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Service Manual
Multi-function weighing balance

KERN MWA_NM

Type MWA300K-1NM
Type MWA300K-1PNM

07/2018
GB



GB

KERN MWA_NM

Version 1.0 07/2018

Servicemanual

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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.

The operation and configuration of each scale is described in the accompanying manual of the scale. Any safety information in respect for verification are also described in the accompanying manual

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

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For operation, please use the operating instructions corresponding to the device

2 Appliance overview

<table>
<tr>
<td>
The wheelchair platform scale MWA-NM with folded and unfolded ramps and the display (serial fitting).</td>
<td>
The wheelchair platform scale MWA-PNM with folded and unfolded ramps, the display and the rail with a stand (serial fitting).
The possibility of retrofitting with 2nd rail MWA-A02 (without a stand).</td>
</tr>
<tr>
<td></td>
<td>Folded wheelchair platform scale MWA-PNM.</td>
</tr>
</table>

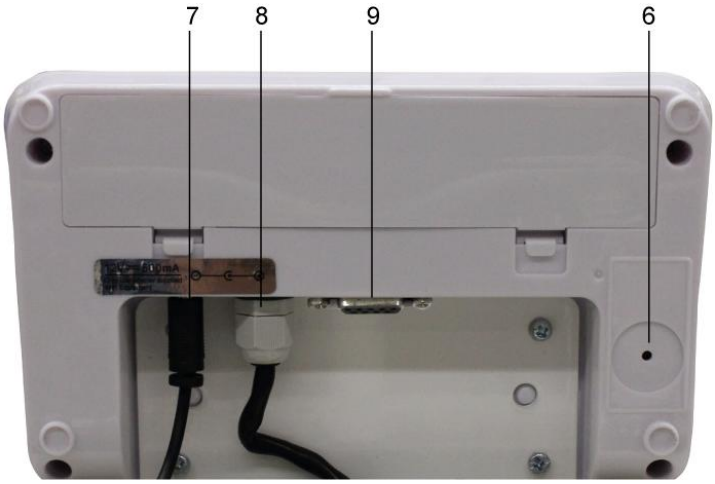
	Weighing balance suitable as wheelchair or stand assist balance. 1. Display Unit 2. Handrail optional MWA-A01with tripod (cannot be retrofitted) MWA-A02 without tripod 3. Ramps 4. Bubble level 5. Carrying handle

		
Wheelchair balance (Collapsible ramps)	Suitable as wheelchair and stand assist balance	Handrail collapsible

Assembly of the rail:

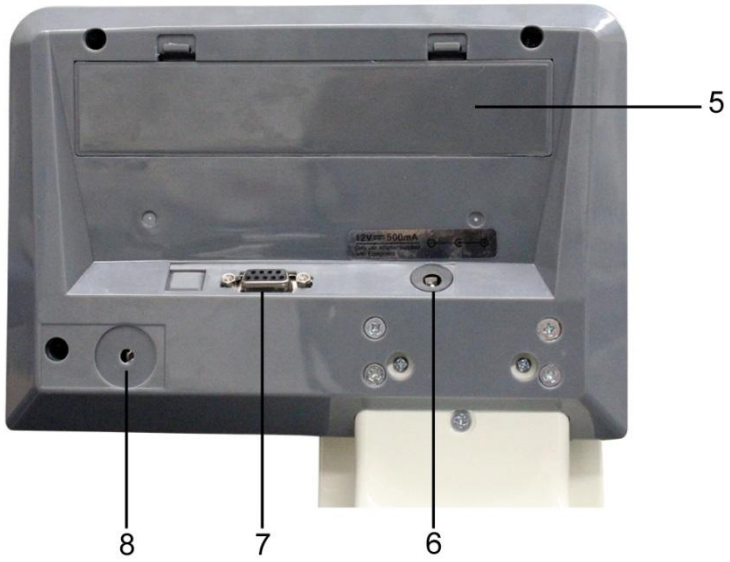
	Carefully mount the rail and fasten it with screws. The activity should preferably be performed by two people.

