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GB

Service Manual
Electronic Hanging Scale

KERN CH

Version 2.0 4/2008

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1 Features

- Tare function with indicator
- Display segment test function
- Display Hold function (6 modes)
- Negative value indication
- Low battery indicator
- Auto Zero
- Auto off function (selectable)
- Zero tracking selectable
- Overload protection
- Two types of Digital Auto Calibration
- Solder pads to prevent end-user internal calibration
- Operated by 9V alkaline battery

2 Span Calibration (CAL)

1. Turn scale on and allow the unit to acclimatize and stabilize for 1 minute.
2. Press and hold the [Unit] key for approx. 3 seconds.
   Display will show [CAL] and then the required calibration weight.
3. Hang the standard weight onto the scale. Wait until display shows [F] then turn off.

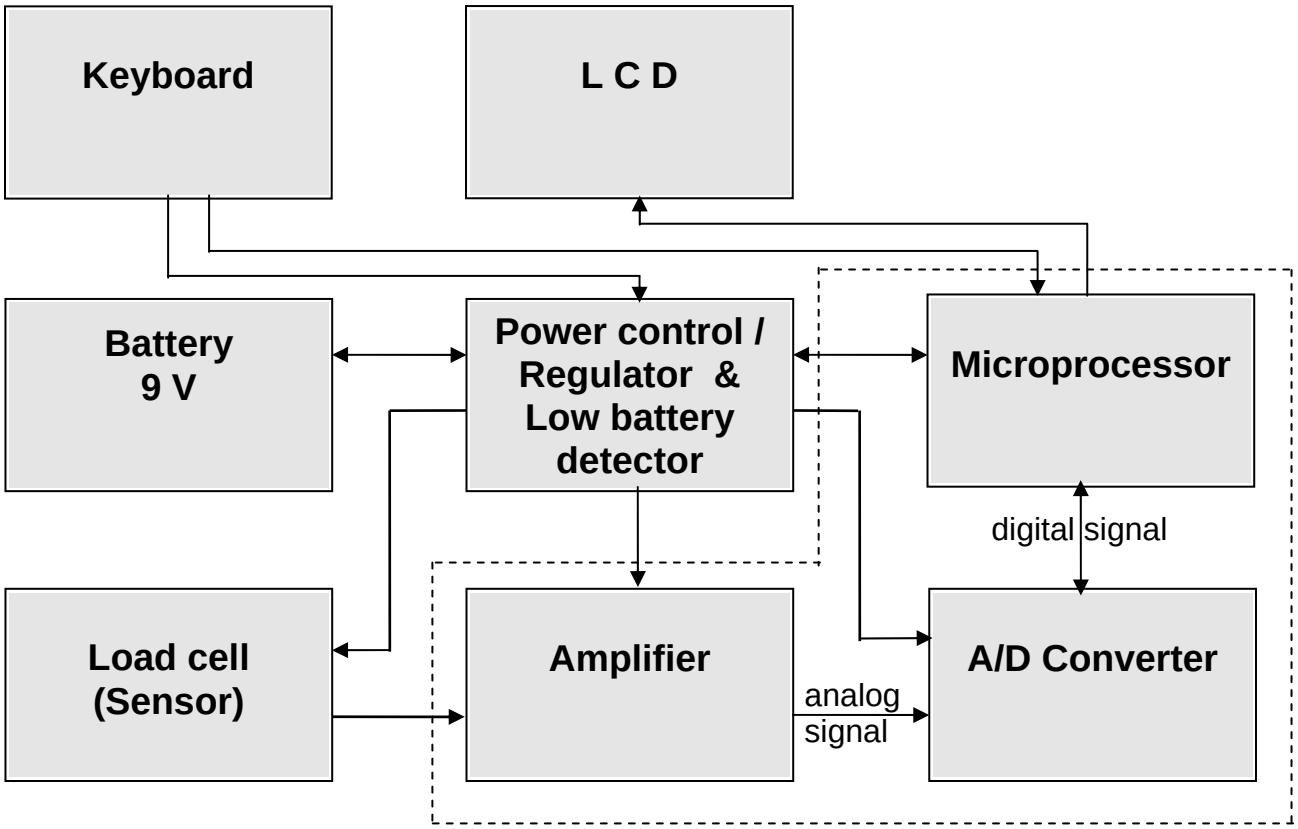
   In case [E] is display instead of [F], this indicates a calibration procedure error, unstable or wrong calibration weight applied for calibration. Turn the scale off and on again and repeat the procedure.

