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# Operating instruction Precision balances

## KERN 440

Version 4.1

09/2009

GB



440-BA-e-0941



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Version 4.1 09/2009

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## 1 Technical data

KERN	440-21N	440-21A	440-33N
Readability (d)	0.001 g	0.001 g	0.01 g
Weighing range (max)	40 g	60 g	200 g
Taring range (subtractive)	40 g	60 g	200 g
Reproducibility	0.001 g	0.001 g	0.01 g
Linearity	± 0.003 g	± 0.003 g	± 0.02 g
Minimum unit weight at piece counting	0.002 g	0.002 g	0.02 g
Warm-up time	2 hours	2 hours	30 minutes
Reference quantities at piece counting	5, 10, 25, 50		
Weighing Units	Details „ <b>Weighing units</b> “ chapter 7.9		
Recommended adjustment weight, not added (class)	40g (F1)	50g (F2)	200g (M1)
Stabilization time (typical)	3 sec.		
Operating temperature	+ 5° C .... + 35° C		
Humidity of air	max. 80 % (not condensing)		
Housing (B x D x H) mm	165 x 230 x 80		
Weighing plate mm	Ø 81	Ø 81	Ø 105
Weight kg (net)	1.0	1.0	1.0
Underfloor weighing	-	-	Standard
Flush-mounted hook	-	-	Option

KERN	440-35N	440-35A	440-43N	440-45N
Readability (d)	0.01 g	0.01 g	0.1 g	0.1 g
Weighing range (max)	400 g	600 g	400 g	1,000 g
Taring range (subtractive)	400 g	600 g	400 g	1,000 g
Reproducibility	0.01 g	0.01 g	0.1 g	0.1 g
Linearity	± 0.03 g	± 0.03 g	± 0.2 g	± 0.2 g
Minimum unit weight at piece counting	0.02 g	0.02 g	0.2 g	0.2 g
Warm-up time	2 hours	2 hours	10 minutes	30 minutes
Reference quantities at piece counting	5, 10, 25, 50			
Weighing Units	Details „ <b>Weighing units</b> “ chapter 7.9			
Recommended adjustment weight, not added (class)	400g (F2)	500g (F2)	400 g (M2)	1,000 g (M1)
Stabilization time (typical)	3 sec.			
Operating temperature	+ 5° C .... + 35° C			
Humidity of air	max. 80 % (not condensing)			
Housing (B x D x H) mm	165 x 230 x 80			
Weighing plate mm	Ø 105	Ø 105	130 x 130	130 x 130
Weight kg (net)	1.0	1.0	1.0	1.0
Underfloor weighing	Standard			
Flush-mounted hook	Option			

KERN	440-47N	440-49N	440-49A
Readability (d)	0.1 g	0.1 g	0.1 g
Weighing range (max)	2,000 g	4,000 g	6,000 g
Taring range (subtractive)	2,000 g	4,000 g	6,000 g
Reproducibility	0.1 g	0.1 g	0.1 g
Linearity	± 0.2 g	± 0.3 g	± 0.3 g
Minimum unit weight at piece count	0.2 g	0.2 g	0.2 g
Warm-up time	30 minutes	2 hours	2 hours
Reference unit weights at piece count	5, 10, 25, 50		
Weighing Units	Details „ <b>Weighing units</b> “ chapter 7.9		
Recommended adjustment weight, not added (class)	2,000 g (M1)	4,000 g (F2)	5,000 g (F2)
Stabilization time (typical)	3 sec.		
Operating temperature	+ 5° C .... + 35° C		
Humidity of air	max. 80 % (not condensing)		
Housing (B x D x H) mm	165 x 230 x 80		
Weighing plate mm	130 x 130	150 x 170	150 x 170
Weight kg (net)	1.0	1.0	1.0
Underfloor weighing	Standard		
Flush-mounted hook	Option		

