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Service manual
Electronic Crane Scales

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KERN HFC

Version 1.0
10/2015
GB

HFC-SH-e-1510

GB

KERN HFC

Version 1.0 10/2015

Service manual

English

Contents

English

1. Basic Information

The device must be repaired only by trained specialist staff or personnel with professional formation (such as a repair-specialist accredited by law concerning verification). The service manual is obligatory for repair work. After repair, original conditions of the device have to be restored. Only original spare parts should be used.

Instructions about conformity-evaluated scales:

Repair must be carried only at 100% compliance with the type approval. A violation of this specification will result in a loss of the type approval! After successful repair the balance will have to be reverified before it can be used again in a statutorily regulated field.

Detailed instructions about conformity-evaluated scales:

Repair must be carried only at 100% compliance with the type approval. A violation of this specification will result in a loss of the type approval!

After successful repair the balance will have to be reverified before it can be used again in a statutorily regulated field.

2. Introdution

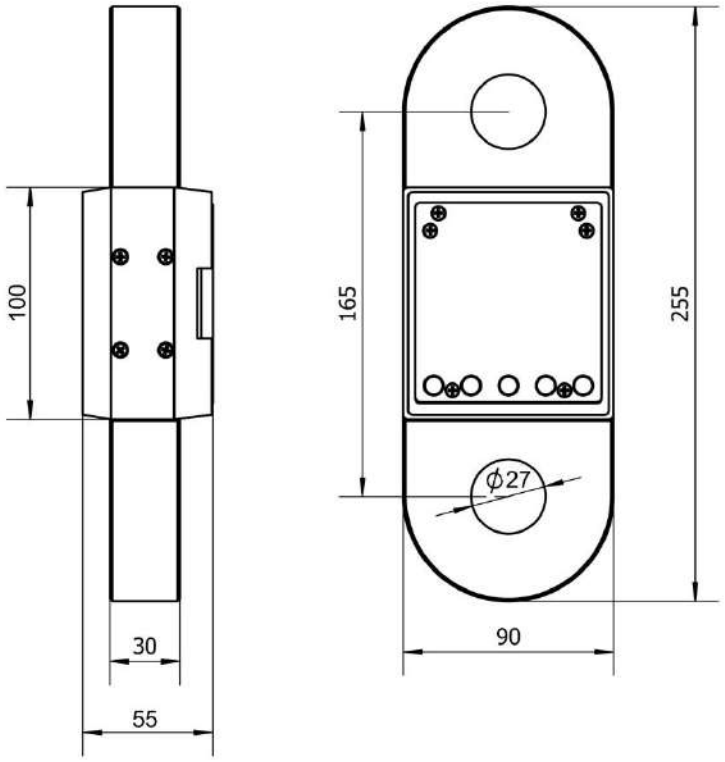
This service manual covers the EOA series and is edited for the authorized servicing personnel.

Notes on operation and setting parameter please refer to the scale corresponding user manual.

