ranging between 5°C and 35°C
- Charge the battery at regular intervals (every 3-6 months), when the balance is not put to use for a longer period of time.

7.6 Adjustment

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 (see chapter 1) is required for stabilization. Ensure that there are no objects on the weighing plate.

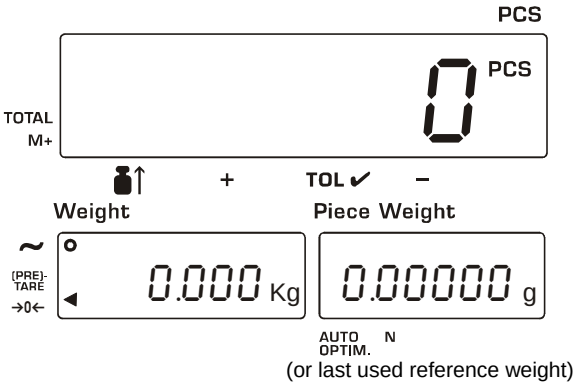
1. Press the PRINT key and keep on pressing it when balance is turned off. To achieve this, turn on the balance by using the ON/OFF key. "CAL" appears on the display. 2. Press →0← button	
3. Weight value of recommended adjustment weight is flashing on display. However, you may enter a value of your choice via the number keys. *	
4. Press ENTER button The display stops flashing.	
5. Ensure that there are no objects on the weighing plate. Press ENTER button After successfully storing the zero point "CAL F" will appear on the display.	
6. Carefully place adjusting weight in the centre of the weighing plate. Press key ENTER, adjustment will take place. Once adjustment is complete, the display will return to step 1. Remove the adjusting weight and turn off the balance using the ON/OFF key. Reattach the removed adjustment switch cover. In case of an adjustment error or an incorrect adjusting weight, the display will not return to step 1. Press the ON/OFF key and repeat the adjustment procedure.	

* The adjustment should be made with the recommended adjustment weight (see chap. 1 "Technical data"). Weights of different nominal values may be used for calibration but are not optimal for technical measuring.
Info about adjustment weights can be found on the Internet at: http://www.kern-sohn.com

8 Basic operation

8.1 Turn on/off

Turn balance on/off by using the ON/OFF key.
The balance will carry out a self-test As soon as the weight display shows "**0**" in all the three display windows your balance is ready to weigh.



(or last used reference weight)

8.2 Automatic switch-off function AUTO OFF

To save battery life, the balance is equipped with an Auto OFF function.
This switches off the balance after a time of approximately 5 minutes after the last weighing or key operation. It is possible to enable/disable the Auto OFF function (F-04-05) in the menu (see chpt. 14.2).

8.3 Balance zero display/zero tracking

Environmental influences can lead to the exact figure of zero not being displayed in spite of an empty weighing dish. It is, however, possible to reset your balance to zero at any time and thus ensure that weighing really does commence at zero. Setting to zero when a weight is applied is only possible within a certain type-dependent range. In the event that the balance cannot be reset to zero with an applied weight, this range has been exceeded.

To reset the balance to zero, press key →0← . A triangle [◀] pops up next to the [a] symbol on the display.

Notice:
The balance has an automatic zero reset function (zero tracking). This function (F-04-01) is activated by the factory in order to compensate the normal zero shift due to variations in temperature, air pressure etc.
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).
When apportioning involves small variations of weight, it is advisable to switch off this function.
If **Zero-Tracking** however is switched off, the weighing display becomes more busy.

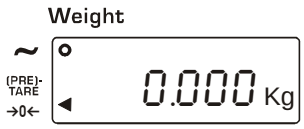
8.4 Stability display

If in the display next to the [~] symbol a circle [O] appears, the balance is a stable status. If the status is instable the [O] display disappears.

8.5 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.

Place empty tare container on the weighing plate. The total weight of the container is displayed.



Press the TARE key.

After dead stop control was carried out, the display is reset to "0". The weight of the container is now internally saved. The zero display and the arrow next to the "**PRE-TARE**" symbol appear.

Place the goods to be weighed into the tare container. Read the weight of the goods on the display.

Information:

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.
To delete the stored tare, unload the weighing plate and then press the TARE key; the [◀] display next to "(**PRE)-TARE**" disappears.

The taring process can be repeated any number of times. The limit is reached when the whole weighing range is exhausted.

8.6 Simple operating mode

If desired, the balance can be installed in simple operating mode. For this purpose enable function F-01-01 ("1"-) in the menu (see chpt. 14.2)
In this mode the use of keys is restricted as follows:

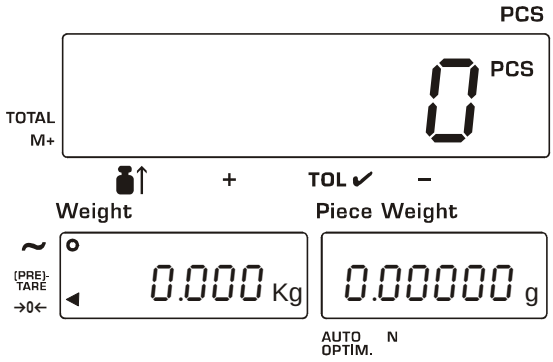
In addition the reference weight can be determined by simply weighing (see chpt. 9.2).

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 Start of add-up process

Turn on balance by pressing the **ON/OFF key**. If the display is not on zero, press the CE -key.



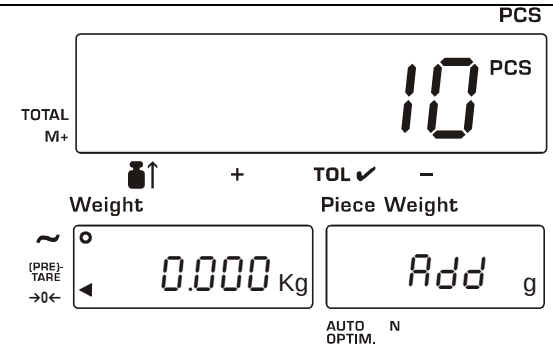
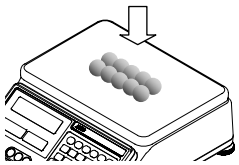
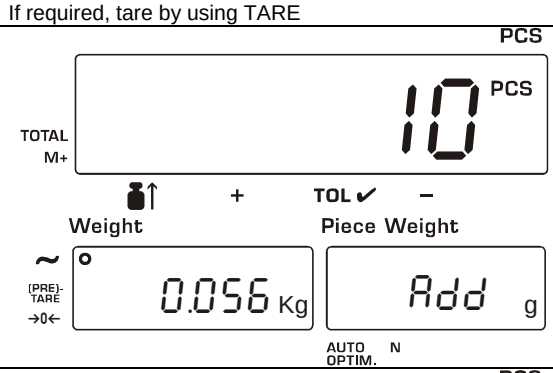
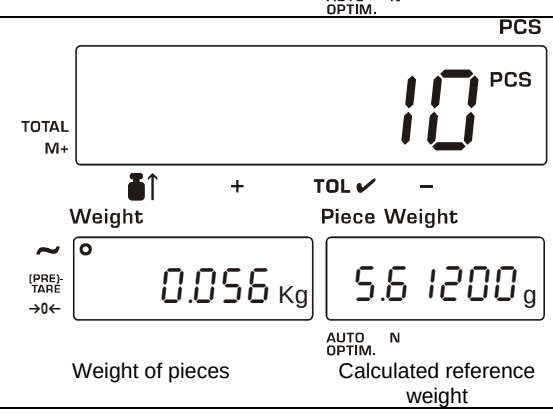
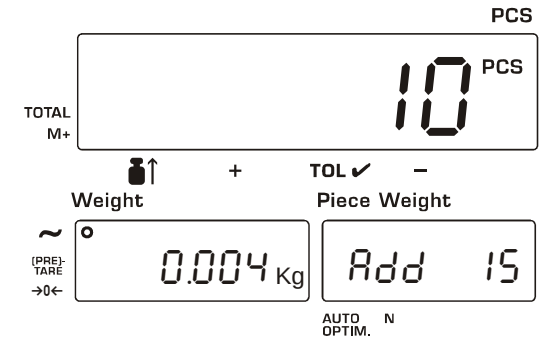
The three LEDs on the keys "**piece weight by**" are flashing. This is a request to enter the method you wish to apply for entering the reference weight. Through the selection of the keys the following options are available to enter or retrieve the reference weight:

Retrieving a stored reference weight via ID no. (chpt.. 9.4)	Numeric input of reference weight (Chpt.. 9.3)	Determination of reference weight by weighing (chpt.. 9.2)