KERN	440-51N	440-53N	440-55N
Readability (d)	1 g	1 g	0.2 g
Weighing range (max)	4,000 g	6,000 g	6,000 g
Taring range (subtractive)	4,000 g	6,000 g	6,000 g
Reproducibility	1 g	1 g	0.2 g
Linearity	± 2 g	± 2 g	± 0.6 g
Minimum unit weight at piece count	2 g	2 g	0.4 g
Warm-up time	10 minutes	30 minutes	2 hours
Reference unit weights at piece count	5, 10, 25, 50		
Weighing Units	Details „ <b>Weighing units</b> “ chapter 7.9		
Recommended adjustment weight, not added (class)	4,000 g (M2)	5,000 g (M2)	5,000 g (F2)
Stabilization time (typical)	3 sec.		
Operating temperature	+ 5° C .... + 35° C		
Humidity of air	max. 80 % (not condensing)		
Housing (B x D x H) mm	165 x 230 x 80		
Weighing plate mm	150 x 170	150 x 170	150 x 170
Weight kg (net)	1.0	1.0	1.0
Underfloor weighing	Standard		
Flush-mounted hook	Option		

## 2 Declaration of conformity



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### Declaration of conformity

Declaration of conformity for apparatus with CE mark

Konformitätserklärung für Geräte mit CE-Zeichen

Déclaration de conformité pour appareils portant la marque CE

Declaración de conformidad para aparatos con marca CE

Dichiarazione di conformità per apparecchi contrassegnati con la marcatura CE

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

### Electronic Balance: KERN 440

Mark applied	EU Directive	Standards
	89/336EEC EMC	EN 55022 : 1998+A1 : 2000 EN 61000-3-2 : 2000 EN 61000-3-3 : 1995+A1 : 2001 EN 55024 : 1998+A1 : 2001

Date: 15.12.2005

Signature:

Gottl. KERN & Sohn GmbH  
Management

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### **3 Basic Information (General)**

#### **3.1 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.

#### **3.2 Improper Use**

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

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

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

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

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

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

#### **3.3 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 and damage caused by media, liquids, natural wear and tear
- The appliance is improperly set up or incorrectly electrically connected
- The measuring system is overloaded

### **3.4 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](http://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.

## **4 Basic Safety Precautions**

### **4.1 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.

### **4.2 Personnel training**

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

## **5 Transport and storage**

### **5.1 Testing upon acceptance**

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

### **5.2 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.

## **6 Unpacking, Setup and Commissioning**

### **6.1 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.

### **6.2 Unpacking**

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

#### **6.2.1 Setup**

The balance must be installed in a way that the weighing plate is exactly in horizontal position.

At the models 440-21N and 440-21A the transport securing must be removed before the weighing plate is mounted.

## 6.2.2 Scope of delivery

### Serial accessories:

- Balance (incl. protective cover)
- Weighing plate
- Mains power supply
- Operating Manual
- Windshield (440-21N, 440-21A)

## 6.3 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.

## 6.4 Operation using a (rechargeable) battery (optional)


Lift-off the battery cover on the lower side of the balance. Connect 9 V compound battery.


Reinsert the battery cover.

For battery operation the balance has an automatic switch-off function which can be activated or deactivated in the menu (chapter 8.1). Proceed as follows:

Switch-on the balance using the  key and wait for the „0“ display.

Press the  key and keep it pressed until „UNIT“ appears on the display.


Press the  key four times, in the display appears „AF“.

Confirm by pressing the -key

Use the  key to choose between the two following settings:

- 1) „AF on“: To save the battery, the balance switches off automatically 3 minutes after having finished the weighing procedure.

- 2) „AF off“: Switch-off function deactivated.

Use the  key to confirm your selected setting.

If there exists an optional rechargeable battery, it has to be connected in the battery compartment via a separate plug-in socket. Now the mains adapter delivered with the rechargeable battery must be applied.

## 6.5 Connection of peripheral devices

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

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

## 6.6 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.

## 6.7 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.


## 6.8 Adjustment

The adjustment should be made with the recommended adjustment weight (see chap. 1 "Technical data"). Adjustment is also possible with the weights of other nominal values (see table 1), but not the optimum for measuring technique.


### Procedure when adjusting:

Observe stable environmental conditions. A warming up time (see chapter 1) is required for stabilization.

Switch on the balance using the  key.

Press  key and keep it pressed, after the acoustic signal there appears in the display for short time „CAL“. After that the exact size appears flashing in the display (chapter.8.4) of the adjustment weight.

Now set the adjusting weight in the centre of the weighing plate.

Now press the  key. Short time later there appears „CAL F“, then the automatic return to the normal weighing mode. In the display there appears the value of the adjustment weight.