Display unit back



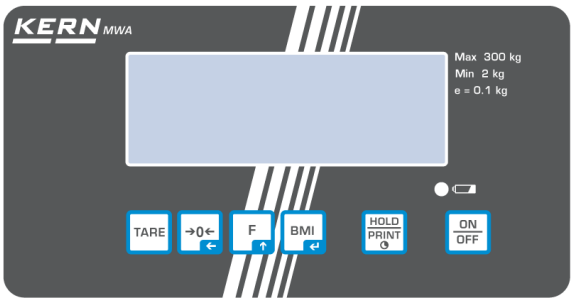
6. Adjustment switch
7. Terminal power supply unit
8. Connecting cable ”display unit - platform"
9. Connector RS232

Display unit at rear



5 Rechargeable battery / battery compartment
6 Mains port
7 RS 232 C
8 Adjustment switch

3 Keyboard overview



Type MWA 300K-1NM

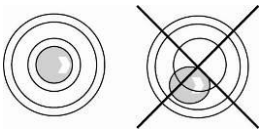
Type MWA 300K-1PNM

Button	Designation	Function
ON OFF	ON/OFF button	Turn on/off
HOLD PRINT	Hold-key Print-key	Hold function /determination of stable weighing value Print (press and hold for a while):Data transmission via interface RS 232
BMI	BMI key	Determination of body mass index **In the menu:** • Confirm selection **For numeric entry:** • Confirm numerical value
F	Function key	**In menu:** • Call up menu • Select menu items **For numeric entry:** • Increase numerical value
→0←	Zeroing key	Weighing scale will be reset to „0.0“ **For numeric entry:** • Change decimal place
TARE	TARE key	Tare balance

4 Overview of display

Display	Designation	Description
	Stability display	Scales are in a steady state
→0←	Zeroing display	Should the balance not display exactly zero despite empty weighing plate, press the  button.Your balance will be set to zero after a short standby time.
NET	Net weight display	Illuminated when net weight is displayed Illuminated after weighing scale was tared
GROSS	Gross weight display	Illuminated when gross weight is displayed
HOLD	HOLD function	HOLD function active
BMI	BMI function	Illuminated while BMI function is enabled
	Rechargeable /Battery display	Shows the capacity of the rechargeable / batteries

4.1 Balance assembly and installation



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

⇨ Check levelling regularly.

4.2 Mains connection

Power is supplied by the external power unit which also serves to isolate the mains supply from the scale. The stated voltage value must be the same as the local voltage.
Always use genuine approved KERN power pack units as per EN 60601-1 directive.

The small sticker attached to the side of the display unit indicates the power port:

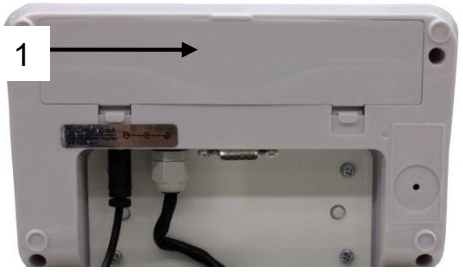


The LED remains illuminated as long as the weighing scale remains connected to the mains.
The LED display informs you during loading about the loading status of the rechargeable battery.

green: Rechargeable battery is completely discharged

blue: Charging rechargeable battery

4.3 Battery operation is possible by obtaining an optional battery power pack.



Open the battery compartment cover (1) at the base of the display unit and insert the rechargeable battery. Charge the battery for at least 12 hours before initial use.
The appearance of the symbol  in the weight display indicates that the battery is almost exhausted. The weighing scale will remain ready for operation for a few more minutes before switching off in order to save battery (s. operating instructions corresponding to the device chap. 11.6 Auto off).Load rechargeable battery.

 Voltage has dropped below prescribed minimum.

 Rechargeable battery very low.

 Rechargeable battery completely reloaded

If the balance is not used for a longer time, take out the rechargeable battery and store it separately. Leaking liquid could damage the balance.

4.4 Battery operation

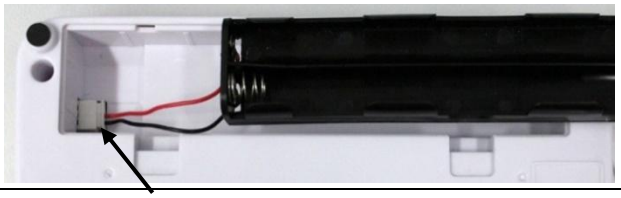
As an alternative to rechargeable battery operation, the balance may also be operated with 6x AA batteries.
Open battery compartment cover (1) at the lower side of the display unit and insert batteries according to the example below. Lock the battery cover again. If the batteries are empty, in the balance display appears the symbol .Change batteries. To save battery power, the balance switches off automatically.