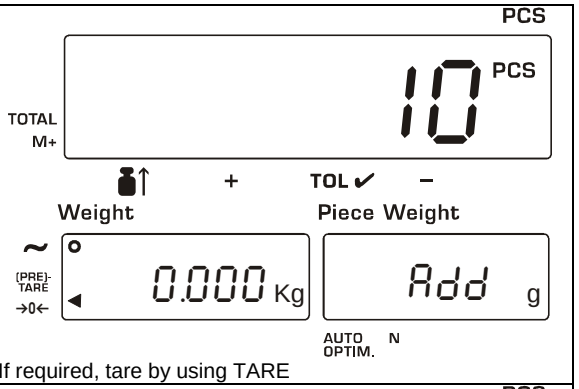
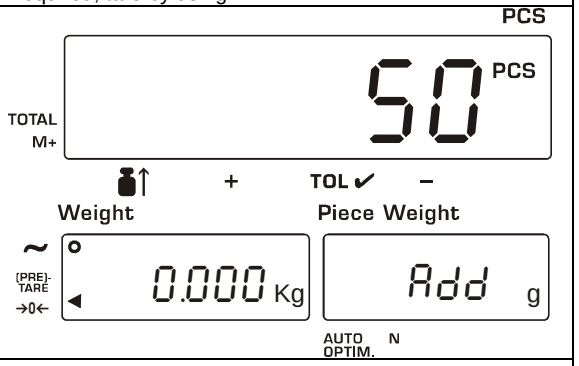
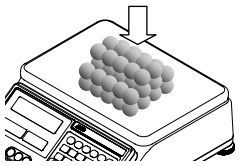
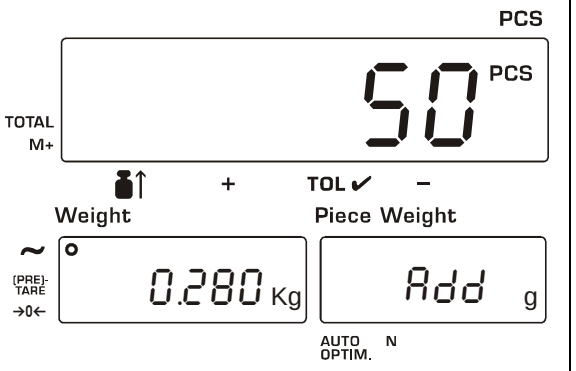
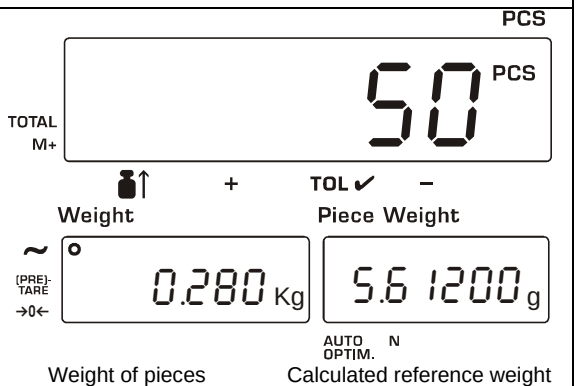
Information:
You can return to this point during operation at any time by pressing the CE key without deleting your settings (tare value, M+, tolerance limits).

9.2 Determination of the reference weight by weighing

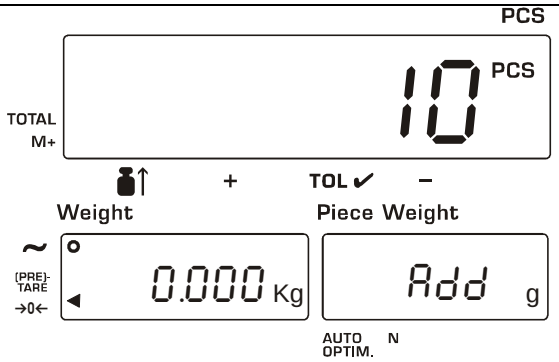
9.2.1 Reference piece number 10

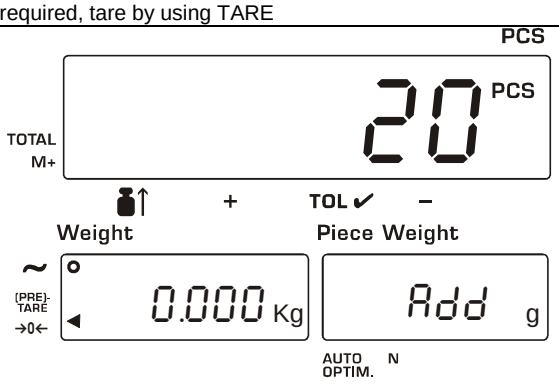
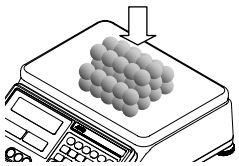
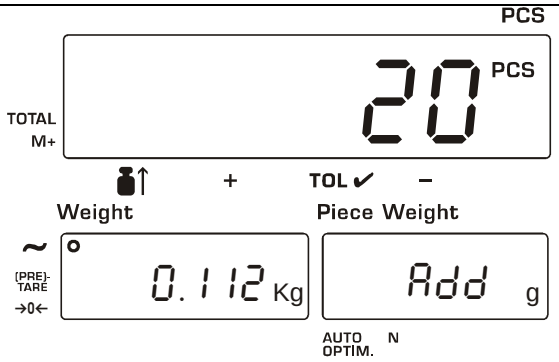
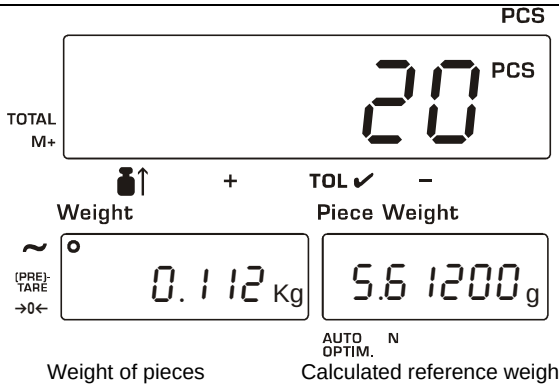
1. Turn on balance by pressing the ON/OFF key. The three LEDs on the keys "**piece weight by**" are flashing. If this is this not the case, press the CE - key. If desired, place the tare container on the balance 2. Press REF button A tare container will automatically be tared.	 If required, tare by using TARE
3. Place10 single pieces to act as reference weights on the balance. The weight of all 10 pieces will be shown 	
4. Press ENTER button The display shows "------" for a moment, while the reference weight is being calculated. Dead stop control is carried out and the calculated reference weight appears on the display.	 Weight of pieces Calculated reference weight
Note: ▪ If "Add ##" appears on the display, you can use this option to carry out reference optimisation as the size of the sample was insufficient for an accurate count. ▪ Either add the required piece number or ignore the message "Add ##" and continue the counting process by pressing the ENTER key. (This, however, will not give accurate results). See also function "F-01-02", chpt.. 14.2 5. Now you can place the parts to be counted onto the weighing plate. All piece number parameters of your load are displayed. ▪ For further information about reference optimisation see chpt. 15.1).	

9.2.2 Reference piece number 5, 25, 50 or 100

1. Turn on balance by pressing the ON/OFF key. The three LEDs on the keys "**piece weight by**" are flashing. If this is this not the case, press the CE - key. If desired, place the tare container on the balance 2. Press REF button A tare container will automatically be tared.	 If required, tare by using TARE
3. To select the reference piece number press the REF key repeatedly until the desired reference piece number appears. 10 → 5 →25 →50 →100 →10. The larger the reference quantity, the higher the counting exactness.	
4. Place the selected piece number to act as reference weight on the balance. The weight of the pieces will be displayed.  The ENTER key is flashing.	
5. Press ENTER button The display shows "------" for a moment, while the reference weight is being calculated. Dead stop control is carried out and the calculated reference weight appears on the display. **Note**: If "Add ##" appears on the display, you can use this option to carry out reference optimisation as the size of the sample was insufficient for an accurate count. Place the required pieces on the balance for reference optimisation.	 Weight of pieces Calculated reference weight
Now you can place the parts to be counted onto the weighing plate. All piece number parameters of your load are displayed.	

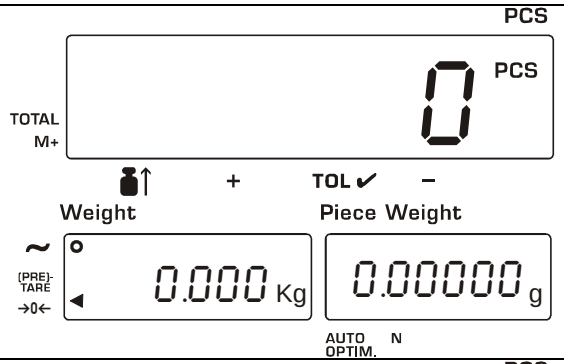
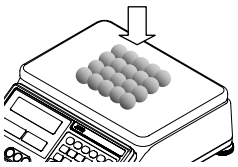
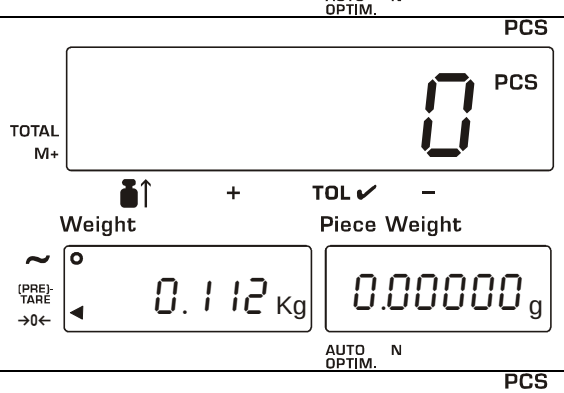
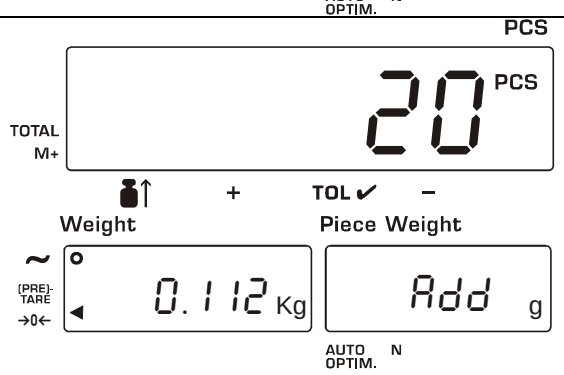
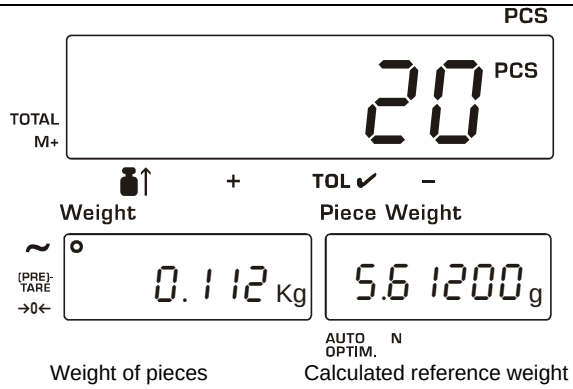
9.2.3 Optional reference piece number

<table>
<tr>
<td>1. Turn on balance by pressing the ON/OFF key. The three LEDs on the keys "piece weight by" are flashing. If this is this not the case, press the CE - key. If desired, place the tare container on the balance
2. Press REF button
A tare container will automatically be tared.</td>
<td> 

If required, tare by using TARE</td>
</tr>
<tr>
<td>3. Enter the reference piece number via the numeric keypad.
(Incorrect inputs can be deleted by pressing the C key).</td>
<td> 
</td>
</tr>
<tr>
<td>4. Place the entered piece number to act as reference weight on the balance. The weight of the pieces will be displayed.
 