An error during adjustment or the use of an incorrect adjusting weight will result in an error message „CAL E“. Repeat adjustment.

Keep the adjustment close to the balance. Daily control of the weighing exactness is recommended for quality-relevant applications.

## 6.9 Underfloor weighing

Objects unsuitable for placing on the weighing scale due to size or shape may be weighed with the help of the flush-mounted platform.

Proceed as follows:

- Switch off balance.
- Turn round the balance.
- Open the closing lid (1) on the bottom of your balance.
- Screw-in the hook for underfloor weighing (2) **carefully and completely** till to the stop (**do not screw-in farther, as this will damage the balance**).
- Place your balance over an opening.
- Suspend the goods to be weighed from the hook and carry out the weighing.

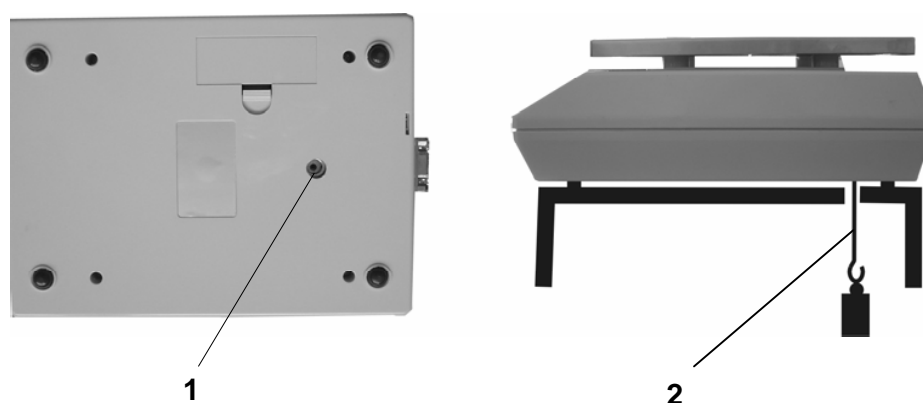


Fig. 1: Setup of balance for underfloor weighing



### CAUTION

- For underfloor weighing use the original hook provided by KERN.
- Always ensure that all suspended objects are stable enough to hold the desired goods to be weighed safely (danger of breaking).
- Never suspend loads that exceed the stated maximum load (max) (danger of breaking)

Always ensure that there are no persons, animals or objects that might be damaged underneath the load.



### NOTICE

After completing the underfloor weighing the opening on the bottom of the balance must always be closed (dust protection).

## 7 Operation

### 7.1 Overview of display



### 7.2 Weighing

Switch on the balance using the  key.

The balance shows for approx. 3 seconds „88888“ in the display and then goes to „0“. Now it is ready for operation.

**Important:** Should the display flash or not be on „0“, press the  key.

Only now (!) place goods onto weighing plate. Take care that the weighed material does not touch the balance housing or the base mat.


Now the weight is displayed, after the standstill control appears the weighing unit (e.g. g or kg) right-hand in the display.

If the goods are heavier than the weighing range, the display will show "Error" (=Overload), and a whistle is sounded.

### 7.3 Taring

Switch-on the balance using the  key and wait for the „0“ display.

Put the tare vessel on the weighing plate and press the  key. The balance display goes to „0“. The weight of the container is now internally saved.

If one after finishing the weighing process presses again the  key, „0“ appears anew in the display.

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

The limit is reached when the whole weighing range is exhausted.



After removing the taring container the total weight is displayed as negative display.



### 7.4 PRE-Tare function

Using this function the weight of a tare vessel can be stored.

This value also remains saved if the balance meanwhile has been switched off and switched on again.

For this switch on the balance using the  key and wait for the „0“ display.


Put tare vessel on the weighing plate and press the  key 6 times until „PtArE“ flashes on the display. By actuating the  key, the current weight on the weighing plate is saved as PRE-Tare weight.

To switch-off this function, unload the weighing plate and press the  key 6 times, until „PtArE“ flashes on the display. After that, press the  key. The stored PRE-Tare weight is deleted.

### 7.5 Plus/minus weighings


For example unit weight control, fabrication control etc.

Switch-on the balance using the  key and wait for the „0“ display.

