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Service Manual
Electronic Crane Scales

KERN HFD

Version 1.0

02/2018

GB

HFD-SH-e-1810

GB

KERN HFT
Electronic Crane Scales

Version 1.0 03/2018

Service manual

Content

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 HFD series and is edited for the authorized servicing personnel.

In this lineup it is an eco product, Therefore, it is not intended to represent the repair manual in detail, since the construction of the balance is very simple. It is therefore only referring to the list of related to disposal spare parts.

3 General Safety Instructions

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 crane scales are modified or used improperly and if damage is resulting from such use.
- Inspect and service crane balance, crane and load suspension devices regularly (see chap. 10.3 in the HFD user manual).
- Log the test result and keep it in the logbook.

3.1 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 crane scales.
- Assembly, commissioning and maintenance should only be carried out by trained specialists.
- Repair of safety-relevant pieces may only be carried out by KERN or by service partners authorized by Messrs. KERN.(Competence certificate or training).
- Use original spare parts only.
- All repairs and spare parts must be documented by the service partner (see list, chap. 11.2 in the HFD user manual).
- All maintenance must be documented (see checklist chap. 11.1 in the HFD user manual).
- Load suspending components may only be exchanged as a complete spare parts set. The dimensions of the new components must be noted (see checklist chapter 11.1 in the HFD user manual).

3.2 Environmental conditions

- Never operate the crane scales in explosive environment. The serial version is not explosion protected.
- Operate the crane scales only under environmental conditions as specified in these operating instructions (especially in chapter 1 „Technical data“in the HFD user manual).
- Do not expose the crane scales 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 operate the crane scales in corrosive environment.
- Protect the crane scales 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.

3.3 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 crane hook only vertically, manually, carefully and without jerks. As soon as a stable weighing value is reached the weighing value can be read.

- Use the crane scales 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, crane scales 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 crane scales or of the crane are not allowed.

3.4 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.

3.5 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

3.6 Safe working

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

3.7 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.

3.8 Testing upon acceptance

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

3.9 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 see the HFD User manual).
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.
For checking original dimensions, s. chap. 6.2 in the HFD user manual

3.10 Shutdown and storage

- Take off the crane scales from the crane and dismantle all load attachment devices from the crane scales.
- Do not store the crane scales at open air

5 The crane scales at a glance

The crane scales are a multi-purpose and cost-saving solution for overhead weighing applications such as e.g. recycling, metal processing, machine engineering, transport and logistics.

With the radio remote control, operation will be more comfortable yet.

5.1 Overview

Fig.1: Front view of balance

1 Upper shackle
2 Display
3 Keyboard
4 Lower shackle

Fig.2: Radio remote control (similar illustration)

5 Antenna
6 Keyboard

5.2 Operating elements

5.3 Overview of display:

[▼] over the symbol appears if

	the rechargeable battery is being charged
	the capacity of the rechargeable battery is exhausted
HOLD	the data-hold function is active
NET	the scales have been tared
	the weight display is stable
a	the weight is in the area around the zero point

5.4 Keyboard overview:

Button	Description of function
HOLD	• Record weight value (freeze) • Shift decimal point (adjustment mode)
M+	• Totalization • Number selection to the right • Exit menu
TARE	• Taring
a	• Zeroing
ON/OFF	• Turn on or off the balance

5.5 Radio remote control

The balance can be operated by the radio remote control like by a keyboard. All functions (excepted **ON/OFF**) can be selected.

The red LED must light up when any button is pressed. If it does not light up, the batteries in the remote control must be exchanged.

Range on free surface (free of buildings) approx. 20 m.

5.6 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 load of crane scales.

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

6 Commissioning

Attention: Always observe chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** "General Safety Instructions"! of the HFD user manual

6.1 Unpacking

 **SAFETY INSTRUCTIONS** **for protection against break**	**Once delivered and unpacked, crane scales will not be taken back.**
	The crane scales have been sealed by Messrs. KERN. ⇨ Load suspension devices are sealed by an adhesive tape. ⇨ The packaging is also sealed by adhesive tape. **+ Broken seal obliges to purchase.**
	Thanks for your comprehension. Your KERN Quality assurance team
 **CAUTION** **Danger for the back!**	**The crane scales are compact and quite heavy.** ⇨ Remove the scales from packaging only with the help of a second person. ⇨ Use a lifting device such as a crane or a forklift truck. ⇨ Secure the scales that they cannot fall down when they are lifted.

Only use original packaging for returning.