The ENTER key is flashing.</td>
<td> 
</td>
</tr>
<tr>
<td>5. Press ENTER button The display shows "------" for a moment, while the reference weight is being calculated. Dead stop control is carried out and the calculated reference weight appears on the display.
Note:
If "Add ##" appears on the display, you can use this option to carry out reference optimisation as the size of the sample was insufficient for an accurate count. Place the requested piece number to act as reference optimisation on the balance.(see note chpt.. 9.2.1).</td>
<td> 

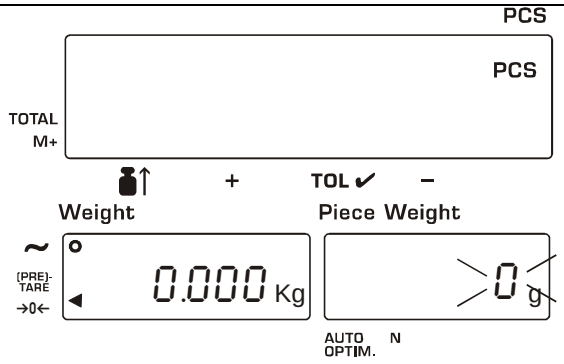
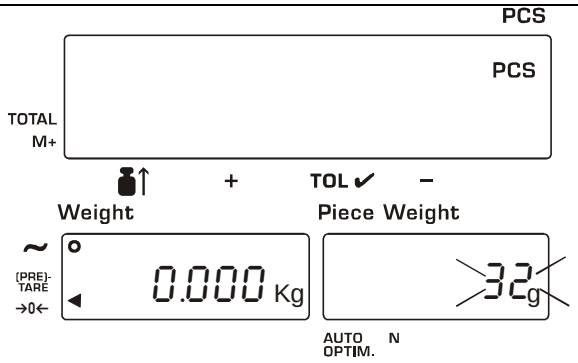
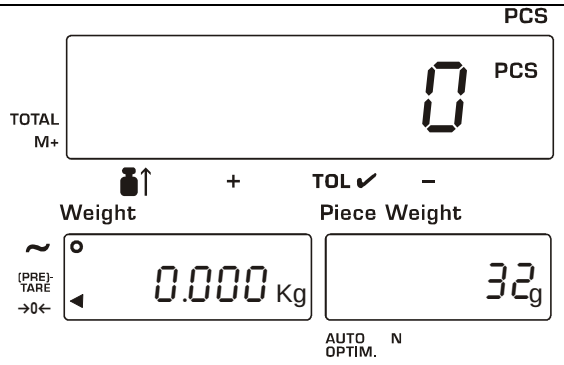
Weight of pieces
Calculated reference weight</td>
</tr>
<tr>
<td colspan="2">Now you can place the parts to be counted onto the weighing plate.
All piece number parameters of your load are displayed.</td>
</tr>
</table>

9.2.4 Optional reference piece number without using the REF - key

1. Turn on balance by pressing the ON/OFF key. The three LEDs on the keys "**piece weight by**" are flashing. If this is this not the case, press the CE - key. If desired, place the tare container on the balance and tare by pressing the TARE key.	
2. Place the piece number to act as reference weight on the balance. The weight of the pieces will be displayed. 	
3. Enter the piece number via the numeric keypad. (Incorrect inputs can be deleted by pressing the C key). The ENTER key is flashing.	
4. Press ENTER button The display shows "------" for a moment, while the reference weight is being calculated. Dead stop control is carried out and the calculated reference weight appears on the display. **Note**: If "Add ##" appears on the display, you can use this option to carry out reference optimisation as the size of the sample was insufficient for an accurate count. Place the requested piece number to act as reference optimisation on the balance.(see note chpt.. 9.2.1).	
Now you can place the parts to be counted onto the weighing plate. All piece number parameters of your load are displayed.	

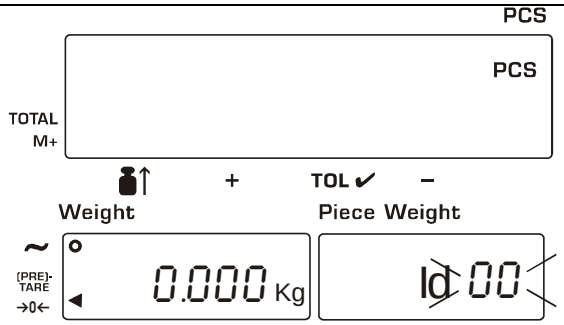
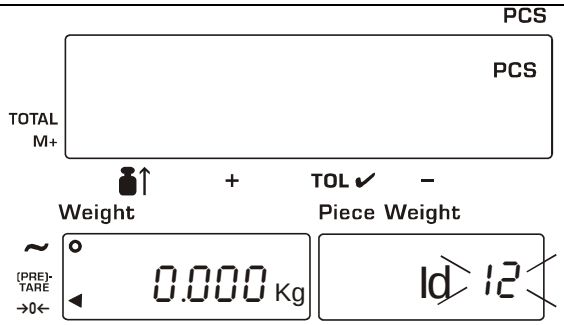
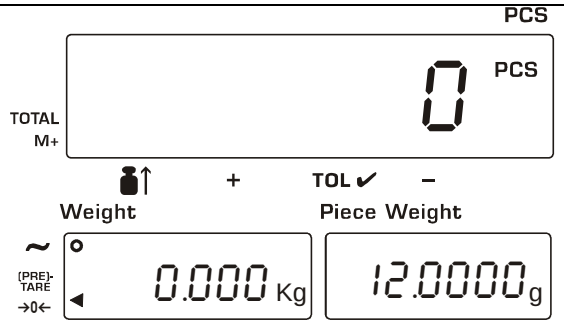
9.3 Numeric entering of the reference weight

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

<table>
<tr>
<td>1. Turn on balance by pressing the ON/OFF key. The three LEDs on the keys "piece weight by" are flashing. If this is this not the case, press the CE key. If desired, place the tare container on the balance and tare by pressing the TARE key.
2. Press REF key
the reference weight display and the ENTER key are flashing</td>
<td> 
</td>
</tr>
<tr>
<td>3. Enter reference weight via numeric keyboard (Incorrect inputs can be deleted by pressing the C key).
The reference weight display and the ENTER key are flashing.</td>
<td> 
</td>
</tr>
<tr>
<td>4. Confirm by pressing the ENTER key.
Note:
An insufficient reference weight is indicated by an acoustic signal and the message "Lo ut". The process will be reset to step 3.</td>
<td> 
</td>
</tr>
<tr>
<td colspan="2">Now you can place the parts to be counted onto the weighing plate.
All piece number parameters of your load are displayed.</td>
</tr>
</table>

9.4 Retrieving a stored reference weight via ID no.

For storing a reference weight via an ID no. see chpt. 11.1

1. Turn on balance by pressing the ON/OFF key. The three LEDs on the keys "**piece weight by**" are flashing. If this is this not the case, press the CE key. 2. Press ID key, "id-00" appears with flashing „00".	
3. Enter ID no. via numeric keyboard (Incorrect inputs can be deleted by pressing the C key). The ENTER key is flashing.	
4. Confirm by pressing the ENTER key, the stored reference weight appears. **Note**: If no reference weight exists for the entered ID no. this will be indicated by an acoustic signal and the message "no id". The process will be reset to step 3.	
Now you can place the parts to be counted onto the weighing plate. All piece number parameters of your load are displayed.	