 Capacity of batteries exhausted.

 Batteries will soon be flat.

 Batteries are completely charged

4.5 Insert batteries

Remove battery compartment cover	
Connect battery holder to housing contact acc. to illustration	
Insert battery holder	

Insert batteries into battery compartment and lock with battery compartment cover.	

5 Menu



Access to service menu „tCH“ is locked in verified balances.

To disable the access lock, destroy the seal and actuate the adjustment switch.For position of adjustment switch, see chap. 17.

Attention:
After destruction of the seal the weighing system must be re-verified by an authorised agency and a new verification wire/seal mark fitted before it can be reused for applications subject to verification.

5.1 Navigation in the menu

Call up menu	⇨ In weighing mode, press F and the first function **[F1 oFF]** will be displayed.
Select function	⇨ With help of F , the individual functions can be selected one after the other.
Change settings	⇨ Confirm selected function by BMI .The current setting will be displayed. ⇨ Select desired setting by F and confirm with BMI, the balance returns to the menu.
Exit menu/ **Return to weighing mode**	⇨ Press TARE, the balance will return to weighing mode.

5.2 Menu overview

Function	Settings	Description
F1 oFF Automatic cutout Auto Off	oFF 0*	Automatic shutdown off
	oFF 3	Automatic shutdown after 3 min.
	oFF 5	Automatic shutdown after 5 min.
	oFF 15	Automatic shutdown after 15 min.
	oFF 30	Automatic shutdown after 30 min.
F2 bt Background illumination of display	bl on	Back lighting for display on
	bl oFF	Display background illumination off
	bl AU*	Backlighting for display will come on automatically as soon as the weighing scale is operated.
F3 Prt Interface parameter	**1. RS-232 mode** Select desired mode by F, then confirm with BMI.	
	P Cont	Continuous data output
	Series	Not documented
	ASK	Remote control instructions: W:Send all weighing details S:Send stable weight value T: Taring Z: Zeroing press HOLD/PRINT for 1-2 sec.
	P cnt 2	Not documented
	P Stab	Automatic data output of stable weighing values
	P Auto	Weighed result will be added automatically to summation memory and issued
	2. Baud rate The currently set baud rate (b xxx) will be shown after the RS-232 mode was confirmed.Select desired Baudrate by pressing F and confirm by pressing BMI.Available Baud rate: 600, 1200, 2400, 4800, 9600	

<table>
<tr><td></td><td colspan="4">3. Data output format
(Setting P Prt, P Auto, P Cont only!)
The currently set data output format will be displayed after the Baud rate has been confirmed.Select desired format by F and confirm with BMI.</td></tr>
<tr><td rowspan="3">Only when set P Cont</td><td>Cont 1</td><td>Default</td><td>Sd0 – on/off
Continuous data output, selectable “Sending 0” yes / no</td></tr>
<tr><td>Cont 2</td><td colspan="2">Not documented</td></tr>
<tr><td>Cont 3</td><td colspan="2">Not documented</td></tr>
<tr><td></td><td colspan="4">4. Printer type
The currently set printer type will be displayed after the data output format has been confirmed.
Select desired printer type by pressing F and confirm with BMI.</td></tr>
<tr><td></td><td colspan="2">LP 50</td><td colspan="2">Not documented</td></tr>
<tr><td></td><td colspan="2">tPUP</td><td colspan="2">Use this setting</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>tCH
Service menu</td><td colspan="2">Pin</td><td colspan="2">Password Input: press F, TARE, HOLD/PRINT subsequently.</td></tr>
<tr><td colspan="5">Operate adjustment switch; for position see chap.15</td></tr>
</table>

<table>
<tr><td rowspan="4">P1 SPd
Display speed</td><td>15*</td><td rowspan="4">Not documented</td></tr>
<tr><td>30</td></tr>
<tr><td>60</td></tr>
<tr><td>7.5</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="4">P2 CAL</td><td>dESC</td><td rowspan="3"></td></tr>
<tr><td>inC</td></tr>
<tr><td>CAP</td></tr>
<tr><td rowspan="2">CAL</td><td>nonLin</td></tr>
<tr><td>LinEAr</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="4">P3 Pro</td><td>tri*</td><td>Not documented</td></tr>
<tr><td>CoUnt</td><td>Not documented</td></tr>
<tr><td>rESEt</td><td>Reset weighing scale to factory setting</td></tr>
<tr><td>SEtGrA</td><td>Not documented</td></tr>
</table>

