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## Service Manual Benchscale

### KERN FCB

Type FCB\_A  
Version 1.0  
01/2018  
GB



FCB -SH-e-1810



# KERN FCB

Version 1.0 01/2018

## Service manual

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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 Introduction**

This service manual covers the FCB\_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 damaged 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](http://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

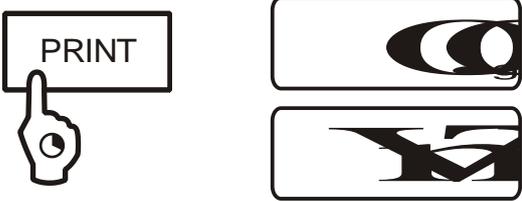
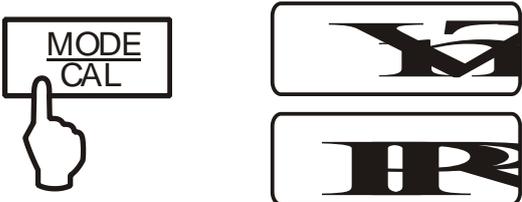
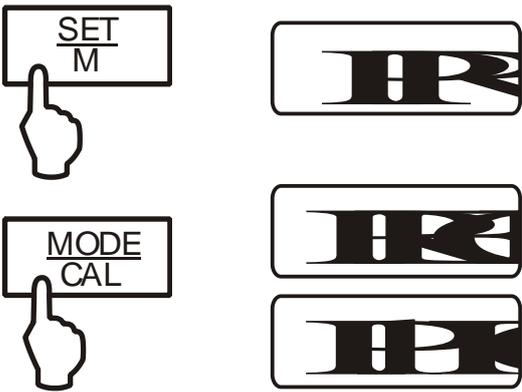
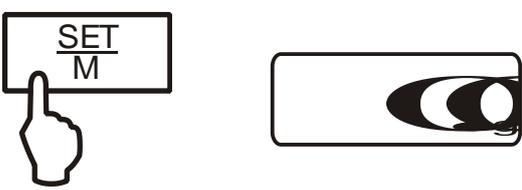
Carefully remove the balance from the packaging, remove plastic cover and setup balance at the intended workstation.

### 6.3 Placing

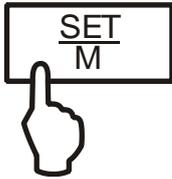
The balance must be installed in a way that the weighing plate is exactly in horizontal position.

## 7 Menu

### Navigation in the menu

<p><b>Access to menu</b></p> 	<p>In weighing mode keep the <b>PRINT</b> key pressed until <b>[Unit]</b> appears.</p>
<p><b>How to select menu items</b></p> 	<p>Using the <b>MODE</b> key the individual menu items can be selected one after the other.</p>
<p><b>How to change settings</b></p> 	<p>Acknowledge selected menu item using <b>SET</b> key, the current setting is displayed.</p> <p>Change the settings using the <b>MODE</b> key. At any pressing of the <b>MODE</b> key, the next setting is displayed, see chapter 9.2 „Menu Overview“.</p>
<p><b>1. Save change of a menu item and exit the menu</b></p> 	<p>⇒ Press the <b>SET</b> key; balance will return to weighing mode.</p>

## 2. Change settings of several menu items



Acknowledge selected menu item using **SET** key, the current setting is displayed.

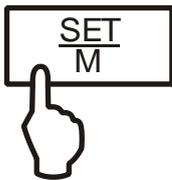


Use the **MODE** key to change settings.



Press the **TARE** key, „**Exit**“ is displayed.

**Either**

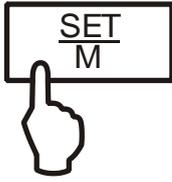


Acknowledge with **SET** key (yes), „**Store**“ is displayed. Save (**SET** key) or reject (**PRINT** key) and exit the menu,

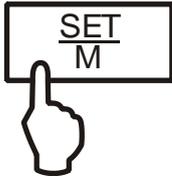
**or**

Press **PRINT** key (no) and make the changes on the other menu items as described above

### Save/reject and exit the menu



⇒ Save



⇒ Reject



### Either

Any changes carried out are stored by pressing the **SET** key (yes). The balance returns automatically into weighing mode.

### or

To cancel changes, press the **PRINT** key (no). The balance returns automatically into weighing mode.