Notes:

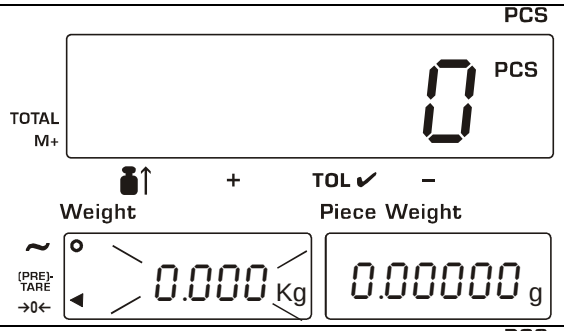
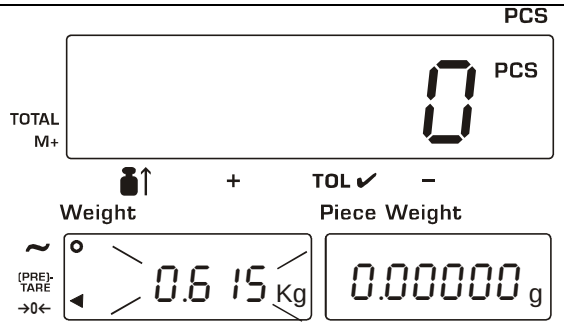
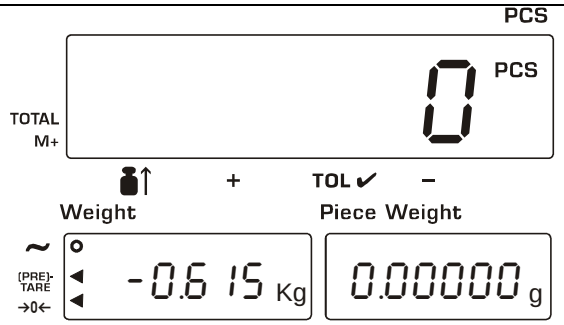
- "id 00" is a special memory area. It always contains the most recently entered reference weight.
- A reference weight is stored automatically under "id 00" where it remains until a new reference weight is stored.
- If a reference weight is deleted by pressing the CE key it can still be invoked via "id 00".

10 PRE-TARE

The balance offers two methods of taring:

- Use of TARE key for direct subtraction of displayed container weight. (see chapter 8.5).

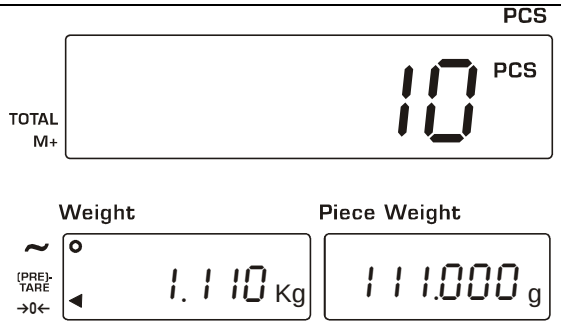
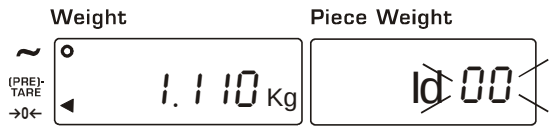
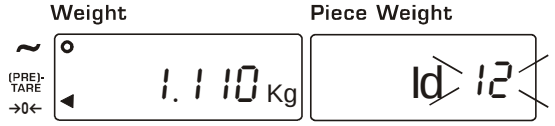
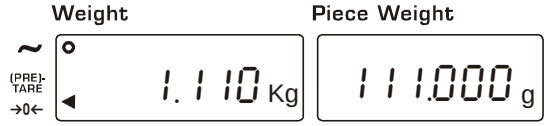
- Entering a known tare weight (PRE-TARE) via numeric keypad
  Proceed as follows:

1. Remove all objects from weighing plate 2. Press PRE-TARE key the reference weight display and the ENTER key is flashing	
3. Enter tare weight via numeric keyboard (Incorrect inputs can be deleted by pressing the C key). The weight display and the ENTER key are flashing	
4. Confirm with ENTER key, the tare weight is shown as a negative value and the [◀] display next to **"(PRE)-TARE"** appears.	
Put on tare container + goods to be weighed. The net weight of the goods to be weighed is displayed	
Deleting the tare value **Either:** Remove all items from the weighing plate, then press the TARE- key. The tare weight will be deleted and the [◀] display next to **"(PRE)-TARE**" will stop flashing. **or:** Press the PRE-TARE key and the weight display will start flashing. Enter 0 on the numeric keypad and press ENTER. The tare weight will be deleted and the [◀] display next to **"(PRE)-TARE**" will stop flashing.	

11 Storing a reference weight

11.1 Storing by ID numbers

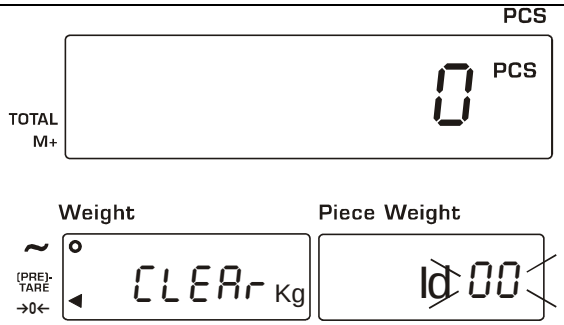
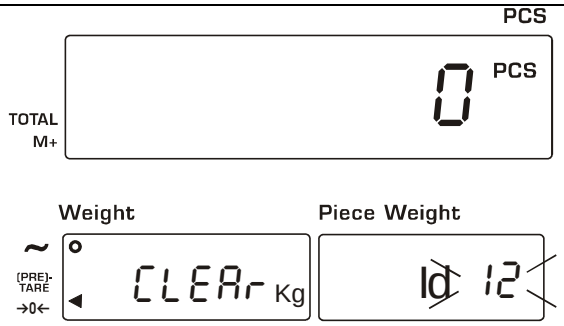
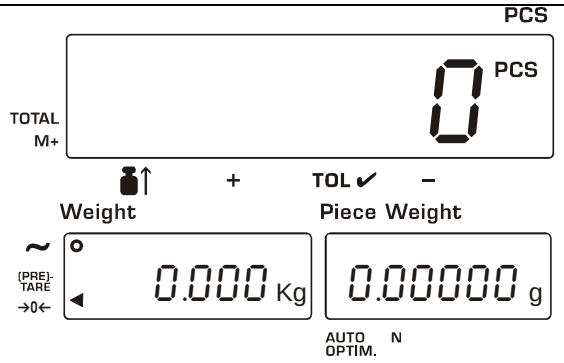
The balance is able to store up to 99 reference weights with 2 digits ID numbers from 01 – 99. For recall see chpt. 9.4.
The factory default setting of the weighing balance only stores the reference weight. In addition it is possible to store the container weight and/or the tolerance limits. For this purpose function F-01-05 must be enabled accordingly (see chpt. 14.2).

1. Input of a reference weight; either numeric or by weighing (chpt. 9.2 -9.3)	
2. Press ID key, "id-00" appears with flashing „00".	
3. Enter ID no. via numeric keyboard (Incorrect inputs can be deleted by pressing the C key). The ID no. and the ENTER key are flashing.	
4. Use the ENTER key to store.	

Note:
If the same ID no. has been stored at an earlier time the balance will issue two beeps and the ID number display will stop flashing.
Now you will have to select one of two options: Either (a) you overwrite the old ID number or (b) you select a different ID number:

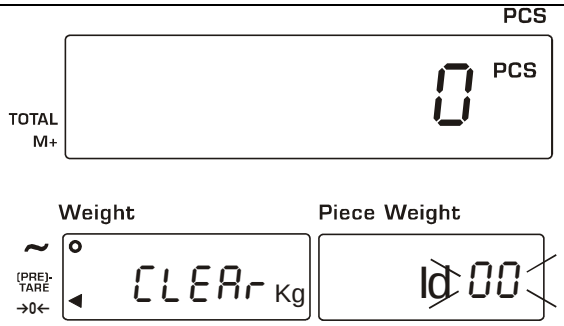
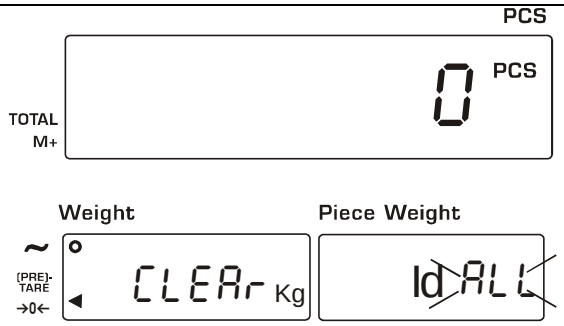
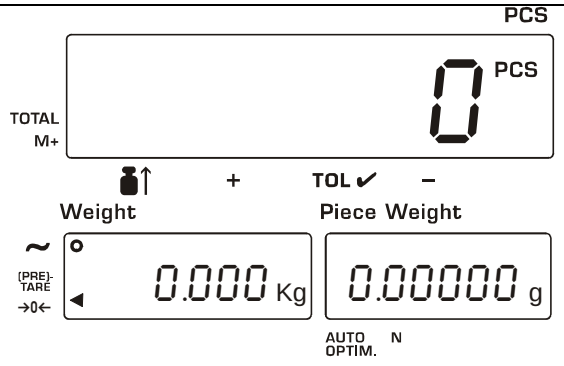
(a) To overwrite the old ID no. press the ENTER key	or	(b) Delete by pressing the C key and select a different ID no. (see step 3)

11.2 Deleting a stored reference weight

1. Keep pressing the C key and press the ID key at the same time. Let go of both loads at the same time.	
2. Enter ID no. to be deleted via numeric keyboard (Incorrect inputs can be deleted by pressing the C key). The ENTER key is flashing.	
3. Confirm by pressing the ENTER key	

Note:
If no ID number to be deleted exists, the balance will issue a bleep. Return to step 2 to repeat or press the CE key to finish.

