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GB

**Service Manual
Electronic Pocket Balance**

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KERN TEE

Version 1.0 4/2008

TEE-SH-e-0810



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Version 1.0 4/2008

Service Manual

Electronic Pocket Balance

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1 Features

- Full Tare
- Display segment test function
- Negative value indication
- Stable indicator
- Low battery indicator
- Auto zero
- Auto off function
- Overload protection
- Two types of Digital Auto Calibration
- Solder pads to prevent end-user internal calibration
- Operated by 2 x AA alkaline batteries

2 Calibration Procedure (CAL)

1. Turn scale on and allow the unit to acclimatize and stabilize for 1 minute.
2. Press and hold the [Light/Cal] key for approx. 3 seconds. Display will show [CAL] and then the required calibration weight.
3. Gently place the correct calibration weight on the center on the weighing pan.
4. Wait until display shows [F] then turn off.

In case [E] is displayed instead of [F], this indicates a calibration procedure error, unstable or wrong calibration weight applied for calibration. Turn the scale off and on again and repeat the procedure.

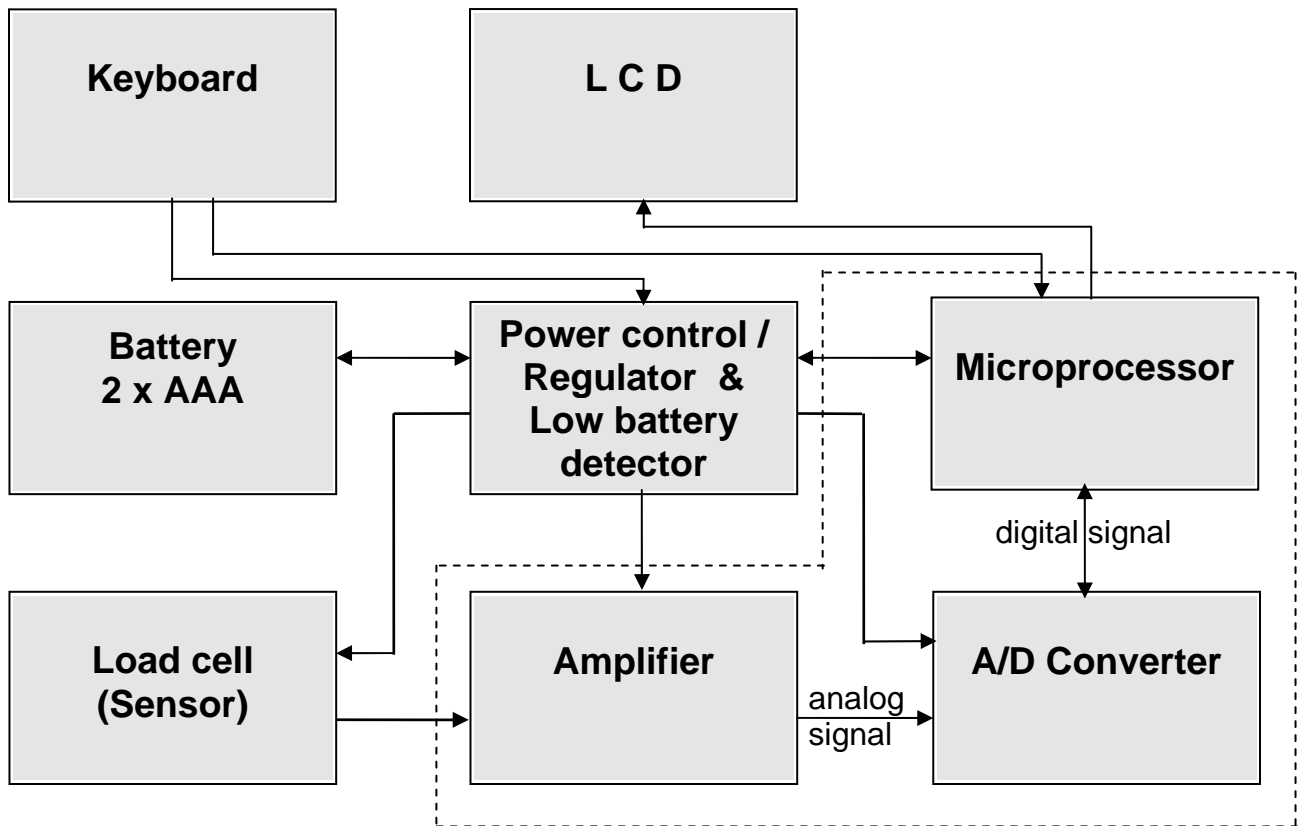
3 Internal Calibration Procedure

1. Remove two screws of the rear housing and open it.
2. Connect **J1** on the main board by soldering the pads together.
3. Place scale on a hard level surface. Turn scale on. Display shall show the internal counts.
4. The internal counts shall fall in the range from **3 000 to 5 000**. In case out of this range, connect **J8** left side or right side to increase or reduce the reading. Connecting or disconnecting pads on **J5**, **J6** or **J7** can fine tune the reading.
5. Press [On/Zero/Off] key once. Display will show [CAL] and then the required calibration weight. Place the corresponding calibration weight on the center of the weighing pan and wait until display shows [F] and then turn off.
6. Disconnect **J1**. Calibration completed.
7. Turn scale on and check the accuracy at different weight.
8. Install rear housing of the scale.

In case [CAL E] is display instead of [CAL F], this indicates a calibration procedure error or wrong weight applied for calibration. Turn the scale off and then on and repeat the procedure.

4 Functional Block Diagram / Description

4.1 Functional Block Diagram



4.2 Function Description

1. **Load cell**

