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Service Manual
Benchscale

KERN FCE

Type FCE_A
Version 1.0
01/2018
GB



FCE -SH-e-1810

GB

KERN FCE

Version 1.0 01/2018

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

2 Introdution

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

Note all rights are reserved. Copying any part of this manual is prohibited without our permission.

3 Basic Information (General)

3.1 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 manually and carefully placed in the centre of the weighing plate. As soon as a stable weighing value is reached the weighing value can be read.

3.2 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“ in the balance. (Example: Slowly draining fluids from a container on the balance.)
Do not leave permanent load on the weighing plate. This may damage the measuring system.
Impacts and overloading exceeding the stated maximum load (max) of the balance, minus a possibly existing tare load, must be strictly avoided. Balance may be damage by this.
Never operate balance in explosive environment. The serial version is not explosion protected.
The structure of the balance may not be modified. This may lead to incorrect weighing results, safety-related faults and destruction of the balance.
The balance may only be used according to the described conditions. Other areas of use must be released by KERN in writing.

3.3 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

3.4 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.

4 Basic Safety Precautions

4.1 Pay attention to the instructions in the Operation Manual



Carefully read this operation manual before setup and commissioning, even if you are already familiar with KERN balances.

Versions in other languages are non-binding translations.
The only binding version is the original document in German.

4.2 Personnel training

The appliance may only be operated and maintained by trained personnel.

5 Transportation & Storage

5.1 Testing upon acceptance

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

5.2 Packaging / return transport



- ⇨ Keep all parts of the original packaging for a possibly required return.
- ⇨ Only use original packaging for returning.
- ⇨ Prior to dispatch disconnect all cables and remove loose/mobile parts.
- ⇨ Reattach possibly supplied transport securing devices.
- ⇨ Secure all parts such as the glass wind screen, the weighing platform, power unit etc. against shifting and damage.

6 Unpacking, Setup and Commissioning

6.1 Installation Site, Location of Use

The balances are designed in a way that reliable weighing results are achieved in common conditions of use.
You will work accurately and fast, if you select the right location for your balance.

Therefore, observe the following for the installation site:

- Place the balance on a firm, level surface;
- Avoid extreme heat as well as temperature fluctuation caused by installing next to a radiator or in the direct sunlight;
- Protect the balance against direct draughts due to open windows and doors;
- Avoid jarring during weighing;
- Protect the balance against high humidity, vapors and dust;
- Do not expose the device to extreme dampness for longer periods of time. 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.
- Avoid static charging of the material to be weighed, weighing container and windshield.

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.

6.2 Unpacking

Carefully remove the balance from the packaging, remove plastic cover and setup balance at the intended workstation.

6.3 Placing

The balance must be installed in a way that the weighing plate is exactly in horizontal position.

7 Instant help

In case of an error in the program process, briefly turn off the balance and disconnect from power supply. The weighing process must then be restarted from the beginning.

Fault	Possible cause
The displayed weight does not glow.	The balance is not switched on.
	The mains supply connection has been interrupted (mains cable not plugged in/faulty).
	Power supply interrupted.
	Batteries are inserted incorrectly or empty
	No batteries inserted.
The displayed weight is permanently changing	Draught/air movement
	Table/floor vibrations
	The weighing plate is in contact with foreign matter.
	Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)
The weighing result is obviously incorrect	The display of the balance is not at zero
	Adjustment is no longer correct.
	Great fluctuations in temperature.
	Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)

8 Adjustment

The adjustment should be made with the recommended adjustment weight (see chap. 1 "Technical data"). Adjustment is also possible with the weights of other nominal values, but not the optimum for measuring technique.

Procedure when adjusting:
Observe stable environmental conditions. A warming up time (approx. 10 min) is required for stabilization.

Operation	Display

⇨ Start balance by pressing ON/OFF

The balance displays for approx. 3 seconds **[88888]**



and then goes to **[0]**. Now it is ready for operation.



⇨ Press TARE and keep it pressed, **[CAL]** is displayed

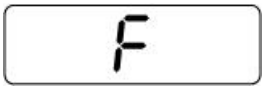


After approx. 5 seconds appears the size of the recommended adjustment weight



(Example)

⇨ Place adjusting weight in the center of the weighing plate, short time later appears [F]



Afterwards the balance automatically jumps back to normal weighing mode. In the display there appears the value of the adjustment weight.