11.3 Simultaneous deleting of all ID memories

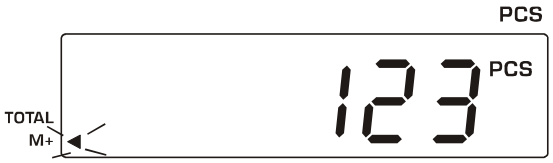
1. Keep pressing the C key and press the →ID key at the same time. Let go of both loads at the same time.	
2. Press the TOTAL key, "idALL" appears with "ALL" flashing.	
3. Press the ENTER key and "ALL" will stop flashing. 4. Once again press the ENTER key and all ID memories will be deleted or To finish without deleting the ID memories press the CE key.	

12 Adding

The balance is equipped with a summation memory used for adding up of identical counted parts to total quantity and total weight.
The balance is set by the factory for manual adding-up (by pressing the M+ key). For automatic adding-up the function F-03-01 must be set to “1” (see chpt. 14.2) in the menu.
Likewise you can activate the summation data (positive/negative weighing values) in the menu, see function F-03-02 (chpt. 14.2).

12.1 Manual adding-up by pressing the M+ key

1. Select reference weight and place number of parts for first weighing.
2. After carrying out a rest position control add the display value to the summation memory by pressing the M+ key.
   The stored value is indicated by a bleep and the flashing [◀] display next to "**M+".** After dead stop control was carried out the balance will return automatically to counting mode.



Place the piece number on the balance for a second weighing and add them to the memory by pressing the M+ key.

Add and weigh more parts if needed as described above.

Please note that the balance must be unloaded between the individual weighing procedures (display < +5d).

Note:
If the balance issues four bleeps or if the [◀] display next to "M+" does not flash, the balance was not unloaded between the individual weighings or the weighing value is not stable (see also function F-03-02)

Deleting the last M+ sum up

1. Keep pressing the C key, press the M+ key, then let go of both.
2. The balance issues a bleep and deletes the last M+ sum up.

If 4 bleeps are sounded, there are no M+ sum ups to delete.

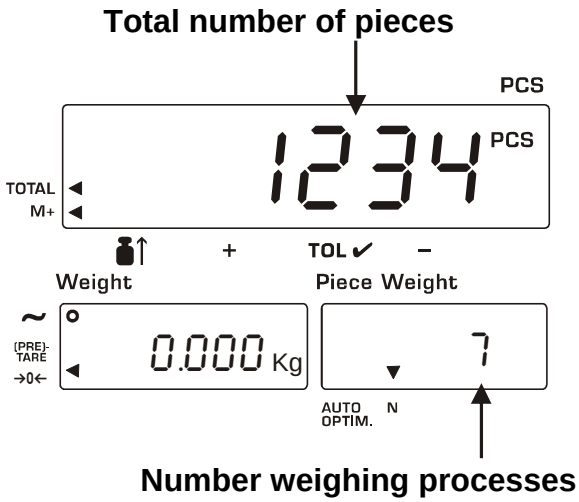
12.2 Automatic adding-up

When the automatic summation function F-03-01 is enabled (for setting "1", see chpt. 14.2.), the individual weighing values will be automatically added to the summation memory without having to press the **M+** after a rest position control was carried out. An acoustic signal indicates when all the weighing values have been added to the summation memory.

- Same procedure as for manual adding-up, see chpt. 12.1 but without pressing the **M+** key.
- Please note that the balance must be unloaded between the individual weighing procedures (display < +5d).
- If function F-03-02 is set to "1" it is only possible to add positive counts (see chpt. 14.2.)

12.3 Displaying a sum total

1. Press the TOTAL key and the total piece number as well as the number of weighings will appear.
   Indicated by the [◀] display next to "TOTAL" and "N"
2. Press the TOTAL key again.
   The balance returns automatically into weighing mode.



12.4 Deleting all stored weighing data

1. Keep pressing the C key, press the TOTAL key, then let go of both.
2. This deletes the **M+** memory.
   The [◀] display next to "**M+**" and „**TOTAL**“ disappears.

Notes:

- Pressing the CE key will delete merely the display but not the data in the summation memory.
- Data remains stored even after the balance was disconnected from the mains.

12.5 M- function

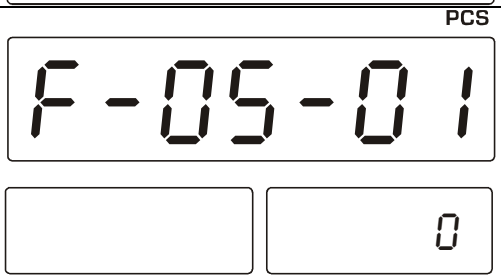
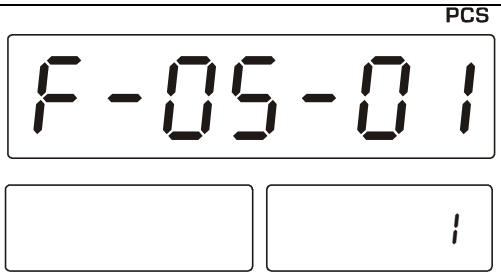
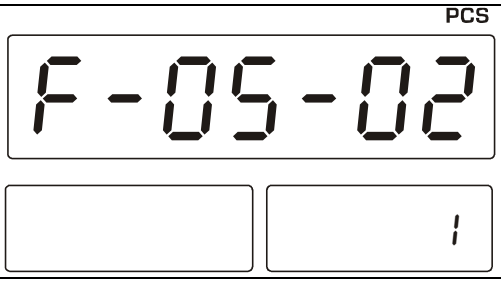
- The balance can subtract summation data from the **M+** memory by pressing the TOL key
- For this purpose enable function F-09-01 in the menu (for setting "1", see chpt. 14.2).
- This function is not used to delete the last **M+** addition but to subtract the summation data instead of adding. The sum total of the number of weighings will be increased.
- There is no automatic function **M-.**

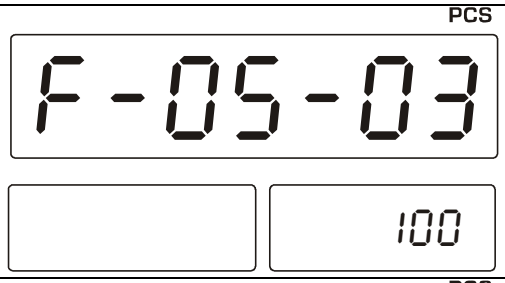
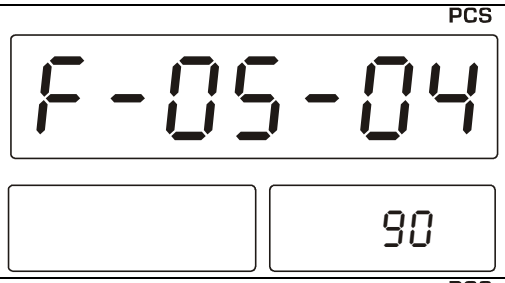
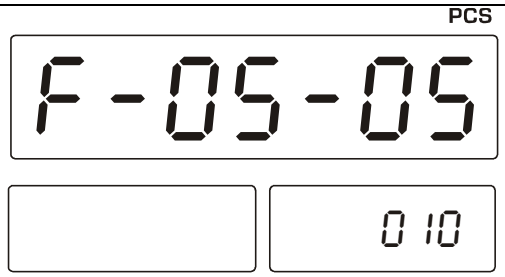
13 Weighing/counting with tolerance range

This function enables weighing of a certain weight or piece number within fixed tolerances, e. g. for control weighings. The achievement of tolerance limits is indicated by an optical/acoustic signal.

Overlay ▼ indicates:	
+	Piece number / weight above upper tolerance limit
TOL ✓	Piece number / weight within tolerance range
-	Piece number / weight below lower tolerance limit

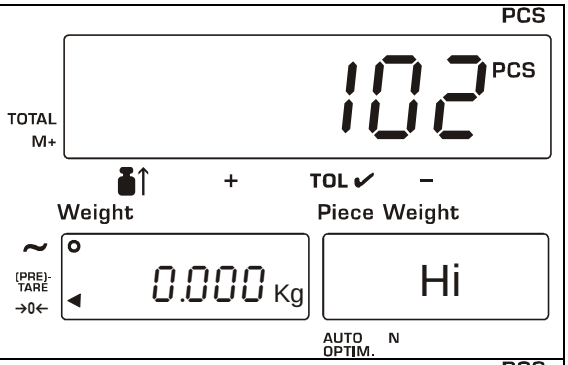
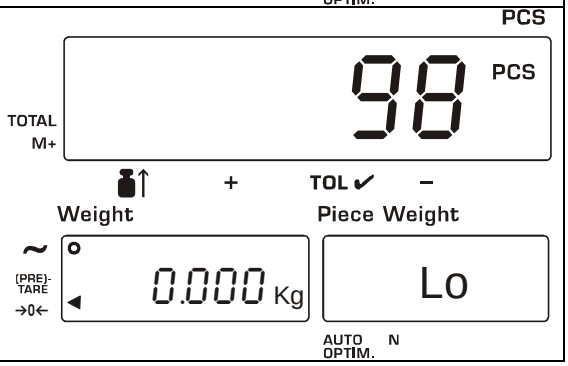
13.1 Parameter selection (see also chapter 14.2)

1. **Switch off** the balance 2. Keep pressing the →0← key and press the ON/OFF key. The first function F-00 will be shown and flashing. Then let go of both keys.	
3. Call up the "fill to target function" by pressing 5 on the numeric keypad.	
4. Press the ENTER key for the current setting to appear	
5. Enter the desired mode (see chpt. 14.2) using the numeric keypad.	
6. Use the ENTER -key to store. The next menu item "F-05-02" used to select data to be compared appears. ▪ 0 = Count data ▪ 1 = Weight data	