Put the nominal weight on the weighing plate and tare to „0“ using the  key. Remove the nominal weight.

Put the test objects subsequently on the weighing plate, the respective deviation from the nominal weight is displayed with the respective sign to „+“ and „-“.

According to the same procedure also packages with the same weight can be produced, referring to a nominal weight.

Back to weighing mode by pressing the  key.




## 7.6 Parts counting

Switch-on the balance using the  key and wait for the „0“ display.

Press  key shortly.


Appears the reference quantity 5.

By pressing the  key several times other reference quantities **10**, **25** and **50** can be called up.


Place as many parts to count on the weighing plate as the set reference quantity requires.


Confirm with  key.

The balance is now in parts counting mode counting all parts on the weighing plate.

By pressing the  key the balance returns to the weighing mode and displays the weight of the counted units.

**Important: The larger the reference quantity, the more accurate the parts counting.**

Smallest counted weight see table „Technical data“, if this weight is less, in the display appears „Er 1“. Use  key to return to the weighing mode.


The tare vessels can also be used for piece counting. Before starting percent weighing use the  key to tare out the container.



## 7.7 Net-total weighings


It is useful if a mixture of several components is weighed into a tare vessel and finally the sum weight of all weighed components is necessary for control purposes (net-total, i.e. the weight of the tare vessel).


### Example:

Put tare vessel onto weighing plate, tare with  key to „0“.

Weigh component ❶ and tare with  key (Memory) to „0“. The memory activation is indicated by a triangle on the left border of the display.

Weigh component ❷, when pressing the  key appears the net total, that means, the sum weight of the components ❶ and ❷. Tare to „0“ using the  key.

Weigh component ❸, when pressing the  key appears the net-total, i.e. the sum weight of components ❶ and ❷ and ❸.


If necessary, also fill the formula up to the desired final value.  
Back to weighing mode by pressing the  key.

## 7.8 Percent weighings

Display symbol: %

Percent weighing allows to display weight in percent, in relation to a reference weight.


Switch-on the balance using the  key and wait for the „0“ display.

Press the  key several times shortly. The reference quantities of the counting function are passed through, after that „100%“ is displayed.

Place the reference item on the weighing pan.

Press  key, the weight of the item is taken over as reference (100%).

Now you can place the test objects onto the weighing plate; the percentage is displayed

Back to weighing mode by pressing the  key.

## 7.9 Weighing units (Unit)

Switch-on the balance using the  key and wait for the „0“ display.

Press the  key and keep it pressed until „UNIT“ appears on the display.








Press  shortly, the selected unit appears in the display.

Use the  key to select between the different units (see table).

By pressing the  key the selected weighing unit is taken over.

	Display display	Conversion factor 1 g =
Gram	g	1.
Pound	lb	0.0022046226
Ounce	oz	0.035273962
Troy ounce	ozt	0.032150747
Tael Hongkong	tlh	0.02671725
Tael Taiwan	tlt	0.0266666
Grain	gn	15.43235835
Pennyweight	dwt	0.643014931
Momme	(mom)	0.2667
Tola	tol	0.0857333381
Carat	ct	5
Freely selectable factor *)	FFA	xx.xx

\*)

In order to enter an own conversion factor, press the  key as explained above until „FFA“ is displayed. Press the  key to reach to the selection. The last digit begins to flash. Using the  key, the displayed value is increased by 1, with the  key it is reduced by 1. Use the  key to jump one digit to the left. When all the changes are ready, use the  key to save this value and by pressing the  key the „Freely selectable factor“ is taken over as current weighing unit.

The different weighing models have integrated different foreign weighing units. Details can be seen in this table:

Model \ Units	440-21N	440-21A	440-33N	440-35N	440-35A	440-43N	440-45N	440-47N	440-49N	440-49A	440-51N	440-53N	440-55N
Gram	x	x	x	x	x	x	x	x	x	x	x	x	x
Pound			x	x	x	x	x	x	x	x	x	x	x
Ounce	x	x	x	x	x	x	x	x	x	x	x	x	x
Troy ounce	x	x	x	x	x	x	x	x	x	x	x	x	x
Tael Hongkong	x	x	x	x	x	x	x	x	x	x	x	x	x
Tael Taiwan	x	x	x	x	x	x	x	x	x	x	x	x	x
Grain	x	x	x	x	x								x
Pennyweight	x	x	x	x	x	x	x	x	x	x	x	x	x
Momme	x	x	x	x	x	x	x	x	x	x	x	x	x
Tola	x	x	x	x	x	x	x	x	x	x	x	x	x
Carat	x	x	x	x	x								
Freely selectable factor	x	x	x	x	x	x	x	x	x	x	x	x	x

## 7.10 Display background illumination

In the menu the functions of the background illumination can be switched on or off. Proceed as follows:

Switch-on the balance using the  key and wait for the „0“ display.