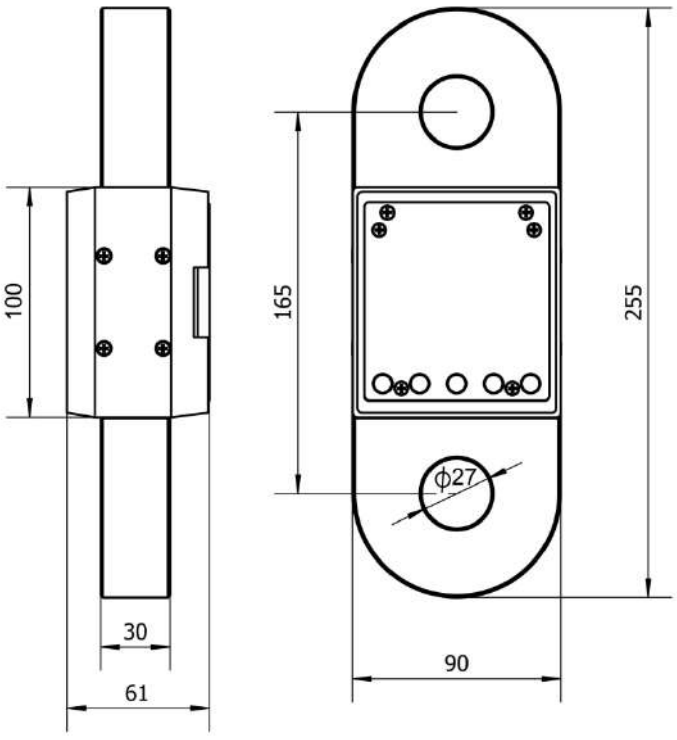
3. Technical data

3.1 Dimensions

Balance 0.6 t / 1 t



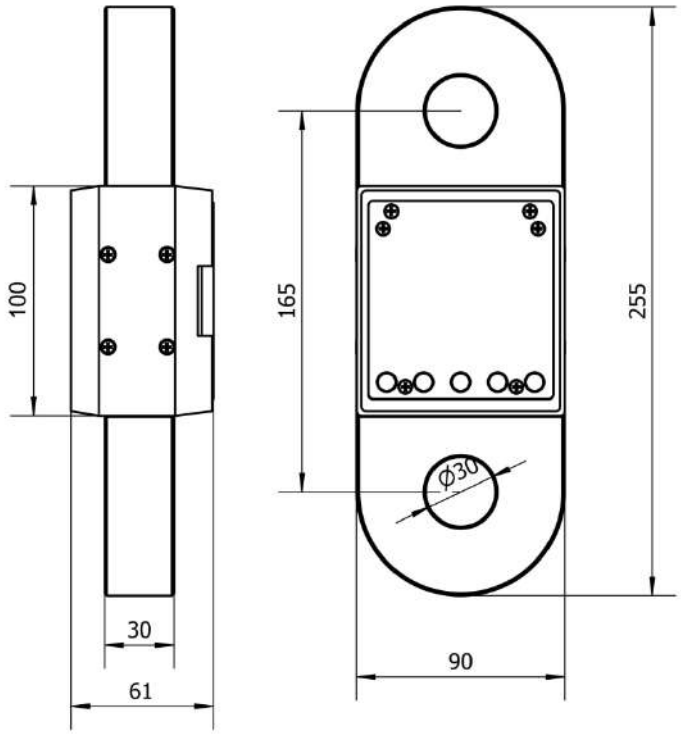
Balance 3 t



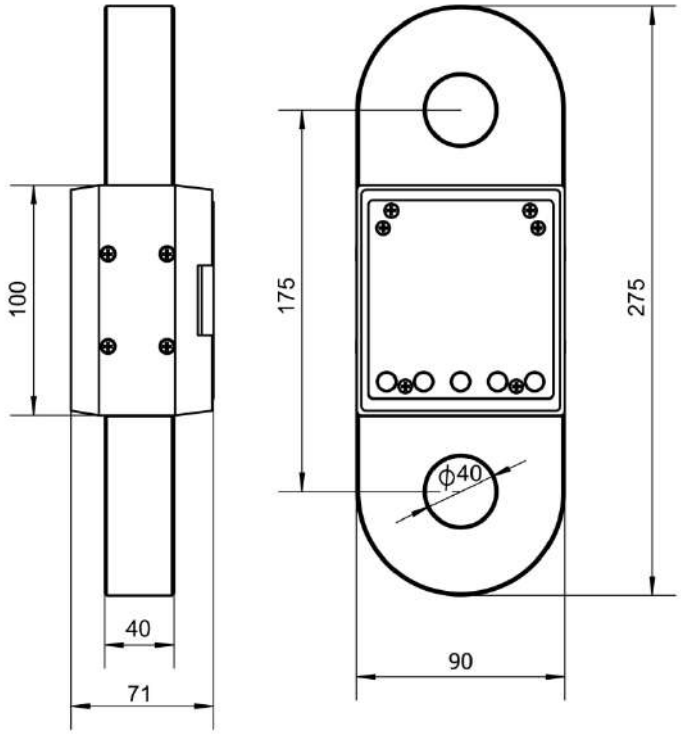
English

English

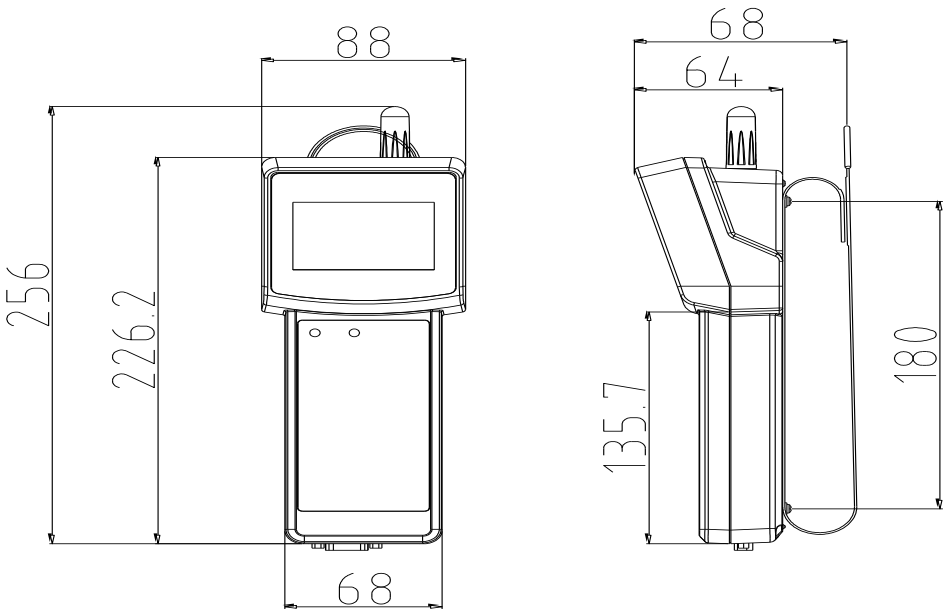
Balance 5 t



Balance 10 t



Holding strap terminal



English

4. General Safety Instructions

4.1 Duties of the owner-operator

Follow national accident prevention regulations and all operator health and safety at work and operating regulations.

- Observe all safety regulations of the crane manufacturer.
- The balance may only be used for the proposed purpose. Any type of use which is not specified in these operating instructions will be considered as improper use. The customer is solely responsible for material damage and injury of persons resulting from an improper use, Messrs. KERN & Sohn will not be liable under any circumstance.
  Messrs. KERN & Sohn cannot be held liable, if the suspended balance is modified or used improperly and if damage is resulting from such use.
- Carry out service and repair to suspended balance crane and lifting tackle at regular intervals.
- Log the test result and keep it in the logbook.

4.2 Organizational measures

- Only trained and instructed staff may operate the balance.
- Make sure that the operating instructions are kept nearby the operation site of the suspended balance.
- Assembly, commissioning and maintenance should only be carried out by trained specialists.
- Weight-bearing components must not be replaced.

4.3 Environmental conditions

- Never operate suspended balance in spaces exposed to explosion hazards. The serial version is not explosion protected.
- Operate the suspended balance only under environmental conditions as specified in these operating instructions
- Do not expose the suspended balance to strong humidity. 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.
- Do not use suspended balance in environments exposed to corrosion hazards.
- Protect the suspended balance against high humidity, vapours and dust.
- 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.

4.4 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.

⇨ All language versions contain a non-binding translation. The original German is binding.

4.5 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 suspended on the load receptor only vertically, manually, carefully and without jerks. As soon as a stable weighing value is reached the weighing value can be read.

- Use the suspended balance only for lifting and weighing of freely movable loads.
- Danger of injury due to improper use. Not allowed are e.g.:
  - Exceeding the allowed nominal load of crane, suspended balance or any type of load attachment devices
  - Conveying persons,
  - Pulling loads over an inclined surface,
  - Tearing-off, pulling or towing loads.
- Modifications or reconstructions of the suspended balance or of the crane are not allowed.