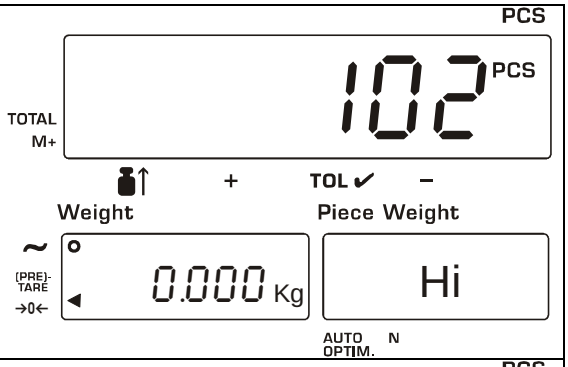
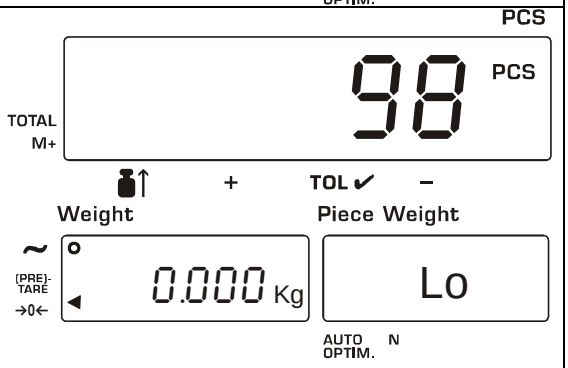
7. Confirm by pressing the ENTER key. The next menu item "F-05-03" used to set the upper tolerance limit appears. Enter setting, using the numeric keypad.	
8. Use the ENTER key to store. The next menu item "F-05-04" used to set the lower tolerance limit appears. Enter setting, using the numeric keypad.	
9. Confirm by pressing the ENTER key. The next menu item used to set the acoustic signal for tolerance control appears. Enter setting, using the numeric keypad (000 = sound disabled. 001 = sound enabled).	
10. Use the ENTER key to store. The next menu item (see chpt. 14.2) appears. The same procedure applies to further settings. 11. To exit the menu, press the ON/OFF key. Use again the ON/OFF key to switch the balance on.	

13.2 Display of set tolerance limits

Condition: F-09-01 = „0“, see chpt. 14.2

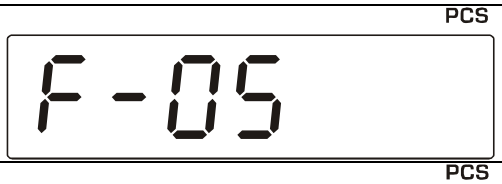
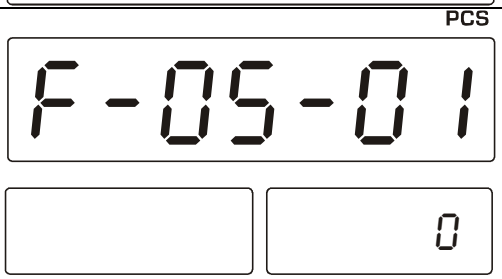
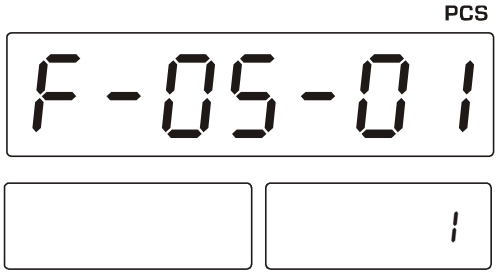
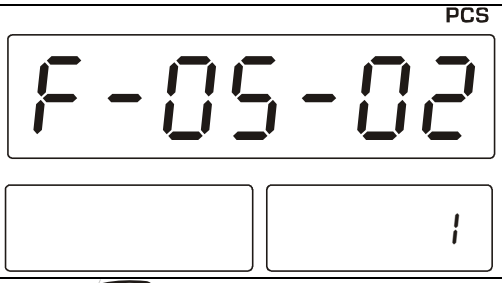
1. Switch on balance 2. Press the TOL key and the set upper tolerance limit will be shown and flashing.	
3. Press the TOL key again and the set lower tolerance limit will be shown and flashing. 4. Press the TOL key again and the balance will return to counting mode	

13.3 Changing set tolerance limits by using the TOL key instead of setting in menu

1. Press the TOL key and the set upper tolerance limit will be shown and flashing. To change the upper tolerance limit, enter the desired value via the numeric keypad. 2. Press the ENTER key, the new upper limit will be stored and the lower limit displayed.	
3. To change the lower tolerance limit, enter the desired value via the numeric keypad 4. Press the ENTER key and the new lower limit will be stored and the balance will return to counting mode. 5. If you do not wish to store the new limit, press the TOL key. The balance returns to weighing mode	
Stored tolerance limits will be retained even after the balance was turned off.	

14 The menu

14.1 Navigation in the menu

1. **Switch off** the balance 2. Keep pressing the →0← key and press the ON/OFF key. The first function F-00 will be shown and flashing. Then let go of both keys.	
3. Invoke the desired function (see chpt. 13.2) by pressing the appropriate numeric key (e.g. 5).	
4. Confirm by pressing the ENTER key, the piece number display will appear and the function and current setting will be flashing. Now you are able to either change the setting (step 5) or to go to the next function (step 6)	
5. Enter the desired setting (see chpt. 13.2) via the numeric keypad • Incorrect inputs can be deleted by pressing the C key, repeat input. • If you want to cancel the process without storing any inputs after pressing the ENTER key for the last time, press the ON/OFF key to cancel.	
6. Press the ENTER key to store your changes and to go to the next function.	
7. To exit the menu, press the ON/OFF key. Use again the ON/OFF-key to switch the balance on.	

- If "Add ##" appears on the display, you can use this option to carry out reference optimisation as the size of the sample was insufficient for an accurate count. Either add the required piece number or ignore the message "Add ##" and continue the counting process by pressing the ENTER key. (This, however, will not give accurate results). See also function "F-01-02", chpt.. 14.2.

14.2 Menu overview

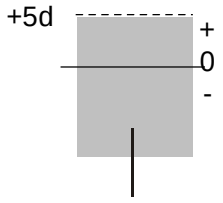
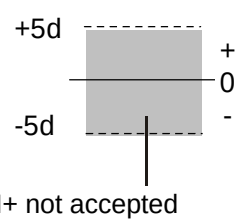
F- 01-X operation

Function key 1	Parameter selection	Description of function
F-01-01	**Operating mode**	
	0*	Standard Operation. All functions and keys are available
	1	Simplified operating mode Reference weight can be determined by weighing. All other keys are disabled (chpt.. 7.11)
F-01-02	**"Add##" additional piece number requirement (see notes "chpt. 9.2.1")** The additional piece number demand ensures during piece counting that no insufficient reference weight is used as this could result in inaccurate results. It is possible to enable or disable this function.	
	0	"Add" function disabled. Light reference weight is accepted without "Add" demand.
	1*	It is possible to enter the reference weight **without** the required additional "Add" pieces (via ENTER key).
	2	It is **not possible** to enter the reference weight without the required additional "Add" pieces (via ENTER key).
F-01-03	0	Always use this setting
F-01-04	**Display of last reference weight used** Each time the balance is turned on the last used reference weight will be displayed. It is possible to enable or disable this function.	
	0*	Last used reference weight will be deleted
	1	Last used reference weight will be displayed automatically
F-01-05	**Content ID memory**	
	00	The ID memory merely contains the reference weight
	Tare value ↓ 00 ↑ Tolerance limit	You may select which other data should be stored in addition to the reference weight by entering 0 (no) or 1(yes) for the data (tare value or tolerance limit). Example: 10 = ID memory contains reference weight and tolerance limits

F-02-X Automatic reference optimisation

Function key 2	Parameter selection	Description of function
F-02-01	Reference optimisation during input of reference weight by weighing (chpt.. 9.2)	
	0	Reference optimisation disabled
	1*	Automatic reference optimization
	2	Manual reference optimisation (using ENTER key)
F-02-02	Reference optimisation during numeric input of reference weight (chpt.. 9.3) or via ID no. (chpt. 9.4)	
	0	Reference optimisation disabled
	1*	Manual reference optimisation (using ENTER key). This setting is enabled when the setting F-02-01 is not "0".
	2	Automatic reference optimisation obeys F-02-01 setting
F-02-03	Minimum reference weight (1d = readability, see chpt. 1)	
	0	1/5 d
	1*	1/100 d

F-02-X summation function

Function key 3	Parameter selection	Description of function
F-03-01	**Automatic/manual M+ add-up (chpt.. 11)**	
	0*	Manual adding-up by pressing the M+ key
	1	Automatic add-up, (positive data only)
F-03-02	**Selection summation data**	
	0*	Positive data only (5d and above)
	1	Positive and negative data (5d and above or -5d and below)
	 **F-03-02=0**	 **F-03-02=1**

F-04-X environment and acoustic signal

Function key 4	Parameter selection	Description of function
F-04-01	**Zero Tracking (chap. 7.8)**	
	0*	Zero Tracking on
	1	Zero Tracking off
F-04-02	**Display speed (reaction)**	
	0	Fast/sensitive
	1*	Normal
	2	Slow/stable
	3	Slower/more stable
F-04-03	**Vibration filter (environment)**	
	0	Sensitive and fast (very quiet set-up location).
	1*	Normal
		Robust but slow (very busy set-up location)
F-04-04	**Acoustic signal for key operation**	
	0*	Sound on
	1	Sound off
F-04-04	**Automatic switch-off function AUTO OFF**	
	0*	Auto-OFF on
	1	Auto-OFF off

F-05-X tolerance control

Function key 5	Parameter selection	Description of function
F-05-01	**Selection of mode**	
	0*	Tolerance control off
	1	Compare all data
	2	Compare stable data
	3	Compare all data, with exception of those close to ZERO*
	4	Compare stable data, with exception of those close to ZERO*
	5	Compare all positive data, with exception of those close to ZERO*
	6	Compare stable positive data, with exception of those close to ZERO*
	* "close to ZERO" means between -4d and +4d of weight data	
F-05-02	**Selection of data to be compared**	
	0*	Summation data
	1	Weight data
F-05-03	**Upper limit**	
	0*	Input via numeric keys Use the . key to set the minus value
F-05-04	**Lower limit**	
	0*	Input via numeric keys Use the . key to set the minus value
F-05-05	**Acoustic signal when tolerance limit has been achieved**	
	000*	Acoustic signal off
	0 0 0 + - TOL ✓	Adjustment „0“: Acoustic signal off „1“: Acoustic signal on Example "**010**": The acoustic signal only sounds when the display meets the "TOL" condition.