## 7.1 Menu overview

Description of function	Function	Parameter	Description of options
Weighing units switching over(see chapter 9.3).	<b>UNIT</b>	<b>g*</b>	Gram
		<b>kg</b>	Kilogram (dependent on model)
		<b>oz</b>	Pound
		<b>ozt</b>	Ounce
		<b>lb</b>	Troy ounce
		<b>tlh</b>	TaelHongkong
		<b>tlt</b>	TaelTaiwan
		<b>gn</b>	Grain (dependent on model)
		<b>dwt</b>	Pennyweight (dependent on model)
		<b>mo</b>	Momme
		<b>Tol</b>	Tola
		<b>ct</b>	Carat (dependent on model)
<b>FFA</b>	Freely selectable factor		
Data transfer mode (see chapter 9.4)	<b>PR</b>	<b>rE CR*</b>	Data output via remote control commands (see chapter 10.3)
		<b>Pr PC</b>	Data output by pressing the PRINT key (see chapter 10.3)
		<b>AU PC</b>	Continuous data output (see chapter 10.3)
		<b>bAPr</b>	Printout on barcode printer (see chapter 10.4)
		<b>AU Pr</b>	Autom.Data output of stable weighing values (see chapter 10.3)
Selection printer output (see chapter 9.4)	<b>LAPr</b>	<b>Hdr*</b>	Edition of the headlines
		<b>GrS</b>	Edition of the total weight
		<b>Net</b>	Edition of the net weight
		<b>tAr</b>	Edition of the tare weight
		<b>N7E</b>	Edition of the stored weight
		<b>PCS</b>	Edition of quantity
		<b>AUJ</b>	Edition of the unit weight
		<b>Rqt</b>	Edition of the reference quantity
		<b>FFd</b>	Edition of a page feeding at start printer output
		<b>FFE</b>	Edition of a page feeding at end printer output

Baud rate (see chapter 9.4).	<b>bAUd</b>	<b>19200</b>	
		<b>9600*</b>	
		<b>4800</b>	
		<b>2400</b>	
		<b>1200</b>	
Auto off (battery operation), see chap. 7.4	<b>AF</b>	<b>on*</b>	Automatic switch-off function after 3 min without changing load ON
		<b>off</b>	Automatic switch-off function after 3 min without changing load OFF
Auto Zero (see chapter 9.3)	<b>tr</b>	<b>on*</b>	On
		<b>off</b>	Off
Selection adjustment weight (see chapter 9.3)	<b>CAL</b>	<b>100</b>	*dependent on model
		<b>200</b>	
		<b>300</b>	
Filter function (see chapter 9.3).	<b>StAbiL</b>	<b>1</b>	Fast display
		<b>2</b>	Normal display
		<b>3</b>	Slow display
Background illumination of the display, (see chap. 9.3)	<b>bL</b>	<b>on*</b>	Background illumination on
		<b>off</b>	Background illumination off
	<b>CH</b>	The background illumination will be switched off automatically 10 sec after having reached a stable weighing value.	
Animal weighing function (see chapter 9.3)	<b>ANL</b>	<b>off*</b>	Off
		<b>3</b>	Period 3 seconds
		<b>5</b>	Period 5 seconds
		<b>10</b>	Period 10 seconds
		<b>15</b>	Period 15 seconds
Reset to factory setting (see chap. 9.3)	<b>rSt</b>	<b>no*</b>	no
		<b>yes</b>	yes

\* = default setting

## 8 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.

<b>Fault</b>	<b>Possible cause</b>
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. <input type="checkbox"/> Electromagnetic fields / static charging (choose different location/switch off interfering device if possible)

## 9 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 (see table 1), 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.

- ⇒ Turn on balance by pressing the **ON/OFF** key.
- ⇒ Press the **MODE** key and keep it pressed, in the display appears shortly „**CAL**“. After that the exact size appears flashing in the display (see chapter.9) of the adjustment weight.
- ⇒ Now set the adjusting weight in the centre of the weighing plate.
- ⇒ Press the **SET** key. Short time later there appears „**CAL F**“, then the automatic return to the weighing mode. In the display there appears the value of the adjustment weight.

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.

### Selection adjustment weight

In the model series KERN FKB\_A, the adjustment weight can be selected from three/four pre-set nominal values (approx.1/3; 2/3; max) (refer also to following table, factory setting with grey background). In order to achieve high-quality weighing results in the sense of the measuring technology, it is recommended to select the nominal value as high as possible. The non delivered adjustment weights can be purchased from KERN as option.



- ⇒ In weighing mode keep the **PRINT** key pressed until **[Unit]** appears.



- ⇒ Press the **MODE** key several times until „**CAL**“ is displayed.



- ⇒ Acknowledge using **SET** key, the current setting is displayed.

- ⇒ Select the desired settings by pressing the **MODE** key.