4.6 Improper Use

Do not use balance for dynamic weighing. In the event that small quantities are removed or added to the material to be weighed, incorrect weighing results can be displayed due to the “stability compensation“. (Example: Slowly draining fluids from a container suspended on the balance.) Do not leave permanent load suspended on the balance. This may damage the measuring system as well as safety-relevant parts.

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

4.7 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

4.8 Safe working

- Do not stand under swinging loads
- Position the crane in a way that the load is lifted vertically.
- When working with the crane and suspended balance wear personal safety equipment (helmet, safety shoes etc.).

4.9 Monitoring of Test Resources

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

4.10 Testing upon acceptance

Inspect packaging immediately upon receipt and inspect device when unpacking in the event of any evident damage.

4.11 Initial Commissioning

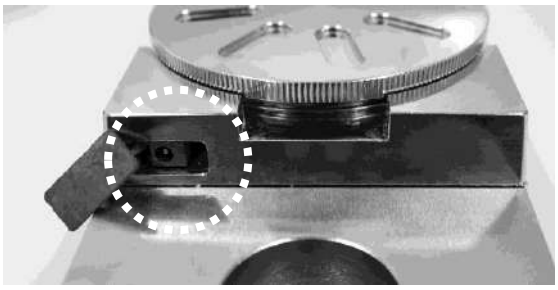
In order to obtain exact results with the electronic balances, your balance must have reached the operating temperature.
During this warming up time the balance must be connected to the power supply (mains, accumulator or battery).
The accuracy of the balance depends on the local acceleration of gravity.
Strictly observe hints in chapter Adjustment.

4.12 Shutdown and storage

- Remove suspended balance from crane and remove all attachment devices from the suspended balance.
- Do not store suspended balance outdoors.

5. Appliance overview

5.1 Rear

	
Battery or rechargeable battery compartment	Mains connection

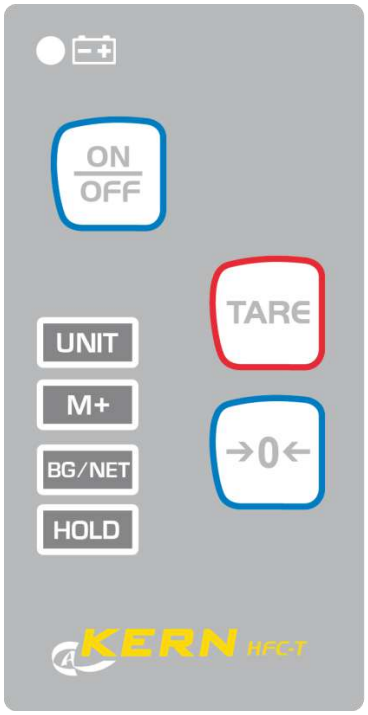
English

5.2 Overview of display

English

Display	Significance
	Rechargeable battery capacity
	Indicators for weighing with tolerance range
M+	Totalization
STABLE	Stability display
ZERO	Zero indicator
Net	The displayed weighing value is a net weighing value
OZT **Lb** **kg**	Weighing Units

5.3 Keyboard overview



Button	Description of function
ON OFF	• Turn on/off balance
TARE	• Taring • Scroll up/down menu • For numeric entry increase value of digit
→0←	• Zeroing • Confirm
UNIT	• Switch-over weighing unit • Exit menu / back to weighing mode.
M+	• Totalization • Select digits for numeric entry
BG/NET	• Change-over button between gross ⇆ and net weight • Delete total added memory • Delete on numeric entry
HOLD	• Fixing weight display • Displaying peak load value

English

5.4 Label

⇨ Do not stand or go under suspended loads.

⇨ Do not use on building site.

⇨ Keep an eye on suspended loads.

(example)

⇨ Do not exceed nominal rated load of balance.

⇨ The product conforms to the requirements of the German Equipment and Product Safety Act.

English

6. Battery

6.1 Battery / rechargeable battery operation

Battery operation:

When batteries are empty,  will appear on the balance's display

Press 

and replace batteries.
Open battery compartment, replace batteries and close battery compartment again.

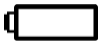
In order to save the battery, the balance switches automatically off after 4 minutes without weighing. This auto-off function can be deactivated in the menu.

When the suspended balance is out of operation for a longer period, remove the batteries.

Unscrew battery / rechargeable battery compartment in the direction of the arrow.	
Replace batteries and relock battery / rechargeable battery compartment.	

English

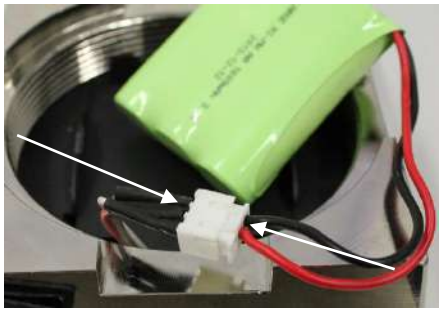
6.2 Accu operation:

When the rechargeable battery is empty,  appears on the balance's display.
Turn off balance and connect power supply unit; battery is charged.
Once the battery has been fully charged the display will show the  symbol.

Insert rechargeable battery:

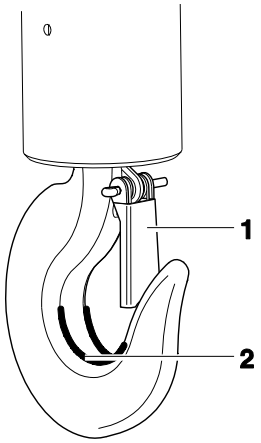
Unscrew battery compartment in arrow direction.	
Remove batteries including battery mount from the device.	 

English

Connect cable of balance to battery cable as shown on image.	
Insert battery in the centre. Ensure that the cables are not kinked. Relock battery compartment.	