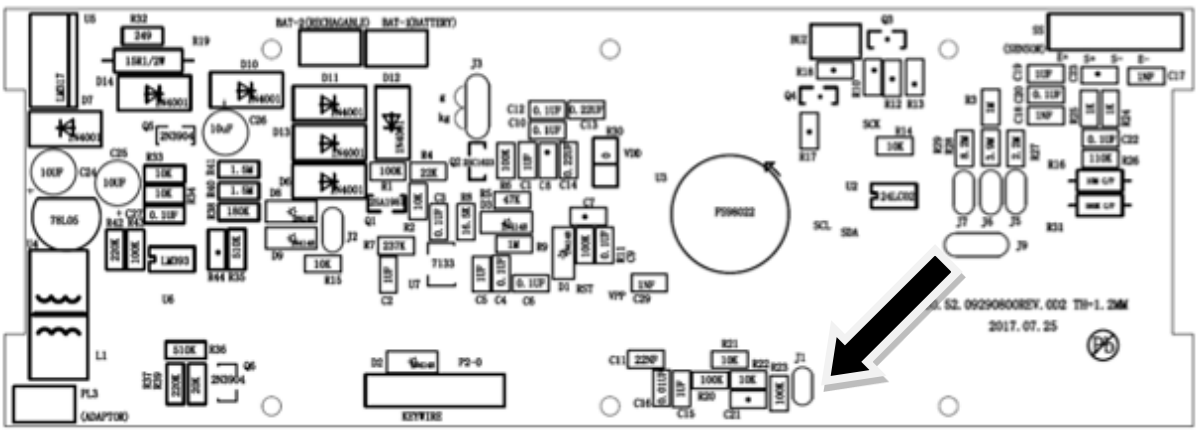
(Example)

An error during adjustment or the use of an incorrect adjusting weight will result in an error message „**CAL E**“. Repeat adjustment.

Keep the adjustment close to the balance. Daily control of the weighing exactness is recommended for quality-relevant applications.

9 Internal calibration

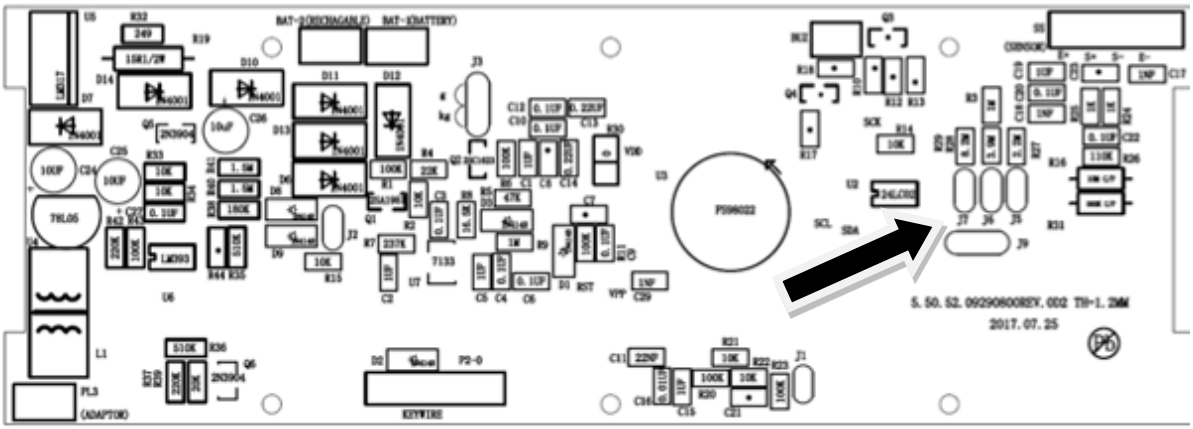
Remove the bottom cover of the scale and connect J1 on the board by soldering. With empty plattform, connect power and turn the balance on.



Operation	Display

Start balance by pressing ON/OFF

The balance displays shows the internal count. The reading shall fall in the range from 2000 to 5000. in case out of this range, remove weighing plate, connect J9.



To increase or decrease reading, connect J5, J6 or J7 to adjust the reading to the range.

Press ON/OFF key once.

Display will show the required calibration weight.