Press the  key and keep it pressed until „UNIT“ appears on the display.

Press the  key seven times, in the display appears „bl“.

Confirm by pressing the  key

Use the  key to choose between the three following settings:

Display	Adjustment	Function
„bl“ on	Background illumination on	Contrastful display which can also be red in the darkness.
„bl“ off	Background illumination off	Battery saving
„bl“ Ch	The background illumination will be switched off automatically 10 sec after having reached a stable weighing value.	Battery saving

Use the  key to confirm your selected setting.


## 7.11 Animal weighing function


The balance has an integrated animal weighing function (mean value calculation). With this function it is possible to weigh domestic or small animals exactly, although they do not stand quiet on the weighing plate.


Note: If they move too much, an exact weighing will not be possible.


In the menu the animal weighing function can be switched on or off. To achieve this, follow the sequence of operations below:

Switch-on the balance using the  key and wait for the „0“ display.

Press the  key and keep it pressed until „UNIT“ appears on the display.

Press the  key eight times, in the display appears „ANL“.

Confirm by pressing the  key.


Use the  key to choose one of the following settings:


Display	Function
„ANL“ off	Animal weighing function is switched off
„ANL“ 3	Weighing value calculation above 3 sec. till to the value display
„ANL“ 5	Weighing value calculation above 5 sec. till to the value display
„ANL“ 10	Weighing value calculation above 10 sec. till to the value display
„ANL“ 15	Weighing value calculation above 15 sec. till to the value display

Use the  key to confirm the selected setting.

### Operation:

Switch-on the balance using the **ON** key and wait for the „0“ display.

Put the weighing good (animal) on the weighing plate and press the die  key. In the display the preselected time is displayed in seconds and then is counted towards zero. During this time the balance takes up several measuring values. When reaching „0“ sounds an acoustic signal and the calculated weighing value is displayed.


By pressing the  key several times, the balance returns to the normal weighing mode.





Repeated pressing of the  key activates this function anew.

## 8 Settings

### 8.1 Call-up menu structure

Switch-on the balance using the  key and wait for the „0“ display.

To enter into the menu structure keep the  key pressed approx. 3 sec. until „UNIT“ appears.

By pressing the  key the different menu items are called up. Use the  key to select a menu item. Within this menu item use the  key to make your choice. By pressing repeatedly the  key the setting is saved.