English

6.3 Suspending the balance



Condition
The crane needs a safety bracket (1) that the unloaded suspended balance cannot fall down.
If the safety bracket is missing or damaged, please contact the crane manufacturer in order to receive a hook with this safety equipment.

⇨ Attach the suspended balance to the lower hook of a crane and close the safety bracket.
The crane scale’s upper eyelet should rest in the saddle (2).

7. Operation

7.1 Safety instructions

<table>
<tr>
<td>  </td>
<td>DANGER Risk of injury due to falling loads!</td>
</tr>
<tr>
<td> 
 
 
 

(example)</td>
<td>⇨ Take great care when operating the crane and follow the general rules for crane operation.
⇨ Check all parts (hook, carbines, rings, rope slings, cables, chains etc.) for excessive wear or damage
⇨ If faults can be seen on the safety bracket of the crane hook or if it is missing completely, the scales must not be used.
⇨ Work only with appropriate speed
⇨ Always avoid vibrations and horizontal forces. Avoid any kind of shock, torsion and oscillating (e.g. caused by inclined suspending)
⇨ Do not use the suspended balance for conveying loads.
⇨ Do not stand or go under suspended loads.
⇨ Do not use on building site.
⇨ Keep an eye on suspended loads.
⇨ Do not exceed nominal rated load of crane, suspended balance or any kind of attachment device on the suspended balance.</td>
</tr>
</table>

English

7.2 Loading the suspended balance

For good weighing results observe the following, illustrations see next page:

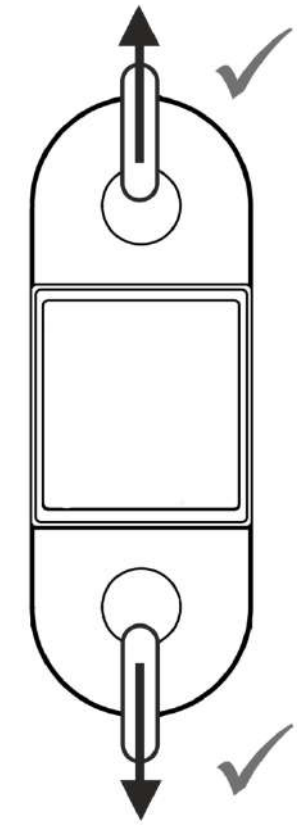
- ⇨ Only use load attachment devices which guarantee a one-spot suspension and where the scales can be suspended freely.
- ⇨ Do not use too large load attachment devices which do not guarantee any one-spot suspension.
- ⇨ Do not use multiple suspensions.
- ⇨ Do not pull or push the load or the loaded balance.
- ⇨ Do not pull the hook horizontally.

Loading the balance

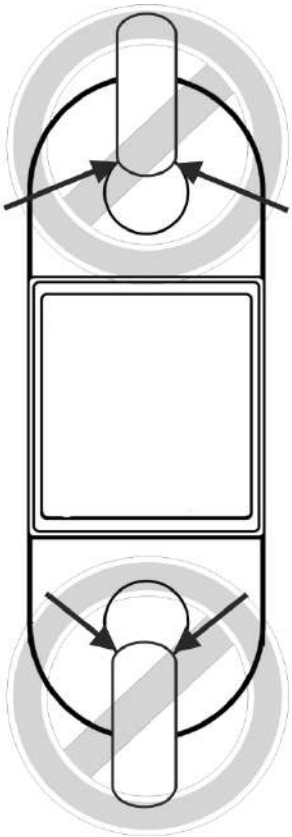
1. Position the hook of the suspended balance over the load.
2. Move downwards the suspended balance until the load can be suspended on the hook of the balance. Reduce the speed when the respective height is going to be reached.
3. Attach load to attachment device. Ensure that all safety-relevant devices are functional (e.g. the safety latch is closed). If the load is fixed by slings, ensure that the slings rest completely on the saddle of the balance hook.
4. Lift-off the load slowly.

   When the load is fixed by slings, ensure that the load is well balanced on both sides and that the slings are correctly positioned

+ **Always use suitable lifting tackle.**



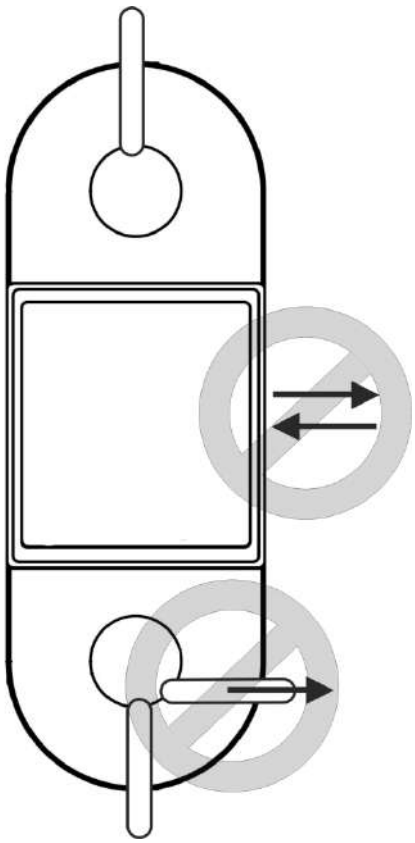
Only use attachment devices which guarantee a one-point suspension and where the scales can be suspended freely.



Do not use too large attachment devices which cannot guarantee a one-point suspension.