2500g

(Example)

Place adjusting weight in the center of the weighing plate, short time later appears [F]

F

Disconnect power to the scale

Disconnect J1 on the board

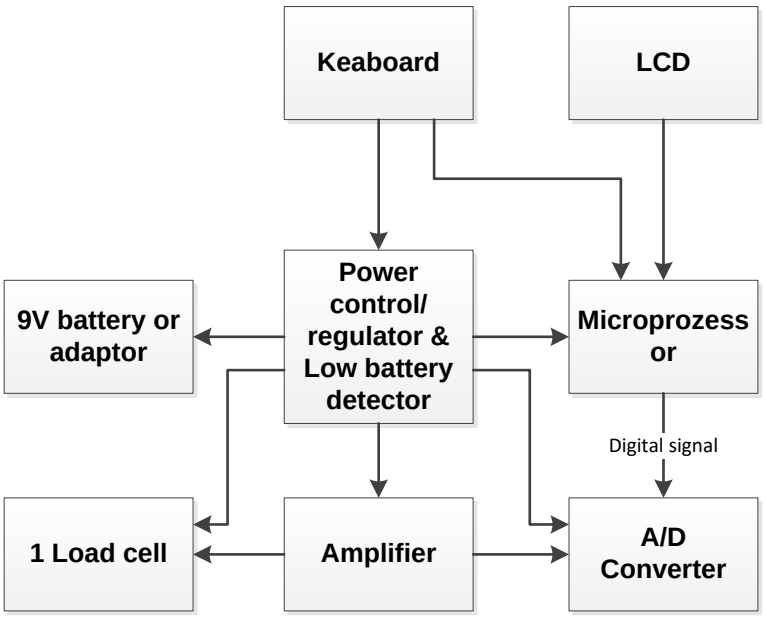
Calibration complete. Check the accuracy at different weights.

In case [E] is display instead of [F], this indicates a calibration procedure error, or wrong weight applied for calibration.

