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Operating instruction
Precision and analytical balances

KERN PRS/PRJ/ARS/ARJ

Version 2.2
11/2006
GB

PRS/PRJ/ARS/ARJ-BA-e-0622

GB

KERN PRS/PRJ/ARS/ARJ

Version 2.2 11/2006

Operating Instructions

Precision and analytical balance

Table of Contents

1 Technical data

KERN	*PRS 320-3N*	*PRS 620-3N*	*PRS 4200-2N*	*PRS 4200-2IP65N*
Readout (d)	*0.001 g*	*0.001 g*	*0.01 g*	*0.01 g*
Weighing range (Max)	*320 g*	*620 g*	*4,200 g*	*4,200 g*
Repeatability	*1 mg*	*1 mg*	*10 mg*	*10 mg*
Linearity	*± 1.5 mg*	*± 1.5 mg*	*± 15 mg*	*± 15 mg*
Recommended adjusting weight, not included (class)	*200 g (E2)*	*500 g (E2)*	*4000 g (E2)*	*4000 g (E2)*
Minimum piece weight in count mode	*0.001 g*	*0.001 g*	*0.01 g*	*0.01 g*
Reference quantity when counting parts	*1-999*	*1-999*	*1-999*	*1-999*
Weighing plate, stainless steel [mm]	*135 x 135*	*135 x 135*	*170 x 170*	*170 x 170*
Dimensions of housing (W x D x H) [mm]	*210 x 340 x 150*	*210 x 340 x 150*	*210 x 340 x 150*	*210 x 340 x 150*
Dimensions of weighing space glass windshield [mm]	*155 x 155 x 55*	*155 x 155 x 55*	*-*	*-*
Net weight (kg)	*5.1*	*5.1*	*4.5*	*4.5*
Stabilisation time	*2 seconds*			
Weight units (verified equipment)	*mg, g*			
Weight units (non-verified equipment)	*mg, g, GN, dwt, ozt, oz, lb, ct, C.M. tLH, tLM, tLT, mo, Tola*			
Permissible ambient conditions	*10° C to 30° C*			
Air humidity	*max. 80 % relative (non condensing)*			

KERN	PRS 6200-2N	PRS 8200-1N	PRS 8200-1IP65N	PRS 12200-1N
Readout (d)	0.01 g	0.1 g	0.1 g	0.1 g
Weighing range (Max)	6,200 g	8,200 g	8,200 g	12,200 g
Repeatability	10 mg	0.1 g	0.1 g	0.1 g
Linearity	± 15 mg	± 0.1 g	± 0.1 g	± 0.1 g
Recommended adjusting weight, not included (class)	5000 g (E2)	5000 g (F2)	5000 g (F2)	10 000 g (F1)
Minimum piece weight in count mode	0.01 g	0.1 g	0.1 g	0.1 g
Reference quantity when counting parts	1-999	1-999	1-999	1-999
Weighing plate, stainless steel [mm]	170 x 170	200 x 200	200 x 200	200 x 200
Dimensions of housing (W x D x H) [mm]	210 x 340 x 150	210 x 340 x 150	210 x 340 x 150	210 x 340 x 150
Net weight (kg)	4.5	4.7	4.7	4.7
Stabilisation time	2 seconds			
Weight units (verified equipment)	mg, g			
Weight units (non-verified equipment)	mg, g, GN, dwt, ozt, oz, lb, ct, C.M. tLH, tLM, tLT, mo, Tola			
Permissible ambient conditions	10° C to 30° C			
Air humidity	max. 80 % relative (non condensing)			

KERN	PRS 12200-1IP65N	PRJ 320-3NM	PRJ 620-3NM	PRJ 1200-3N
Readout (d)	0.1 g	0.001 g	0.001 g	0.001 g
Weighing range (Max)	12,200 g	320 g	620 g	1,220 g
Minimum load	-	0.02 g	0.02 g	-
Verification value	-	0.01 g	0.01 g	-
Verification categories	-	II	II	-
Repeatability	0.1 g	1 mg	1 mg	1 mg
Linearity	± 0.1 g	± 1.5 mg	± 1.5 mg	± 2 mg
Recommended adjustment weight	10 000 g (F1)	-	-	-
Adjustment weight	-	internal	internal	internal
Minimum piece weight in count mode	0.1 g	0.001 g	0.001 g	0.001 g
Reference quantity when counting parts	1-999	1-999	1-999	1-999
Weighing plate, stainless steel [mm]	200 x 200	135 x 135	135 x 135	135 x 135
Dimensions of housing (W x D x H) [mm]	210 x 340 x 150	210 x 340 x 150	210 x 340 x 150	210 x 340 x 150
Dimensions of glass windshield [mm]	-	Weighing space 155 x 155 x 55	Weighing space 155 x 155 x 55	150 x 150 x 60
Net weight (kg)	4.7	5.5	5.5	5.5
Weight units	mg, g, GN, dwt, ozt, oz, lb, ct, C.M. tLH, tLM, tLT, mo, Tola	mg, g	mg, g	mg, g, GN, dwt, ozt, oz, lb, ct, C.M. tLH, tLM, tLT, mo, Tola
Permissible ambient conditions	10° C to 30° C			
Stabilisation time	2 seconds			
Air humidity	max. 80 % relative (non condensing)			

KERN	PRJ 4200-2NM	PRJ 6200-2NM	PRJ 6200-1IP65NM	PRJ 8200-1NM
Readout (d)	0.01 g	0.01 g	0.1 g	0.1 g
Weighing range (Max)	4,200 g	6,200 g	6,200 g	8,200 g
Minimum load	0.5 g	0.5 g	5 g	5 g
Verification value	0.1 g	0.1 g	1 g	1 g
Verification categories	II	II	II	II
Repeatability	10 mg	10 mg	0.1 g	0.1 g
Linearity	± 15 mg	± 15 mg	± 0.1 g	± 0.1 g
Adjustment weight	internal	internal	internal	internal
Minimum piece weight in count mode	0.01 g	0.01 g	0.1 g	0.1 g
Reference quantity when counting parts	1-999	1-999	1-999	1-999
Weighing plate, stainless steel [mm]	170 x 170	170 x 170	200 x 200	200 x 200
Dimensions of housing (W x D x H) [mm]	210 x 340 x 150	210 x 340 x 150	210 x 340 x 150	210 x 340 x 150
Net weight (kg)	5.5	5.5	5.6	5.6
Weight units	mg, g, kg			
Permissible ambient conditions	10° C to 30° C			
Stabilisation time	2 seconds			
Air humidity	max. 80 % relative (non condensing)			

KERN	PRJ 8200-1IP65NM	PRJ 10200-1IP65NM	ARS 120-4N	ARS 220-4N
Readout (d)	0.1 g	0.1 g	0.1 mg	0.1 mg
Weighing range (Max)	8,200 g	10,200 g	120 g	220 g
Minimum load	5 g	5 g	-	-
Verification value	1 g	1 g	-	-
Verification categories	II	II	-	-
Repeatability	0.1 g	0.1 g	0.1 mg	0.1 mg
Linearity	± 0.1 g	± 0.1 g	± 0.2 mg	± 0.2 mg
Recommended adjusting weight, not included (class)	-	-	100 g (E2)	200 g (E2)
Adjustment weight	internal	internal		
Minimum piece weight in count mode	0.1 g	0.1 g	0.1 mg	0.1 mg
Reference quantity when counting parts	1-999	1-999	1-999	1-999
Weighing plate, stainless steel [mm]	200 x 200	200 x 200	Ø 80	Ø 80
Dimensions of housing (W x D x H) [mm]	210 x 340 x 150	210 x 340 x 150	210 x 340 x 345	210 x 340 x 345
Dimensions of glass windshield [mm]	-	-	205 x 205 x 260 weighing space: 180 x 200 x 240	205 x 205 x 260 weighing space: 180 x 200 x 240
Net weight (kg)	5.6	5.6	5.9	5.9
Weight units	mg, g, kg	mg, g, kg	mg, g, GN, dwt, ozt, oz, lb, ct, C.M. tLH, tLM, tLT, mo, Tola	
Permissible ambient conditions	10° C to 30° C		15° C to 25° C	
Stabilisation time	2 seconds		3 seconds	
Air humidity	max. 80 % relative (non condensing)			

KERN	ARJ 120-4NM	ARJ 205-5DM	ARJ 220-4NM
Readout (d)	0.1 mg	0.01/0.1 m g	0.1 mg
Weighing range (Max)	120 g	90/205 g	220 g
Minimum load	0.01 g	0.01 g	0.01 g
Verification value	1 mg	1 mg	1 mg
Verification categories	I	I	I
Repeatability	0.1 mg	0.03/0.1 mg	0.1 mg
Linearity	± 0.2 mg	± 0.06/0.2 mg	± 0.2 mg
Stabilisation time	3 seconds	10/3 seconds	3 seconds
Adjustment weight	internal	internal	internal
Minimum piece weight in count mode	0.1 mg	0.01 mg	0.1 mg
Reference quantity when counting parts	1-999	1-999	1-999
Weighing plate, stainless steel [mm]	Ø 80	Ø 80	Ø 80
Dimensions of housing (W x D x H) [mm]	210 x 340 x 345	210 x 340 x 345	210 x 340 x 345
Dimensions of glass windshield [mm]	205 x 205 x 260 weighing space: 180 x 200 x 240	205 x 205 x 260	205 x 205 x 260 weighing space: 180 x 200 x 240
Net weight (kg)	6.9	6.9	6.9
Weight units	mg, g		
Permissible ambient conditions	15° C to 25° C		
Air humidity	max. 80 % relative (non condensing)		

2 Declaration of conformity

KERN & Sohn GmbH
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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 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 Balance: KERN ARS, ARJ
KERN PRS, PRJ

Mark applied	EU Directive	Standards
CE	89/336EEC EMC	EN 50081-1 EN 50082-1 EN 55022

Date: 15.01.2006 **Signature:**

Gottl. KERN & Sohn GmbH
Management

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Declaration of conformity

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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. **This declaration is only valid with the certificate of conformity by a notified body.**

Deutsch Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt. **Diese Erklärung gilt nur in Verbindung mit der Konformitätsbescheinigung einer benannten Stelle.**

Français Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après. **Cette déclaration est valide seulement avec un certificat de conformité d'un organisme notifié.**

Español Manifestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las normas siguientes. **Esta declaratión solo será válida acompañada del certificado de conformidad de conformidad de la parte nominal.**

Italiano Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate. **Questa dichiarazione sarà valida solo se accompagnata dal certificato di conformità della parte nominale.**

Model:	**KERN ARJ**	**PRJ 320-3NM** **PRJ 620-3NM** **PRJ 1200-3N** **PRJ 4200-2NM** **PRJ 6200-2NM**	**PRJ 6200-1IP65NM** **PRJ 8200-1NM** **PRJ 8200-1IP65NM** **PRJ 10200-1IP65NM**

EU Directive	**Standards**	**EC-type-approval certificate no.**	**Issued by**
90/384/EEC	EN 45501	D00-09-029	PTB

Date: 15.01.2006

Signature:

Gottl. KERN & Sohn GmbH
Management

3 Fundamental information (general)

3.1 Intended use

The balance you have purchased is to be used to determine the weight of the 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. The weighing value can be read off after a stable weighing value has been obtained.

3.2 Inappropriate use

Do not use the balance for dynamic weighing, if small quantities of the material to be weighed are removed or added. The “stability compensation” function in the balance itself can result in incorrect weighing results being displayed! (Example: Slowly draining fluids from a container on the balance.)
Do not leave a permanent load on the weighing plate. This can damage the measuring equipment.
Be sure to avoid impact shock and overloading the balance in excess of the prescribed maximum load rating (max.), minus any possible tare weight that is already present. This could cause damage to the balance.
Never operate the balance in hazardous areas. The standard model is not explosion-proof.
Structural alterations may not be made to the balance. This can lead to incorrect weighing results, faults concerning safety regulations and also to serious damage to the balance.
The balance may only be used in compliance with the described guidelines. Varying areas of application/planned use must be approved by KERN in writing.

3.3 Guarantee

The guarantee is not valid following

- non-observation of our guidelines in the operating instructions
- use other than for the applications described
- alteration to or opening of the device
- mechanical damage and damage caused by media, liquids, or natural wear and tear
- inappropriate installation or electric installation
- overloading of the measuring equipment

3.4 Monitoring the test equipment

The metrology features of the balance and any possible available test weight must be checked at regular intervals within the scope of quality assurance. For this purpose, the user responsible must define a suitable interval as well as the nature and scope of this check. Please see KERN's home page (www.kern-sohn.com) for information regarding the monitoring of balance test equipment and the test weights required for this. Test weights and balances can be calibrated quickly and at a reasonable price in KERN's accredited DKD calibration laboratory (return to national standard).