Press the PRINT key 3 seconds  
->

Chapter 8.5.1  
Data transfer mode

Chapter 8.6  
Selection printed edition

Chapter 8.5.2  
Baud rate

Chapter 6.4  
Battery operation

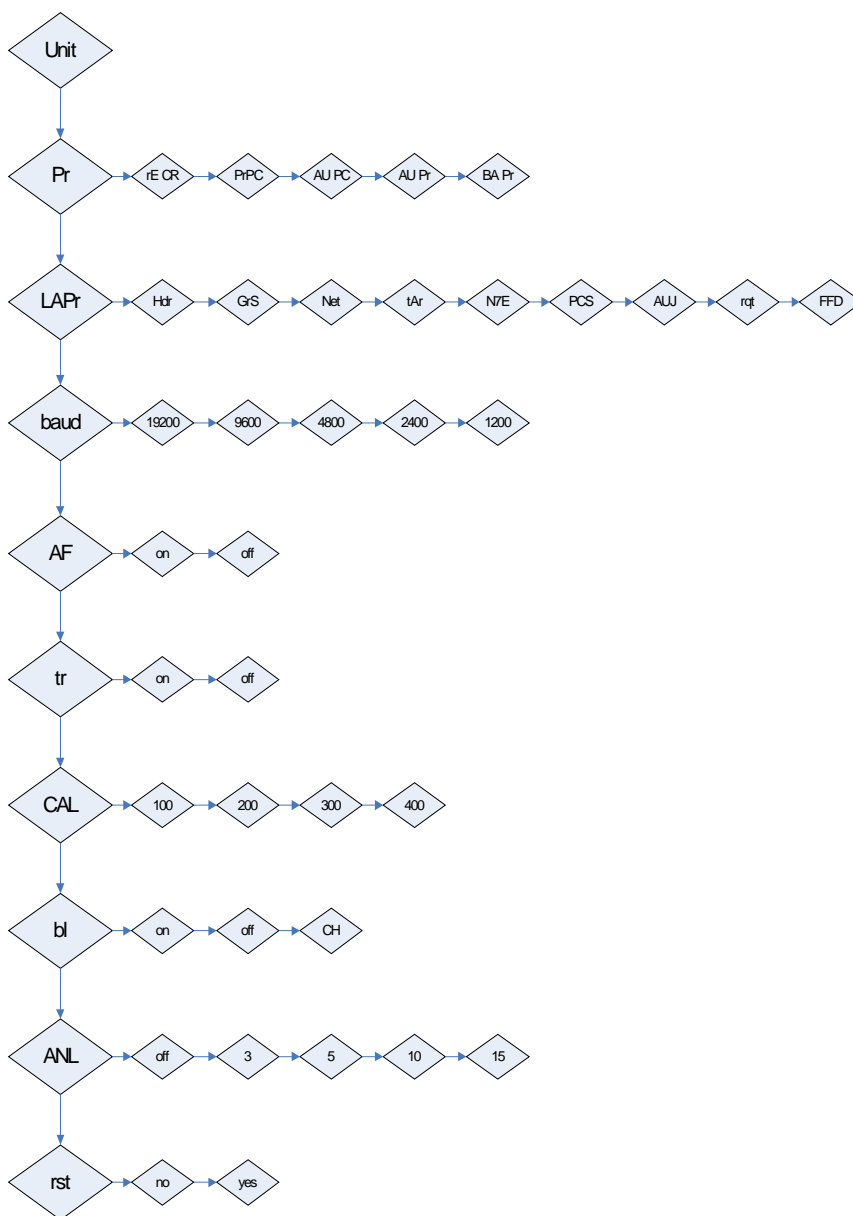
Chapter 8.3  
Zero-Tracking

Chapter 8.4  
Selection of adjustment weight

Chapter 7.10  
Background illumination

Chapter 7.11  
Animal weighing function




Chapter 8.7  
Reset to  
Default setting




## 8.2 Leave menu structure

Everywhere in the menu it is possible to leave the menu structure and thereby save or reject the changes made.

After pressing the  key „Exit“ is displayed.

A: Use the  (YES) key, to confirm. After that „store“ is displayed. If it shall be saved, press the  key repeatedly.  
If the menu shall be left without saving, press the  NO key.






B: The  (NOT EXIT) key must be pressed, if the next menu item shall be reached. After having set all the individual adjustments, it can be saved.

## 8.3 Dosing and Zero-tracking

The Auto-Zero function is used to tare small variations in weight automatically. 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.

Activate/deactivate Zero-Tracking	Balance display
1. Keep the  key pressed until „Unit“ is displayed.	Unit
2. Press the  key several times until „tr“ is displayed.	tr
3. Press the  key to activate the function.	tr on
4. By pressing once more the  key, the function is deactivated.	tr off
5. The changed setting is taken over by pressing the  key.	
6. The balance returns to the weighing mode.	0.0 g

#### 8.4 Selection of the adjustment weight

In the model KERN 440, the adjustment weight can be selected from four pre-set nominal values (approx. 1/4; 1/2; 3/4; max) (refer also to table 1 below, factory setting with grey background). In order to achieve high-quality weighing results in the sense of the measuring technology, it is recommended to select the nominal value as high as possible. The non delivered adjustment weights can be purchased from KERN as option.

