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Service Manual
Platform Scale / Display Unit

KERN SFE / KFE-TM

Version 1.0
11/2012
GB



SFE-SH-e-1210

GB

KERN SFE / KFE-TM

Version 1.0 11/2012

Service Manual

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1. Basic information
Grundlegende Hinweise

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.

Das Gerät darf nur von geschultem oder beruflich ausgebildetem Fachpersonal (z. B. eichrechtlich anerkannter Instandsetzer) repariert werden.

Die Serviceanleitung ist bindend für Reparaturen.

Das Gerät muss nach erfolgter Reparatur wieder in den Originalzustand zurückversetzt werden.

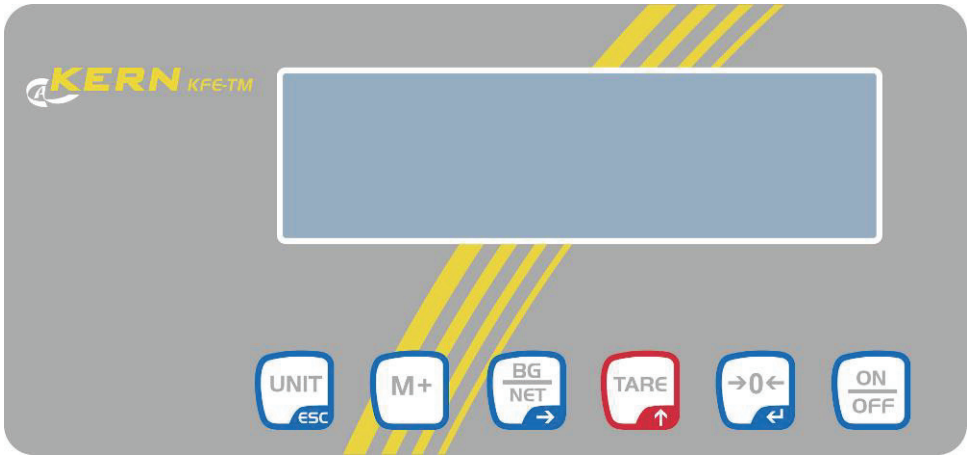
Es dürfen nur Originalersatzteile verwendet werden.

Hinweis zu konformitätsbewerteten Waagen:

Reparatur darf nur in 100% -iger Übereinstimmung mit der Bauartzulassung erfolgen. Ein Verstoß gegen diese Vorgabe führt zum Erlöschen der Bauartzulassung!

Nach erfolgreicher Reparatur muss eine Nacheichung erfolgen, um die Waage wieder im gesetzlich geregelten Bereich verwenden zu können.

2. Keyboard description



Key	Function
ON OFF	• Turn on/off
→0←	• Zeroing
Navigation key ↵	• Confirm entry
TARE	• Taring
Navigation key ↑	• Scroll forward in menu • At numeric input increase flashing digit
M+	• Add weighing value to summation memory • Display sum total • Delete total added memory
BG NET Navigation key →	• Change between gross ⇔ and net weight • Digit selection to the right
UNIT ESC	• Switch-over weighing unit
ESC	• Back to menu/weighing mode

Numerical input via the navigation buttons

Key	Function
	Digit selection to the left
	Delete
	Digit selection to the right
	Increase flashing digit
	Terminate input

3. Adjustment

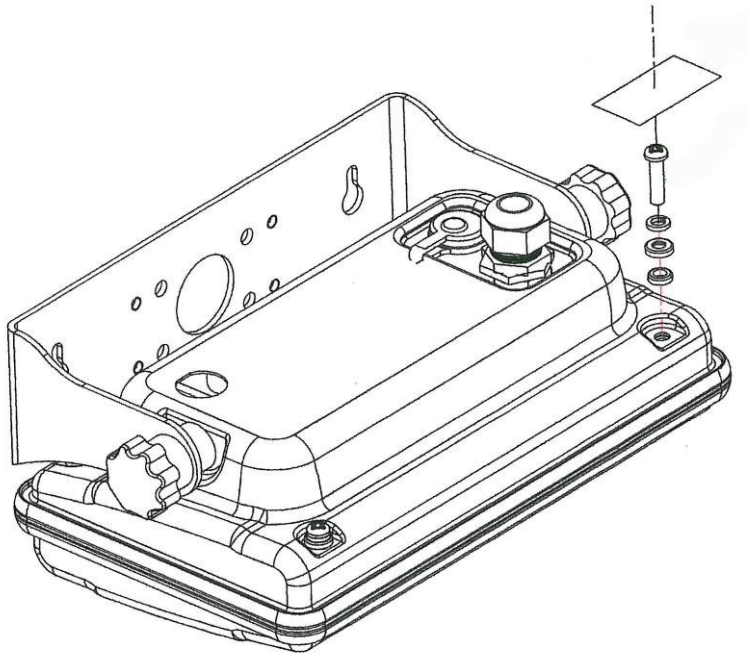
- The adjustment is locked for verified balances.