This is the heart of the whole system. The load cell itself is arranged as a bridge. The resistance change of the bridge elements is proportional to the load applied on the load cell. Therefore, the output of the load cell is an analog signal, which is proportional to the load applied on the scale.

2. **Amplifier**

The analog signal from the load cell is very small, of the order of micro-volt. Hence, a linear and stable amplifier is applied to amplify the analog signal to an appropriate level.

3. **A/D Converter**

In order for the analog signal can be input to the microprocessor, this part converts the analog signal to its digital equivalent. The operation of the analog to digital converter is using a SIGMA DELTA technique and under the control of the microprocessor.

4. **Microprocessor**

The microprocessor control all the functions of the scale, such as auto zero, A/D conversion, timings, weight calculation, display, overload indication, low battery indication, tare, etc....

5. **Display**

This is the part where the weight is shown out on the LCD display in digital form. The whole display is driven by the microprocessor.

6. **Power Regulator and Low Battery Detector**

This part contains the ON/OFF power control. In order for the external power can be used by other parts of the scale, a regulator is used to regulate the supply. A low battery detector is employed to make sure that the power supply is strong enough for normal operation of the scale.

7. **Keyboard**

The keyboard provides on user interface. [On/Zero/Off] and [Light/Cal] keys are employed to operate the scale.

5 Trouble Shooting

Power on



Full Segments?

If no display, check battery, connection between battery—main board.

If missing segments, check fixing of LCD frame, zebra connector under LCD.



Display Zero?

If display [LO], check battery >2.5V.

If display [E] , check internal count.



Proper readout?

If unstable reading, check load cell and environmental conditions.



Correct reading?

If not accurate, perform internal calibration.

If cannot reach full capacity, check load cell and internal zero point.

If always zero, check internal zero point. Internal calibration if necessary.



Normal operation.

6 To Replace PCB

1. Disassemble rear housing of scale.
2. Disconnect wires to PCB. Replace a new PCB. Connect wires to PCB again.
3. Perform internal calibration as described in section 3.
4. Assemble rear housing of scale.
5. Check accuracy of scale at different weight.