F-06-X RS-232C Data output

Function key 6	Parameter selection	Description of function
F-06-01	**Data output mode**	
	0*	Data are transmitted by pressing the PRINT key. + remote control instructions
	1	Continuous data transmission It is not possible to use remote control commands
	2	Data will be transmitted when the weight display is stable at +5d or above. + remote control instructions
	3	Data will be transmitted when the weight display is stable at 5d or above/below. + remote control instructions
	4	Remote control commands only
	5	Not documented
	6	Not documented
	7	Not documented
	8	Not documented
	* "close to ZERO" means between -4d and +4d of weight data	
F-06-02	**Selection of output values**	
	0100*	Transmitting data
	ID reference weight ↓ ↓ **0 0 0 0** ↑ ↑ Weight Quantity	To select which data to transmit, enter either "0" or "1" for the data: ID no., piece number, weight or reference weight Example: When "1100" is entered only the ID no. and the piece number will be sent.
F-06-03	**Data format**	
	0*	Not documented
	1	Not documented
	2	Format for general peripherals
F-06-04	**Baud rate**	
	0*	2400 bps.
	1	4800 bps.
	2	9600 bps.
F-06-05	**Data length and parity**	
	0*	7 Bit, even parity
	1	7 Bit, odd parity
	2	8 Bit, no parity

Information: Use the setting “0“ at all times for F-07 and F-08

F-09-X key TOL

Function key 9	Parameter selection	Description of function
F-09-01	Operating mode for key TOL	
	0*	Use as key for the display and/or change of upper or lower tolerance limit
	1	Use as key M- for subtracting summation data from M+ memory
F-09-02	**Decimal point and RS-232C output**	
	0000*	Decimal point: "." Header for stable weight data: „ST" Confirmation of command: <ACK><C_R><L_F>
	ACK decimal point ↓ ↓ **0 0 0 0** ↑ ↑ ST/WT K.A.	Select decimal point "." or "," and output format for RS-232C Set "0" or "1" for each bit. Decimal point: „0" = "**.**" „1" = "**,**" Header: „0" = "ST,+001.2346kg" „1" = "WT,+001.2346kg" Confirmation: „0" = "<ACK><C_R><L_F>" „1" = " "<ACK>"

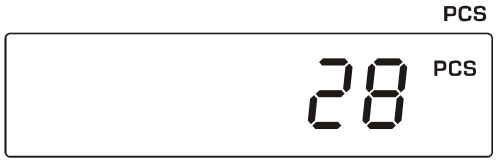
Information: Use the setting "0" at all times for F-11 and F-12

Factory settings are marked by *.

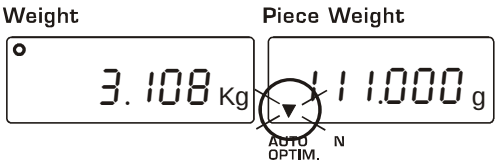
15 Description of individual functions

15.1 ACAI function (automatic counting accuracy improvement = automatic reference optimisation)

In order to improve add-up accuracy, the ACAI function calculates the reference weight anew each time new pieces are added.



At every reference optimisation, the reference is calculated anew. As the additional pieces increase the base for the calculation, the reference also becomes more exact.



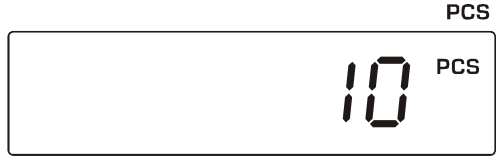
ACAI notes

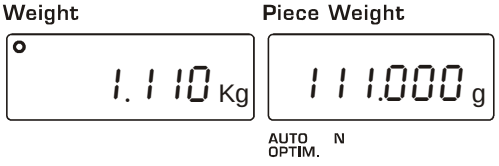
- The ACAI procedure must be carried out after setting the reference weight. For this purpose the piece number must still be on the weighing plate.
- Do not remove the piece number before the ACAI procedure is complete.
- If the pieces remain within the ADAI range, they must not be counted during adding.
- If you want to have the most accurate add-up results for each different batch of identical pieces, use the ADAI each time when starting a count for a new batch.
- The ACAI function is set by the factory to manual operation if the reference weight is entered digitally via the keyboard, the ID memory or via PC via serial interface. This can be converted to automatic mode. The ACAI mode during the input of the reference weight via ID or digital input is controlled via function F-02-02 (see chpt. 14.2).

15.1.1 ACAI automatic mode

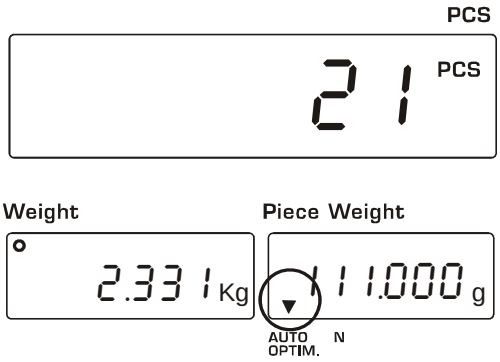
Setting in menu (chpt..14): F-02-01 = „1“

1. Run:
   Leave the piece number on the weighing plate after setting the reference weight

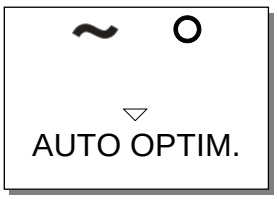




2. Add additional pieces within the next ACAI range (see table below). As a rough guide, approximately double the piece number on the weighing plate.



Piece number on the weighing plate	ACAI Add-up range	Piece number on the weighing plate	ACAI Add-up range
10	13~26	60	63~122
20	23~49	70	73~138
30	33~70	80	83~152
40	43~89	90	93~166
50	53~106	100	103~299
		>200	203~492

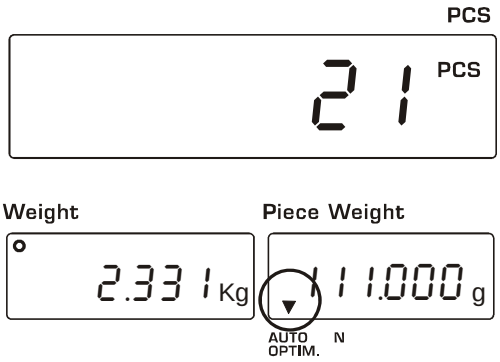
		
As long as you are within the range, the triangle ▼ will pop up during adding.	When adding is stopped and the display becomes stable, the triangle ▼ will start flashing.	Once the new reference weight has been calcu-lated, the triangle ▼ will disappear.

3. Add more pieces within the ACAI range until you have reached a piece number that is as great as the greatest piece number you wish to count.
4. When you have added the maximum number of required pieces, remove the pieces and start the add-up procedure.

15.1.2 ACAI manual mode

- During the manual ACAI procedure the reference weight will only be re-calculated after pressing the ENTER key.
- Setting in menu (chpt..14.2): F-02-01 = „2“

1. Run:
   Leave the piece number on the weighing plate after setting the reference weight
2. Add additional pieces within the next ACAI range (see table in test passage above). The triangle ▼ will pop up (above "AUTO OPTIM.") as soon as the weight is within the ACAI range.
3. Wait until the display is stable, then press the ENTER key. During the calculation of the new reference weight the triangle ▼ (above "AUTO OPTIM.) will be flashing for a moment and then disappear.



4. Add more pieces within the ACAI range until you have reached a piece number that is as great as the greatest piece number you wish to count.
5. When you have added the maximum number of required pieces, remove the pieces and start the add-up procedure.

15.2 AWA function (audible weighing assist = acoustic fill-to-target)

This function is used to support the approximation to a target piece number (e.g.20 items) by a gradually intensifying acoustic signal.

There are three operating modes. These are selected with the help of the TARGET key.

Mode off: AWA function disabled

Target mode: Setting a target piece number

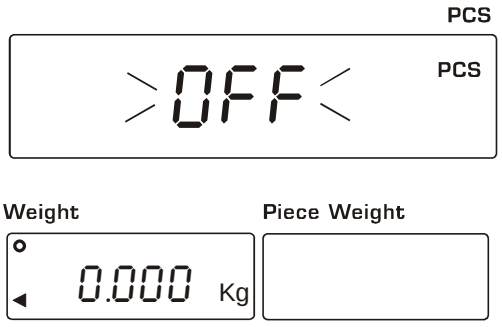
Interval mode (int): When in interval mode, a target piece number (e.g. 20 items) for repeat counts may be selected several times (e.g. 20, 40, 60, 80 items).