**Table 1:**

<b>440-21N</b>	<b>440-21A</b>	<b>440-33N</b>	<b>440-35N</b>	<b>440-35A</b>	<b>440-43N</b>	<b>440-45N</b>
10g	10g	50g	100g	100g	100g	200g
20g	20g	100g	200g	200g	200g	500g
30g	40g	150g	300g	400g	300g	700g
40g	50g	200g	400g	500g	400g	1,000g
	60g			600g		

<b>440-47N</b>	<b>440-49N</b>	<b>440-49A</b>	<b>440-51N</b>	<b>440-53N</b>	<b>440-55N</b>
500g	1,000g	1,000g	1,000g	1,000g	1,000g
1,000g	2,000g	2,000g	2,000g	2,000g	2,000g
1,500g	3,000g	5,000g	3,000g	5,000g	5,000g
2,000g	4,000g	6,000g	4,000g	6,000g	6,000g








## 8.5 Interface RS232C

### Data output via interface RS 232 C

#### General Information







The previous condition for the data transfer between balance and a peripheral device (e.g. printer, PC ...) is that the appliances are set to the same interface parameters (e.g. baud rate, transfer mode ...).

#### 8.5.1 Data transfer mode

Setting of data transfer mode	Balance display
1. Keep the  key pressed until „Unit“ is displayed.	Unit
2. Press  key, „Pr“ appears.	Pr
3. To change the setting, press the  key.	Pr PC
4. The mode can be converted using the  key (Pr PC; AU PC; AU Pr ; <b>re Cr</b> ; BA Pr ; details chapter 9.4).	AU Pr
5. The changed setting is taken over by pressing the  key.	
6. The balance returns to the weighing mode.	0.0 g


#### 8.5.2 Baud rate


The baud rate necessary for the measuring values transfer can be set.  
In the following example the baud rate is set to 9600 baud.


Setting of baud rate	Balance display
1. Keep the  key pressed until „Unit“ is displayed.	Unit
2. Press  key	Pr
3. Press  key, „baud“ appears.	Baud
4. Confirm by pressing the  key	4800
5. The baud rate can be changed using the  key (1200, 2400, 4800, <b>9600</b> , 19200).	9600
6. The changed setting is taken over by pressing the  key.	
7. The balance returns to the weighing mode.	0.0 g

## 8.6 Selection printed edition



Use this function to select which data are sent via the RS232C interface.  
To achieve this, follow the sequence of operations below: (is **not** valid for the data transfer mode BAPr )


Switch-on the balance using the  key and wait for the „0“ display.

Press the  key and keep it pressed until „UNIT“ appears on the display.


Press the  key twice, in the display appears „LAPr“.

Confirm by pressing the  key

Now it is possible to scroll forward in the available edition parameters using the  key, to scroll backward, use the  key.

After actuating the  key, the current state is displayed ( on / off ).

Use the  or the  key to change the state.


After that the current state is saved using the  key and the menu is left.  
By that way the user can configure his own data block, which then is sent to a printer or to a PC.


Display	Status	Function
„Hdr“	On / Off	Edition of the headlines
„GrS“	On / Off	Edition of the total weight
„Net“	On / Off	Edition of the net weight
„tAr“	On / Off	Edition of the tare weight
„N7E“	On / Off	Edition of the stored weight
„PCS“	On / Off	Edition of quantity
„AUJ“	On / Off	Edition of the unit weight
„rqt“	On / Off	Edition of the reference quantity
„FFd“	On / Off	Edition of a page feeding


## 8.7 Reset to factory setting


With this function the manual changes of the menu settings are reset to factory setting.


For this switch on the balance using the  key and wait for the „0“ display.

Press the  key and keep it pressed until „UNIT“ appears on the display.

Press the  key nine times, in the display appears „rst“.

Acknowledge selection with  key. The current status „no“ is displayed.

Use the  key to set the status to „YES“.

When pressing the  key, a reset to factory setting is carried out, and at the same time the status is reset to „no“.

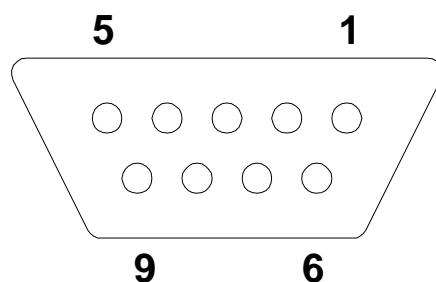
After that return to weighing mode.

