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GB

Service Manual
Electronic Pocket Balances

KERN CM_N

Version 2.1 09/2005

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1. Introduction

1.1 Features

- Memory function with indicator
- Full Tare function
- Power up display segment test function
- Low battery indicator
- Auto zero
- Negative value indication
- Multiple weighing units
- Auto off function
- Backlight selection
- Overload indication
- Hinged cover with built-in solar calculator
- Digital internal calibration
- Solder Pads to prevent end-user internal calibration
- Operated by two alkaline AAA batteries

1.2 Digital Auto Calibration Procedure

1. Turn scale on by pressing the [ON/M] key.

2. Press the [UNIT/CAL] key for 3 seconds. Display will show the required calibration weight.

3. Press the [OFF] key, display will show [CAL0]. Place the standard weight onto the scale. Wait until display shows [CALF] then turn off. In case [CALE] is display instead of [CALF], this indicates a calibration procedure error, unstable or wrong calibration weight applied for calibration. Reset the scale and repeat the procedures.

1.3 Internal Calibration Procedure

1. Slide the two battery compartment door locks to disassemble the door. Remove the screw inside the battery compartment, and remove the bottom housing of the scale.

2. Connect J1 on the PC board by soldering.

3. Install the scale. With scale on its weight position, turn scale on. Display will show the internal counts. The reading shall fall into the range of 3000 to 6000.
   In case out of this range, connect J9 to increase or decrease reading. Connect or disconnect J5, J6, J7, J8 or J10 to adjust the reading to the required range.

4. Press [ON/M] key once. Display will show the required calibration weight. Place the weight onto the scale accordingly until the display turn off.

5. Disconnect J1. Calibration completed. Check the accuracy at different weight.

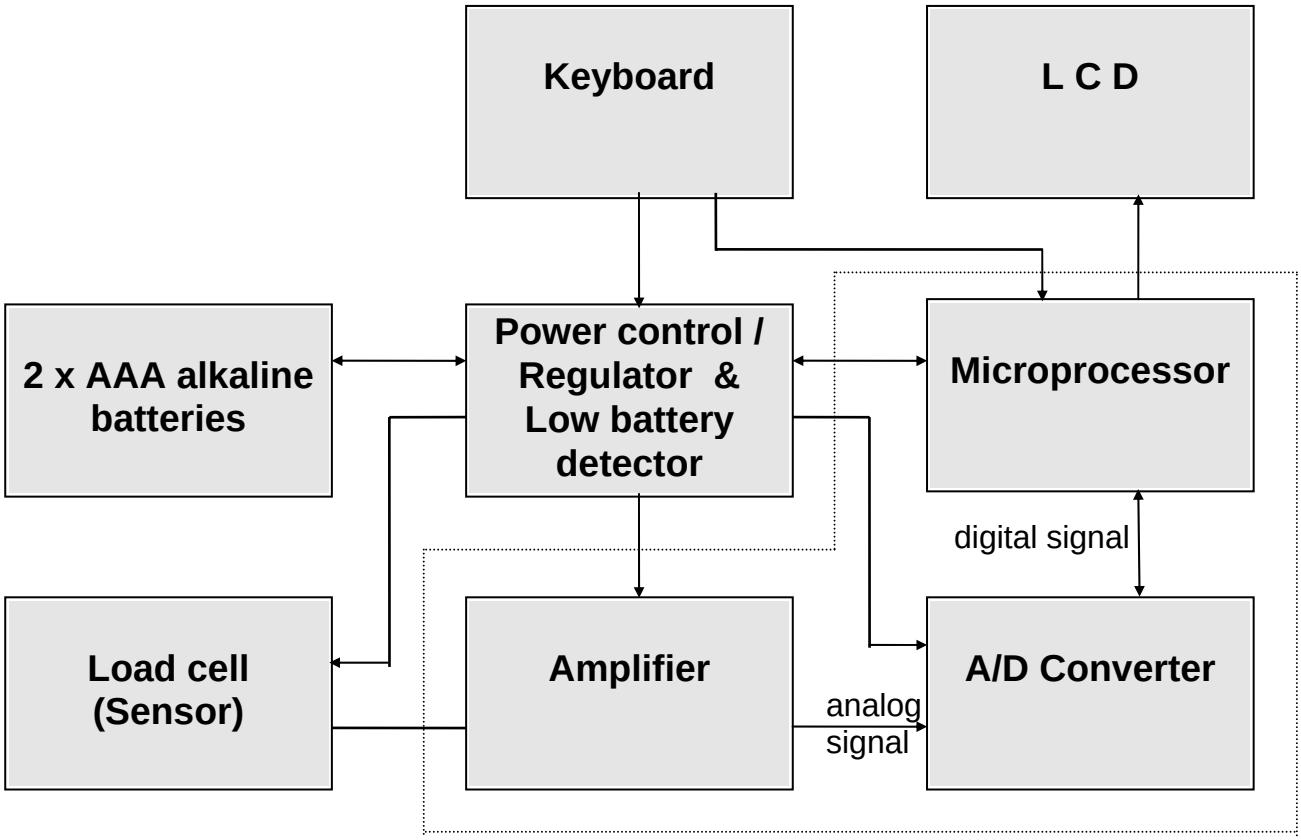
6. Install the bottom housing of scale with the screw. Install batteries and battery compartment door.