⇨ Make sure that all parts are completely present.
- Crane scales
- Mains adapter
- Remote control
- Operating instructions (logbook)

6.2 Checking the original dimensions

⇨ Enter the original dimensions shown on the production data sheet in the grey fields of the checklist chap. **Fehler! Verweisquelle konnte nicht gefunden werden.**. in the HFD user manual

⇨ Check original dimensions of crane balance; for implementation see chap.15.2 "Regular Maintenance" in the HFD user manual

⇨ Enter all data (date, tester, results) in the first line under "Inspection before first use" in the checklist (see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** in the HFD user manual)

 **CAUTION**	If the dimensions of your first safety inspection do not match those of KERN, the balance must not be put into operation. In this case please contact a service partner authorised by Messrs. KERN.

6.3 Rechargeable battery operation

 **CAUTION**	**Material damage on crane scales** ⇨ Only use the delivered mains adapter. ⇨ Make sure that the mains adapter, the cable and the mains plug are in a perfect condition. ⇨ Do not use the crane scales during the loading process.

Before the first use, the rechargeable battery should be charged by connecting it to the mains power cable for at least 24 hours. The operating time of the rechargeable battery is approx. 60 hours.

The capacity of the rechargeable battery will soon be exhausted, when the display begins to flicker. If "**lo_bat**" appears, the balance will remain operable for approx. 30 minutes more, then it switches off automatically. Connect the power cable as soon as possible to load the rechargeable battery.

The LED display over  provides information about the battery's charging status.

red: Voltage has dropped below prescribed minimum.

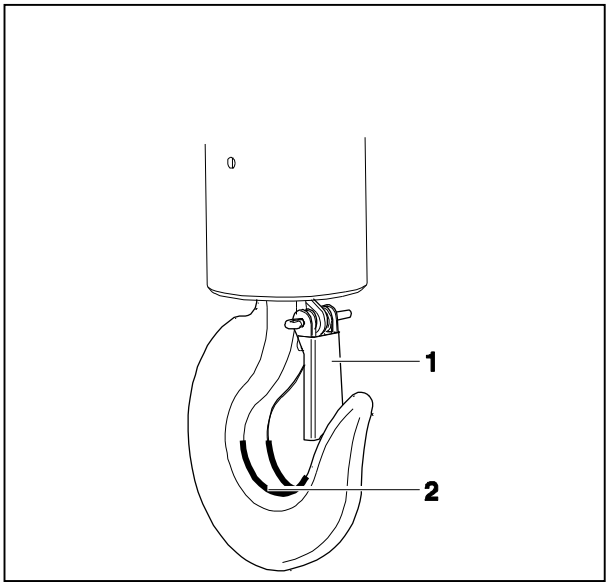
green: Rechargeable battery completely reloaded

yellow: Charging storage battery

⇨ To save the battery, the balance switches automatically off without weighing (time can be selected, see chap. **Fehler! Verweisquelle konnte nicht gefunden werden.**. Function "F9 of" in the HFD user manual)

When the crane scales are out of operation for a longer period, remove the rechargeable battery.

6.4 Suspending the balance



6.5 Condition

The crane needs a safety bracket (1) that the unloaded crane scales 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.

⇨ Suspend the crane scales on 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> 
Risk of injury due to falling loads!

Danger</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, eyelet, rings, rope slings, cables, chains etc.) for excessive wear or damage
⇨ If faults can be seen on the safety bracket of the hook or if it is missing completely, the balance 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 crane scales for transporting loads.

⇨ Do not stand or go under suspended loads.

⇨ Do not use on building site.

⇨ Keep always an eye on suspended loads.

⇨ Do not exceed the nominal load of crane, crane scales or any kind of load attachment devices at the crane scales.

⇨ When weighing dangerous goods such as melted mass, radioactive material), observe the prescriptions for handling dangerous goods!</td>
</tr>
</table>

7.2 Loading the crane scales

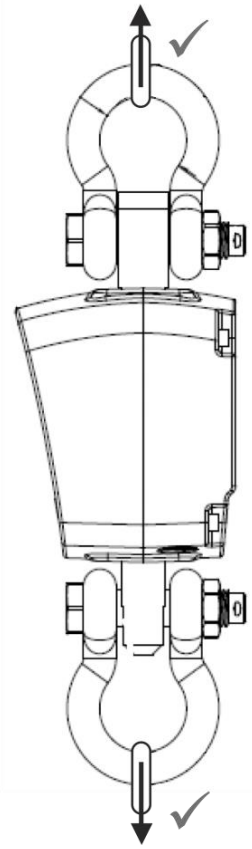
For good weighing results observe the following, illustrations see next page:

- ⇨ 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.