4 Fundamental safety information

4.1 Observe the information in the operating instructions

Please read the operating instructions carefully before installing and commissioning, even if you already have experience with KERN balances.

4.2 Staff training

The device may only be operated and maintained by trained members of staff.

5 Transport and storage

5.1 Acceptance check

Please check the packaging immediately upon delivery and check the device during unpacking for any visible signs of external damage.

5.2 Packaging

Please retain all parts of the original packaging in case it should be necessary to return items at any time.
Only the original packaging should be used for return consignments.
Before despatch, disconnect all attached cables and loose/movable parts.
Affix any intended transport security devices. Secure all parts, e.g. weighing plate, power supply unit etc. to prevent slipping and damage.

6 Unpacking, installation and commissioning

6.1 Place of installation, place of use

The balance is constructed in such a way that reliable weighing results can be achieved under normal application conditions.
By selecting the correct location for your balance, you will be able to work quickly and precisely.

Therefore please observe the following at the place of installation:

- 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 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 long periods of time. Inadmissible bedewing (condensation of air moisture on the device) can occur if a cold device is taken into a significantly warmer environment. In this case, please acclimatise the device for approx. 2 hours at room temperature after it has been disconnected from the mains.
- Avoid static charging of the material to be weighed and weighing container.

Major display deviations (incorrect weighing results) are possible if electromagnetic fields occur, as well as due to static charging, currents and unstable power supply. It is then necessary to change the location.

6.2 Unpacking

Carefully remove the balance from the packaging, remove the plastic cover and install the balance in the intended workplace.

6.3 Installation

The balance consists of the balance body (1), the scale pan holder (4) and the pan (5), which, depending on the model, may be square (fig. 1, right) or round (fig. 1, left). Depending on the model (see Chapter 1 “Technical Data”) the balance additionally has a simple windshield (fig. 1, right) or a windshield with sliding doors (fig. 1, left) (2) and/or a protective ring (3).

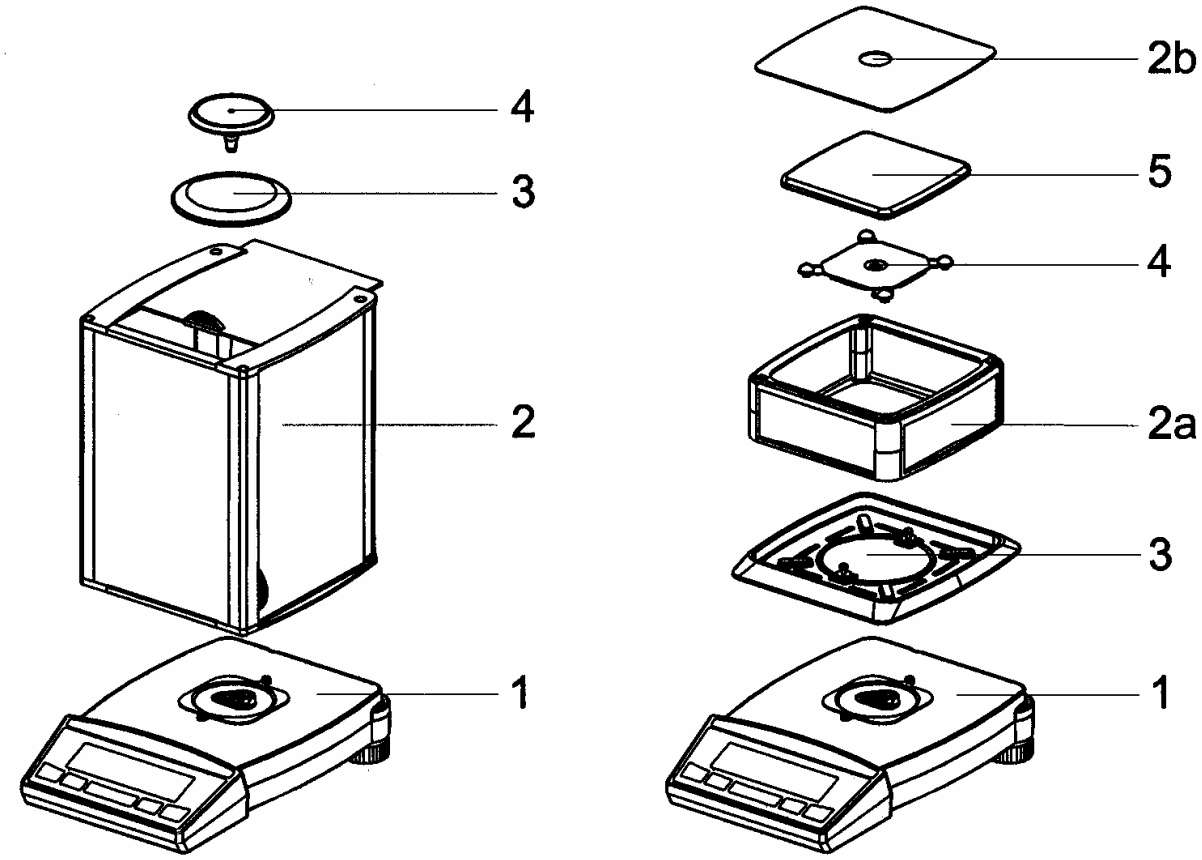
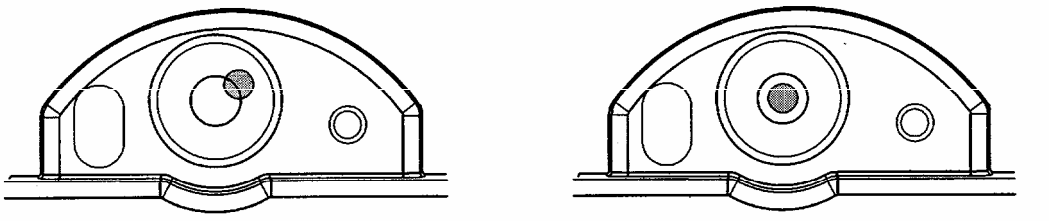


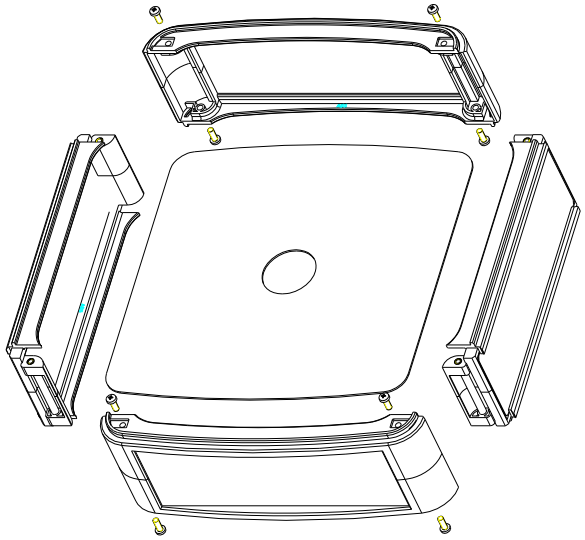
Fig. 1 Your balance

Use the foot screws to level the balance until the air bubble is in the prescribed circle in the spirit level.



6.3.1 Windshield for PRS and PRJ balances (d=0.1 mg)

The position of the windshield on the balance can be seen in figure 1 (see 2a).

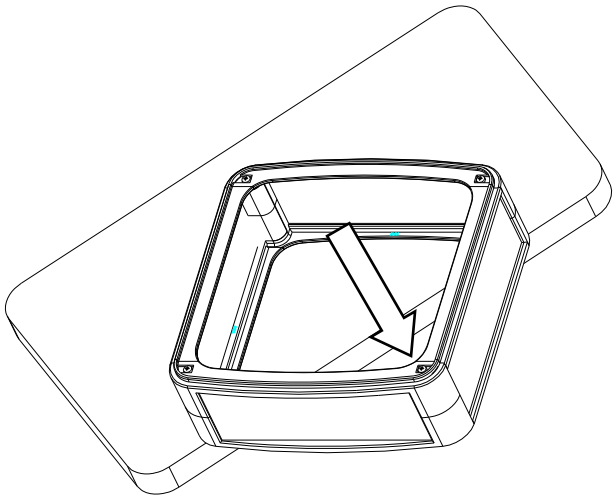


Note:

If the windshield is not even after assembly, it can be adjusted according to drawing below.

Press down the higher corner (arrow) with moderate force.

If necessary, turn windshield by 90° and carry out the same operation again until the windshield sits evenly.



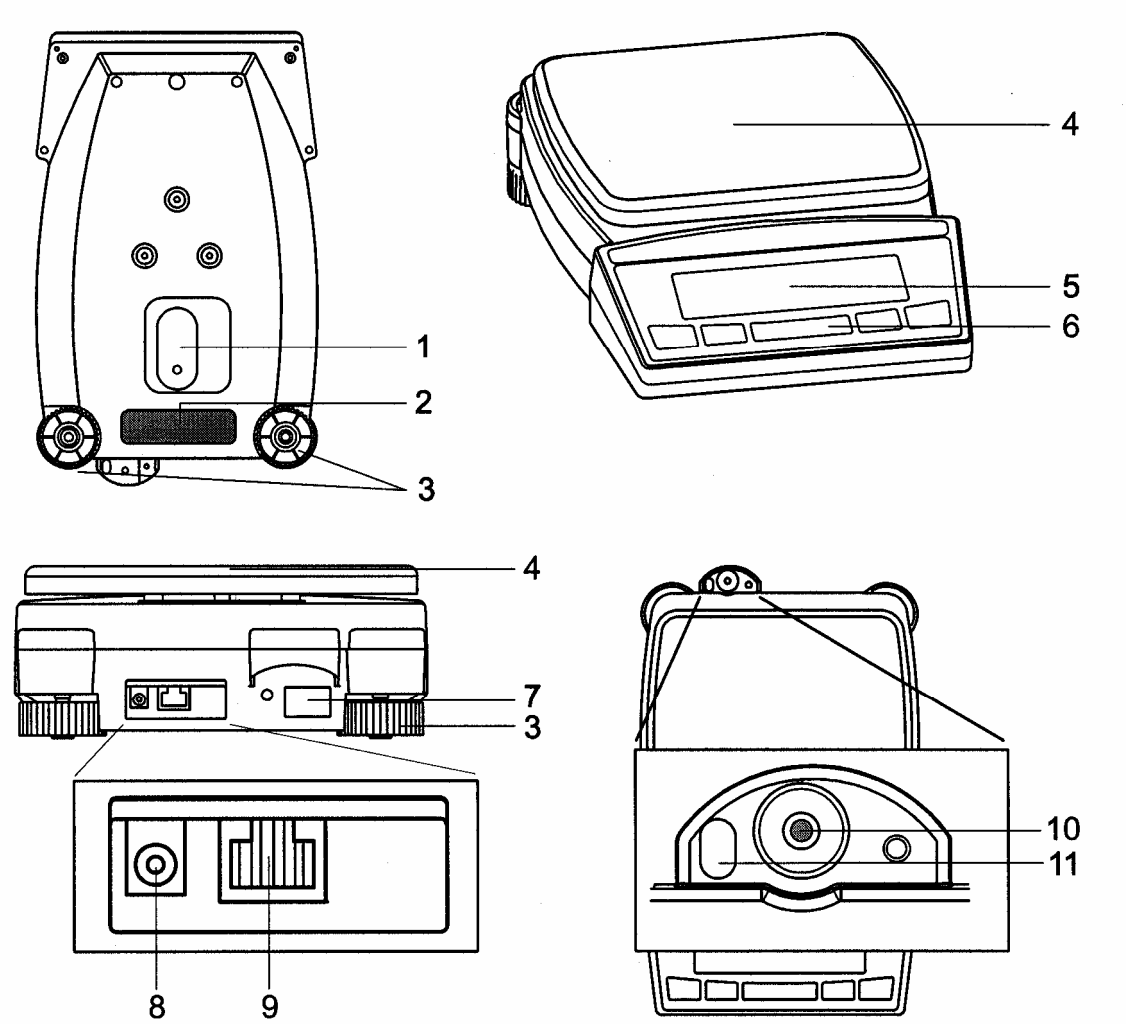
6.4 Functions of the balance

The versatile weighing program allows you to use the KERN balances of the PRS, PRJ, ARS, ARJ series not only for simple weighings but also using a simple method to carry out various weighing applications such as, for example, percentage or component counting applications and documenting the measurements obtained accurately and unequivocally.