3 Internal Calibration Procedure

1. Remove four screws of the rear housing of the scale and open it.
2. Connect **J1** on the main board.
3. With scale on its weight position, turn scale on. Display will show the internal counts. The reading shall fall into the range of **3 000** to **5 000**. In case out of this range, connect **J9** to increase or decrease the reading. Connect or disconnect pads on **J5**, **J6** or **J7** to adjust the reading of the required range.
4. Press [ON/OFF/TARE] key once. Display will show the required calibration weight. Hang weight onto the scale accordingly until scale show [F] and turn off.
5. Disconnect **J1**. Calibration completed. Check the accuracy at different weight.
6. Install the rear housing of scale with the four screws.

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/Off/Tare], [Hold] and [Unit] keys are employed to operate the scale.

5 Trouble Shooting

Power on

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Full Segments?

If no display, check battery, keyboard / overlay, connection between keyboard—main board, battery—main board.
If missing segments, check fixing of LCD frame, zebra connector under LCD.

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Display Zero?

If display [LO], check battery>7.5V
If display [E] , check internal count.

↓

Proper readout?

If unstable reading, check hook, load cell

↓

Correct reading?

If not accurate, perform span calibration.
If cannot reach full capacity, check hook, 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 connections to keyboard (PL1), load cell (S1-S4), ground wire and battery (PL2) from the PCB. Disassemble the PCB screws. Repleace a new PCB and fix screws. Connect connections from PCB to keyboard, load cell, ground wire and battery again.
3. Perform internal calibration as described in section 3.
4. Assemble rear housing of scale.
5. Check accuracy of scale at different weight.

CH 15K20		**CH 50K50**		**CH 50K100**	
weight	tolorance	weight	tolorance	weight	tolorance
2.00 kg	0.02 kg	10.00 kg	0.05 kg	10.00 kg	0.05 kg
5.00 kg	0.02 kg	20.00 kg	0.05 kg	20.00 kg	0.05 kg
10.00 kg	0.02 kg	30.00 kg	0.05 kg	30.00 kg	0.05 kg
15.00 kg	0.04 kg	40.00 kg	0.10 kg	40.00 kg	0.10 kg
		50.00 kg	0.10 kg	50.00 kg	0.10 kg