  In order to unlock the access, the seal must be destroyed and the jumper on the printed circuit board must be fitted (see chap. 3.1).

  Attention:
  After destruction of the seal the weighing system must be re-verified by an authorised agency and a new verification wire/seal mark fitted before it can be reused for applications subject to verification.
- The weight to be used depends on the capacity of the scale. Carry out adjustment as near as possible to the scale's maximum weight. Info about test weights can be found on the Internet at: http://www.kern-sohn.com.
- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.

3.1 Position of seals and jumper

Access to conductor plate:



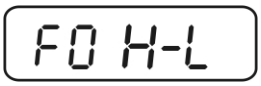
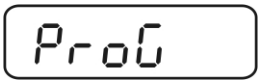
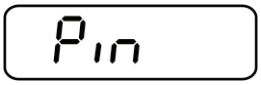
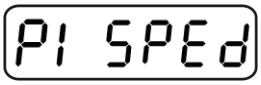
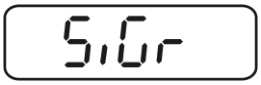
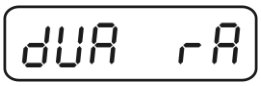
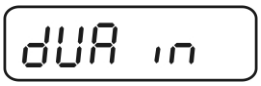
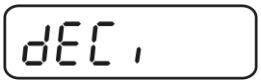
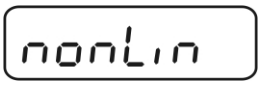
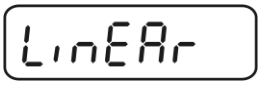
⇨ Remove seal

⇨ Open display unit

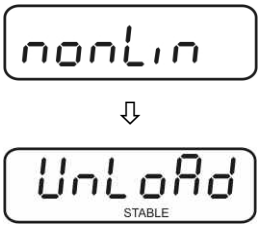


⇨ For adjustment / access to the configuration menu the jumper „CAL“ must be fitted.

3.2 Call-up menu

⇨ In weighing mode press UNIT and M+ at the same time and the first menu block F0 H-L will appear.	
⇨ Press TARE repeatedly until ProG is displayed.	
⇨ Press →0←, password query Pin will appear.	
⇨ Press BG/NET, UNIT, →0← subsequently until the first menu item P1 SPEd is shown.	
⇨ Press TARE repeatedly until P2 nod is displayed.	
⇨ Confirm by →0←. ⇨ Press TARE repeatedly until the currently balance typ will be displayed. SiGr = Singel range dUA rA = Dual range dUA in = Multi interval	 ⇳  ⇳ 
⇨ Confirm by →0←.	
⇨ Press TARE repeatedly until CAL will be displayed.	
⇨ Confirm by →0← and select by TARE. nonLin = Justierung LinEAr = Linearisierung	 ⇳ 

3.3 Procedure

⇨ Confirm menu setting nonLin by →0←. Ensure that there are no objects on the weighing plate. ⇨ Wait for stability display, then press →0←.	
⇨ The currently set adjustment weight will be displayed.	
⇨ Either use the displayed adjustment weight or change it with UNIT ESC, BG NET → and TARE ↑ (numerical input see chapter 2), the active digit is flashing. ⇨ Confirm by →0←, „LoAd“ will be shown.	
⇨ Carefully place adjusting weight in the centre of the weighing plate. Wait for stability display, then press →0←.	
⇨ After the adjustment the balance will carry out a self-test. Remove adjusting weight **during** selftest, balance will return into weighing mode automatically. An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure.	

4. Linearization

Linearity shows the greatest deviation of a weight display on the scale to the value of the respective test weight according to plus and minus over the entire weighing range.
If linearity deviation is discovered during a testing instrument control, you can improve this by means of linearization.

- The linearisation is locked for verified weighing systems.

  In order to unlock the access, the seal must be destroyed and the jumper on the printed circuit board must be fitted (see chap. 3.1).

  Attention:
  After destruction of the seal the weighing system must be re-verified by an authorised agency and a new verification wire/seal mark fitted before it can be reused for applications subject to verification.

- Observe stable environmental conditions. Stabilisation requires a certain warm-up time.

Procedure:



⇨ Call-up menu setting LinEAr, see chap. 3.2.

⇩



⇨ Acknowledge with →0←.
Ensure that there are no objects on the weighing plate.



⇨ Wait for stability display „STABLE“, then press →0←. When “LoAd 1“ is displayed, put the first adjustment weight (1/3 max) carefully in the centre of the weighing platform.