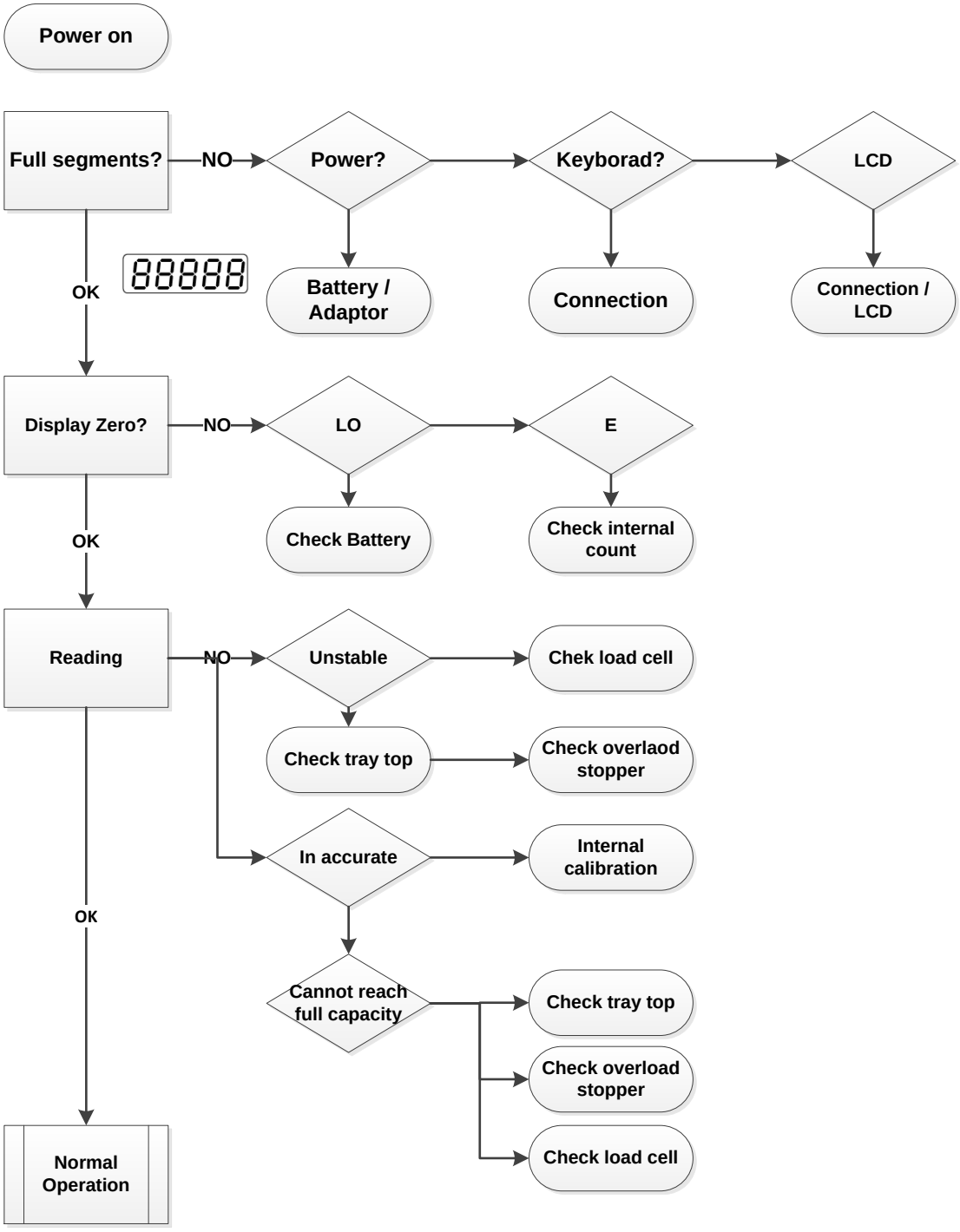
E

Turn the scale off and then on and repeat the procedure.