The most important basic production features of the KERN PRS, PRJ, ARS, ARJ series include:

- Anti-theft encoding with four-digit numerical code
- Multi-stage password protection for the program menus
- ICM-Autocalibration (Intelligent Calibration Mode)
- 5-key multifunction control panel
- LCD display with multi-line display
- ISO and GLP compliant reporting of measurement results
- RS232/V24 serial interface for data transfer
- Storable user-configuration (UMM User Menu Memorized)
- Functions programmed in the factory for:
  - Parts counting
  - Percentage weighing
  - Weighing in different, internationally-valid units
  - Density determination
  - Net-total weighing function
- Device for suspended weighing

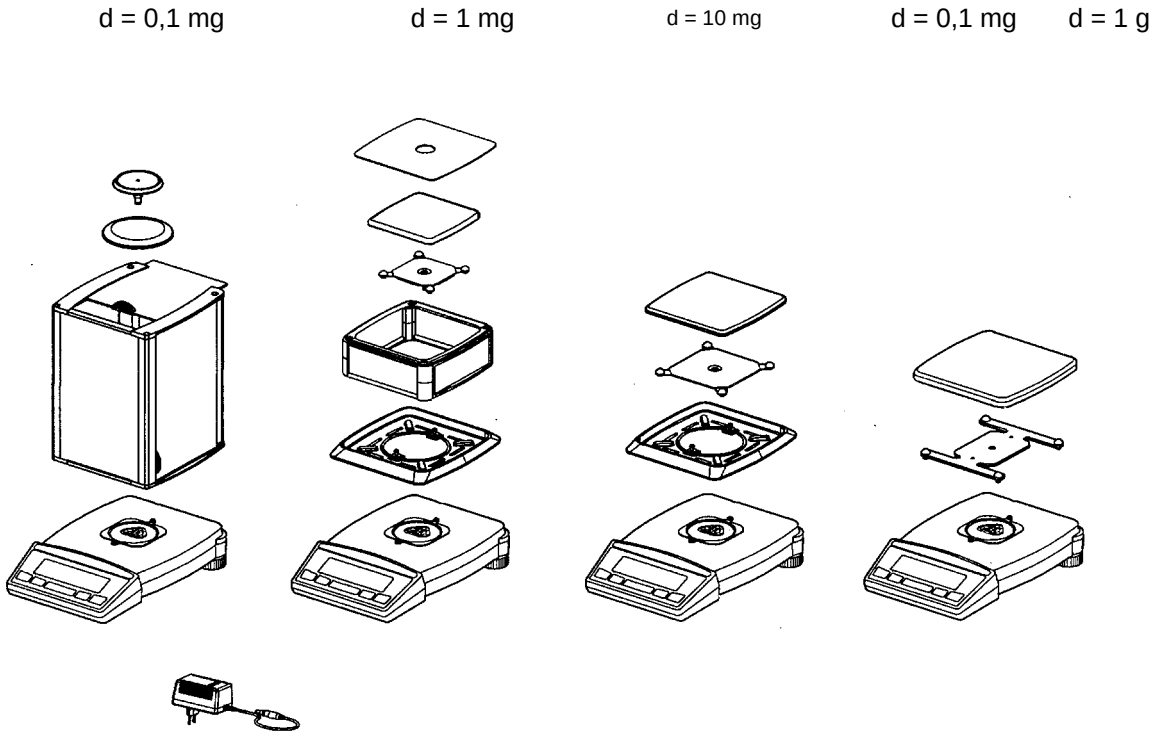
6.5 Equipment overview:



1 Cover of the device for suspended weighings
2 Name plate
3 Adjustable feet (for levelling)
4 Weighing plate
5 Multifunction display
6 10-key control panel
7 Serial No. plate
8 Connecting socket for power adaptor
9 RS232 Interface
10 Spirit level
11 Eyelet for attaching a safety chain

6.6 Scope of delivery

Inspect delivery for completeness immediately on unpacking all components.



Standard accessories
Balance
Scale pan support with weighing plate
Power adaptor
Protective cover for the display
Windshield BASIC (only balances d = 0.1 mg)
Simple windshield (only balances d = 1 mg)
Protective ring (only balances d = 1 mg, d = 10 mg)
Operating instructions

6.7 Mains supply

Electric power supply is by means of the external power adaptor. The printed voltage level must comply with the local voltage.
Only use original KERN power adaptors. The use of other makes is subject to approval by KERN.

6.8 Connecting peripheral devices

The balance must be disconnected from the mains before connecting or disconnecting additional equipment (printer, PC) to or from the data interface.
Only use KERN accessories and peripheral devices with your balance as these have been specially adapted to function best with your balance.

6.9 Commissioning

A warm up time of 1 hour after switching the balance on will stabilise the measuring values.
The accuracy of the balance depends on the local gravity.
Please be sure to observe the information in the chapter on Calibration.

6.10 Calibration

Since the Earth's gravity is not the same everywhere, each balance must – in accordance with the underlying physical weighing principle – be adjusted to compensate for the gravity at each location. This adjustment process, known as “calibration”, must be carried out on commissioning and after each subsequent relocation. It is also advisable that you adjust the balance periodically during weighing operation in order to obtain exact measured values.

NOTE
The balance must be calibrated on commissioning and after every relocation. If you work in accordance with “Good Laboratory Practice GLP”, observe the prescribed intervals between calibrations (adjustments).

Adjusting the calibration is carried out in the configuration menu. Depending on the model of balance, this may be done externally, internally or automatically (see Chapter 8.6 “Calibration functions”).
Adjustment should be carried out with the recommended adjusting weight (KERN ARS/PRS, see Chapter 1 „Technical Data“). The adjustment can also be carried out with different adjusting weights, but not ideal from a metrological point of view.
Using the “Intelligent Calibration Mode” (ICM) the balance can itself determine the size of the calibration weight, which enables an exact calibration with different weights (in 10 g, 50 g, 100 g and 500 g steps, depending on model).

You can find information about test weights on the Internet: http://www.kern-sohn.com

The calibration of the balance is set in the configuration menu (see Chapter 8.6 “Calibration of the balance”).

Possible types of calibration, depending on the balance model:

- External calibration by means of ICM (Intelligent Calibration Mode)
- External calibration with freely selectable weight
- Internal calibration
- Automatic calibration

NOTE
The calibration can be interrupted at any time by pressing the “**ON/OFF**” key.

6.10.1 External calibration by means of ICM (only ARS/PRS models)

Depending on the type of balance, calibration weights in steps of 10 g, 50 g, 100 g and 500 g can be used, where the calibration weight must relate to the accuracy of the balance.
For an external calibration by means of ICM, “SET CALIBRATION MODE EXTERNAL” must be selected in the configuration menu (see Chapter 8.6 “Calibration functions”).

- Switch to “WEIGHING” using the “↻” key

CALIBRATION

- Press “**CAL**” until “CALIBRATION” appears.

- - 0000 g

- The balance carries out a zero measurement (0000 g is shown flashing)

- - 2000 g

- After the zero measurement has been taken, the display flashes with the recommended calibration weight
- Place the calibration weight on the pan

- - 2000 g

- The display continues to flash
- Calibration is complete when the display stops flashing

+ 2000 g

6.10.2 External calibration with freely selectable weight (only ARS/PRS models)

For an external calibration with user-definable weight, “SET CALIBRATION MODE EXT.-DEF.” must be selected in the configuration menu (see Chapter 8.6 “Calibration functions”).
Then, the effective value of the calibration weight (DEF. n.nnn g) must be entered with up to ten times precision when compared with the balance.

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

Then proceed as follows:

- Switch to “WEIGHING” using the “⟳” key

CALIBRATION

- Press “**CAL**” until “CALIBRATION” appears.

- - 0000 g

- The balance carries out a zero measurement (0000 g is shown flashing)

- - 372 g

- After the zero measurement has been taken, the display flashes with the previously entered calibration weight
- Place the calibration weight on the pan

- - 372 g

- The display flashes rapidly
- Calibration is complete when the display stops flashing (the exact weight is shown)

+372.15 g

6.10.3 Internal calibration (only ARJ/PRJ models)

For an internal calibration with the built-in calibration weight, “SET CALIBRATION MODE INTERNAL” must be selected in the configuration menu (see Chapter 8.6 “Calibration functions”).

Then proceed as follows:

- Switch to “WEIGHING” using the “” key
- Press “**CAL**” until “CALIBRATION” appears.
- The calibration is finished after a certain period of time.

6.10.4 Automatic calibration (only ARJ/PRJ models)

For automatic calibration with the built-in calibration weight, “SET CALIBRATION MODE AUTO” must be selected in the configuration menu (see Chapter 8.6 “Calibration functions”).

The balance now calibrates itself automatically every 24 hours and/or after each temperature change of 3 degrees Celsius, depending on how “SET CALIBRATION AUTOCAL” has been defined in the configuration menu.

The timing of the automatic calibration is as determined in the configuration menu under “SET CALIBRATION AUTOCAL.-TIME n h”. (e.g. 6 h for 06.00 o'clock in the morning).

NOTE

For automatic calibration by time and by time/temp., the date and time of the balance must first be set correctly (see Chapter 8.9 “Date and time”).

The calibration can also be initiated manually at any time, even when auto-calibration is activated.

The automatic calibration then takes place only if no weight is placed on the pan for at least five minutes.

It is recommended that the time for the auto-calibration be set at a time outside the normal business hours (for example, in the early morning).

6.10.5 Balances appropriate for verification (only ARJ/PRJ models)

Balances appropriate for verification are provided with EU/OIML approval or meet the EU regulations for verified balances.
The balance program and certain functions of the weighing output differ from the standard program in the case of balances which are appropriate for verification – in accordance with EU regulations.

General:
According to EU guideline 90/384/EEC, balances must be verified officially if they are to be used as follows (in a legally regulated area):

a) For commercial transactions if the price of goods is determined by weighing.
b) For the production of medicines in pharmacies as well as for analyses in the medical and pharmaceutical laboratory.
c) For official purposes.
d) For the production of packed goods.

In case of doubt, please contact your local weights and measures office.
Verification information
For those balances marked as appropriate for verification in the technical data, an EC type approval is available. In the event that the balance is used in an area subject to verification as described above, it must be officially verified and re-verified at regular intervals.
Re-verification of a balance is carried out in compliance with the respective legal provisions of that particular country. The period of verification validity for balances in Germany, for example, is normally 2 years.
The legal provisions of the country of use are to be observed.
After the verification process, the scale is sealed at the marked points.

Without the "seal", the verification of the scale is not valid.

Balances appropriate for verification are provided with EU approval or meet the EU regulations for verified balances.
The balance program and certain functions of the weighing output differ from the standard program in the case of balances which are appropriate for verification – in accordance with EU regulations.

NOTE

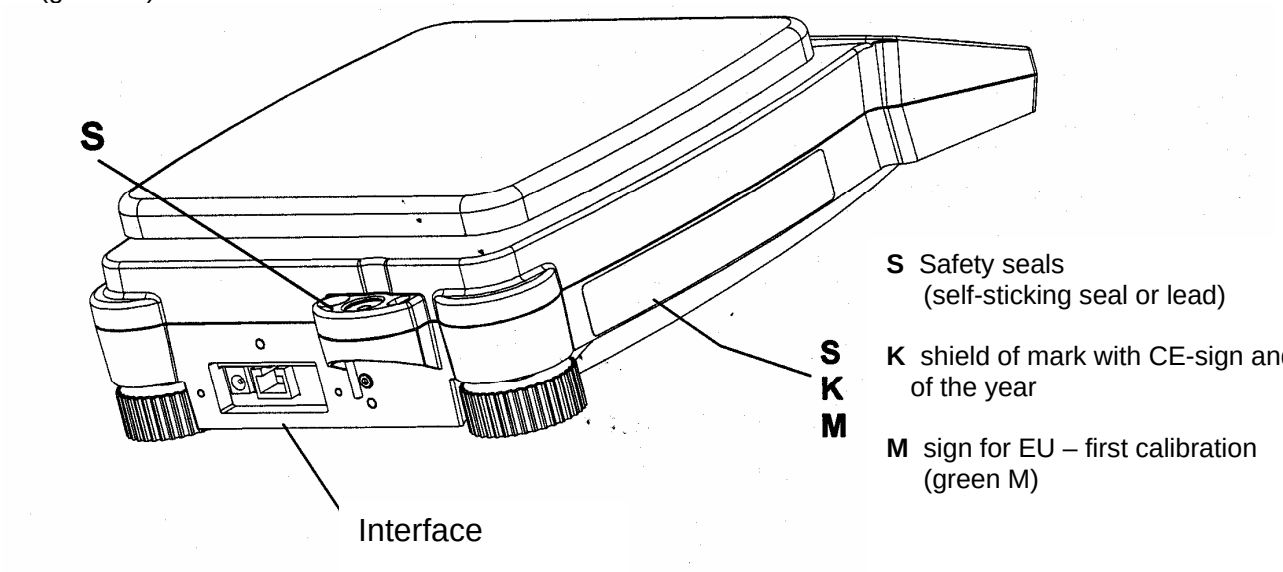
If a circle appears in the main display of a verified balance, then the displayed value is not verified.