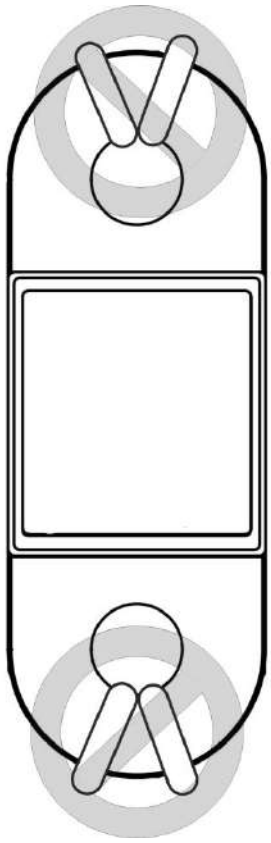
English

English



Do not push or pull

Do not pull the hook horizontally



Do not use multiple suspensions

8. Menu

8.1 Navigation in the menu:

Call up menu	⇨ Switch-on balance and during the selftest press TARE. The first function „F0 off“ is displayed.
Select menu item	⇨ With help of TARE, the individual menu items can be selected one after the other.
Select setting	⇨ Confirm selected menu item by pressing →0←. The current setting will be displayed.
Change settings	⇨ Switch into the available settings using TARE.
Confirm setting	⇨ Press →0←, balance returns to menu
Exit menu / Return to weighing mode	⇨ Press UNIT repeatedly.

English

8.2 Overview:

Function	Available settings		Description
F0 oFF	**bk**	bk on	Background illumination on
		bk oF	Background illumination off
		bk AU	Background illumination switches on automatically when loaded or a button is pressed
	bEEP	oFF	Acoustic signal for weighing with tolerance range switched off
		ok	Audio sound when load is within tolerance limits
		nG	Audio sound when load is beyond tolerance limits
	oFF	0	Autom. shutdown disabled
		3/5/15/30	Autom. switch-off, options include 3, 5, 15, 30 minutes.
F1 H-L	**SEtHi**		Upper limit value “tolerance weighing “
	SEtLo		Lower limit “tolerance weighing”
F2 Unt	On / off **lb**		Set weighing unit to “on”, which you wish to switch-over to by UNIT in weighing mode
	On / off **N**		
F3 Com	Not documented		
F4 CH	CH 1 ↓ CH 8		Communication channel remote control
ProG  **Pn**	Service menu Press →0←, when display shows “ProG“ and the password query “Pn“ will appear. Press TARE, M+, →0← one after the other and the first menu block “P1 rEF“ will be displayed.		

P1 rEF	**AZn**	off 0.5 d 2 d 4 d	Automatic zero correction (auto-zero) on change of display, Digit options include 0.5d, 2 d, 4 d..	Modifications may only be carried out by a specialist with competent knowledge. Adjustment or linearization is required after each configuration.
	0AUto	P0 P10 P20 P50 P100	Load range where the display after switching-on the balance is automatically set to zero. Options include 0, 10, 20, 30, 50, 100 %	
	0rAnG	P0 P2 P4 P10 P20	Load range where the display is set to zero by pressing →0←. Options include 0, 2, 4, 10 , 20%.	
P2 CAL	**SiGrA** Single range scale	dESC	Position of the decimal dot	
		inC	Readability (d)	
		CAP	Capacity (max)	
		CAL	Adjustment procedure see chap. 9.1	
	dU rA Dual range scale	dESC	Position of the decimal dot	
		inC	div 1 Readability [d] 1. Weighing range	
			div2 Readability [d] 2. Weighing range	
		CAP	cap 1 Balance capacity [max] 1. Weighing range	
			cap 2 Balance capacity [max] 2. Weighing range	
		CAL	Adjustment procedure see chap. 9.1	
	dU in Multi-interval scale	dESC	Position of the decimal dot	
		inC	div 1 Readability [d] 1. Weighing range	
			div2 Readability [d] 2. Weighing range	
		CAP	cap 1 Balance capacity [max] 1. Weighing range	
			cap 2 Balance capacity [max] 2. Weighing range	
		CAL	commo Adjustment procedure	
			LinE0 Linearization procedure	
P3 inP	**12345**		Display internal resolution	
P 4 HLd	**Hold**		Data-HOLD function	
	PEAK		Peak value function	

English

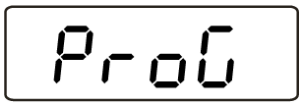
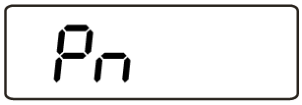
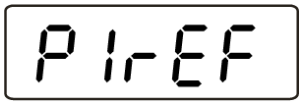
9. Adjustment / linearization

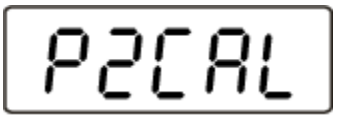
9.1 Adjustment

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.

- Provide the required adjustment weight.
  The weight to be used depends on the capacity of the scale. Carry out adjustment as near to maximum load as possible. Info about test weights can be found on the Internet at: http://www.kern-sohn.com
- Observe stable environmental conditions. A warming up time (see chapter 1) is required for stabilization.

Preparation:

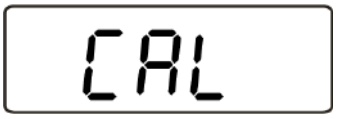
⇨ Turn off balance and attach suitable lifting tackle.	
⇨ Turn on balance with the lifting tackle attached and press TARE during self-test. The first function „F0 off“ is displayed.	
⇨ Press TARE repeatedly until „ProG“ will be displayed.	
⇨ Press →0←, when display shows “ProG“ and the password query “Pn“ will appear.	
⇨ Press subsequently TARE, M+, →0← and the first menu block “P1 rEF“ will be displayed.	

⇨ Press TARE to call up “P2 CAL“.	
⇨ Press →0← and select the set balances type by TARE.	

SiGrA → Single-range balance

dU rA → Dual range balance

dU in → Multi-interval balance

⇨ Acknowledge by →0←.	
⇨ Press TARE repeatedly until „CAL“ will be displayed.	