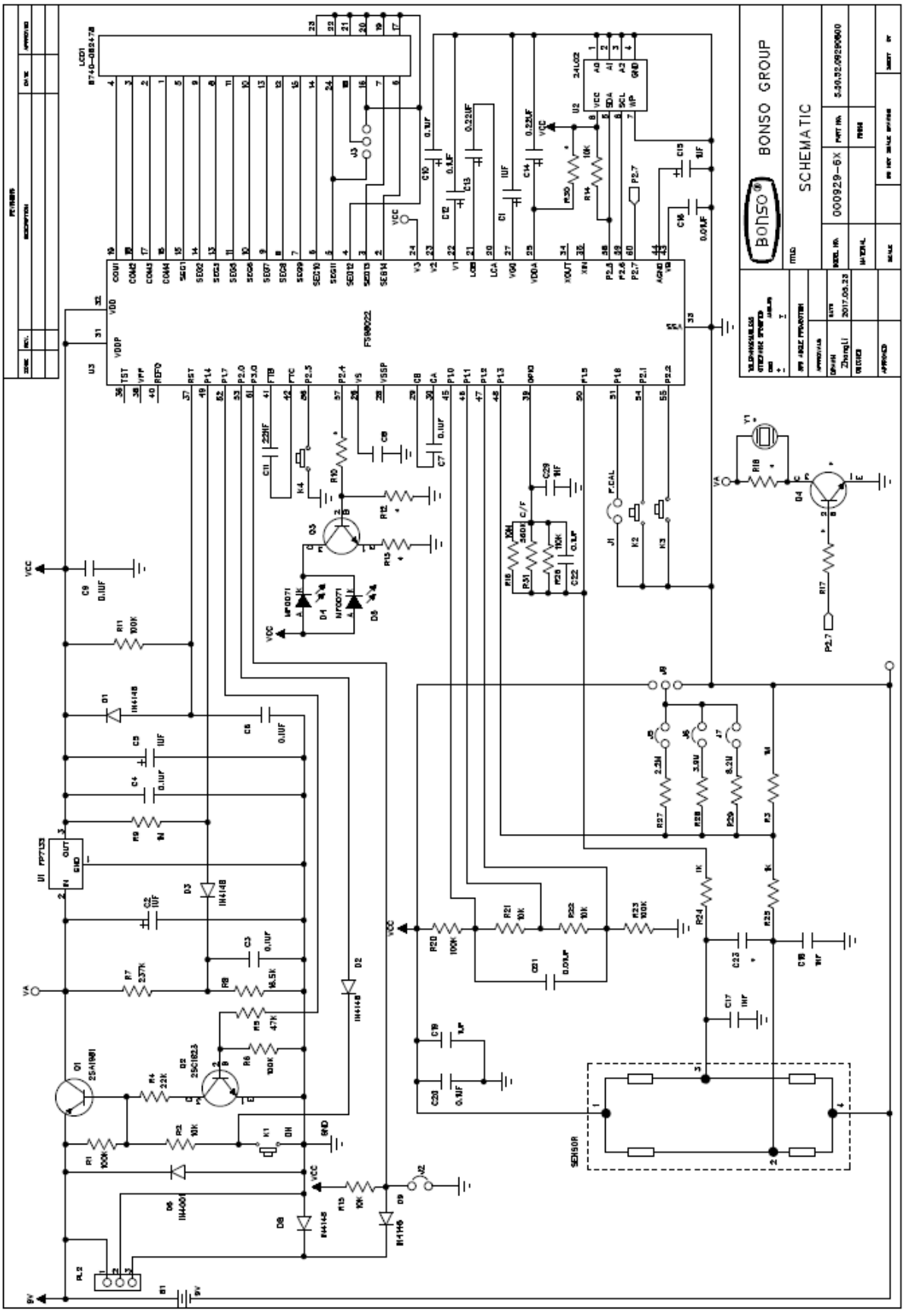
10 Functional Block Diagram

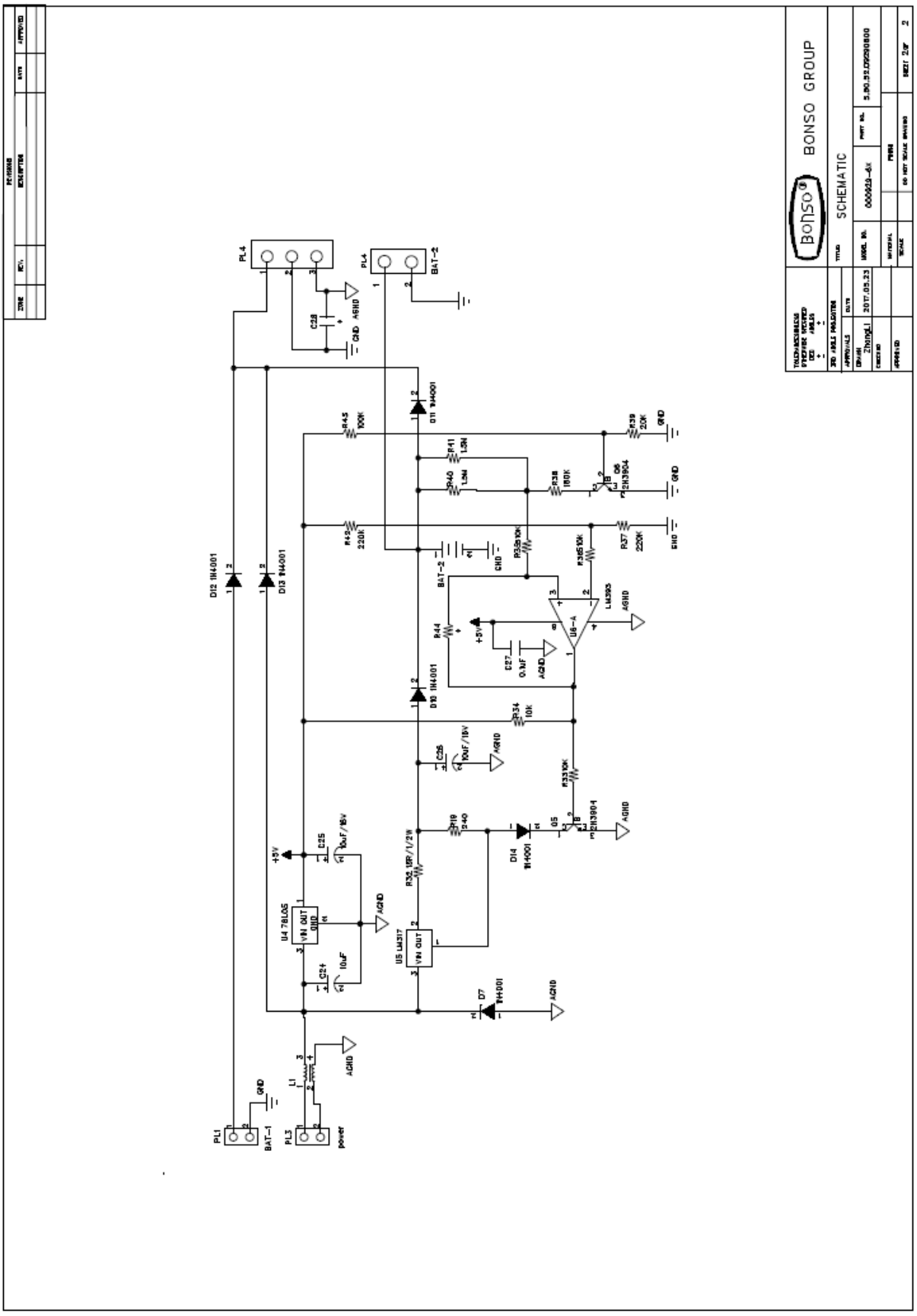


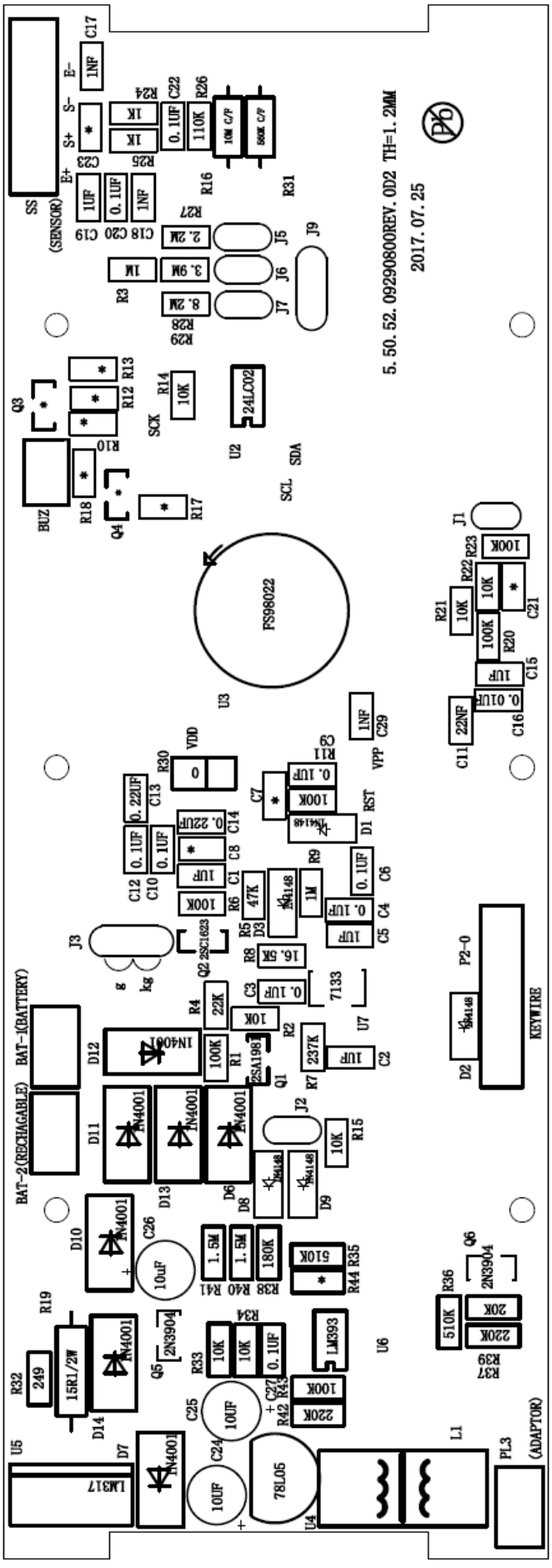
11 Trouble Shooting



12 Schematics




BONSO GROUP
SCHEMATIC
BONSO
BAT-2
PL4
PL1
PL3
BAT-1
power
GND
AGND
+5V
D11 1N4001
D12 1N4001
D13 1N4001
D10 1N4001
D14 1N4001
D7 1N4001
R45 100K
R41 1.2M
R40 1.2M
R38 100K
R39 220K
R42 220K
R35 100K
R36 100K
R37 220K
R44
R34 10K
R33 10K
R19 240
R32 1R/1/2W
C38
C27 0.1uF
C26 100uF/16V
C25 100uF/16V
C24 10uF
L1
U4 78L05
U5 LM317
U6-A LM393
Q5 2N3904
Q6 2N3904


5.50.52.09290800REV.0D2 TH=1.2MM
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IN4001
IN4148
2SA1198
2SC1623
KEYWIRE
(SENSOR)
(ADAPTOR)
BAT-1(BATTERY)
BAT-2(RECHAGABLE)
BUZ
SCK
SDA
SCL
VDD
VPP
RST
P2-0
S+
S-
E+
E-