⇨ Wait for stability display „STABLE“, then press →0←. When “LoAd 2“ is displayed, put the second adjustment weight (2/3 max) carefully in the centre of the weighing platform.



⇨ Wait for stability display „STABLE“, then press →0←. When “LoAd 3“ is displayed, put the third adjustment weight (max. load) carefully in the centre of the weighing platform.



⇨ Wait for stability display „STABLE“, then press →0←.

⇨ After the adjustment the balance will carry out a self-test. Remove adjusting weight **during** selftest, the appliance will return into weighing mode automatically.



An adjusting error or incorrect adjusting weight will be indicated by the error message; repeat adjustment procedure.

5. Configuration menu

Call-up configuration menu:

⇨ In weighing mode press UNIT and M+ at the same time and the first menu block F0 H-L will appear.

⇨ Press TARE repeatedly until ProG is displayed.

⇨ Press →0←, password query Pin will appear.

⇨ Press BG NET, UNIT, →0← subsequently until the first menu item PI SPEd is shown.

Navigation in the menu

⇨ With help of TARE, the individual menu items can be selected one after the other.

⇨ Confirm selected menu item by pressing →0←. The current setting will be displayed.

⇨ Switch into the available settings using TARE.

⇨ Either save by pressing →0← or cancel by pressing UNIT.

Press UNIT repeatedly to exit menu.

Configuration menu overview:

Menu block Main menu	Menu item Submenu		Available settings / explanation
P1 SPEd	SPd 15		ADC speed
	SPd 30		
	SPd 60		
	SPd 7.5		
P2 mod	SiG rA	Single-range balance Confirm by →0←, after that the following menu items are available.	
		dEC i	Position decimal point available selection 0, 0.0, 0.00, 0.000, 0.0000
		inC inC 1	Readability/verification value selectable 1, 2, 5, 10, 20, 50
		inC 2	
		inC 5	
		inC 10	
		inC 20	
		inC 50	
		CAP	Balance capacity (max)
		Adjust weighing system according to configuration.	
		CAL nonLin	Adjustment, see chap. 3
		LinEAr	For linearisation see chapter 4

	dUA rA	Dual range balance Confirm by →0←, after that the following menu items are available.			
		dEC 1		Position decimal point available selection 0, 0.0, 0.00, 0.000, 0.0000	
		InC	diU 1	InC 1	Readability / verification value for 1. Weighing range Selectable 1, 2, 5, 10, 20, 50
				InC 2	
				InC 5	
				InC 10	
				InC 20	
				InC 50	
			diU 2	InC 1	Readability / verification value for 2. Weighing range Selectable 1, 2, 5, 10, 20, 50
				InC 2	
				InC 5	
				InC 10	
				InC 20	
				InC 50	
		CAP	CAP 1	Balance capacity (Max) 1st weighing range	
			CAP 2	Balance capacity (Max) 2nd weighing range	
	Adjust weighing system according to configuration.				
		CAL	nonLin	Adjustment, see chap. 3	
			LinEAr	For linearisation see chap. 4	

	dUA in	Multi-interval balance Confirm by →0←, after that the following menu items are available.			
		dEC 1		Position decimal point available selection 0, 0.0, 0.00, 0.000, 0.0000	
		inC	diU 1	inC 1 inC 2 inC 5 inC 10 inC 20 inC 50	Readability / verification value for 1. Weighing range Selectable 1, 2, 5, 10, 20, 50
			diU 2	inC 1 inC 2 inC 5 inC 10 inC 20 inC 50	Readability / verification value for 2. Weighing range Selectable 1, 2, 5, 10, 20, 50
		CAP	CAP 1	Balance capacity (Max) 1st weighing range	
			CAP 2	Balance capacity (Max) 2nd weighing range	
		Adjust weighing system according to configuration.			
		CAL	nonLin	Adjustment, see chap. 3	
			LinEAr	For linearisation see chapter 4	
P3 Pro	tri			Not documented	
	CoUnt			Internal A/D converter value, e.g. 133631	
	rESEt			Reset to default setting	
	GrA			Local gravity, e.g. 9.8100	
P4 CHt	node 1			Weighing mode (tolerance weighing, totalizing)	
	node 2			Animal weighing mode	
	node 3			Not documented	
	node 4			Not documented	

6. Installing display unit / platform

Technical data

Supply voltage:	5 V/150mA
Max. signal voltage	0 ~ 15 mV
Zeroing range	0 ~ 5 mV
Sensitivity	2-3 mV/V
Resistance parameter	80 - 100 Ω, max 4 items per 350 Ω load cell

How to connect the platform

⇨ Disconnect device from mains.
⇨ Pull load cell cable into the display unit through the screwable cable attachment.
⇨ Weld the individual wires of the load cell cable to the printed circuit board, see fig. 1. Details can be seen in the technical data of the load cell.