In balances of class (I) the circle also denotes the warm-up phase.

Your KERN trader will be happy to assist you at any time if you have any questions on the verification of the balance or on working with verified balances.

6.10.6 Position of verification safety seal (only on ARJ/PRJ models appropriate for verification)

M sign for EU – first calibration
(green M)



S Safety seals
(self-sticking seal or lead)

K shield of mark with CE-sign and date of the year

M sign for EU – first calibration
(green M)

Balances which are subject to verification must be taken out of operation if:

- The **weighing result** from the balance is outside the **operational error limit**. Therefore at regular intervals, load the balance with known test weights (approx. 1/3 of the maximum load) and compare with the display value.
- The **re-verification date** has been exceeded.

6.11 Suspended weighing

Objects which, because of their size or shape, cannot be put on the scale, can be weighed by means of suspended weighing.
Proceed as follows:.
Turn the balance off.

- Remove the scale-pan and the scale pan support and turn the balance over.
- Push the metal-cover (1) on the underside of the balance to one side.
- Hang a small hook (available as an accessory) into the aperture (3) of the now visible metal casting (2).
- Place the balance over an opening.
- Replace the scale pan support and the scale pan.
- Level the balance.
- Switch on the balance.
- Hang the object to be weighed on the hook and carry out the weighing.

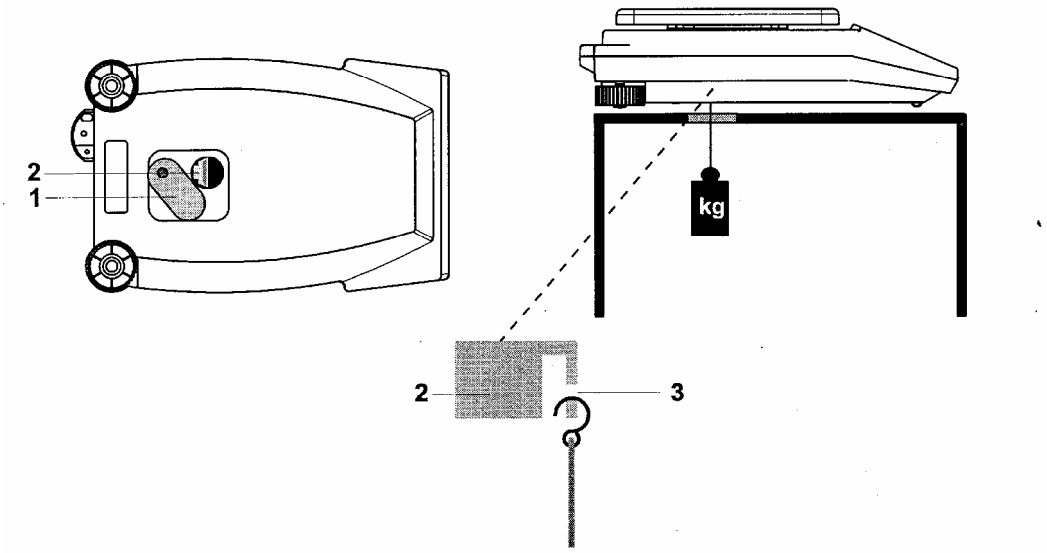


Fig.: Setting up the balance for suspended weighings

CAUTION
Take care that the hooks used for the suspended weighing are stable enough to safely hold the goods which you wish to weigh.

NOTE
Take care that no dirt or moisture can get into the balance while the scale pan support is removed. After completing the suspended weighing, the opening on the underside of the balance must be closed again (dust protection).

7 Modes of operation and use

7.1 Switching on the balance

- Press “**ON/OFF**“ to switch the scale on.

The balance carries out a self-diagnosis in order to test the most important functions.
After completion of the start-up process (approximately ten seconds) “Zero” appears in the display.
The balance is ready for operation and is in weighing mode.

7.2 Auto-Standby-Mode

The balance is equipped with an Auto-Standby mode, which can be activated or deactivated in the configuration menu.

If Auto-Standby mode is activated, the balance automatically switches to Standby mode shortly after the last weighing or key operation (current-saving function).

The delay before switching to Standby is defined in the configuration menu (see Chapter 8.7 “Weighing mode”).

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

7.3 Significance of the two main menus

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

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

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

In addition, you can also define the parameters for the statistics program and the checkweighing program in the application menu.

7.4 Activating the two main menus

7.4.1 Activating the configuration menu

- Press “**ON/OFF**“ to switch the scale on.
- During the start-up sequence (about 10 seconds), keep the “**MENU**” key depressed until “SET CONFIGURATION” appears in the display.
- You can then alter the configuration menu

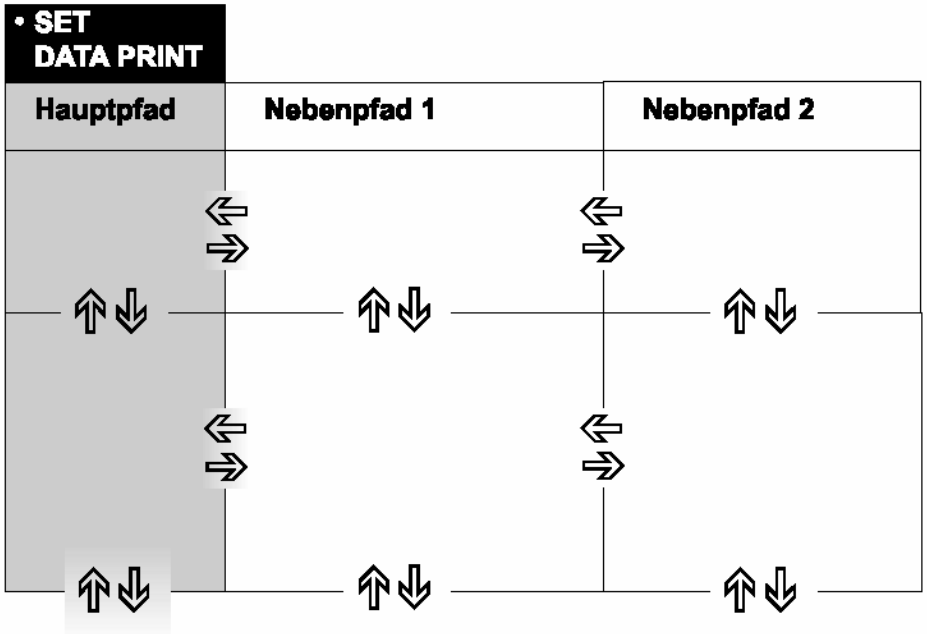
7.4.2 Activating the application menu

- To get into the application menu, press “MENU” after the start-up sequence is complete.

7.5 How the menu control operates

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

The cursor keys “⇦“, “⇨“, “⇧” and “⇩“ allow you to move within the paths.



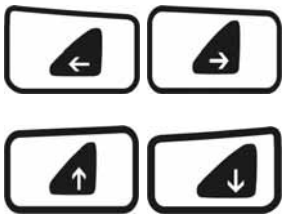
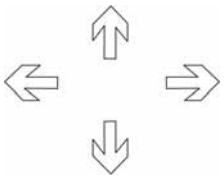
NOTE
The menu tree diagrams shown have the same layout as the paths of the two main menus.

7.5.1 Control panel

Eight of the ten keys on the Multifunctional Control Panel serve multiple functions (functions for weighing mode and programming mode respectively).

7.5.2 Operation in weighing mode

In **weighing mode**, the **grey shaded key symbols** in the control panel apply.

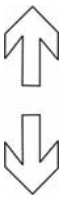
Key(s)	Name	Function in weighing mode
	**"ON/OFF"**	• Switches the balance on and off
	**"MENU"**	• Calls up the configuration menu and the application menu
	**"CAL"**	• Initiates calibration functions
	**"T"**	• Initiates tare functions
		• Switches between the basic program and the selected application
	**"PRINT"**	• Initiates print functions
		• Function keys. Initiate the functions in the info-line (see Chapter 7.5.5 "Info-line and function keys").

NOTE

For the use of the "**T**", "**CAL**", "↻" and "**PRINT**" keys, see Chapter 10 "Special operating keys".

7.5.3 Operation in programming mode

In **programming mode**, the **blue shaded key symbols** in the control panel apply.

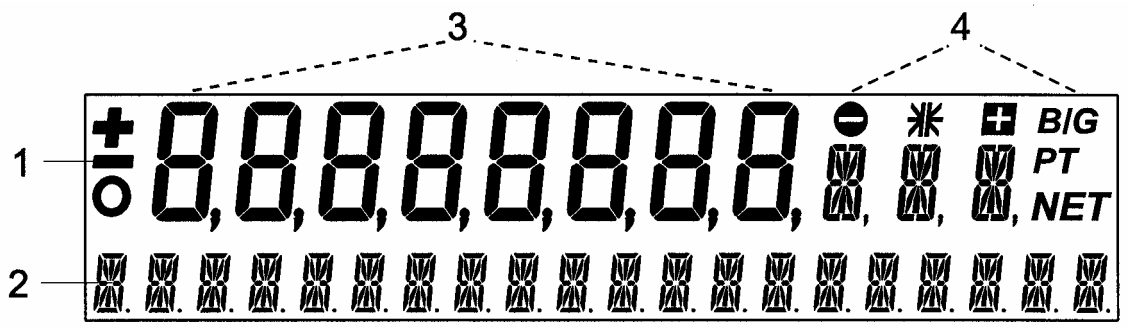
Key(s)	Name	Function during weighing mode
		• Toggles between menu main path and sub-path
		• Moves up and down within the main or sub-path. • Alters the selected parameters
		• Selects parameters • Stores the altered parameters
	**esc**	• Aborts an entry • Exits the menu
	**ins**	• Places cursor (when entering text)
	**clr**	• Deletes entry (when entering text)
	**PRINT**	• Enters a full-stop (when entering text)

The balance can also be operated by remote control. For the relevant remote control commands, see Chapter 11 “Data transfer to peripheral devices”.

For an illustration of the method of operation see Chapter 12 “Practical examples”.

7.5.4 Display

The balance display has two lines (1 and 2).

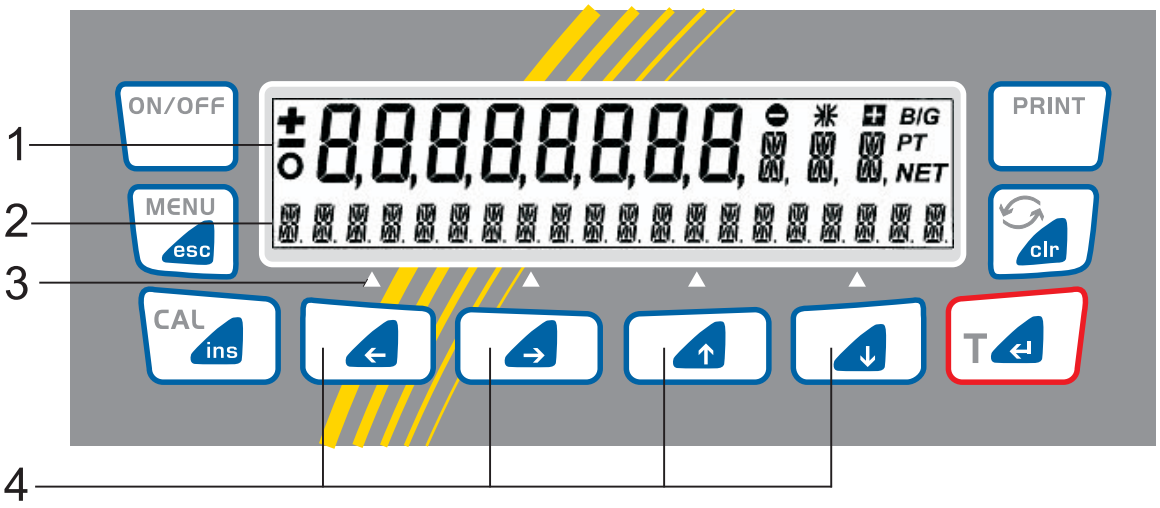


The upper display-line (1) includes the 8-digit measurement display (3) as well as various symbols (4).
The lower line (2) serves as a 20-character info-line and is used in conjunction with the cursor keys to control the working programs.