- ⇒ Use the **SET** key to confirm selection.

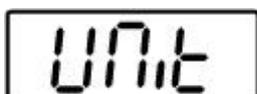
FCB3K-4A	FCB6K-4A	FCB 8K-4A
		2000
1000	2000	4000
2000	4000	6000
3000	6000	8000

FCB 10K-3A	FCB 20K-3A	FCB 30K-3A
------------	------------	------------

4000	10000	10000
8000	15000	20000
12000	20000	30000

### Filter

only model:  
FCB 8K-4A



(Example)

This menu item allows the balance to be set according to specific ambient conditions and measuring purposes.

⇒ In weighing mode keep the **PRINT** key pressed until **[Unit]** appears.

⇒ Press the **MODE** button several times until „StAbiL“ is displayed.

⇒ Acknowledge using **SET** button, the current setting is displayed.

⇒ Select the desired settings by pressing the **MODE** button.

<b>1</b>	Filter 1: The balance reacts quickly and in a sensitive manner, quiet set-up location.
<b>2</b>	Filter 2: The scale reacts normally, normal installation site
<b>3</b>	Filter 3: The balance reacts slowly and in a robust manner, busy set-up location

⇒ Use the **SET** key to confirm selection.

## 10 Internal calibration

Remove the top housing of the scale. Place scale on a hard level surface.

Operation	Display
-----------	---------

Start balance by press and hold   

Then release the hold key

1. 
2. 
3. 

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.

2570

Press  to enter the model selection. Press  or  to select different model.

Press  to confirm the model. Display will show. LCD display A/D count again.

F

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Press  display will show

Disconnect power to the scale

Disconnect J1 on the board

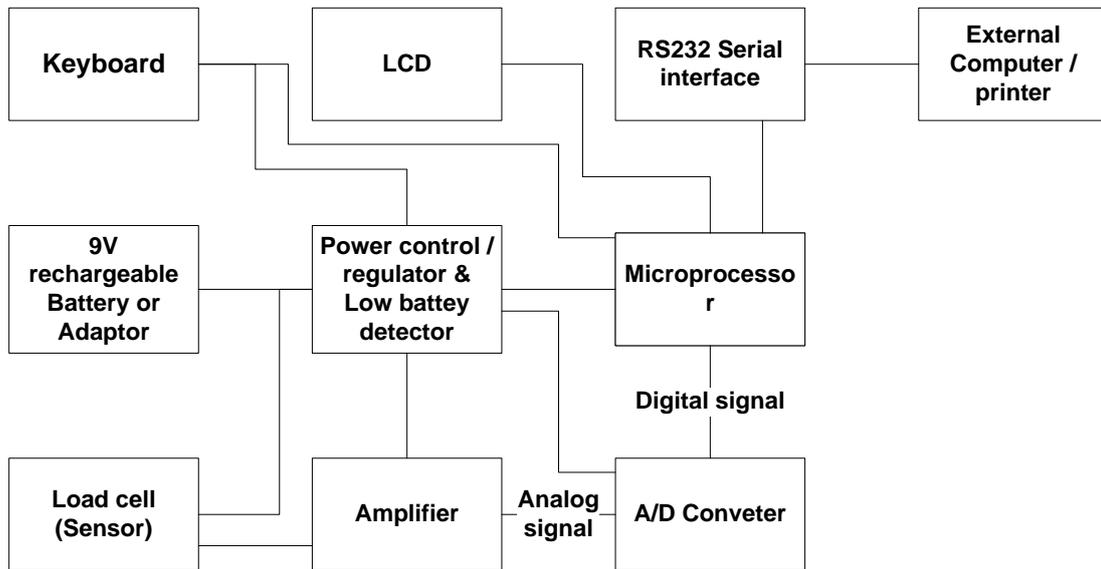
Calibration complete. Check the accuracy at different weights.