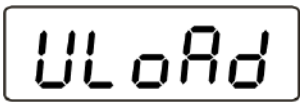
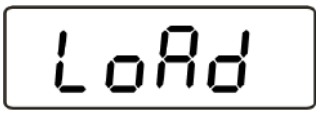
⇨ Confirm by →0← and select required setting by TARE

Commo → Adjustment

LinE0 → Linearization

English

How to carry out adjustment:

⇨ Confirm adjustment function “Commo“ by →0←.	
⇨ “ULoAd“ will be displayed. Make sure that no loads apart from the lifting tackle are attached to the hook.	
⇨ Wait for stability display, then press →0←. Either use the displayed adjustment weight or change by TARE and M+, the currently enabled digit is flashing. To change the selected (flashing) digit, press TARE repeatedly until the desired value is displayed. Then select further digits by M+ and amend them by TARE.	 (example)
⇨ Confirm by →0←, „LoAd“ will be shown. ⇨ Attach adjustment weight. Wait for stability display, then press →0←.	
⇨ After successful adjustment „Pass“ will be displayed. Afterwards the balance will carry out a self-test. “Err19“ will appear briefly (Ignore error message), then the balance will change automatically into weighing mode and the total weight will be displayed. Adjustment has now been completed successfully.	  (example)

⇨ In case of an adjustment error or incorrect adjustment value the error message “fail“ will be displayed and you must repeat the adjustment procedure.

9.2 Linearization

Linearity shows the greatest deviation of a weight display on the scale to the value of the respective test weight according to plus and minus over the entire weighing range.
If linearity deviation is discovered during a monitoring of test resources, you can improve this by means of linearization.

- Carrying out linearization is restricted to specialist staff possessing well acquainted with the workings of balances.
- The test weights to be used must be adapted to the balance's specifications
- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.
- After successful linearization you will have to carry out calibration

Preparation:
Call up linearization function "LinE0"; see chap. 8.2

How to carry out linearization:

⇨ Confirm „LinE0" by →0←.	
⇨ "LoAd0" will be displayed. Make sure that no loads apart from the lifting tackle are attached to the hook.	
⇨ Wait for stability display, then press →0←. As soon as "LoAd 1" is displayed attach first adjustment weight (1/3 max).	
⇨ Wait for stability display „STABLE", then press →0←. As soon as "LoAd 2" is displayed attach second adjustment weight (2/3 max).	

English

⇨ Wait for stability display „STABLE“, then press →0←. As soon as “LoAd 3“ is displayed attach third adjustment weight (max).	
⇨ Wait for stability display, then press →0←.	
⇨ After successful adjustment „Pass“ will be displayed. Afterwards the balance will carry out a self-test. “Err19“ will appear briefly (Ignore error message), then the balance will change automatically into weighing mode and the total weight will be displayed. Linearization has now been completed successfully.	  (example)

English

10. Cleaning, Maintenance and Disposal

 **Danger**	**Risk of injury and risk of material damage!** **The suspended balance is part of the lifting gear!** **For a safe operation please observe the following:** ⇨ Have carried out a regular maintenance by trained specialized staff ⇨ Carry out regular maintenance and servicing ⇨ Have the parts exchanged only by trained specialized staff. ⇨ If there arose discrepancies with the safety checklist, the balance must not more be put into operation. ⇨ Do not repair the suspended balance yourself. Repair may only be carried out by service partners authorized by Messrs. KERN.

10.1 Cleaning and Disposal

 **CAUTION**	**Damage to suspended balance!** ⇨ Do not use industrial solutions or chemicals (e.g. acid → embrittlement).

⇨ Clean the keyboard and the display with a soft cloth soaked in mild window cleaning agent.

⇨ 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.

10.2 Regular maintenance and care

▲ The regular 3-month maintenance may only be carried out by an expert with competent knowledge of working with suspended balances. Thereby the national regulations for prevention of accidents as well as the working, operation and safety regulations of the owner-operator.

▲ To check the dimensions only use suitable test devices.

▲ The regular 12-month maintenance must only be carried out by trained specialized staff (KERN customer service).

▲ The results of the maintenance must be written down in a checklist

▲ The additional results of the extended maintenance have to be entered in the checklist

▲ The load suspension device is to be cleaned before inspection

Regular maintenance:

Prior to each usage	▪ Check for fault-free operation of the attachment devices
Initial start-up, every **3 months** or definitely after **12 500 weighing processes**	▪ Check all dimensions ▪ Check the suspended balance and the used attachment device for wear and tear, such as e.g. plastic deformation, mechanical damage (unevenness), notches, striation, cracks, corrosion and torsions. ▪ Remove balance from use immediately if a reading exceeds the permitted deviation from the original reading or any other fault is identified.
Every **12 months** or in any case after **50 000 weighing processes**	▪ If the enhanced maintenance has to be carried out by trained staff (KERN customer service). At this general revision all load carrying parts must be checked for gaps with magnetic powder.
Every **10 years** or anyway after **500 000 weighing processes**	▪ Replace entire suspended balance

Note
For inspection of wear and tear please refer to the drawing below.

Rejection criteria: Load carrying devices may no longer be used when e.g.

+ Deviations during the tests defined for maintenance were discovered.
+ The type or load rating plate is missing.
+ Load suspension devices known to have been overloaded or subject to other harmful influences may no longer be used and/or may be re-used only after inspection.

11. Cleaning, Maintenance and Disposal

If the scale does not operate properly, find out the problem as possible.
Determine whether the problem is constant or alternate. Be aware that problems can be caused by mechanical or electrical influences.

Check the following.

- Water
- Corrosive materials
- Vibrations or temperature or wind
- Physical damage

Check the scale cables for damage, and check all connections and connecters for any loose contact or incorrect connection

Cleaning

- Disconnect the power before cleaning.
- Use a cloth with mild suds and light cleaning agents.
- Make sure that fluid not able to get into the device.
- Use a clean and soft cloth for rub off.