7.5.5 Info-line and function keys

If an application (working program) is used, then as well as the measurement display (1), the four column info-line also appears at the bottom edge of the display.

Any function displayed in the info-line corresponds to the function key which is directly below it (marked by G (3)).

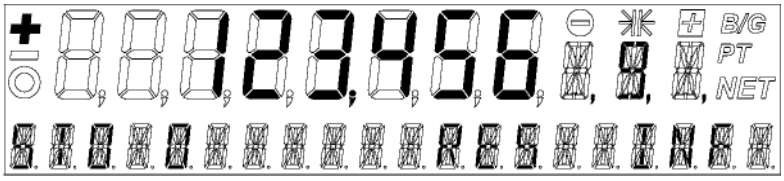


The cursor keys (4) “⇦”, “⇨”, “⇧” and “⇩” serve as function keys in the applications.

These initiate the functions displayed in the info-line (2).

7.5.6 Example of display: Statistics program

- **Display on the balance in the statistics program**



- **Relevant displays in the operating instructions**

+		**123,456**	**9**	normal weight display
STO 0		**RES**	**INF**	Info-line
△	△	△	△	
"⇦"	"⇨"	"⇧"	"⇩"	Function keys

- **Function key legends as shown in the example:**
  - **STO** initiates the manual store function "STO"
  - **RES** activates the "RES" (Reset) function
  - **INF** activates the "INF" function (display sequence of the statistic parameters: average value, standard deviation, relative standard deviation, maximum, minimum …)

NOTE

If the statistics program is activated in parallel with a working program, then "⇩" is reserved for storing ("STO function") or recalling statistical parameters ("INF function").

If the statistics program is not active, then "⇩" can be used for the working program.

7.6 Password protection of the menus

The two main menus of the balance can be protected against unintentional changes by a freely selectable, four-digit password.

- With password protection deactivated, any operator can change the balance configuration and application menu.

- With “medium” password protection activated, only the configuration menu is protected against unintentional changes.

- With “high” password protection activated, both the configuration menu and the application menu are protected against unintentional changes. Only after entering the correct, four-digit password can changes be made to the configuration menu and the application menu.

NOTE

The password protection is deactivated from the factory.

The **pre-programmed password** set from the factory is: 7 9 1 4

This password is the same for all KERN balances and is always valid, in parallel with a self-selected password.

Make a note of your **personal password**.

The possibilities for setting the password protection and changing the password are described in Chapter 8.10 “Password protection”.

7.7 Anti-theft encoding

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

- With anti-theft encoding deactivated, the balance can be switched on again and operated after interruption of the power supply without entering a code.

- With anti-theft encoding activated, the balance requires the entry of the four-digit code after each interruption to the power supply.

- If the code is entered incorrectly, the balance is blocked.

- If the balance is blocked, it must first be disconnected from the power supply, then reconnected and unblocked by entering the correct four-digit code.
- After seven consecutive incorrect entries the display will read “NO ACCESS, CALL SERVICE”. In this case, only KERN Service can unblock the balance again.

NOTE

The anti-theft-encoding is deactivated from the factory.

The **pre-programmed password** set from the factory is: **8 9 3 7**

This password is the same for all KERN balances. For reasons of security you should therefore always enter your own code.

Keep your **personal code** in a safe place.

To activate the anti-theft encoding and to alter the code programmed in the factory to one which you have chosen yourself, see Chapter 8.11 “Anti-theft encoding”.

8 Working with the configuration menu

This chapter describes the configuration menu and its functions.

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

8.1 Structure of the configuration menu

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

Main path	Definable functions
SET CONFIGURATION	Selection of the basic configuration (factory setting, user setting or storing a new user setting)
UNIT 1	Unit in which the results of the weighing are displayed
SET DATA PRINT	Print formats; type of value to be printed out (individual value, continuous print, time or load change dependant values, date, time, user etc.)
SET CALIBRATION	Calibration method
SET WEIGHING MODE	Stability mode (Quality of the balance location), Auto-Standby mode, zero correction, tare method (rapid or standard tare); Chapter 6.6
SET INTERFACE	Baud rate, parity, handshake functions of the peripheral interfaces
SET DATE AND TIME	Date and time (standard format or American format p.m. and a.m.) [only ARJ and PRJ]
PASSWORD	Password protection for menu definition
THEFTCODE	Activation/deactivation and changing the Anti-theft encoding
KEY TONE	Key Tone on/off
LANGUAGE	Language (E, G, F)

Printing conventions used in this document:

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

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

- You will find the entire menu tree for the configuration menu in Chapter 14 “Configuration menu tree”.

- Explanations of the menu functions are printed in *italic*s.

8.2 Language function

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **LANGUAGE**		
SPRACHE DEUTSCH **LANGUAGE ENGLISH** LANGUE FRANCAISE		Select language

In order to alter the language, proceed as follows:

- Activate the configuration menu (see Chapter 7.4.1 “Activating the configuration menu”)

- Press ”⇩” repeatedly until the current language is displayed.

- Press “↵”. The display starts to flash.

- Press ”⇩” repeatedly until the language you require is displayed.

- Press ”↵” to confirm the selection.

- Press “esc” to exit the menu.

8.3 Defining the configuration

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

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

8.4 Selecting the weight unit

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **UNIT 1**			
UNIT 1	**g**		Gramme
	kg		Kilogramme
	------		------
	t		Tola

The balance can show results in different units, although on some balances display it is not possible to display in milligrammes or kilogrammes because of the current weighing range.

Display	**Weight unit**	**Conversion to grammes**
g	Gramme	
(mg)	Milligramme	0.001 g
(kg)	Kilogramme	1,000 g
GN	Grain	0.06479891 g
dwt	Pennyweight	1.555174 g
ozt	Troy ounce	31.10347 g
oz	Ounce	28.34952 g
LB	Pound	453.59237 g
ct	Carat	0.2 g
C.M.	Carat Metric	0.2 g
tLH	Tael Hong Kong	37.4290 g
tLM	Tael Malaysia	37.799366256 g
tLT	Tael Taiwan	37.5 g
mo	Momme	3.75 g
t	Tola	11.6638038 g
Bht	Baht	15.2 g

For further information on “Setting the weight unit”, see the example in Chapter 12.1.2.

8.5 Print functions

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SET DATA PRINT**		
	AUTO-START ON/**OFF**	*Start print automatically on switch on/off*
	MODE UNSTABLE	*Individual print, each value*
	MODE **STABLE**	*Individual print, stable value*
	MODE LOAD CHANGE	*Print after change of load*
	MODE CONTINUOUS	*Continuous print after every integration time*
	MODE TIMEBASE	*Continuous print with timebase*
	TIMEBASE **2.0**	*Timebase (in seconds)*
	SET PRINT FORMAT	DATE AND TIME ON/**OFF** BALANCE ID ON/**OFF** PRODUCT ID ON/**OFF** GROSS AND TARE ON/**OFF** UNITS ON/**OFF** OPERATOR ID ON/**OFF** VERIFICATION MODE **ON**/OFF PRODUCT * ttt...
		PRODUCT MODE **HOLD** PRODUCT MODE DELETE PRODUCT MODE COUNT OPERATOR ttt...

Using “SET PRINT FORMAT”, those elements which are switched on are printed in each case:

- With “UNITS”, all units active at that time are printed out,
- with “PRODUCT ttt...”, the product name can be entered alphanumerically,
- with “PRODUCT MODE HOLD”, this product name is stored,
- with “PRODUCT MODE DELETE”, it is deleted after each expression,
- with “PRODUCT MODE COUNT” a counter is printed after every product name and this counter is incremented by 1 after each print out.
- with “OPERATOR ttt...” the operator can be entered alphanumerically.

When a peripheral device (for example a printer) is connected, the balance interface must be configured in the “SET INTERFACE” sub-menu (see Chapter 8.8 “Interface functions”).
For further information on “Setting the print function”, see the example in Chapter 12.1.3.

8.6 Calibration functions

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SET CALI-BRATION**			
	MODE	OFF	*no access*
	MODE	EXTERNAL	*external*
	MODE	EXT.-DEF.	*external with user-defined weight (DEF n.nnn g)*
	MODE	**INTERNAL**	*with internal weight*
	MODE	AUTO	*automatic (AUTOCAL) only PRJ and ARJ models*
	DEF.	**0.000 g**	*Calibration weight for EXT.-DEF. mode*
	AUTOCAL.	**TIME/TEMP.**	*Autocal. on time and temp.*
	AUTOCAL.	TEMPERATURE	*Autocal. on temperature*
	AUTOCAL.	TIME	*Autocal. on time only PRJ and ARJ models*
	AUTOCAL. TIME	**6 h**	*Time for Autocalibration*

For calibration of the balance see Chapter 6.10 “Calibration of the balance” and Chapter 6.10.1 “Notes on calibration”.

NOTE

The factory setting depends on the balance model. The internal calibration modes are only available on the PRJ and ARJ models.

8.7 Weighing mode

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SET WEIGH-ING MODE**			
	FLOATING DISPLAY	0.04	*Enter integration time (in seconds)*
	FLOATING DISPLAY	0.08	
	FLOATING DISPLAY	**0.16**	
	FLOATING DISPLAY	0.32	
	STABILITY	LOW	*Setting the stability control (instability of the balance location)*
	STABILITY	**MEDIUM**	
	STABILITY	HIGH	
	AUTO-STANDBY	**OFF**	*Auto-Standby not active or active after nn minutes*
	AUTO-STANDBY	5 MIN.	
	AUTO-STANDBY	10 MIN.	
	AUTO-STANDBY	30 MIN.	
	AUTO-ZERO	**ON**/OFF	*Automatic zero correction on/off*
	QUICK TARE	ON/**OFF**	*Quick tare on/off*

By using the weighing mode functions, you can describe the quality of the balance location.

By using the AUTO-STANDBY function, you can define the period of non-use before the balance automatically goes into the energy-saving mode.

NOTE

The automatic standby function only operates if automatic zero point compensation is activated.

For further information see Chapter 13.

8.8 Interface functions

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SET INTER-FACE**			
	BAUD RATE	300	*Select baud rate*
	BAUD RATE	**600**	
	BAUD RATE	1200	
	BAUD RATE	2400	
	BAUD RATE	4800	
	BAUD RATE	9600	
	PARITY	**7-EVEN-1STOP**	*Select parity*
	PARITY	7-ODD-1STOP	
	PARITY	7-NO-2STOP	
	PARITY	8-NO-1STOP	
	HANDSHAKE	**NO**	*Enter handshake function*
	HANDSHAKE	XON-XOFF	
	HANDSHAKE	HARDWARE.	

By using the interface functions, the RS232/V24 interface of the balance is matched to the interface of a peripheral device (see Chapter 11 “Data transfer to peripheral devices”).

8.9 Date and time (only PRJ and ARJ models)

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

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

NOTE

The date and time display continues in the event of a power failure. If this is not the case, the balance backup battery is exhausted and must be replaced by KERN trader.

8.10 Password protection

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

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

Password protection permits you to protect the application menu and/or the configuration menu against unintentional changes.

For further information on password protection, see Chapter 7.6 “Password protection of the menus” and Chapter 12.1.4 “Activation of password protection”.

8.11 Anti-theft encoding

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

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

If the anti-theft encoding is activated, a four-digit code must be entered after every interruption of the power supply in order to unblock the balance for use.
For further information on the anti-theft encoding see Chapter 7.7 “Anti-theft encoding”.
To activate the anti-theft encoding, proceed as described for password protection.

9 Working with the application menu

This chapter explains which working programs are contained within the balance and how these are operated (see also Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”).

If “PRINT” is operated in an application, a report is printed out which relates to the application.

9.1 Structure of the application menu

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.
The application menu is used to recall the working programmes of the balance and to adapt them to the user's needs:

Main path	Definable functions
SET APP.	Select application program:
SETUP APPLICATION	Specify parameters for the working program as selected under “Application”
SET STATISTICS	Statistics and store functions
SET CHECK +/-	Define nominal weight and limits for comparative weighings
AUTO-START ON/OFF	The selected application program can, if required, be loaded automatically every time the balance is switched on

Printing conventions used in this document:

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

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

- You will find the complete menu tree for the application menu in Chapter 15 “Application menu tree”.

- Explanations of the menu functions are printed in *italic*s.

9.2 Selecting an application

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SELECT APPLICATION**			
SET APP	**OFF**		*Normal weighing mode*
	UNITS		*Different units*
	COUNT		*Parts counting*
	PERCENT		*Percent weighings*
	CALCULATOR		*Conversions*
	PAPER		*Determine paper weights (in g/cm^2)*
	NET TOTAL		*Totalise weighing results with intermediate tare*
	TOTALISE		*Totalise weighing results without intermediate tare*
	ANIMAL WEIGHING		*Animal weighings*
	DENSITY		*Determining density*

In this function field, select the desired application.