6 Data output RS 232

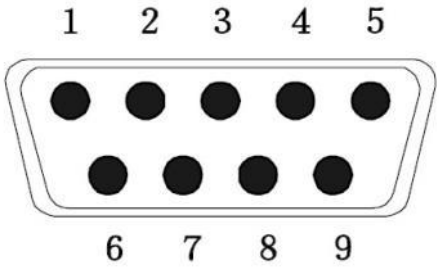
You can print weighing data automatically via the RS 232 interface or manually by pressing HOLD PRINT via the interface according to the setting in the menu.

This data exchange is asynchronous using ASCII - Code.

The following conditions must be met to provide successful communication between the weighing balance and the printer.

- Use a suitable cable to connect the weighing balance to the interface of the printer.Faultless operation requires an adequate KERN interface cable.
- Communication parameters (baud rate, bits and parity) of balance and printer must match.For detailed description of interface parameters see chap. 13.2)

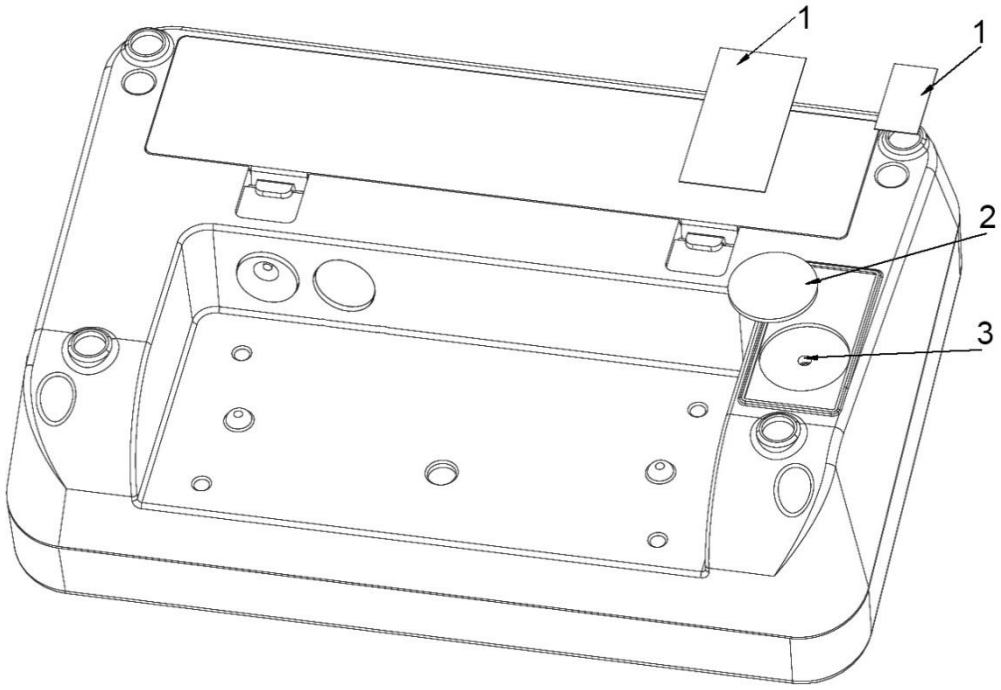
6.1 Pin allocation of balance output bushing:

	Pin 2:TXD - output Pin 3:RXD - input Pin 5: GND - signal ground

6.2 Technical data

Connection	9 pin d-subminiature bushing
	Pin 2 output
	Pin 3 input
	Pin 5 signal earth
Baud rate	Optional 600/1200/2400/4800/9600
Parity	no
Databits	8 bits
Stopbits	1 bit

7 Verification



1. Self-destroying seal mark
2. Cover
3. Adjustment switch

7.1 Verification validity period (current status in G)

Personal scales (including chair and wheelchair scales) in hospitals	4 year
Personal scales, when not located in hospitals (for example, doctor's offices and nursing homes)	unlimited
Baby weighing scales and mechanical birth weight scales	4 year
Bed scales	2 year
Scales in dialysis stations	unlimited

Rehab clinics and health authorities are treated as hospitals.
(4 years of verification validity)

Not treated as hospitals (verification validity not limited) are dialysis stations, nursing homes and doctor’s surgeries.