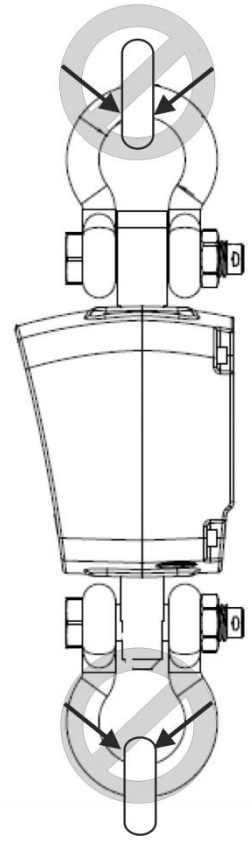
7.3 Loading the balance

1. Position the crane scales over the load.
2. Move downwards the crane scales until the load can be suspended on the balance. Reduce the speed when the respective height is going to be reached.
3. Suspend a load. If necessary, ensure that the safety bracket is closed. If the load is fixed by slings, ensure that the slings rest completely on the saddle of the load attachment device.
4. Lift-off the load slowly.

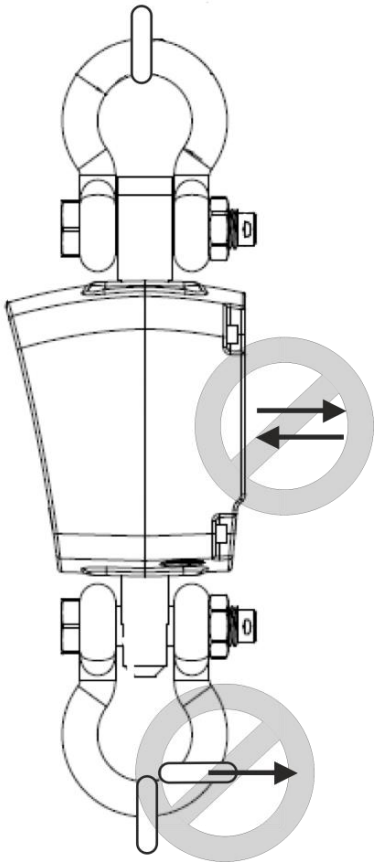
   When the load is fixed by slings, ensure that the load is well balanced on both sides and that the slings are correctly positioned



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

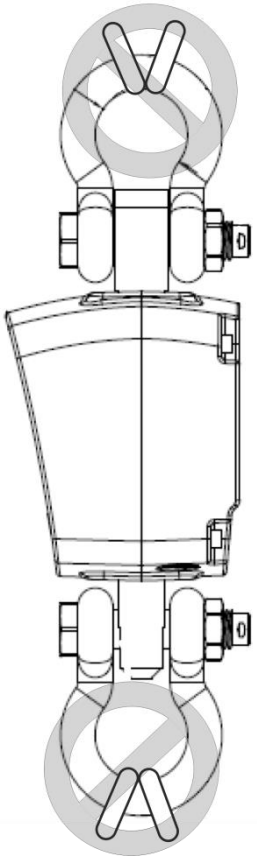


Do not use too large load attachment devices which cannot guarantee a one-point suspension.



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 function	⇨ Switch-on balance and during the selftest press the **TARE** button. "**P1 - - -**" will be displayed. ⇨ Enter password "000" : Select a number by the **M+** key Increase the numeric value using the **TARE** key Confirm by the **ZERO** key. The first function „F0 cal“ is displayed.
Select function	⇨ The **TARE** button allows to select the individual functions one after the other.
Select setting	⇨ Confirm the selected function by the **ZERO** button. The current setting will be displayed.
Change settings	⇨ Use the **TARE** button to switch over into the available settings.
Confirm setting	⇨ Press the **ZERO** button, the balance returns into the menu.
Exit menu / Return to weighing mode	⇨ Press the **M+** key.

8.2 Overview:

<table>
<tr><th>Function</th><th colspan="4">Description</th></tr>
<tr><td>F0 cal</td><td colspan="4">Adjustment, see chap. 9 in the HFD user manual</td></tr>
<tr><td rowspan="17">F1 cap

Set weighing balance capacity (max) / balance type</td><td rowspan="5">threer</td><td>600</td><td rowspan="5">Three-range balance</td><td rowspan="17">Modifications may only be carried out by a specialist with competent knowledge.</td></tr>
<tr><td>1500</td></tr>
<tr><td>3000</td></tr>
<tr><td>6000</td></tr>
<tr><td>12000</td></tr>
<tr><td rowspan="5">single</td><td>600</td><td rowspan="5">Single-range balance</td></tr>
<tr><td>1500</td></tr>
<tr><td>3000</td></tr>
<tr><td>6000</td></tr>
<tr><td>12000</td></tr>
<tr><td rowspan="5">Dual r</td><td>600</td><td rowspan="5">Multi-range balance</td></tr>
<tr><td>1500</td></tr>
<tr><td>3000</td></tr>
<tr><td>6000</td></tr>
<tr><td>12000</td></tr>
<tr><td rowspan="5">Dual i</td><td>600</td><td rowspan="5">Multi-interval balance</td></tr>
<tr><td>1500</td></tr>
<tr><td>3000</td></tr>
<tr><td>6000</td></tr>
<tr><td>12000</td></tr>
<tr><td rowspan="3">F2 sp</td><td>Slow</td><td colspan="3" rowspan="3">Reaction speed
selectable slow, medium, fast</td></tr>
<tr><td>mid</td></tr>
<tr><td>fas</td></tr>
<tr><td>F3 inp</td><td colspan="4">Display internal resolution</td></tr>
<tr><td>F4 GRA</td><td colspan="4">Gravitation constant at place of installation</td></tr>
<tr><td>F5 com</td><td>mode</td><td>wifi</td><td colspan="2">Not documented</td></tr>
</table>