If an application is selected in the “SET APP.” menu, then only those sub-menus, which contain functions and parameters necessary to define the selected application are shown in the “SETUP APPLICATION” menu.

9.3 Setup for “SET APP UNITS”:

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• SETUP APPLICATION			
UNITS	UNIT 2	kg	*Kilogramme*
	UNIT 2	mg	*Milligramme*
	UNIT 2	------	-----
	UNIT 2	**OFF**	*not active*
	UNIT 3	GN	*Grain*
	UNIT 3		-----
	UNIT 3	**OFF**	*not active*
	UNIT 4	C.M.	*Carat Metric*
	UNIT 4	------	-----
	UNIT 4	**OFF**	*not active*

- **Function key legends:**

“g”: “Display value in unit 1”, e.g. gramme

“kg”: “Display value in unit 2”, e.g. kilogramme

“GN”: “Display value in unit 3”, e.g. grain

“ct”: “Display value in unit 4", e.g. carat or

Statistics functions (if statistics program is activated)

NOTE

For basic operation, Unit 1 is defined in the configuration menu (standard unit for all weighings, if the “UNITS” application is not activated, see Chapter 8.4 “Selecting the weight unit”).

- **Display in the “UNITS” application:**

+		**8.070**	**g**
g	kg	TLH	CT
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

By pressing the relevant function key, the weight display is switched to the corresponding unit

9.4 Setup for “SET APP COUNT”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• SETUP APPLICATION			
COUNT	KEY 1	**5**	*Reference quantity = 5*
	KEY 2	**10**	*Reference quantity = 10*
	KEY 3	**25**	*Reference quantity = 25*
	KEY 4	**50**	*Reference quantity = 50*

By using the “COUNT” program you can count items of uniform weight (screws, balls, coins, etc.).

To do this you must first weigh a defined quantity of items (e.g. 5 items) and assign the acquired reference weight to the reference quantity by pressing the relevant function key.

Depending on the weight and tolerances of the objects to be counted, you should count a representative number of items to determine the reference weight.

- **Function key legends:**

«5» Definition of reference quantity as 5

up to

«50» Definition of reference quantity as 50

For further information on “Setting up parts counting”, see the example in Chapter 12.2.1.

- **Display in the “COUNT” application:**

+		**123.456**	**g**
5	10	25	50
△	△	△	△
«⇦»	«⇨»	«⇧»	«⇩»

The value is first displayed in gramme

Then press e.g. "5"

+		**5**	**g**
5	10	25	50
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

The value is converted to items (PCS) and displayed or printed out

9.5 Setup for “SET APP PERCENT”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.
Main menus” and Chapter 4.5 “How the menu control operates”.

• **SETUP APPLICATION**			
PERCENT	DECIMALS	**AUTO** 0 1 2 3	*Enter number of decimal places for the percentage display*

Using the “PERCENT” program you can display and print out the weight of different measurements as a percentage of a previously defined reference weight.

Place the reference weight on the weighing plate and press “SET” to set the reference weight to be 100 %.

- Function key legends:

“SET” Define the reference weight with the number of decimal places as defined in "Decimals"

- **Display in the “PERCENT” application:**

+			**13.456**	**g**	*The value is first displayed in gramme*
SET					
△	△	△	△	*The press “SET”*
“⇦”	“⇨”	“⇧”	“⇩”	

+			**100,00**	**%**	*The value is set as 100 %. All further values are then either displayed or printed out as a percentage of the defined reference weight.*
SET					
△	△	△	△	
“⇦”	“⇨”	“⇧”	“⇩”	

9.6 Setup for “SET APP CALCULATOR”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• SETUP APPLICATION		
CALCULATOR	SET KEY 1	NAME nnnnn FACTOR n.nnn e+n DECIMAL PLACES n DISPLAY TEXT nnn PRINTER TEXT nnnnnnnn
	SET KEY 2	NAME nnnnn FACTOR n.nnn e+n DECIMAL PLACES n DISPLAY TEXT nnn PRINTER TEXT nnnnnnnn
	SET KEY 3/4	*same as for key 1 and 2*

When activating the “CALCULATOR” application, each of the four function keys is first assigned a name, then a particular conversion factor, decimal place definition, display unit and unit for the printout.

- **Display in the “CALCULATOR” application:**

+		**123.456**	**g/M**
NAME 1	NAME 2	NAME 3	NAME 4
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

The value is converted and printed out.

In programming mode, the previously defined key names are shown above the function keys.

After pressing a function key, the current value is converted in accordance with the assigned factor and the result is displayed or printed out after the print key is pressed.

In this way, for example, you can convert the weights of samples of a known size directly into “grammes per square metre” and these will be displayed.

9.7 Setup for “SET APP PAPER”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

Setting the paper program is carried out in the same way as for the calculator. See Chapter 9.6 “Setup for “SET APP CALCULATOR”.

By using this program you can convert the weights of paper items with standard sizes (e.g. 100 cm2, 20 x 25 cm, A4, 40 x 25 cm) directly into “Grammes per square meter” and these will then be displayed.

- **Display in the “PAPER” application:**

+		**123.456**	**g/M2**
100	20 x 25	A4	40 x 25
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

The value is converted and displayed or printed out.

This application is a special application of the calculator (see Chapter 9.6 “Setup for “SET APP. CALCULATOR“).

9.8 Setup for “SET APP NET TOTAL”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SETUP APPLICATION**		*For this application there is no setup menu!*
NET TOTAL		

By using the working program “NET TOTAL” you can add individual weighings, whereby the balance is tared off to zero before each individual weighing.

- **Function key legends:**

“STO”: Accept stable value and then add to total of components
“RES”: Reset
“INF”: Change to total weight, remaining capacity, individual components and back to current value
Exit the INF display using the “**esc**” key

- **Display for “NET TOTAL” application:**

+		**70.456**	**g**
STO 2		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- **Procedure, if display is changed with** ”⇩”**:**

+		**100.579**	**g**
Total 100.579 g		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

Display sequence:

TOTAL: 100.579
REM.-CAP.: 209.421 g
“individual components”

+		**100.579**	**g**
REM.-CAP.209.421 g		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

Exit with “**esc**”

9.9 Setup for “SET APP TOTALISE”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SETUP APPLICATION**		*For this application there is no setup menu!*
TOTALISE		

By using the working program “TOTALISE” you can add individual weighings, whereby the balance is not tared off to zero before each individual weighing.

- **Function key legends:**

“STO”: Accept stable value and add

“RES”: Reset

“INF”: Change to total weight, remaining capacity, individual components and back to current value

Exit the INF display using the “esc” key

- **Display for “TOTALISE” application:**

+		**70.456**	**g**
STO 2		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- **Procedure, if display is changed with “⇩”:**

+		**70.456**	**g**
Total 70.456 g		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

+		**70.456**	**g**
REM.-CAP.239.543 g		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

Display sequence:

TOTAL: 70.456 g
REM.-CAP.: 239.543 g
“individual components”

Exit with “**esc**”

9.10 Setup for “SET APP ANIMAL WEIGHING”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SETUP APPLICATION**		
ANIMAL WEIGHING	MEASURING DURATION 4	*Enter time period in seconds*

By using the working program “ANIMAL WEIGHING” you can weigh living animals accurately, even when they move around on the weighing plate.

Throughout the measuring period as defined by the user in the setup menu, the scale measures continuously, then at the end of the measuring period it averages the stored values and then gives the resulting average value.

- **Function key legends:**

“MAN”: Manual trigger for the measuring process

“AUTO”: Automatic trigger for the measuring process with one second delay after each change in load

“STO”: Statistics and store functions

- **Display for “ANIMAL WEIGHING” application:**

+		**56.879**	**g**
MAN	AUTO		STO
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

9.11 Setup for “SET APP DENSITY”

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SETUP APPLICATION**		
DENSITY	MODE SOLID ON BOTTOM MODE **SOLID IN AIR** MODE LIQUID MODE SOLID POROUS	*Solid* *Solid* *Measure liquids* *Porous solid*
	INDEX ON/**OFF**	*Index on/off*
	REFERENCE **8000**	*Reference for INDEX*
	TIMEBASE **0.0**	*Timebase for repeat operation in seconds*
	REF. DENSITY **0.998205**	*Density of the liquid used for measurement (factory setting: water at 20 °C)*
	TEMPERATURE **20 C**	*Temperature in °C of the water to be used in the measurement*

By using the “DENSITY” working program, you can carry out density determination.

- **Function key legends on start-up:**

“OK”: Accept current reference density

“CAL”: Determine reference density of measuring liquid

“T-H2o”: Set reference density of water at nn.n °C

“20.0C”: Set reference density of water at nn.n °C

- **Display for “DENSITY” application on start-up**

+		0.9988205	g/cm
OK	CAL	T-H20	20.0C
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- **Function key legends during the weighing:**

“AIR”, etc Request for measurement of the relevant value

«<–>»: “switch over” from index to density

“SET”: initiate the relevant step

“STO”: store the relevant value (statistics)

- **Function key legends during the weighing:**

Step	+		123.456	9
1	AIR			SET
2	FLOOR			SET
3	POROUS			SET
4	LIQUID			SET
5	DENSITY		<—>	STO
6	INDEX		<—>	STO
	△	△	△	△
	«⇦»	«⇨»	«⇧»	«⇩»

During operating steps (up to six may be necessary), the info-line shows the indications seen in this table.

If during step 5 or 6, the tare key “T” is pressed, then a reset is triggered.
The program guides the user through the individual operating steps.

For further information see Chapter 13.2.

9.12 Setup for the statistics program

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• **SETUP STATISTICS**		
STATISTICS	MODE **OFF** MODE STATISTICS MODE RECORDER MODE STAT./RECORDER	*Statistics program only from statistics* *Only data storing stat. and storing*
	NUMBER **100**	*Number of values which should be collected automatically (1 … 999).*
	MANUAL COLLECTION	*with function key “STO”*
	COLLECTION ON TIMEBASE	*on timebase*
	COLLECTION ON LOAD CHANGE	*after every change in load*
	TIMEBASE **2.0**	*Timebase for “storing” in seconds*

- **Functions of the statistics program and storing functions:**
- MODE

  - In this function field, you can define whether only the statistics program, only the storing program or whether both programs are to be used at the same time.
- COLLECTION

  - With “MANUAL” the function key “STO” must be pressed for every value which is to be stored.
  - With “CHANGE IN LOAD”, the balance automatically stores the measured value after every change in load.
  - With “TIMEBASE” the balance stores the measured value after each defined time period (factory setting: 2.0 seconds).
- TIMEBASE

  - Definition of the time period for the collection of data according to “COLLECTION TIMEBASE” (e.g. every 2 seconds).
- NUMBER

  - Definition of the number of values after which the store process should be automatically completed.

NOTE

When storing the first value, a range of ±50 % is defined.

Subsequent values must be within this range, otherwise an error message will appear.

- **Function key legends for “Stat./Recorder”:**

“STO”: Accept value, Start/Stop of automatic collection
“END”: Permanently store accepted data (only with recorder activated)
“RES”: Before starting a new measuring sequence, the store must be reset by using “RES” .
“INF”: Change the display to “Average value (AVERAGE)”, “Standard deviation (STDDEV.)”:
“Relative standard deviation (STDDEV.-%)”,
“Maximum (MAX)”,
“Minimum (MIN)”,
Recorder values and back to
“current value”

Exit the INF display using the “**esc**” key.

- **Display in Statistics program**

+		**123.456**	**g**
STO		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- **Display sequence, if changed with** ”⇩”**:**

+		**123.456**	**g**
AVERAGE		123.456 g	
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

Display sequence:

AVERAGE: 123.456 g

STDA.: 0.001 g

STDA.-%: 0.01 g

MAX.: 123.456 g

+		**123.456**	**g**
STOR		0.001 g	
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

“individual components”

Exit with “**esc**”

For further information on “Setting the Statistics function”, see the example in Chapter 12.2.2.

9.13 Setup for CHECK weighing

To activate the menu see Chapter 7.4 “Activating the two main menus” and Chapter 7.5 “How the menu control operates”.

• SETUP CHECK +/-			
CHECK +/-	MODE	ON/OFF	*Switch application on/off*
	NOM.	100,000 g	*Enter nominal weight*
	TO	120,000 g	*Define upper limit*
	TU	80,000 g	*Define lower limit*

By using the working program “CHECK +/-“ you can check each value to see if it matches a defined reference value, within permissible plus/minus deviations.