11.1 Error Codes

Error Code	Description	POSSIBLE CAUSES
Err 4	Zero range exceeded, due to turning on or by pressing 	• Goods on the platform • Overload, when zeroing the scale. • Improper calibration • Load cell problem • PCB problem
Err 6	A/D Count out of the range	• Platform not installed • Load cell problem • PCB problem

11.2 Determine the Problem

Determine whether the problem is in the PCB or the Load Cell

- Remove power from the system, and disconnect the load cell connection from the PCB
- Connect the PCB to a load cell simulator
- Reapply power and test the PCB
- If problem goes away, its source is probably in the Load cell. Check the wiring, connecter, load cell and mechanical components of the load cell.

If problem persists, its source is probably in the PCB. Check the PCB voltages, connecters, cables and function programs

11.3 Testing Load cell

For testing load cell, remove power from the system, and disconnect the PCB from the Load cell

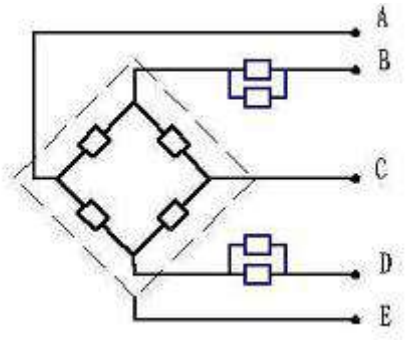
Physical Test:

- Check the moisture, or foreign material inside.
- Check load cell surface badly rusted or corroded
- Check the strain gauge areas become compressed
- Check any physical damage (body bent or twisted) to the load cell
- Check load cell cable, all leads are connected, any cut, splits or tears.
- Check load cell for proper input and output resistances

Electrical Test:

Use an accurate multimeter to check the ohms

Load Cell Connections



Signal + Green
Supply + Red

Signal - White

Supply - Black
Shield

Measuring Points	Resistance
Red (+ Exc) to Black (–Exc)	409 ±6Ω
Green (+Sig) to White (–Sig)	350Ω ±3Ω

Leakage Resistance

- Check each of the load cell wires to the load cell cable screen.
- Check each of the load cell wires to the load cell body.

These readings should be greater than 1000mΩ or OL.
If this reading is less than 1000 mΩ, then this load cell has leakage between the internal circuit and the load cell body or cable screen

Zero Balance

- Connect the load cell to a stable DC source of between 5 to 10V
- Connect multimeter to mV and connect to the load cell signal wires
- The meter should read 0.00mV ± approximately 1 % of full load.

If the output reads greater than ±10% of full scale capacity, then the load cell will require replacement.

11.4 Testing PCB Voltages

If the problem is in the PCB, use a multimeter to check the following voltages

AC Power

Check the AC power socket out put voltage.

- Voltage must be a -20% and +10% of the normal AC voltage.

adapter Voltage

Check the adapter output cable connecter voltage

- Voltage must be minimum 9VDC and maximum 12VDC

PCB Input Voltage

Check the PCB input power connecter voltage

- Voltage must be minimum 9VDC in to the pin AD+

Check Battery Voltage and Charging Voltage

1. Check the Battery Voltage,
   - Voltage must be minimum 6VDC. If below the 6VDC connect the adapter for charging
   - The battery voltage below the 5.5VDC, replace the battery and install new battery.

2. Check the Battery Charging Voltage;
   - Remove the battery connection terminals (Red and Black) from the battery.
   - Connect the power and turn on the scale
   - Voltage into the terminal minimum 6.5VDC

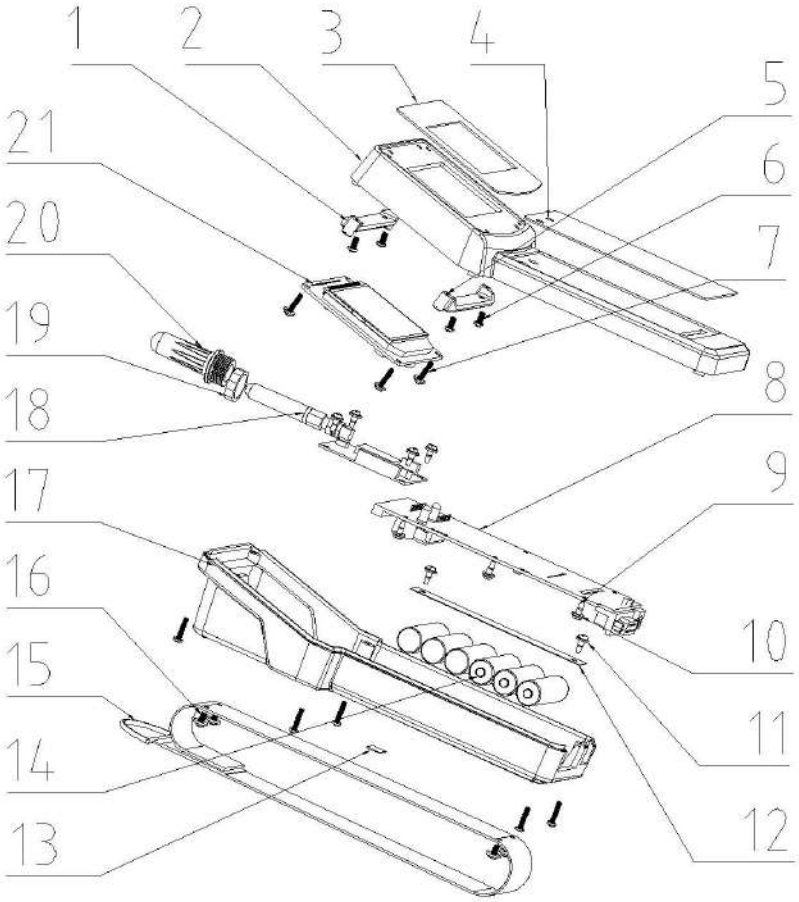
11.5 Trouble Shooting

Problem	Possible Cause	Common Solutions
Display is blank, no self-checking	Mains power is turned off. Power supply not plugged in Internal battery not charged Display turned off	Check the power is going inside and switch is turned on. Verify the voltage
After self-checking error message stuck	Crane not installed Unstable weight Load cell damaged Mechanics damaged	Check again after turn on the scale Check the load cell connecters
OL or ------ appears on the display	Maximum capacity exceeded Load cell or mechanism damaged Power supply fault	Check the crane is installed correctly Check again after turn on the scale Check the power connecters