(Details derived from: „Information by the verification authority, weighing scales applied in medical use“)

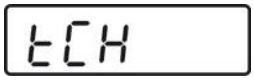
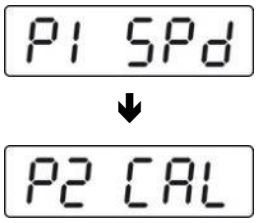
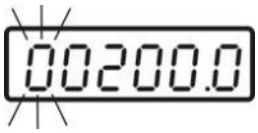
8 Adjustment

As the acceleration value due to gravity is not the same at every location on earth, each display unit with connected weighing plate 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 weighing system 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 display unit periodically in weighing operation.

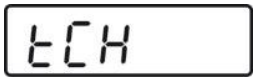
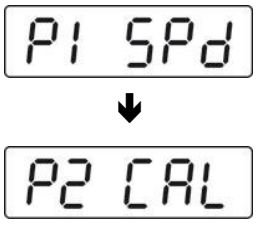
	• Prepare the required adjustment weight. The adjustment weight to be applied depends on the capacity of a weighing scale, see chap. 1. Carry out adjustment as closely as possible to admissible maximum load of weighing scale. Information about test weights you will find in the internet under http://www.kern-sohn.com • Observe stable environmental conditions. For warm-up time required for stabilization see operating instructions corresponding to the device chap. 1.

	Access to service menu „tCH“ is locked in verified weighing scales. To disable the access lock, destroy the seal and actuate the adjustment switch. Position of the adjustment switch see operating instructions corresponding to the device chap. 17. **Attention:** After destruction of the seal the weighing system must be re-verified by an authorised agency and a new verification wire/seal mark fitted before it can be reused for applications subject to verification.

8.1 Procedure:

	⇨ In weighing mode, press F repeatedly until **[tCH]** appears.
	⇨ Press BMI, **[Pin]** is displayed
	Press F, TARE and HOLD PRINT one after the other, **[P1 SPd]** will appear
	⇨ Press F, „**P2 CAL**“ will be displayed ⇨ **Operate adjustment switch; for position see chap.16**
	⇨ Press BMI, **[dESC]** is displayed
	⇨ Press F repeatedlyuntil **[CAL]** will be displayed. ⇨ Confirm with BMI
	⇨ Confirm with BMI, **[UnloAd]** appears
	⇨ Ensure that there are no objects on the weighing pan. ⇨ Wait for stability display "STABLE", then confirm with BMI
 (example)	⇨ The size of the currently set adjustment weight will be displayed. To change, select the digit to be altered by →0←, and the numerical value by F. ⇨ Confirm with BMI, **[LoAd]** appears.

8.2 Linearity Adjustment

	⇨ In weighing mode, press F repeatedly until **[tCH]** appears.
	⇨ Press BMI, **[Pin]** is displayed
	Press F, TARE and HOLD subsequently, **[P1 SPd]** will appear
	⇨ Press F, „**P2 CAL**“ will be displayed ⇨ **Operate adjustment switch; for position see MCC-NM Instruction manual chap.15**
	⇨ Press BMI, **[dESC]** is displayed
	⇨ Press F repeatedlyuntil **[CAL]** will be displayed. ⇨ Confirm with BMI
nonL in	⇨ Press F Linear appears
L inEAr	⇨ Confirm with BMI
LoAd 0	⇨ Confirm with BMI Zero Load Point
LoAd 1	⇨ Confirm with BMI 1/3 Load Point
LoAd 2	⇨ Confirm with BMI 2/3 Load Point
LoAd 3	⇨ Confirm with BMI Full Load Point

9 MAINTENANCE

9.1 General

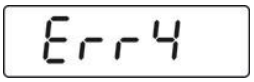
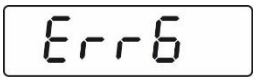
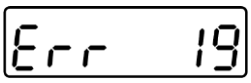
If the scale does not operate properly, find out the problem as possible.
Determine whether the problem is constant or alternate. Be aware that problems can be caused by mechanical or electrical influences.

Check the following.