1.4 Display Segment Test

Whenever the balance is power on, all segments of the LCD will be turn on for 2 seconds. Check for any missing segment.

2. Functional Block Diagram / Description

2.1 Functional Block Diagram



2.2 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 cells. Therefore, the output of the load cells is an analog signal, which is proportional to the load applied on the platform.

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 (Pulse Modulation for CM60-2N) 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 and display, overload indication, low battery indication, tare function, calibration function, 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 user interface. [ON/M], [OFF], [UNIT/CAL] and [TARE] keys are employed to operate the scale.

3. Trouble Shooting

Power on

↓

Full Segments?

If no display, check battery ; connection between battery—PCBA; keyboard—PCBA.

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

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Display Zero?

If display [Lo], check battery>2.3v.

If display [E] , check internal count.

↓

Proper readout?

If unstable reading, check platform, loadcell, overload stop.

↓

Correct reading?

If not accurate, perform internal calibration.

If cannot reach full capacity, check platform, load cells, and internal zero setting.

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

↓

Normal operation.

4. To Replace PCBA

1. Remove the battery compartment door. Disassemble the middle assembly.

2. Disconnect battery wires, keyboard wires and load cell wires from the PCBA. Replace a new PCBA. Connect battery wires, keyboard wires and load cell wires again.

3. Perform internal calibration as described in section 1.

4. Assemble bottom housing of scale.

5. Check accuracy of scale at different weight.

CM 150-1N		**CM 320-1N**		**CM 1K1N**	
weight (g)	**tol. (g)**	**weight (g)**	**tol. (g)**	**weight (g)**	**tol. (g)**
50.0	0.2	100.0	0.2	500 g	2
100.0	0.2	200.0	0.2	1000 g	2
150.0	0.2	300.0	0.2		
CM60-2N		**CM 50-C2N**		**CM 500-GN1**	
weight (g)	**tol. (g)**	**weight (g)**	**tol. (g)**	**weight (g)**	**tol. (g)**
20.00	0.02	1.000	0.004	10.00	0.02
40.00	0.02	5.000	0.004	20.00	0.02
60.00	0.02	10.000	0.004	30.00	0.02

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

5. To Replace Loadcell Assembly

1. Remove the battery compartment door. Disassemble the middle assembly. Disconnect loadcell connections to the PCBA.

2. Disassemble screw fixing loadcell, and then screws fixing tray top. Assemble new loadcell to tray top, then middle assembly. Connect loadcell to PCBA.