In the ”CHECK +/-“ application, the four function keys are not active.

In the display “+”, “–“ and “⇨II⇦” are active.

Whenever “⇨**II**⇦” is illuminated, the measured value is within the defined tolerances.

The function of the signal lamp and the symbols in the Check-Weigher application are defined as follows:

- Weight > = 50% of nominal value: symbol "-" and lamp "red"

- Weight TU to TO: symbol ">||<" and lamp "green", signal sounds as soon as the weight is stabilised

- Weight > TO: symbol "+" and lamp "yellow"

NOTE

A signal lamp is available as an accessory for this type of display.

10 Special operating keys

10.1 The Tare key “T”

- **Initiate tare process**

– Ensure that the balance is in the weighing mode
– Briefly press “**T**”
– The balance performs a tare operation.

10.2 The CAL key “CAL”

- **Initiate a calibration process**

– Ensure that the balance is in the weighing mode
– Keep “**CAL**” pressed until “CALIBRATION” is displayed
– Release “**CAL**”
– The balance carries out a calibration in accordance with the settings in the configuration menu (cf. Chapter 8.6 “Calibration functions”) and records these by means of a printout.

NOTE
A calibration process can be aborted using the “**ON/OFF**” key

10.3 The Print key “PRINT”

- **Print out an individual value or a report**

– Ensure that the balance is in the weighing mode
– Briefly press “**PRINT**”
– The individual value or report will be printed out.

- **Reset product counter to 1**

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

- **Print out a balance status**

– Ensure that the balance is in the weighing mode
– Keep “**PRINT**” pressed until “PRINT STATUS” is displayed
– Release “**PRINT**”
– The balance status will be printed out.

- **Print out the application setup**

– Ensure that the balance is in the weighing mode
– Keep “**PRINT**” pressed until “PRINT APPLICATIONS” is displayed
– Release “**PRINT**”
– The application setup will be printed out.

10.4 The Change key «⟳»

- **Switch to other applications**

– If you hold the «⟳» key pressed down, all active applications will be displayed one after another:
if e.g. statistics program, checkweigh program and the “COUNT” application are active, these will appear one after the other in the info-line: “WEIGHING”, “CHECK +/- “, “STATISTICS”, “COUNT”.
– Release “⟳”, when the application you require is displayed.

11 Data transfer to peripheral devices

For data transfers to peripheral devices, the balance is equipped with an RS232/V24-interface.
Before the data transfer, the RS232 interface must be synchronised with the one in the peripheral device in the balance's configuration menu (see Chapter 8.8 “Interface functions”).

- **Handshake**

The handshake is set to “NO” (none) from the factory. It can be set to software handshake XON/XOFF, or to hardware handshake.

- **Baud rate**

Possible baud rates: 300, 600, 1,200, 2,400, 4,800, 9,600 baud.

- **Parity**

Possible parity: 7 even 1 stop, 7 odd 1 stop, 7 No 2 stop or 8 No 1 stop.
1 2 34 5 67 8SP

± 12 V	**SB**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
7 even 1	SB	1st DA	2nd DA	3rd DA	4th DA	5th DA	6th DA	7th DA	PB	SP
7 odd 1	SB	1st DA	2nd DA	3rd DA	4th DA	5th DA	6th DA	7th DA	PB	SP
7 no 2	SB	1st DA	2nd DA	3rd DA	4th DA	5th DA	6th DA	7th DA	1st SP	2nd SP
8 no 1	SB	1st DA	2nd DA	3rd DA	4th DA	5th DA	6th DA	7th DA	8th DA	SP

SB: Start Bit PB: Parity Bit

DA: Data Bit SP: Stop Bit

11.1 Connection to peripheral devices

The balance can be connected to peripheral devices in three ways:

- **Standard, duplex connection**

Balance	RJ 45 D25	Peripheral device
RS 232 out	2 3 →	RS 232 in
RS 232 in	6 2 ←	RS 232 out
GND	5 7 —	GND

- **Standard, duplex connection with additional hardware handshake in the peripheral device**

Balance	RJ 45 D25	Peripheral device
RS 232 out	2 3 →	RS 232 in
RS 232 in	6 2 ←	RS 232 out
GND	5 7 —	GND
CTS	3 20 ←	DTR
DTR	7 5 →	CTS

11.2 Data transfer

Display

D7	D6	D5	D4	D3	D2	D1	D0	U	U	U

The data transfer takes place using ASCII code:

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

B	Blank Space	(space)
S	Sign	Sign (+, -, space)
DP	Decimal Point	Decimal Point
D0...D7	Digits	Digits
U	Unit	Unit
CR	Carriage Return	Carriage Return
LF	Line Feed	Line Feed

NOTE

Unused positions are filled with spaces.

The decimal point DP can be between D0 and D7.

11.3 Remote-control commands

Command	Function
ACK	Acknowledgement n = 0 off; n = 1 on
*CAL	Start calibration (only where INT or EXT selected)
DN	Reset weight display
D.....	Describe weight display (right-aligned)
@N	Reset info display
@.....	Describe info display
In	Set FLOATING DISPLAY time n n=0 t=0.04 sec. n=1 t=0.08 sec. n=2 t=0.16 sec. n=3 t=0.32 sec.
N	Reset balance
OFF	Switch off balance
ON	Switch on balance
PCxxxx	Enter anti-theft code
PDT	Print out date and time
PRT	Initiate printing (Press “Print” key)
PST	Initiate print status
Pn (ttt.t)	Set print mode n = 0 Individually print each value (unstable) n = 1 Individually print stable value (stable) n = 2 Print after load change n = 3 Print after each integration time n = 4 Print on timebase in sec (ttt.t)
R%k	Set current weight=100 % with k=0...7 decimal places (k=A: use automatic positioning of decimal point)
REF%k rrr	Set reference weight rrr for 100 % with k=0...7 decimal places (k=A: use automatic positioning of decimal point)
Rnnn	Set current weight=nnn items
REFrrr	Set reference weight rrr for 1 item

Command	Function
Sn	Set stability n n=0 low n=1 medium n=2 high
SDTttmm-jjhhmmss	Set date and time (German) (Tag, Monat, Jahr, Stunde, Minute, Sekunde)
SDTmmd-dyyhhmmss	Set Date and Time (English) (Month, Day, Year, Hour, Minutes, Seconds)
T (ttt)	Tare off or set tare to a specific value
Uxnn	Set unit x (1...4) of the balance with nn (0=g, 1=mg, 2=kg, ...)
UxS	Switch balance to unit x (1...4)
ZERO	Zero the balance (provided weight is stable and within the zero-setting range)

NOTE

Each remote-control command must terminate with “CR” “LF”.

The commands are acknowledged if required.

11.4 Examples for the remote control of the balance

Input	Description of the initiated function
D – – – – –	Five dashes will be shown
D	TEST123. Display will be: tESt123
D	The display will be dark
T100	-100.000g (tare set to 100 g)
T1	-1.000 g (tare set to 1g)
T	Balance will be tared off

Table 8.5 Examples for remote control

12 Practical examples

12.1 Changing the configuration menu

To activate the configuration menu see Chapter 7.4.1.

12.1.1 Setting the choice of language

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

SPRACHE DEUTSCH **or** **LANGUE FRANCAISE** **or** **LANGUAGE ENGLISH**	• Press "⇩" repeatedly until the currently active language is displayed • Press "↵".
LANGUAGE ENGLISH	• The language then flashes
	• Press "⇩" repeatedly until the required language is displayed
SPRACHE DEUTSCH	• Press "↵" to confirm the language selection

12.1.2 Setting the Weight unit

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

UNIT 1 9	• Press "⇩" repeatedly until Unit 1 is displayed • Press "↵".
UNIT 1 9	• The display flashes
	• Press "⇩" repeatedly until the required unit is displayed
UNIT 1 mo	• Press "↵" to confirm the selection

12.1.3 Setting the Print functions

In order to alter the print parameters proceed as follows:

SET DATA PRINT	• Press “⇩” repeatedly until “SET DATA PRINT” is displayed
AUTO-START ON	• Press ”⇨” to get into the function menu (“AUTO-START OFF“ or “AUTO-START ON” is displayed) • Press “⏎”.
AUTO-START ON	• The display flashes • Press “⇩” to select between ”ON” and “OFF”
AUTO-START OFF	• Press ”⏎” to confirm the desired change
MODE STABLE	• Press ”⇩” to select the next function (MODE STABLE is displayed)
MODE STABLE	• The display flashes • Press “⇩” until the parameter you require is displayed (STABLE, UNSTABLE, LOAD CHANGE etc are displayed one after the other.)
MODE Load change	• Press ”⏎” to set the new parameter.

Press ”⇩” again to select the next function (“TIMEBASE 2.0” is displayed, then “SET PRINT FORMAT”, then back to “AUTOSTART ON” etc.). Using “⏎”, select the parameter which you would like to change. Change the values in the same way as described for the "AUTOSTART" and "MODE" functions, and confirm the changes each time with “⏎”.

12.1.4 Activation of password protection

The possibilities for setting the password protection are described in Chapter 8.10 “Password protection”.
In order to activate password protection, proceed as follows:

PASSWORD ––––	• Press ”⇩” repeatedly until “PASSWORD----“ is displayed
PASSWORD 0000	• Press “↵”. The first digit of the password “---- “ appears. • Press ”⇩” repeatedly until the first digit of the password is correctly displayed.
PASSWORD 6000	• Press “⇨”. • Then the second digit of the password flashes.
PASSWORD 6100	• Press ”⇩” repeatedly until the second digit of the password is correctly displayed. • In the same way, enter the third and fourth digit of the password. • When you have entered all four digits, press “↵”. • Press “⇨”
DATA PROTECTION OFF	• The current data protection status is now displayed: “DATA PROTECTION OFF” or “DATA PROTECTION MEDIUM” or ”DATA PROTECTION HIGH”. • Press “↵”.
DATA PROTECTION OFF	• The display flashes • Press “⇩” repeatedly to change the password status
DATA PROTECTION MEDIUM	• Press “↵” to store the entry

In order to alter the password, proceed as follows.

	• Enter the password and press “⇨”
DATA PROTECTION MEDIUM	• The current data protection status is then displayed • Press “⇩”
PASSWORD NEW - - - -	• Enter the new password (procedure as described above)
DATA PROTECTION MEDIUM	• Press “↵” to store the entry

12.2 Selecting an application program

To activate an application menu see Chapter 7.4.2.

12.2.1 Setting for Counting by weighing

For setup see Chapter 9.4 “Setup for “SET APP. COUNT””

To count uniformly heavy objects such as coins, screws or similar things, proceed as follows:

- Activate the application menu

SET APP. OFF

- Press “⇩” repeatedly until “SET APP. OFF” is displayed
- Press “↵”.

SET APP. OFF

- The display flashes
- Keep pressing “⇩” until “SET APP. COUNT” is displayed

SET APP. COUNT

- Press “↵” to confirm the application selection
- Press “⇩”

SETUP APPLICATION

- “SETUP APPLICATION” is displayed.
- Press “⇨”

KEY – 1 5

- “Key – 1 5” is displayed (assigning reference quantity)
- Press “⇩”

KEY – 2 10

- “Key – 2 10” is displayed.
- Press “↵”

KEY – 2 10

- The display flashes
- By pressing “⇩” and “⇧” you can alter the value

KEY – 2 8

- Press “↵” to store the new value.

When you have adjusted the values for “KEY 3” and “KEY 4” in the same way, press “**MENU**” to go back to weighing mode.
The balance then displays “0.00 g”.

By holding the Change key “  ” depressed for a longer period of time, you can switch to “COUNT”.
The following display appears:

		0.000	g
5	8	25	50
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Place **five** of the items to be counted (e.g. paper clips) on the weighing plate

		3.720	g
5	8	25	50
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Press “5” (allocated reference quantity = 5)

		5	PCS
5	8	25	50
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- The weight is then converted and displayed in items (PCS)

		237	PCS
5	8	25	50
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Then place all items to be weighed on the weighing plate
- The quantity is then displayed

NOTE

Depending on the weight and tolerances of the objects to be counted, you should count a representative number of items to determine the reference weight.