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

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

9.2 Error Codes

Display	Description
	**Zero range exceeded** (on start-up or when pressing the →0← key) • Load on weighing pan • Excess load, during zero setting of weighing scale • Incorrect adjusting process • Fault on load cell
	**Value outside the A/D converter range** • Damaged weighing cell • Damaged electronics
	**Unable to initialise zero point** • Measuring cell defective / overloaded • Object on weighing pan / contact • Transport safety device has not been removed • Main board defective

9.3 Determine the Problem

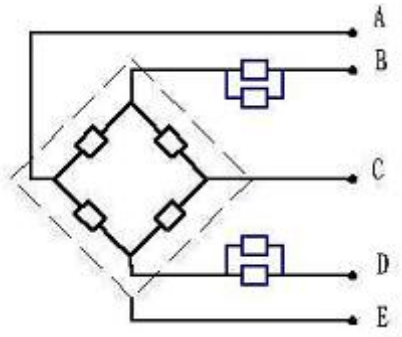
Determine whether the problem is in the PCB or the Load Cell

- Disconnect the power supply from the scale, and disconnect the load cell connection from the PCB
- 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

9.4 Check the Load cell

- Remove power from the system, and disconnect the PCB from the Load cell
- Check the moisture, or foreign material inside.
- Make sure all leads are connected and correctly.
- Check load cell for proper input and output resistances

Load Cell Connections



Signal + Green
Supply + Red
Signal - Black
Supply - White
Shield

Measuring Points	Resistance
Red (+ Exc) to White (–Exc)	420 ±20Ω
Green (+Sig) to Black (–Sig)	350Ω ±5Ω

9.5 Checking the different 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.

Adaptor Voltage
Check the adaptor output cable connecter voltage
Compare the value with the name plate on the scale

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

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 6V/3.4Ah battery.

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

9.6 Trouble Shooting

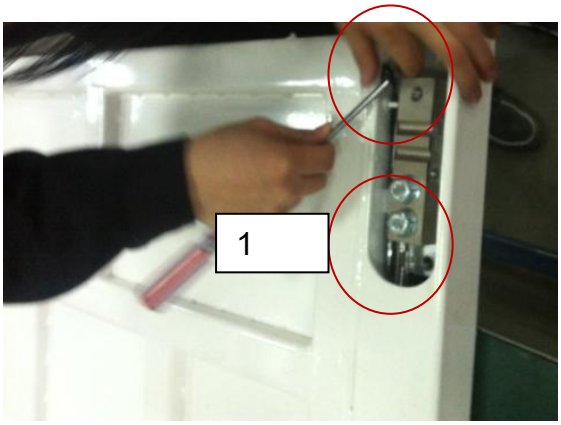
Problems	Possible cause	Common Solutions
Display is blank. No self test	Mains power is turned off. Power supply faulty or not plugged. Internal battery is not charged. On/Off switch problem	Check power is getting inside the scale and on/off switch is working. Verify the voltages, which is on the power labels.
Blank display after self test	Pan not installed. Unstable weight, load cell damaged	Check the pans are installed correctly. Try to turning on again.
OL or -------	Maximum capacity exceeded. Load cell or mechanics damaged. Power supply faulty	Check the platform is installed correctly. Try to turn on the scale again. Do the calibration again
------- or NULL displayed	Weight is on the platform is below permissible limit. Pan not installed correctly. Power supply faulty. Load cell or mechanism faulty	Check the platform is installed correctly. Try to turn on the scale again. Do the calibration again
Display is unstable	Goods touching somewhere. Air variation or any vibrations. Temperature changed. Load cell or connections faulty. Power supply faulty	Check the scale is in acceptable location. Check the connecters and load cell. Check the power supply and battery
Weight value incorrect	Calibration error. Platform of load cell touching somewhere. Wrong weighing unit	Use accurate weight for to do the calibration Check the pan and load cell is installed proper and touching. Check the parameter settings. Check the load cell and connecters
Can not use full capacity	Over load protection stoppers or transport locks are not removed. Parameters are set incorrectly. AD problem. Load cell or mechanism damaged	Check the stoppers and locks under the platform. Check the weighing unit and parameter settings. Check the load cell.
Platform Corner Weight different	Over load protection stoppers or transport locks are not removed. Load cell or mechanism damaged	Check the stoppers and locks under the platform. Use accurate weight for to do the calibration Check the load cell.
Battery not charging	Mains voltage problem Charging circuit problem Battery Problem	Check the mains and adaptor. Check the battery. Check the charging circuit

10 Parts Replacement

10.1 Replace load cell



- Turn over the platform and loosen the four feet.
- Loosen the screws on the load cell.
- Remove the BJ04board.