		blue	Not documented
		off	Interfaces switched-off
	baud	600	Baud rate
		1200	
		2400	
		4800	
		9600	
F6 ti	00:00	Setting time	
F7 ti	00.00.00	Setting date	
F8 st	on	Multitare switched on	
	off	Multitare switched off	
F9 of	0	Automatic switch-off function is disabled	
	5 min	Weighing system will be turned off after 3 min.	
	10 min	Weighing system will be turned off after 5 min.	
	20 min	Weighing system will be turned off after 15 min.	
	30 min	Weighing system will be turned off after 30 min.	
F10 ovEr	XXXXXXX	Check overload records, see chapter 8.3 in the HFD user manual	

8.3 Check overload records

⇨ Call up function „F10 ovEr“, see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** in the HFD user manual

⇨ Press the **ZERO** key to confirm, the display will show the overload number

⇨ Press **ZERO** key again, the date / time and the overload weight will be show in turn.

⇨ Using the **TARE**-key to select the overload number one by one, and press **ZERO** key to check the overload information you select.

9 Adjustment

⇨ Switch-off balance and attach a carrying help if necessary.

⇨ Switch-on balance with attached carrying help and during the selftest press the **TARE** button. "**P1 - - -**" will be displayed.

⇨ Enter password "000" :
Select a number by the **M+** key
Increase the numeric value using the **TARE** key
Confirm by the **ZERO** key. The first function „F0 cal“ is displayed.

⇨ Press the **ZERO** button, „UnLoAD“ will be displayed.

⇨ Unload the balance and wait until the **[▼]** above  appears.

⇨ Press the **ZERO** button, the currently set adjustment weight is displayed.

⇨ In order to change, select the number to be changed by the **M+** button and set the desired value using the **TARE** button, the active digit flashes.

⇨ Confirm by the **ZERO** button, „LoAd“ will be displayed.

⇨ Attach the adjustment weight and wait until the **[▼]** above  appears

⇨ Press the **ZERO** button.

⇨ After successful adjustment the balance carries out a selftest, then it automatically returns to weighing mode.
An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure

10 General

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 indicator cables for damage, and check all connections and connecters for any loose contact or incorrect connection

10.1 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.

10.2 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

10.3 Testing Load cell

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

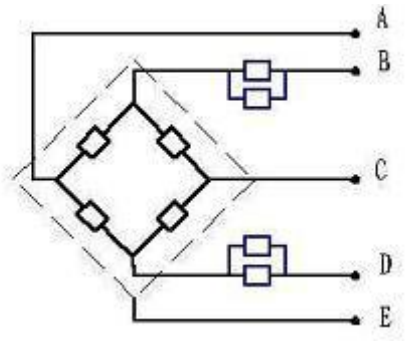
Physical Test:

- ⇨ 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

10.4 Electrical Test:

Use an accurate multimeter to check the ohms

Load Cell Connections



Signal **+** Green

Supply **+** Red

Signal **-** White

Supply **-** Black

Shield

Resistance

Measuring Points	**Resistance**
Red (+ Exc) to Black (–Exc)	400±10Ω
Green (+Sig) to White (–Sig)	352±2Ω

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.

10.5 Testing PCB Voltages

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

10.6 AC Power

Check the AC power socket out put voltage.

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

10.7 Adaptor Voltage

Check the adaptor output cable connecter voltage

⇨ Voltage must be minimum 9VDC and maximum 15VDC

10.8 PCB Input Voltage

Check the PCB input power connecter voltage

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

10.9 Check Battery Voltage and Charging Voltage

1. Check the Battery Voltage,

- ⇨ Voltage must be minimum 6VDC. If below the 6VDC connect the adaptor for charging
- ⇨ The battery voltage below the 5.5VDC, replace the battery and install new 7.4V/5.2Ah 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

10.10 Replace Main Board

 Release 4 pcs screw from bottom of the scale by using cross screw driver.

 Open the bottom cover, the main board lie on top cover, use cross screw driver loose 4 screw for main board, pull out all connector on the main board, then you can bring out main board carefully.

 Install the new main board, plug all connector at last,After check anything， try to turn on the power ， if anything is OK，close the top cover，replace main

board completely.

10.11 Battery Replacement

- Remove the screw securing the battery cover from the scale
- Open the battery cover from the housing.
- Take it out the battery from in side the housing.