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

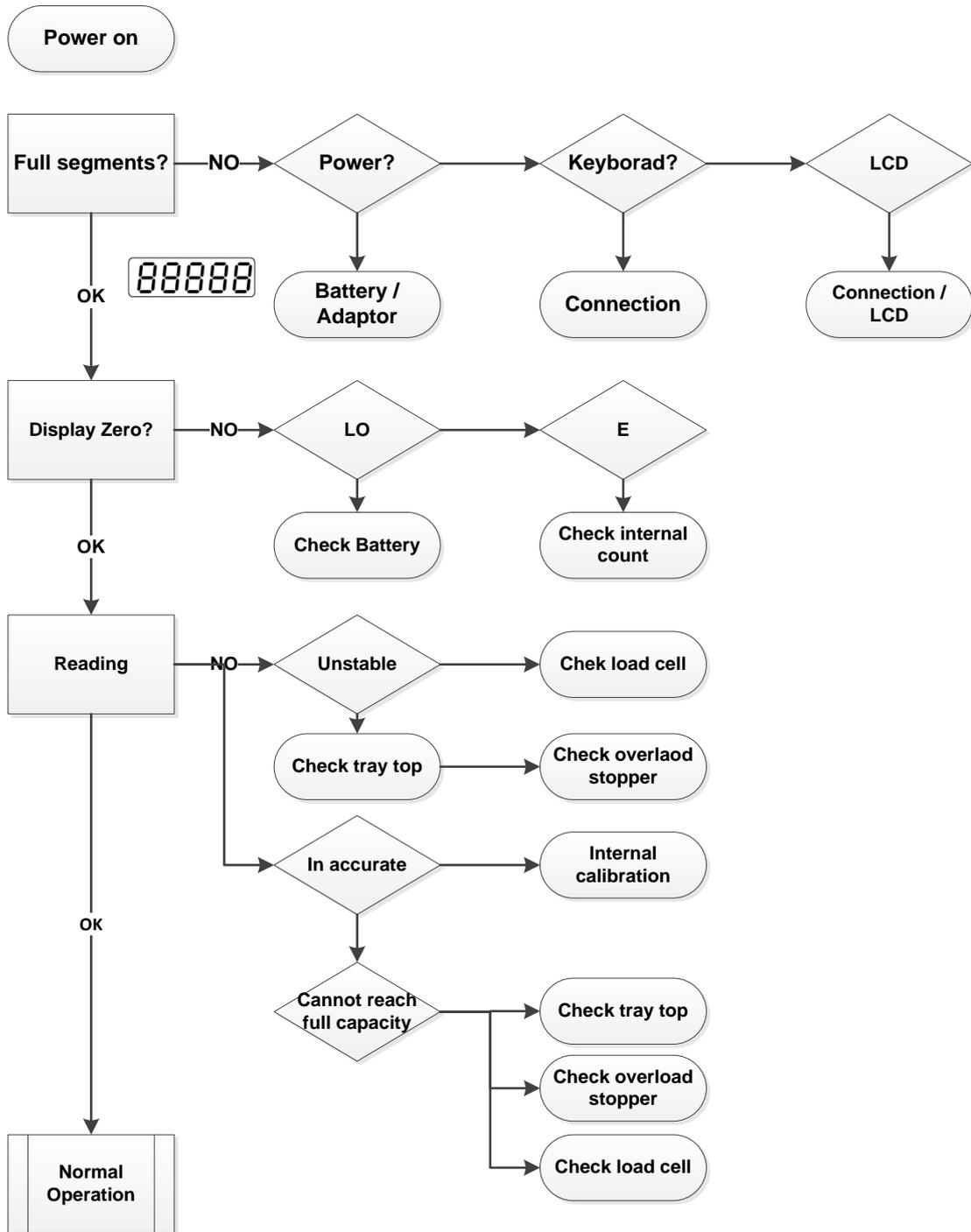
E

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

## 11 Functional Block Diagram



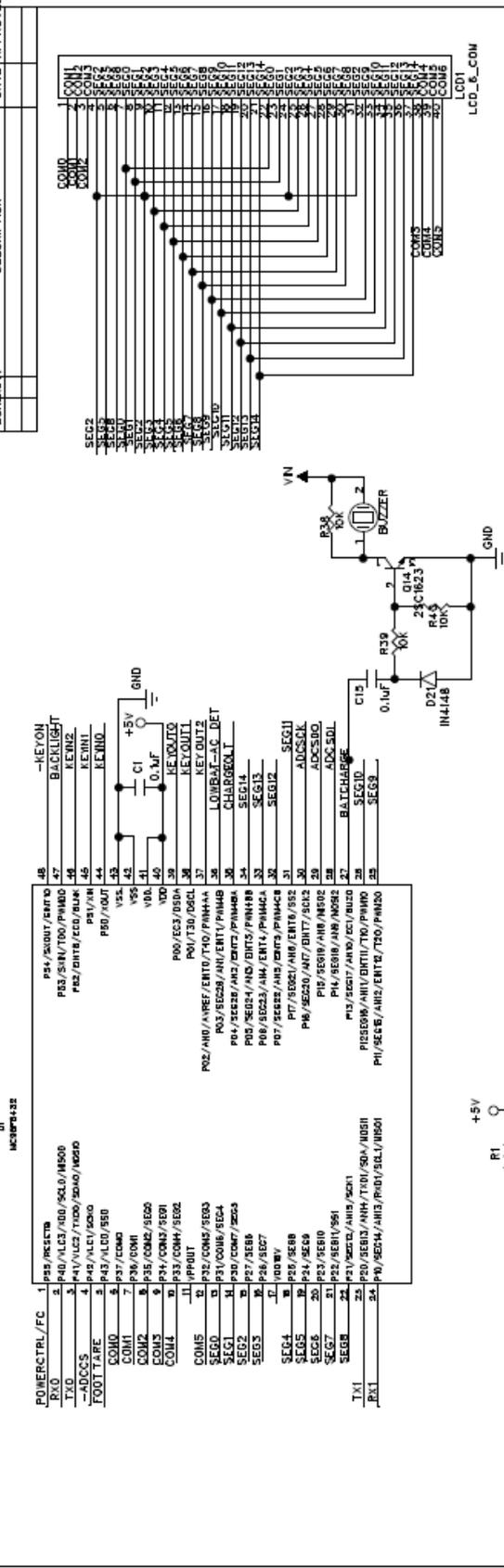
## 12 Trouble Shooting



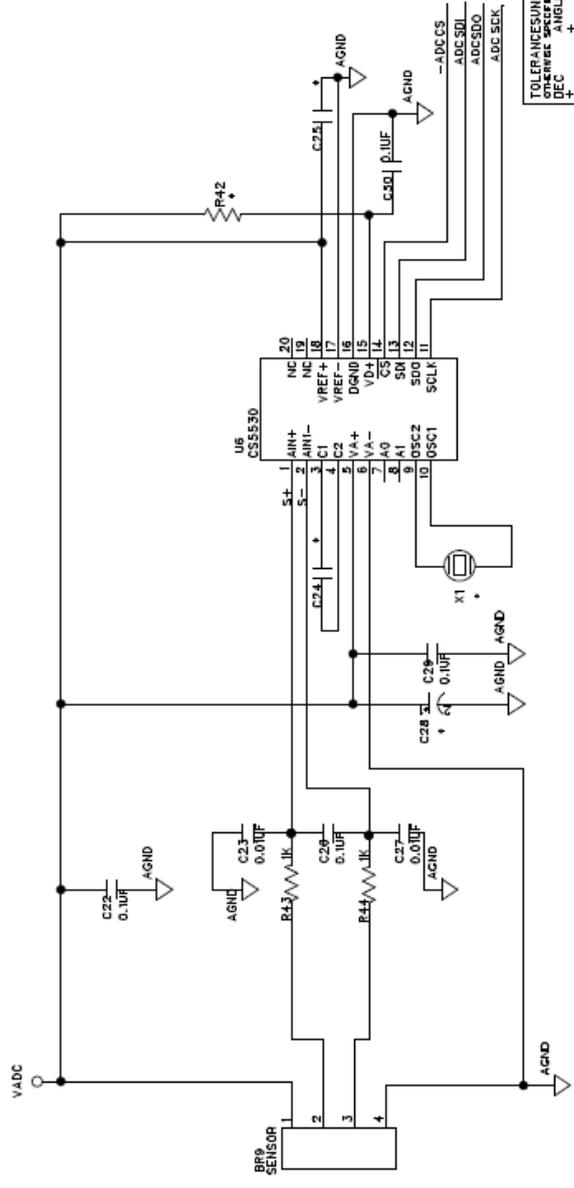
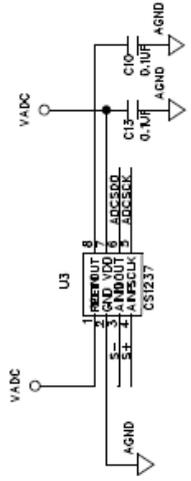


4.4

ZONNE I.	REVISIONS	DESCRIPTION	DATE	APPROVE



REVISORIS		DATE	APPROVED
ZONBRE I.	DESCRIPTION		



TOLERANCES UNLESS OTHERWISE SPECIFIED		BONSO GROUP	
DEC	ANGLES	TITLE:	SCHEMATIC
±	±	3RD ANGLE PROJECTION	
±	±	APPROVALS	DATE
±	±	DRAWN	2017.07.17
±	±	CHECKED	
±	±	APPROVED	
±	±	MODEL NO.	000929-0X
±	±	PART NO.	3.50.02.0000700
±	±	MATERIAL	FINISH
±	±	SCALE	DO NOT SCALE DRAWING
±	±	SHEET	3 OF 4