- Move the load cell line through the hole, Load cell 1and load cell 2 can be removed



- Then load cell 3 and load cell 4 can be easy moved.

- Before change the load cell 1 and load 2, should reserve the corresponding line to across the holes.

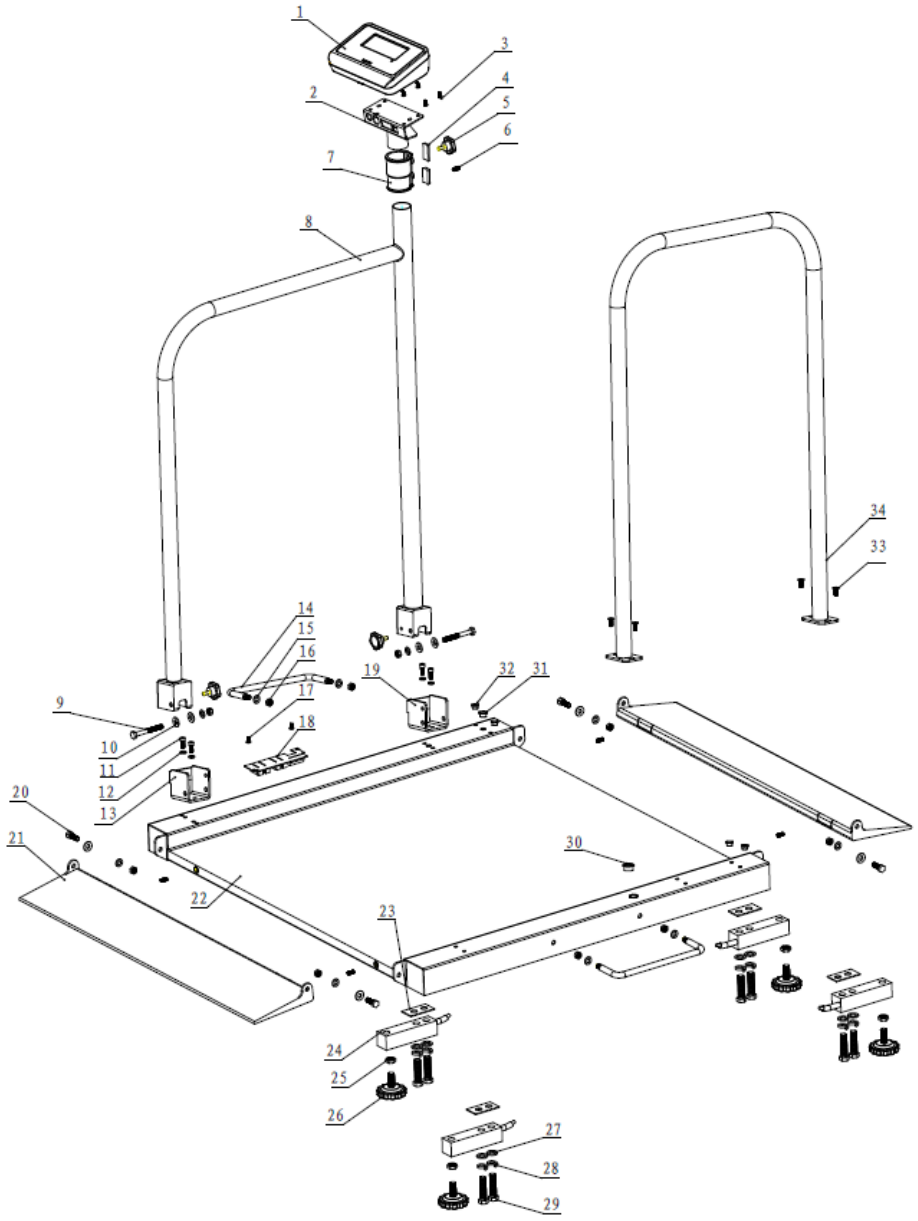
10.2 Replace the mainboard





- Remove the 9 screws.
- Remove the battery switch , calibration switch,RS232 port line, colour cable,screws,then change the new main board

11 DRAWING


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