- Remove the connectors from the battery terminals.
- Change to new battery.
- Connect the connectors to the battery terminals.

- Close the battery cover to housing
- Fix screws for to securing the battery cover.

11 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	Pan not installed Unstable weight Load cell damaged Mechanics damaged	Check the pan is installed correctly. 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 platform is installed correctly Check again after turn on the scale Check the load cell connecters Check the power connecters
------ or NULL displayed	Weight on the scale below the permissible limit. Pan has been removed Pan support is not seated proper 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	Anything is lying and touching under the pan Sample is moving from the platform Due to vibration, air variation and temperature variation Power supply faulty Load cell damaged	Check the scale is acceptable location and table 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 pan 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. Adaptor damaged Charging circuit failure Battery failure	Check the mains voltage Check the adaptor Check the power connecters and circuit Check the battery

12 Error messages

Error message	Description	Possible causes / Elimination
Err 1	Wrong date	⇨ *Enter date in format "yy;mm;dd", see chap.* **Fehler! Verweisquelle konnte nicht gefunden werden.** *in the HFD user manual "F7 da"*
Err 2	Wrong time	⇨ *Enter time in format* "hh;mm;ss"*, see chap.* **Fehler! Verweisquelle konnte nicht gefunden werden.** *in the HFD user manual "F7 da"*
Err 4	Error during zero setting	⇨ Zero range exceeded ⇨ Check if the balance is not loaded
Err 5	Keyboard error	⇨ Improper operation of the balance
Err 6	Value outside the A/D changer range	⇨ Damaged weighing cell ⇨ Damaged electronics
Err 7	Error "Determination of percentage"	⇨ Increase the value to >0.5 d
Err 8	Incorrect adjusting weight	⇨ Check value for adjustment weight, see chap. 1 in the HFD user manual
Err 9	The displayed weight is permanently changing	⇨ Draught/air movement ⇨ Table/floor vibrations ⇨ Weighing pan has contact with other objects.
Err 10	No WLAN connection	⇨ Check menu setting "F5 com➡mode➡wifi"
Err 11	Error "Communication log"	⇨ Check the communication settings
Err 12	Error "Totalizing"	⇨ Number of totalizing operations > 99 ⇨ Capacity of balance exhausted
Err 15	Error "Gravitational constant"	⇨ Value out of range 09.xx -1.0xx
Err 17	"Taring" error	⇨ Taring range exceed or not achieved
Err 19	Unable to initialise zero point	⇨ Measuring cell defective / overloaded ⇨ Object on weighing pan / contact ⇨ Main board defective ⇨ Adjustment required
- - ol - -	Maximum load exceeded	⇨ Reduce load ⇨ Check whether the balance has been damaged
--lo--	Underload	⇨ Negative weight, check platform and restart or adjust.
Fai l h / fai l l / fai l	Adjustment error	⇨ Check value for adjustment weight, see chap. 1 in the HFD user manual ⇨ Repeat adjustment process
Ba lo / lo ba	Capacity of rechargeable battery exhausted	⇨ Recharge battery

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

13 Drawing

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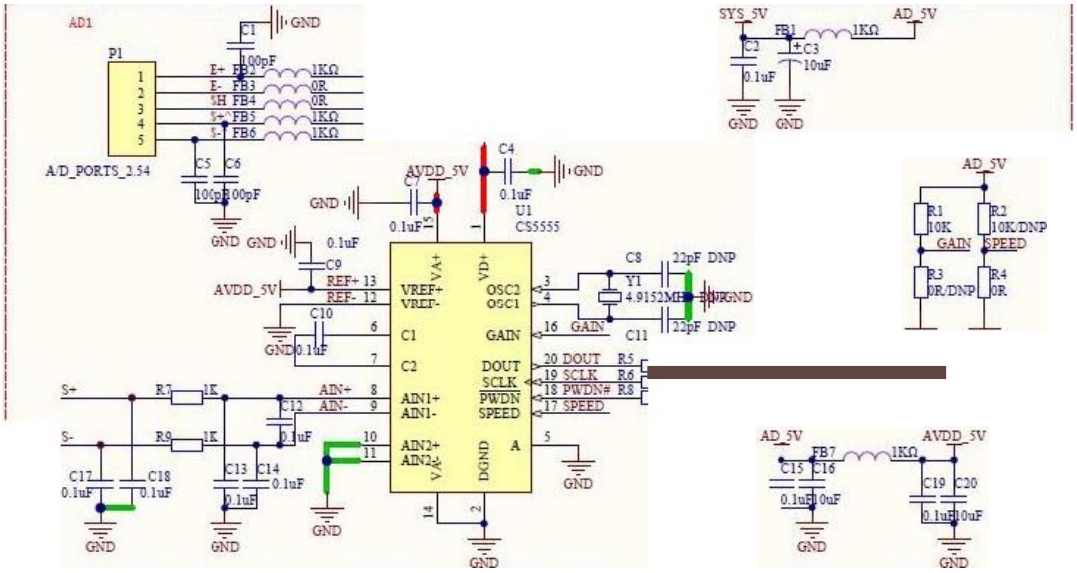
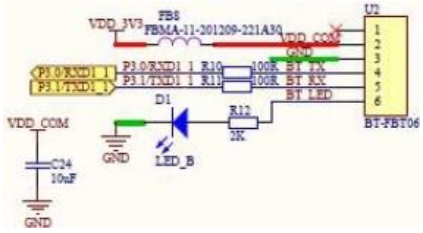
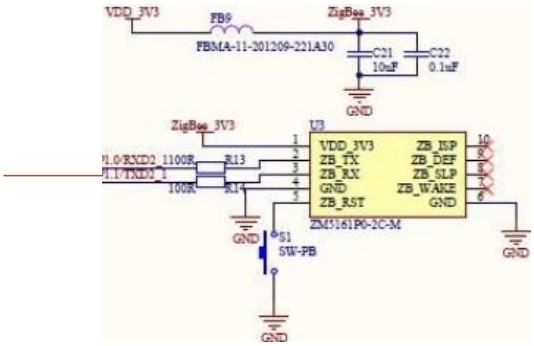
14 Circuit Diagram