## 9 Data output RS 232 C

### 9.1 Technical data

- 8-bit ASCII Code
- 1 start bit, 8 data bits, 1 stop bit, no parity bit
- Baud rate selectable at 1200, 2400, 4800 and **9600** Baud
- Miniature plug-in necessary (9 pole D-Sub)
- For operation with interface faultless operation is only ensured with the correct KERN – interface cable (max. 2m)

### 9.2 Pin allocation of the balance output socket (front view),



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

### 9.3 Explanation of the data transfer

#### 9.3.1 Pr PC

Press the PRINT key, at stable value the format is transferred from **LAPR**.

a. Format for stable values for weight/quantity/percentage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B*	B	B	B	B	B	B	B	B	0	.	0	B	g	B	B	C R	LF

b. Format in case of fault

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	B	B	B	B	B	B	E	r	r	o	r	CR	LF

#### 9.3.2 AU Pr

As soon as the weighing value is stable, the format is automatically transferred from **LAPR**.

c. Format for stable values for weight/quantity/percentage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B*	B	B	B	B	B	B	B	B	0	.	0	B	g	B	B	C R	LF

d. Format in case of fault

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	B	B	B	B	B	B	E	r	r	o	r	CR	LF

### 9.3.3 AU PC

The weighing values are sent automatically and continuously, no matter if the value is stable or unstable.

#### e. Format for stable values for weight/quantity/percentage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B*	B	B	B	B	B	B	B	B	0	.	0	B	g	B	B	C R	LF

#### f. Format in case of fault

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	B	B	B	B	B	B	E	r	r	o	r	CR	LF

#### g. Format for unstable values for weight/quantity/percentage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B*	B	B	B	B	B	B	B	B	0	.	0	B	CR	LF

### 9.3.4 rE Cr

The remote control commands s/w/t are sent from the remote control unit to the balance as ASCII code. After the balance having received the s/w/t commands, it will send the following data.

Take into account that the following remote control commands must be sent without a subsequent CR LF.

- s** Function: Stable weighing value for the weight is sent via the RS232 interface
- w** Function: Weighing value for the weight (stable or unstable) is sent via the RS232 interface
- t** Function: No data are sent, the balance carries out the tare function.

#### h. Format for stable values for weight/quantity/percentage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B*	B	B	B	B	B	B	B	B	0	.	0	B	g	B	B	C R	LF

#### i. Format in case of fault

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	B	B	B	B	B	B	E	r	r	o	r	CR	LF

#### j. Format for unstable values for weight/quantity/percentage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B*	B	B	B	B	B	B	B	B	0	.	0	B	CR	LF

### SYMBOLS:

B*	= blank or M
B / 0 /.	= blank / weight values / decimal dot, depending on the measuring Value
g	= weight unit / unit / %
E, o, r	= ASCII code or "E, o, r"
CR	= carriage return symbol
LF	= line feed symbol

## **9.4 Output on bar code printer**


The data transfer mode has to be set on „**BA Pr**“ (chapter 8.5.1).

As bar code printer a Zebra printer model LP2824 is provided.

Take into account that the output format of the balance is fixedly defined and cannot be changed.

The printer format is stored in the printer, i.e. in case of a failure the printer cannot be changed with a new one from factory, previously it is necessary that KERN installs the respective software.

The Zebra printer and the balance must be connected to the delivered interface cable when they are switched off.

After switching-on both appliances, and after reaching the status ready-for-operation, a label will be printed out when pressing the  key.

## **10 Service, maintenance, disposal**

### **10.1 Cleaning**

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

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

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

**Spilled weighing goods must be removed immediately.**

### **10.2 Service, maintenance**

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

Before opening, disconnect from power supply.

### **10.3 Disposal**

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

## 11 Instant help

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

Help:

### Fault

### Possible cause

The displayed weight does not glow.

- The balance is not switched on.
- The mains supply connection has been interrupted (mains cable not plugged in/faulty).
- Power supply interrupted.
- Batteries are inserted incorrectly or empty
- No batteries inserted.

The displayed weight is permanently changing

-

- Draught/air movement
- Table/floor vibrations
- The weighing plate is in contact with foreign matter.
- Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)

The weighing value is obviously wrong

- The display of the balance is not at zero
- Adjustment is no longer correct.
- Great fluctuations in temperature.
- Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)

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