TEE 150-1	
weight	Tolorance
50g	0.2g
100g	0.2g
150g	0.2g

6. Check other functions, such as Tare, Backlight and Auto-Off.

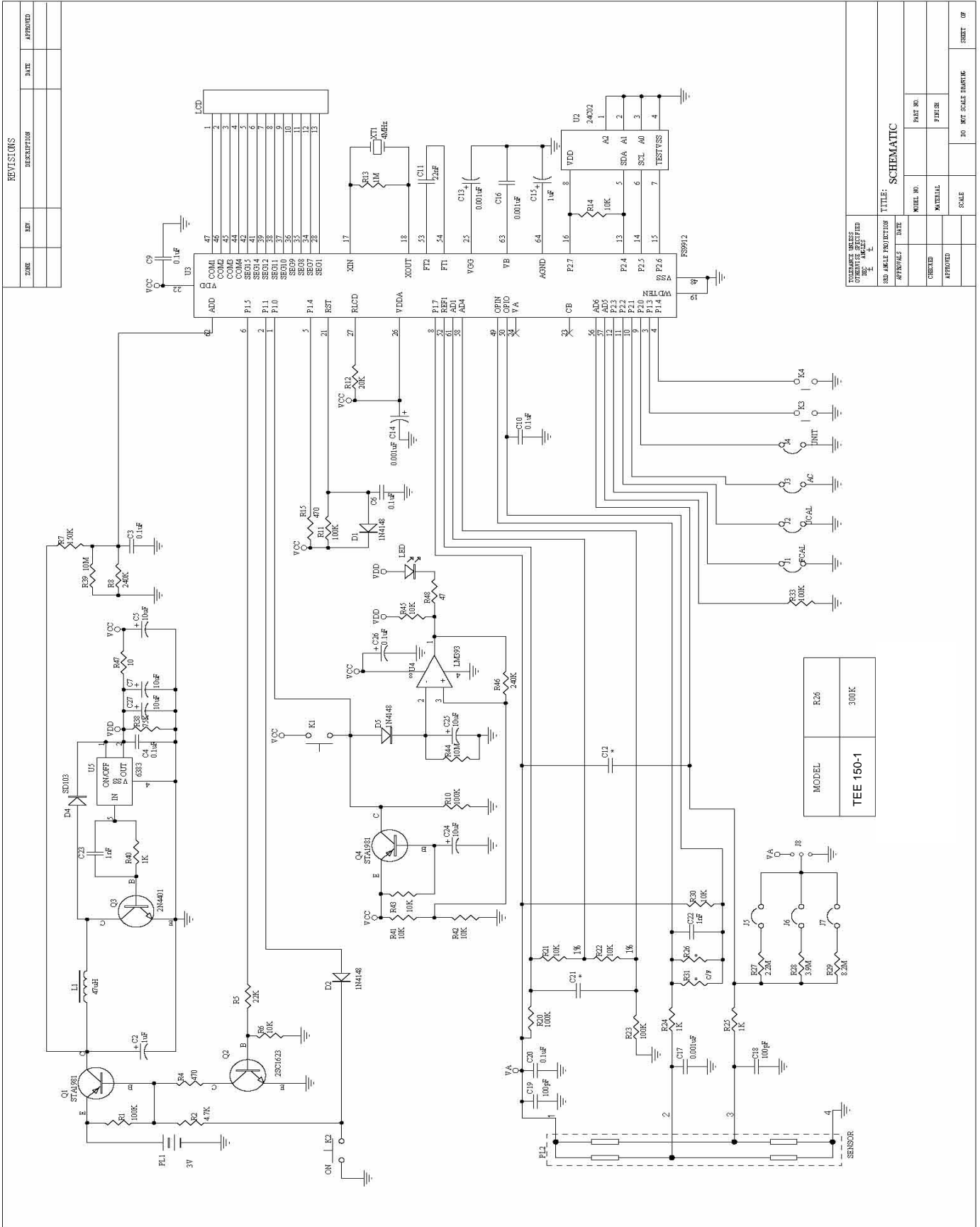
7 To Replace Load Cell Assembly

1. Disassemble rear housing of scale.
2. Disassemble screws fixing the load cell.
3. Disconnect wires to PCB. Replace the load cell with a new one.
Assemble screws fixing the load cell. Connect wires to PCB.
4. Perform internal calibration as described in section 3.
5. Assemble rear housing of scale.
6. Check accuracy of scale at different weight.

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weight	Tolorance
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7. Check other functions, such as Tare, Backlight and Auto-Off.

8 Schematics



9 Components Layout