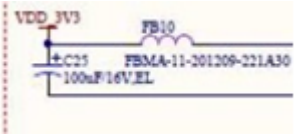
14.1 AD

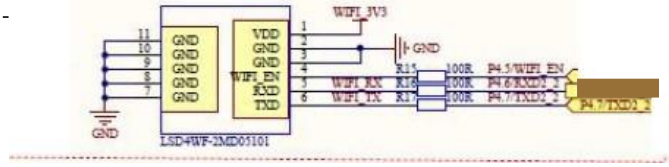


14.2 COM

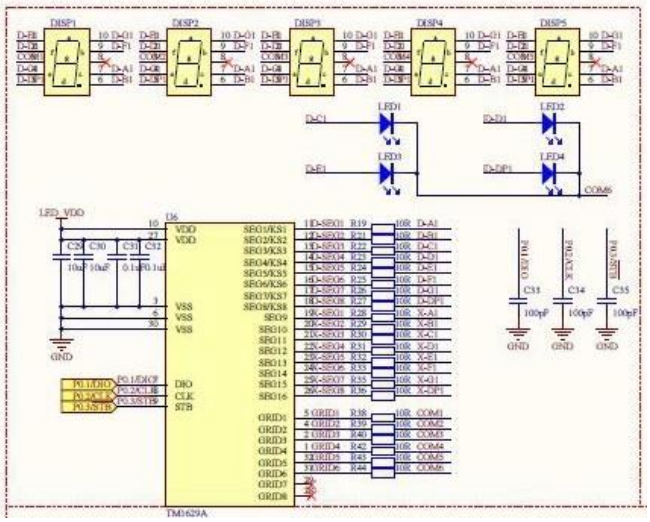


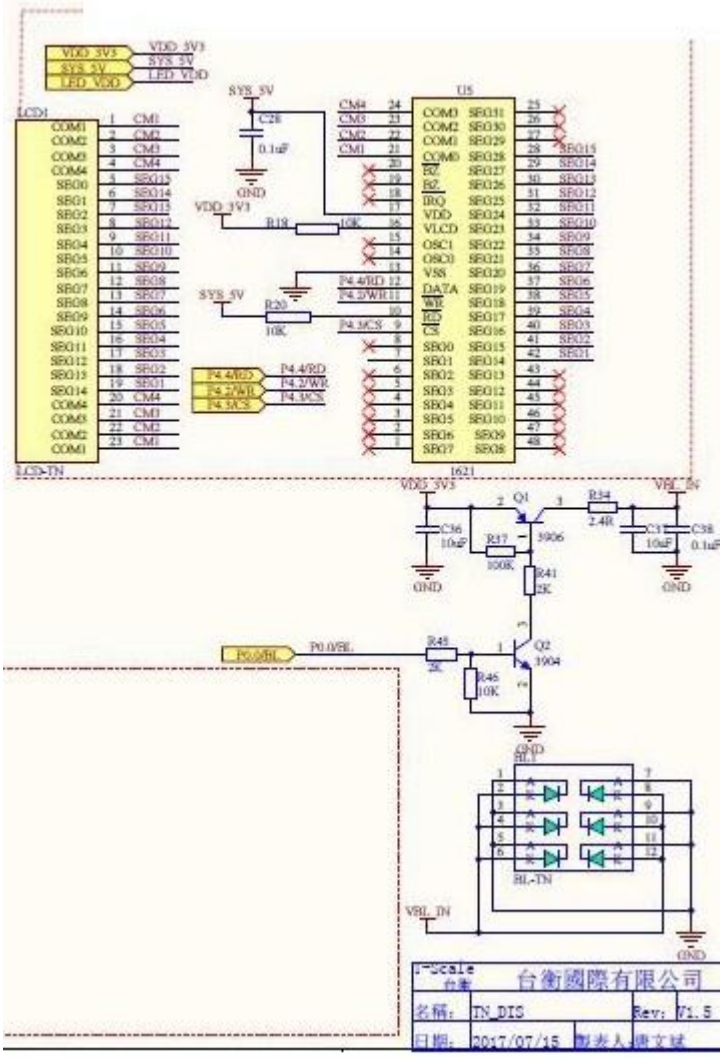




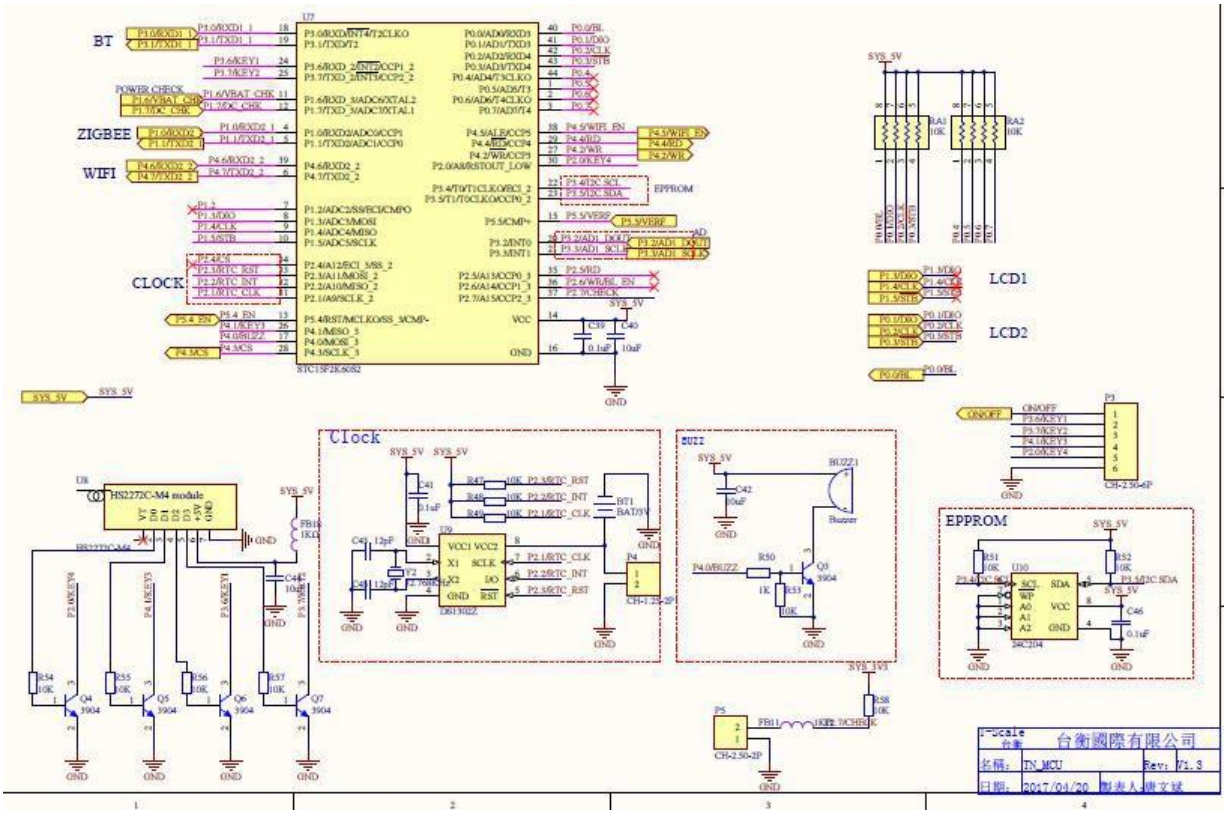


14.3 DIS

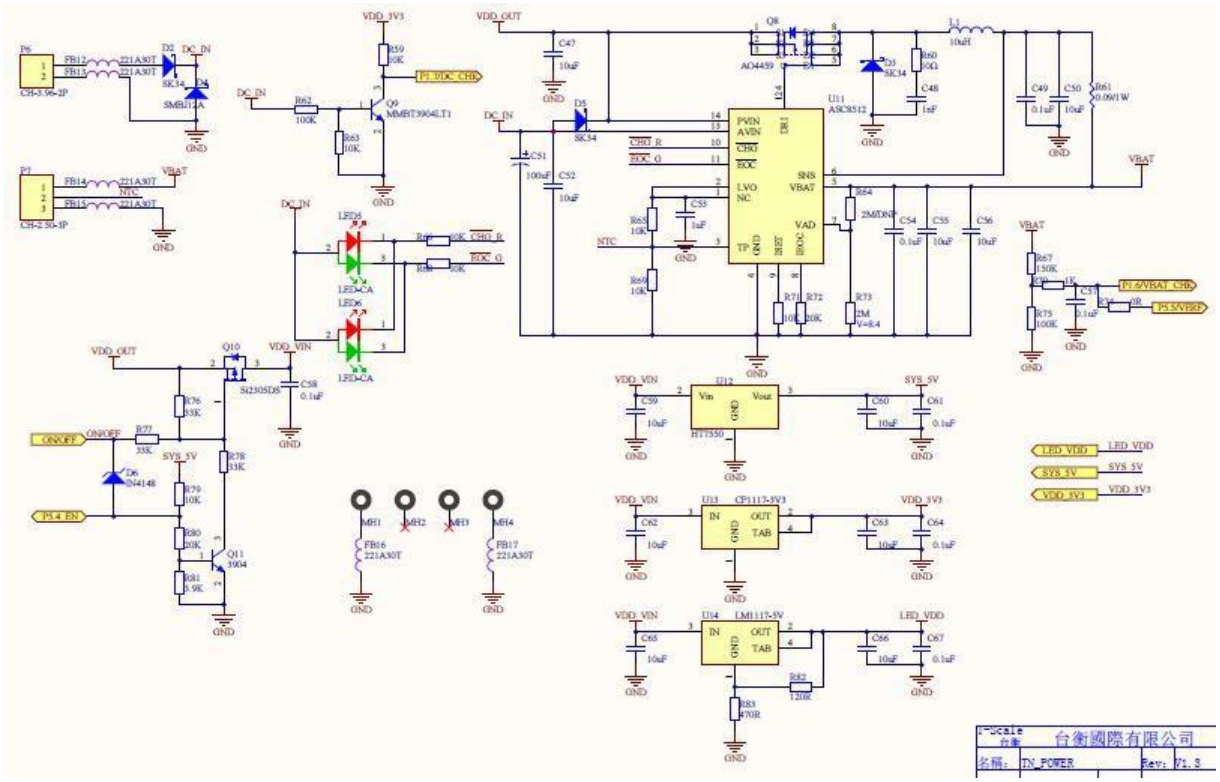




14.4 MCU



14.5 POWER



15 Maintenance, Repair, Cleaning and Disposal

 **Danger**	**Risk of injury and risk of material damage!** **The crane scales are part of a hoisting device!** **For a safe operation please observe the following:** ⇨ Have carried out a regular maintenance by trained specialized staff ⇨ Carry out regular maintenance and care, see chapter 15.2 and **Fehler! Verweisquelle konnte nicht gefunden werden.** in the HFD user manual ⇨ 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 crane scales by yourself. Repair may only be carried out by service partners authorized by Messrs. KERN.

15.1 Cleaning and Disposal

 **CAUTION**	**Damage on the crane balance!** ⇨ Do not use any industrial solutions or chemicals

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

15.2 Regular maintenance and care