------ or NULL displayed	Weight on the scale below the permissible limit. Crane has been removed Load cell or mechanism damaged	Check the platform is installed correctly Try to make zero by pressing zero key Check again after turn on the scale Check the load cell connecters
Display is unstable	Sample is moving from the crane Due to vibration, air variation and temperature variation Power supply faulty Load cell damaged	Check the scale is acceptable location is good Check the power supply Check the load cell and connecters
Incorrect value	Calibration error Calibrated with inaccurate weight. Goods not placed correctly to the platform Wrong unit is displayed Load cell damaged	Calibrate again. Check the calibration weight is correct and accurate. Check the crane is installed correctly Check the goods is placed correctly. Check the load cell and connecters
Cannot use full capacity	Overload stopper is touching Transporting lock is not removed Parameter settings incorrectly Load cell damaged PCB damaged	Check the transporting lock and overload stopper Check the parameters settings Check the platform is installed correctly Check the load cell Check the PCB
Battery not charging	Mains voltage is not correct. adapter damaged Charging circuit failure Battery failure	Check the mains voltage Check the adaptor Check the power connecters and circuit Check the battery

12. Drawing

12.1 Indicator

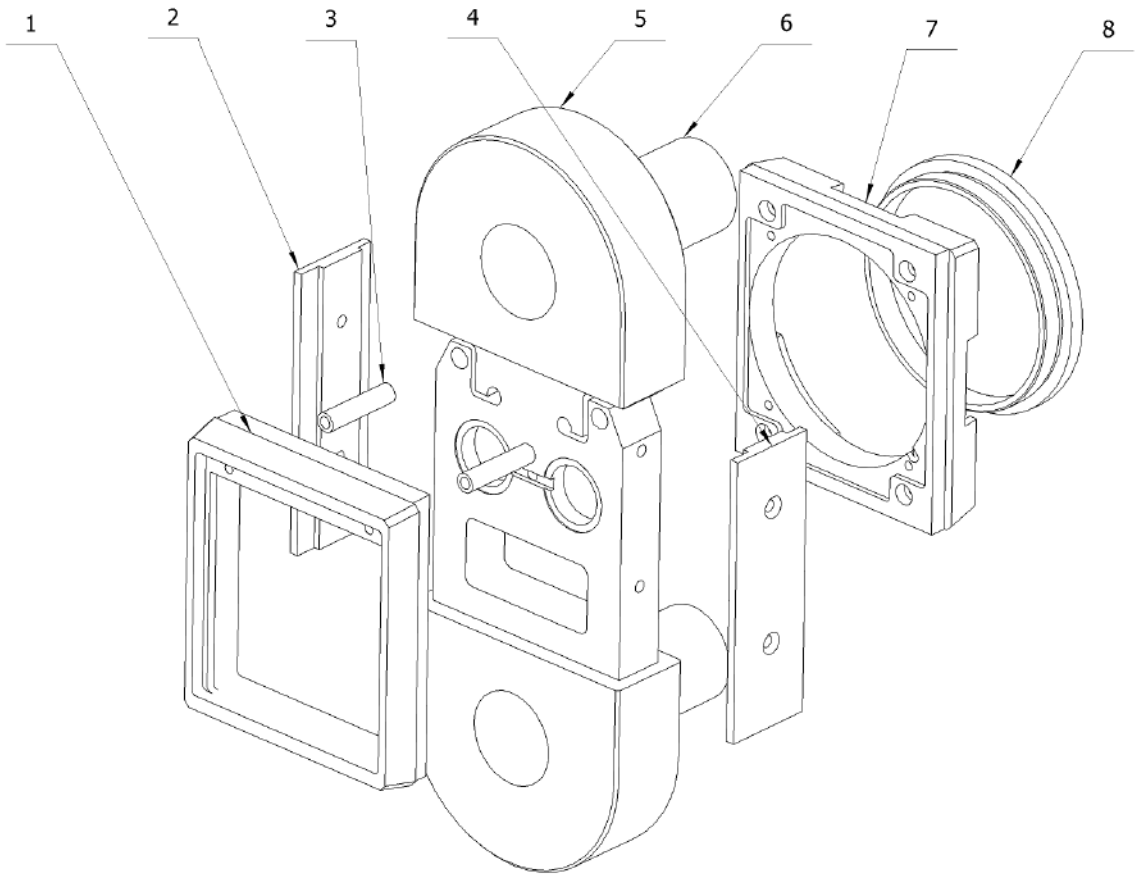


Parts Name

No	Parts Name	Qty	Spec
1	Support1	1	ABS
2	cover	1	ABS
3	facing	1	PC
4	Key panel	1	PC
5	Support2	1	ABS
6	Screw	4	M3x6
7	Screw	10	M2.5x12
8	Main board	1	
9	Screw	12	M3x8
10	gasket	14	Paper (M3)
11	gasket	6	carbon steel (M3)
12	Battery fastener	1	PC
13	Name plate	1	
14	Ni-H battery group	1	7.2V / 2000mAh
15	Handlebar Tape	1	nylon
16	Screw	4	M3x8
17	lower cover plate	1	ABS

18	Wireless module	1	
19	nut	1	M16
20	Antenna protective jacket	1	ABS
21	IC for display	1	

12.2 Crane scale：



Parts Name

No	Parts Name	Qty	Spec
1	protegulum	1	aluminum
2	left pressure block	1	aluminum
3	fixed loop	1	
4	right pressure block	1	aluminum
5	elastomer	1	aluminum
6	Distanzbuchse	2	aluminum
7	rear cover	1	aluminum
8	seal cover	1	aluminum
9			
10			