12.2.2 Setting the statistics function

To store measured values and then be able to evaluate these statistically, proceed as follows:

- Activate the application menu

SET STATISTICS

- Press "⇩" repeatedly until "SET STATISTICS" is displayed
- Press "⇨"

MODE OFF

- The display changes to "MODE OFF"
- Press "↵"

MODE OFF

- The display flashes
- Press "⇩" repeatedly
- "MODE STATISTICS", "MODE STAT./RECORDER" and "MODE OFF" etc are displayed

MODE STATISTICS

- Define the application (see Chapter 9.12 "Setup for the statistics program") and store with "↵"
- Press "⇩"

QUANTITY 100

- "Quantity 100" is displayed
- Press "↵"

QUANTITY 100

- The display flashes
- Press "⇩" or "⇧" as many times as necessary until the required quantity (max. 999) is displayed and press

QUANTITY 3

- "↵" to store your selection
- Press "⇩"

MANUAL COLLECTION

- "MANUAL COLLECTION" is displayed
- Press "↵"

MANUAL COLLECTION

- The display flashes
- Press "⇩" repeatedly until the required method of storing is displayed and press

COLLECTION ON LOAD CHANGE

- "↵" to store your selection

Press "**MENU**" to return to weighing mode. The balance then displays "0.00 g".

If you hold the Change key "  " depressed, then you will see "COUNT", then "STATISTICS", then "WEIGHING", then "COUNT" again, etc. appear one after the other in the info-line.

Hold the Change key depressed until “STATISTICS” is displayed and then release the key. This display appears:

		0.000	g
STO 0		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

		8.050	g
STO 1		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Place the first item (e.g. a pencil) on the weighing plate
- Start the collection with “STO 0”.

		8.150	g
STO 2		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Place the second item on the weighing pan.

		7.820	g
STO 3		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Place the third item on the weighing pan.

You can then recall the statistical parameters.
Press “⇩”.
The following display appears (average value):

		0.000	g
AVERAGE			8.006 g
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Press “⇩” repeatedly to recall the statistical parameters one after the other

		0.000	g
STOA.			0.169 g
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Standard deviation

		0.000	g
STOA. %			2.11 %
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Relative standard deviation

		0.000	g
MAX.:			8.150 g
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Maximum value

		0.000	g
MIN.			7.820 g
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- Minimum value
- Press “**esc**” to exit the info display.

		0.000	g
STO		RES	INF
△	△	△	△
“⇦”	“⇨”	“⇧”	“⇩”

- “**RES**” will reset the memory. The balance is ready for the next measuring sequence.

13 Further information

13.1 Notes on Weighing mode

13.1.1 Set Weighing mode: Floating display

The value set for the Floating display defines the period after which each new measurement is displayed.
When defining this time period, the quality of the balance location is crucial. The stability control must also be appropriately selected.

Recommended values:

- Optimal balance location: FLOATING DISPLAY 0.04 or FLOATING DISPLAY 0.08
- Good balance location: FLOATING DISPLAY 0.16
- Critical balance location: FLOATING DISPLAY 0.32

NOTE
The value of the Floating Display is related to the stability control and the balance location.

13.1.2 Set Weighing mode: Stability control

The value set for stability control depends on the quality of the balance location and must be correctly selected in order to obtain optimal, reproducible results. Select:

- “HIGH STABILITY” at an **optimal** balance location,
- “MEDIUM STABILITY” at a **good** balance location or
- “LOW STABILITY” at a **critical** balance location

13.1.3 Set Weighing mode: Auto-Standby

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

- the balance is tared off and has shown “Zero” for at least 5 minutes,
- the balance has received no remote control command via the interface for at least 5 minutes,
- the automatic zero correction “Auto-Zero” is activated.

These are the options for re-start the balance after it has been switched off by automatic Auto-Standby:

- Briefly depress any key
- Put a weight on the scale
- Give a remote control command via the interface

13.1.4 Set Weighing mode: Auto-Zero

If the automatic zero correction “Auto-Zero” is activated, the balance always gives a stable zero (e.g. even with room temperature fluctuations).

13.2 Notes on density determination

Using the “Density” working program, you can determine the density of solids and liquids (with accessories for density determination).
For this, you can choose from various methods of weighing.

NOTE

Determination of density using a density set is described in the following chapters 13.1.6 – 13.1.9. Various models are available for the PRx/ARx models.

Balance model		Density set model
ARJ../ ARS..	→	AR-A01
PRJ../PRS..	→	PR-A02

13.2.1 Density determination “Solid on bottom mode”

The reference liquid (water) which has been temperature-adjusted, is placed on the weighing pan and tared.
Then the solid is placed into the liquid and weighed. Then the solid is suspended in such a way that it is still completely in the water, but no longer touches the bottom. It is weighed again.
The balance can determine the density of the solid from the weights taken.

13.2.2 Density determination “Solid in air mode”

With this weighing method, the solid is weighed through suspended weighing (see Chapter 6.11 “Suspended weighing”).
Then the solid is submersed in the reference liquid (water) which has been temperature-adjusted, and the solid does not touch the weighing pan floor, but is nevertheless still completely in the water. It is now weighed again.
The balance can determine the density of the solid from the weights taken.

13.2.3 Density determination “Liquid mode”

With this weighing method you can determine the density of a liquid.
The procedure is the same as for density determination in “solid in air” mode. A piece of solid glass with a volume of 10 cm^3 or 100 cm^3 is used as a solid.

13.2.4 Density determination “Porous solid mode”

With this weighing method you can determine the density of a porous solid.
To be able to carry out such measurements, you will need the density determination set.
The procedure for measuring density is described in the operating instructions included with the set.

14 Configuration menu tree

- Press “**ON/OFF**” to switch the scale on.
- During the start-up sequence (about 10 seconds), keep the “MENU” key depressed until “SET CONFIGURATION” is displayed.

• **SET KONFIGURATION**	
	FACTORY CONFIG. USER CONFIG. STORE CONFIG.

• **UNIT 1**	
UNIT 1	g mg kg GN dwt ozt oz Lb ct C.M tlH tlM tlT mo t Bht

• **SET DATA PRINT**		
	AUTO-START	ON/**OFF**
	MODE	UNSTABLE
	MODE	**STABLE**
	MODE	LOAD CHANGE
	MODE	CONTINUOUS
	MODE	TIMEBASE
	TIMEBASE	**2.0**

	SET PRINT FORMAT	DATE AND TIME ON/**OFF** BALANCE ID ON/**OFF** PRODUCT ID ON/**OFF** GROSS AND TARE ON/**OFF** UNITS ON/**OFF** OPERATOR ID ON/**OFF** PRODUCT ttt... PRODUCT MODE **HOLD** PRODUCT MODE DELETE PRODUCT MODE COUNT OPERATOR ttt...

• SET CALI BRATION

MODE	OFF
MODE	EXTERNAL
MODE	EXT.-DEF.
MODE	**INTERNAL**
MODE	AUTO
DEF. 0.000	0.000 g
AUTOCAL.	**TIME/TEMP.**
AUTOCAL.	TEMPERATURE
AUTOCAL.	TIME
AUTOCAL. TIME	**6 h**

• SET WEIGHING MODE

FLOATING DISPLAY	0.04
FLOATING DISPLAY	0.08
FLOATING DISPLAY	**0.16**
FLOATING DISPLAY	0.32
STABILITY	LOW
STABILITY	**MEDIUM**
STABILITY	HIGH
AUTO-STANDBY	**OFF**
AUTO-STANDBY	5 MIN
AUTO-STANDBY	10 MIN
AUTO-STANDBY	30 MIN
AUTO-ZERO	**ON**/OFF
QUICK TARE	ON/**OFF**

• SET - INTERFACE		
	BAUD RATE	300
	BAUD RATE	**600**
	BAUD RATE	1200
	BAUD RATE	2400
	BAUD RATE	4800
	BAUD RATE	9600
	BAUD RATE	192000
	PARITY	**7 EVEN 1STOP**
	PARITY	7 ODD 1STOP
	PARITY	7 NO 2STOP
	PARITY	8 NO 1STOP
	HANDSHAKE	**NO**
	HANDSHAKE	XON-XOFF
	HANDSHAKE	HARDWARE

• SET DATE AND TIME	(only PRJ/ARJ models)	
	TIME	[HH.MM.SS]
	DATE	[DD.MM.YY]
	FORMAT	**STANDARD**/US

• PASSWORD		
PASSWORD ____	DATA PROTECTION	**OFF**
	DATA PROTECTION	MEDIUM
	DATA PROTECTION	HIGH
	NEW PASSWORD	– – –

• THEFTCODE		
THEFTCODE ____	THEFT PROTECTION	**OFF**
	THEFT PROTECTION	ON
	NEW CODE	– – – –

• KEY TONE		
KEY TONE	KEY TONE	**OFF**
	KEY TONE	ON

• LANGUAGE	
	LANGUAGE ENGLISH
	SPRACHE DEUTSCH
	LANGUE FRANCAISE

15 Application Menu Tree

- Press “MENU” after the start-up sequence is complete, in order to get into the application menu.

• **SET APP.**
OFF
UNITS
COUNT
PERCENT
CALCULATOR
PAPER
NET TOTAL
TOTALISE
ANIMAL WEIGHING
DENSITY

• **SETUP APPLICATION**	
	Structure depends on the current application, (see Chapter 9 “Working with the application menu”)

• **SET STATISTICS**		
	MODE	**OFF**
	MODE	STATISTICS
	MODE	RECORDER
	MODE	STAT./RECORDER
	QUANTITY	**100**
	COLLECTION	**MANUAL**
	COLLECTION	TIMEBASE
	COLLECTION	LOAD CHANGE

• **SET CHECK +/-**		
	MODE	ON/**OFF**
	NOM.	**100.000 g**
	TO	**120.000 g**
	TU	**80.000 g**

• **AUTO-START**		
	AUTO-START	**ON**/OFF

15.1 Software updates via Internet

Software updates are available via the internet

http://www. prs.kern-sohn.de

http://www. prj.kern-sohn.de

http://www. ars.kern-sohn.de

http://www. arj.kern-sohn.de

Loading these software updates onto the balance ensures that your balance always contains the latest functions or function upgrades.

16 Servicing, maintenance, disposal

16.1 Cleaning

Please disconnect the device from the operating voltage before cleaning.

Only use a cloth dampened with mild suds and not aggressive cleaning agents (solvents or similar). Please ensure that fluids are not able to get into the device and rub off using a clean, soft cloth.
Loose sample residue/powder can be removed carefully using a brush or hand vacuum cleaner.

Remove any spilt goods immediately.

16.2 Servicing, maintenance

The device may only be opened by trained service engineers authorised by KERN.
Disconnect from the mains supply before opening.

16.3 Disposal

The operating company shall dispose of the packaging and the device in compliance with the valid national or regional law in the area of operation.

17 Troubleshooting

The balance should be switched off for a short time following any errors in the programming process and disconnected from the mains supply. It is then necessary to start the weighing process again from the beginning.

Help:

Fault	***Possible cause***
Weight display is not illuminated.	• *The balance is not switched on.* • *The mains supply connection has been interrupted (mains cable not plugged in/faulty).* • *Power supply interrupted.*
The weight display changes continually	• *Draught/air movement* • *Table/floor vibrations* • *The weighing plate is in contact with foreign matter.* • *Electromagnetic fields / static charging (choose different location/switch off device which is causing the interference if possible)*
The weighing result is obviously incorrect	• *The balance display is not set to zero* • *Calibration is no longer correct.* • *Great fluctuations in temperature.* • *Electromagnetic fields / static charging (choose different location/switch off device which is causing the interference if possible)*

Switch the balance off if other error messages should appear and then switch on again. Contact the manufacturer if the error message does not disappear.

18 Error messages and correction of faults

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

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

18.1 Notes on correcting faults

The following table shows faults and their possible causes. If you cannot clear the fault on the basis of the table, please contact a KERN Service Engineer.

Fault	**Possible causes**
Weight display does not light	Balance not switched on Connection to power adaptor is interrupted Power supply has failed (interruption to current) The power adaptor is defective
"OL" is shown in the display	The weighing range has been exceeded (Note the information on the maximum weight range)
"UL" is shown in the display	The weight is below the range of the balance (weighing pan or scale pan support missing)
The weight display fluctuates continually	The draught is too strong at the balance location The balance support is vibrating or varying The weighing pan is touching a foreign body The time chosen for FLOATING DISPLAY is too short The material being weighed is absorbing moisture The material being weighed is being blown away, is evaporating or is subliming Strong temperature variations in the material being weighed
Weighing result is obviously incorrect	The balance was not correctly tared The balance has not been levelled correctly The calibration is no longer correct There are strong variations in temperature

Fault	Possible causes
There is no display or only dashes	The stability control (Balance functions) is set too sensitively The time selected for Floating display is unsatisfactory
Configuration menu cannot be altered	The password lock is activated in the configuration menu
The display flashes continuously during calibration	The balance location is not stable (abort calibration by switching off using “ON/OFF” key and then install the balance at a more suitable location). Use of an imprecise calibration weight (only applies to external calibration)