- The regular 3-month maintenance may only be carried out by an expert with competent knowledge of working with crane scales. 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 the checklist (chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** in the HFD user manual).
- The additional results of the extended maintenance have to be entered in the checklist (chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** in the HFD user manual).

- The replaced spare parts also must be entered, (chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** in the HFD user manual)

15.3 Regular maintenance:

Initial start-up, every **3 months** or definitely after **12500 weighings**	• Check all dimensions, see checklist chap. **Fehler! Verweisquelle konnte nicht gefunden werden.** in HFD user manual • Check the shackle or the eyelet for wear and tear, such as e.g. plastic deformation, mechanical damage (unevenness), notches, striation, cracks, corrosion, thread damage and torsions. • Check the application of the safety bracket on the hook, moreover check for fault and correct function • For balances of big construction size: Check that the split pin and the nut on the shackle are not loose If a dimension exceeds the admitted deviation from the original dimension (see checklist, chap. **Fehler! Verweisquelle konnte nicht gefunden werden.** in HFD user manual) or if other discrepancies have been found, the balance must be repaired at once by trained specialized staff (KERN customer service). Never do repair it by yourself! Take balance out of operation immediately! All repairs and spare parts must be documented by the service partner (see list, chap. **Fehler! Verweisquelle konnte nicht gefunden werden.** in HFD user manual).
Every **12 months** or in any case after **50000 weighings**	• 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 **5 years** or anyway after **250000 weighings**	• All load carrying parts have to be exchanged by trained specialized staff (KERN customer service).
Every **10 years** or anyway after **500 000 weighings**	• Replace the crane balance entirely

Note

During the revision watch out for wear and tear according to the following drawings (chap. **Fehler! Verweisquelle konnte nicht gefunden werden.** in HFD user manual).