6. Check other functions, such as TARE, Hold and Auto-Off.

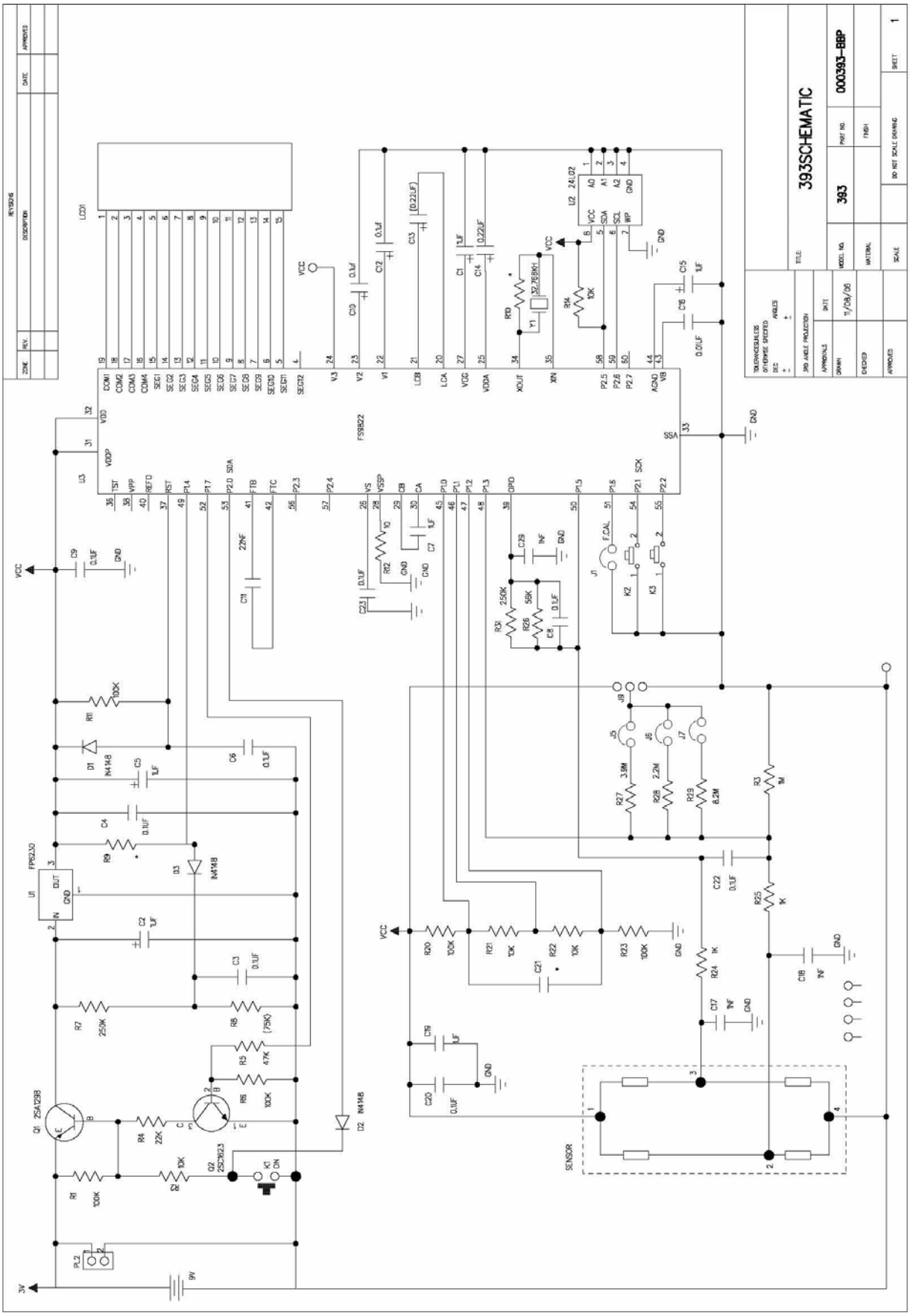
7 To Replace Load Cell Assembly

1. Disassemble rear housing of scale. Remove overlay and keyboard to disassemble screw fixing load cell.
2. Disconnect wires to PCB. Remove shaft and hook from load cell. Replace the load cell with a new one. Assemble shaft, hook, load cell fixing screw, keyboard and overlay. Connect wires to PCB.
3. Perform internal calibration as described in section 3.
4. Assemble rear housing of scale.
5. Check accuracy of scale at different weight.

CH 15K20		**CH 50K50**		**CH 50K100**	
weight	tolorance	weight	tolorance	weight	tolorance
2.00 kg	0.02 kg	10.00 kg	0.05 kg	10.00 kg	0.05 kg
5.00 kg	0.02 kg	20.00 kg	0.05 kg	20.00 kg	0.05 kg
10.00 kg	0.02 kg	30.00 kg	0.05 kg	30.00 kg	0.05 kg
15.00 kg	0.04 kg	40.00 kg	0.10 kg	40.00 kg	0.10 kg
		50.00 kg	0.10 kg	50.00 kg	0.10 kg

6. Check other functions, such as TARE, HOLD, and Auto-Off.

8 Schematics



9 Components Layout