3. Perform internal calibration as described in section 1.

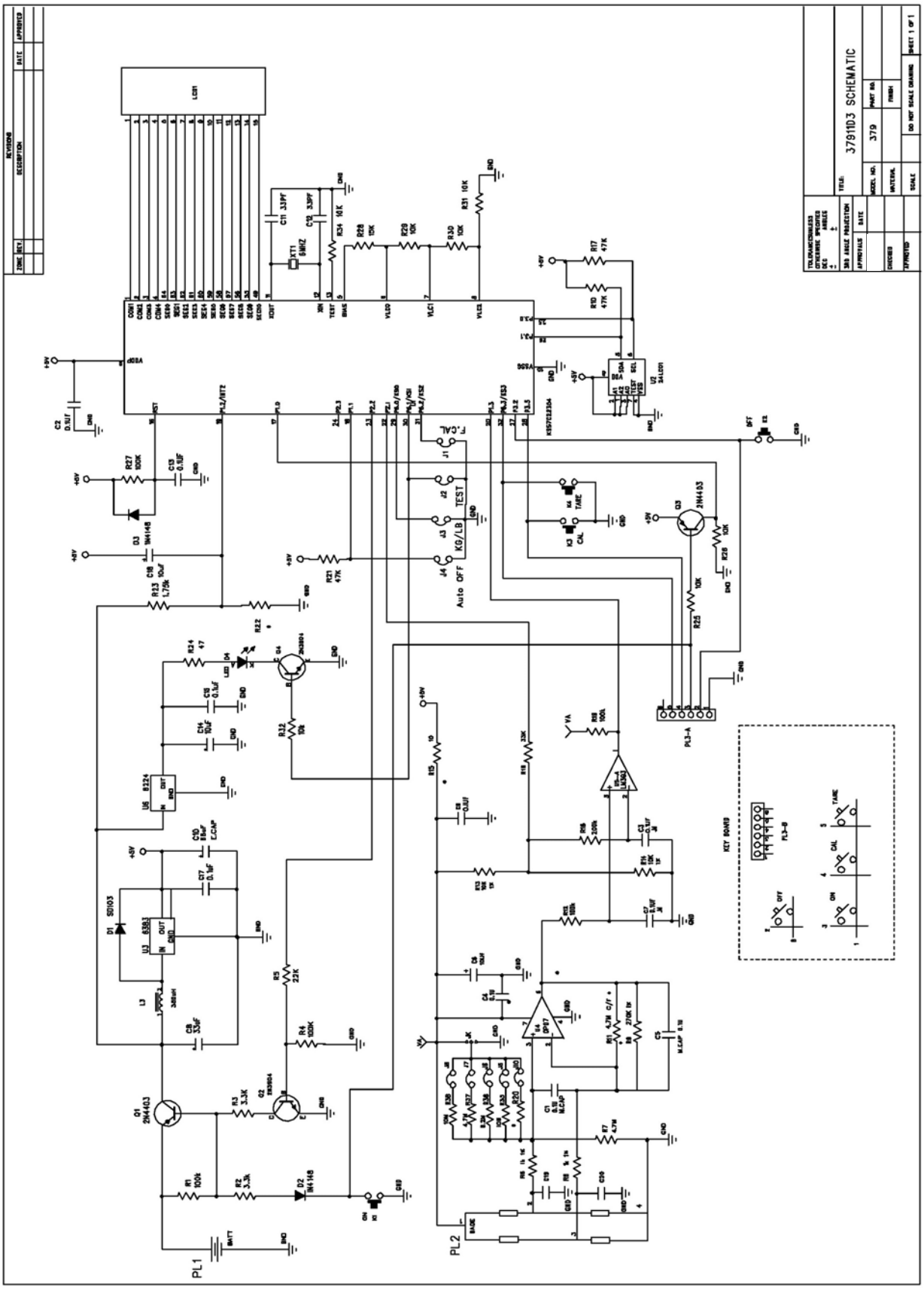
4. Assemble the middle assembly and battery compartment door of scale.

5. Check accuracy of scale at different weight.

CM 150-1N		**CM 320-1N**		**CM 1K1N**	
weight (g)	**tol. (g)**	**weight (g)**	**tol. (g)**	**weight (g)**	**tol. (g)**
50.0	0.2	100.0	0.2	500 g	2
100.0	0.2	200.0	0.2	1000 g	2
150.0	0.2	300.0	0.2		
CM60-2N		**CM 50-C2N**		**CM 500-GN1**	
weight (g)	**tol. (g)**	**weight (g)**	**tol. (g)**	**weight (g)**	**tol. (g)**
20.00	0.02	1.000	0.004	10.00	0.02
40.00	0.02	5.000	0.004	20.00	0.02
60.00	0.02	10.000	0.004	30.00	0.02

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

6. Schematics



7. Components Layout