- A signal is given starting from "piece number -9". Whilst you are adding pieces and approach the target piece number the acoustic signal will change the intervals of beeps. These become shorter and will stop as soon as the piece number has been reached.
- The acoustic signal bleeps again for "target piece number +1, 2, 3 or 4" items.
- The minimum piece number is set to 10.
- If the piece number is set to less than 50 in the interval mode, the acoustic signal will start sounding at "target piece number -5".
- It is not possible to set a minus target and an interval count at the same time. However, the AWA function also works for negative piece counts.
- **The AWA function must be disabled if the acoustic signal is used for tolerance control.**

15.2.1 Enabling/disabling the AWA function

To disable the AWA function:

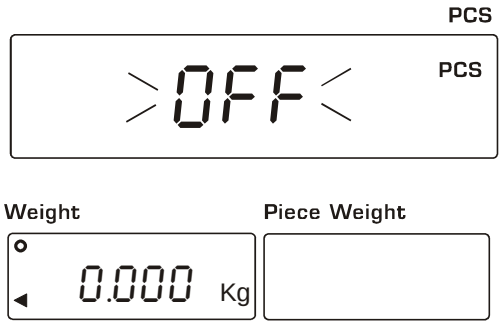
1. Press the TARGET key, the current mode appears.*
2. Press the TARGET key repeatedly until "off" appears.
3. Confirm by pressing the ENTER key and the balance will return to count mode.



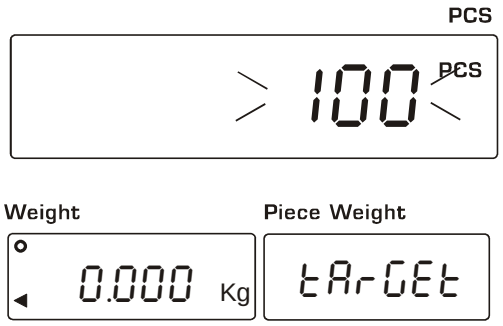
* Information: To return to weighing mode without having to change the setting, press the CE key.

Target mode:

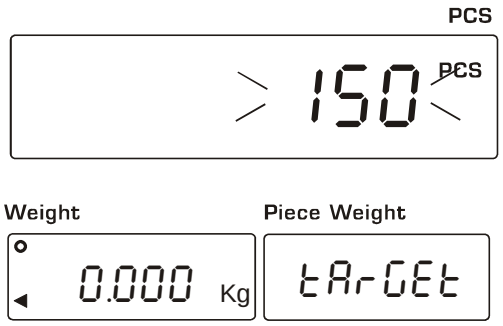
1. Press the TARGET key, the current mode appears.



2. Press the TARGET key repeatedly until "target" appears. The set target piece number is flashing.



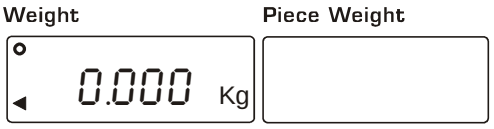
3. To change target number of pieces enter desired value via numeric keyboard (Incorrect inputs can be deleted by pressing the C key).
   The ENTER key is flashing.



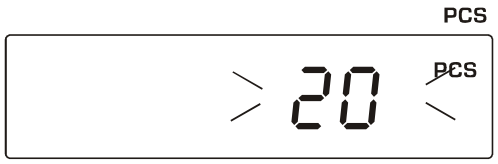
4. Confirm by pressing the ENTER key and the balance will return to count mode with the target mode enabled.

Interval mode :

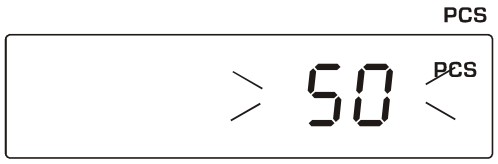
1. Press the TARGET key, the current mode appears.



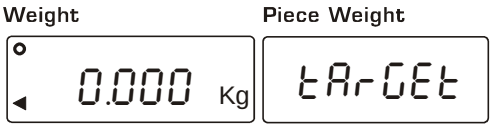
2. Press the TARGET key repeatedly until "int" appears. The set interval count is flashing.



3. To change interval count enter desired value via numeric keyboard (Incorrect inputs can be deleted by pressing the C key).
   The ENTER key is flashing.



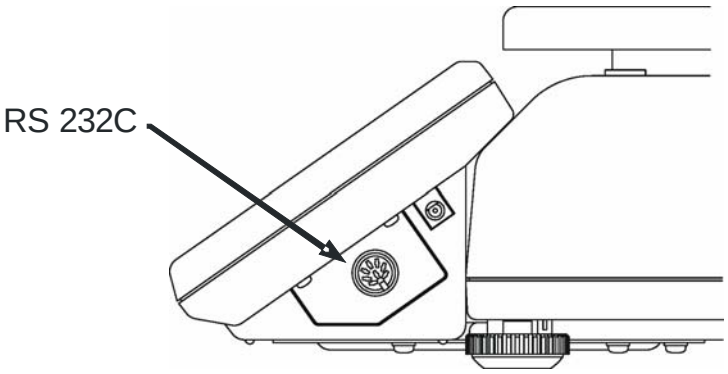
4. Confirm by pressing the ENTER key and the balance will return count mode with the interval mode enabled.



16 Data output RS 232C

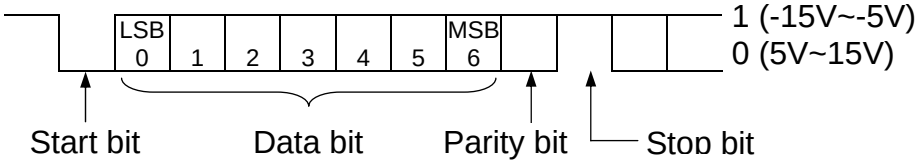
The balance is typically equipped with a RS 232C interface.

Data output is shown on the right hand side of the display box.

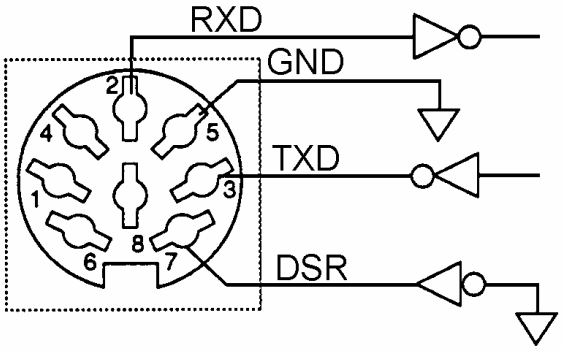


16.1 Technical specifications of interface

Asynchronous, bi-directional, half-duplex
Baud rate: 2400, 4800, 9600 bps
Data: 7 bits + parity 1bit (even / odd) or 8 bits (non-parity)
Start bit: 1 bit
Stop bit: 1 bit
Code: ASCII
Terminator: Data Send / C_RL_F Data Receive / C_R or C_RL_F



Pin assignment:



2 Receive data
3 Transmit data
5 Signal ground
7 Data set ready
1, 4, 6 and 8 N.C.

16.2 Data output

Parameters are set in function F-06-X (see chpt. 14).

Data output mode F- 06-01:

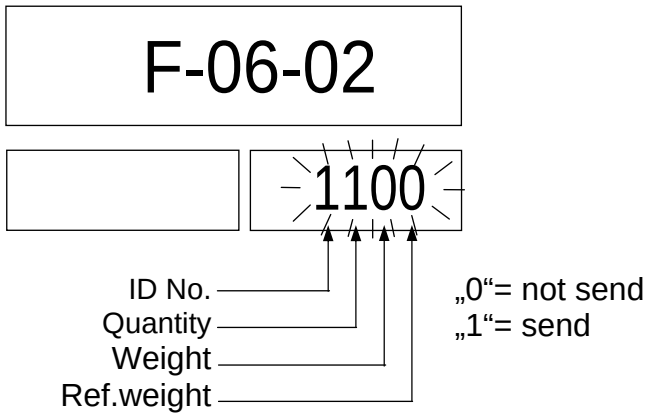
- **F- 06-01=“0“ .**
  Data are transmitted by pressing the PRINT key. Data transmission is indicated by a flashing piece number display.

- **F- 06-01=“1“** .
  Continuous data transmission The interval between continuous data is c. 2 sec.

- **F- 06-01=“2“** .
  Data will be transmitted when the weight display is stable at +5d or above.

- **F- 06-01=“3“** .
  Data is transmitted whilst the weight display is stable at ±5d or above/lower.

Selecting output values F- 06-02:
To select which data to transmit, enter either "0" or "1" for the data: ID no., piece number, weight or reference weight
Example: When "1100" is entered only the ID no. and the piece number will be sent.



Data format F- 06-03:

Apply setting **F- 06-03="2"** to act as data format for general peripherals.

Baud rate F- 06-04:

- **F- 06-04=“0“ :**2400 bps
- **F- 06-04=“1“** :4800 bps
- **F- 06-04=“2“** :9600 bps

Remote control instructions

Command	Significance	Note:
@	Start / stop continuous data output	
A	CE Key:	
D	PRE-TARE	“D,1.23$C_R$$L_F$” = "1.23kg" Tara
J	TOTAL-key	
K	M+ -key	
Q	Instant data output	Data dependent on F-06-02
S	Output of stable weighing values	
T	TARE-key	
Z	→0← -key	

Error Codes

En	Significance
EO	Error data transmission
E1	Command error
E2	"Scale not ready" error.
E4	Excessive number of characters
E6	Format error
E7	Outside range