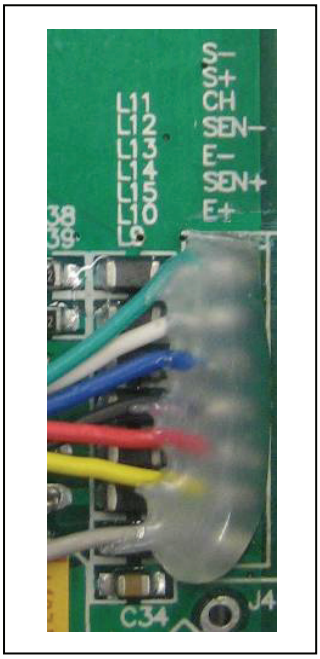


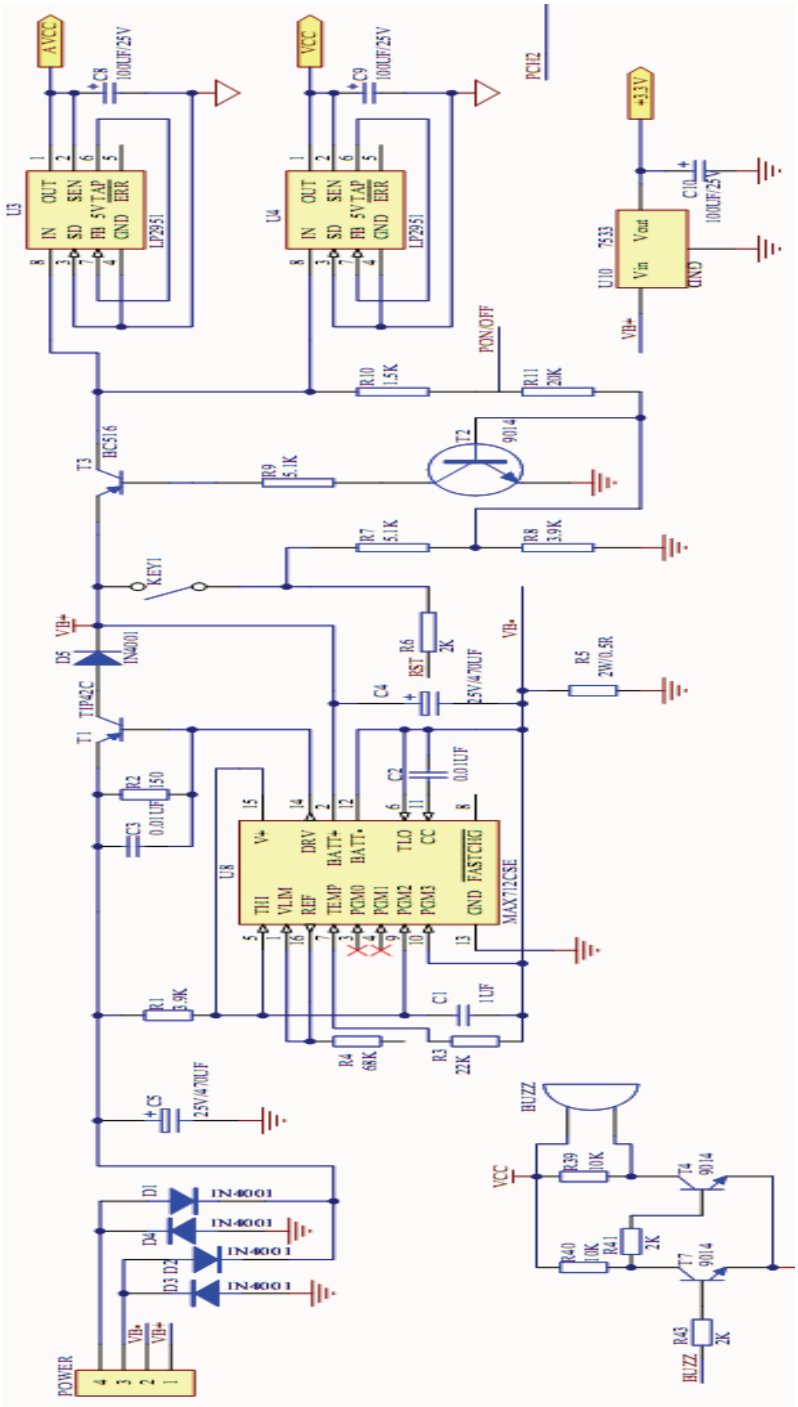
Fig. 1

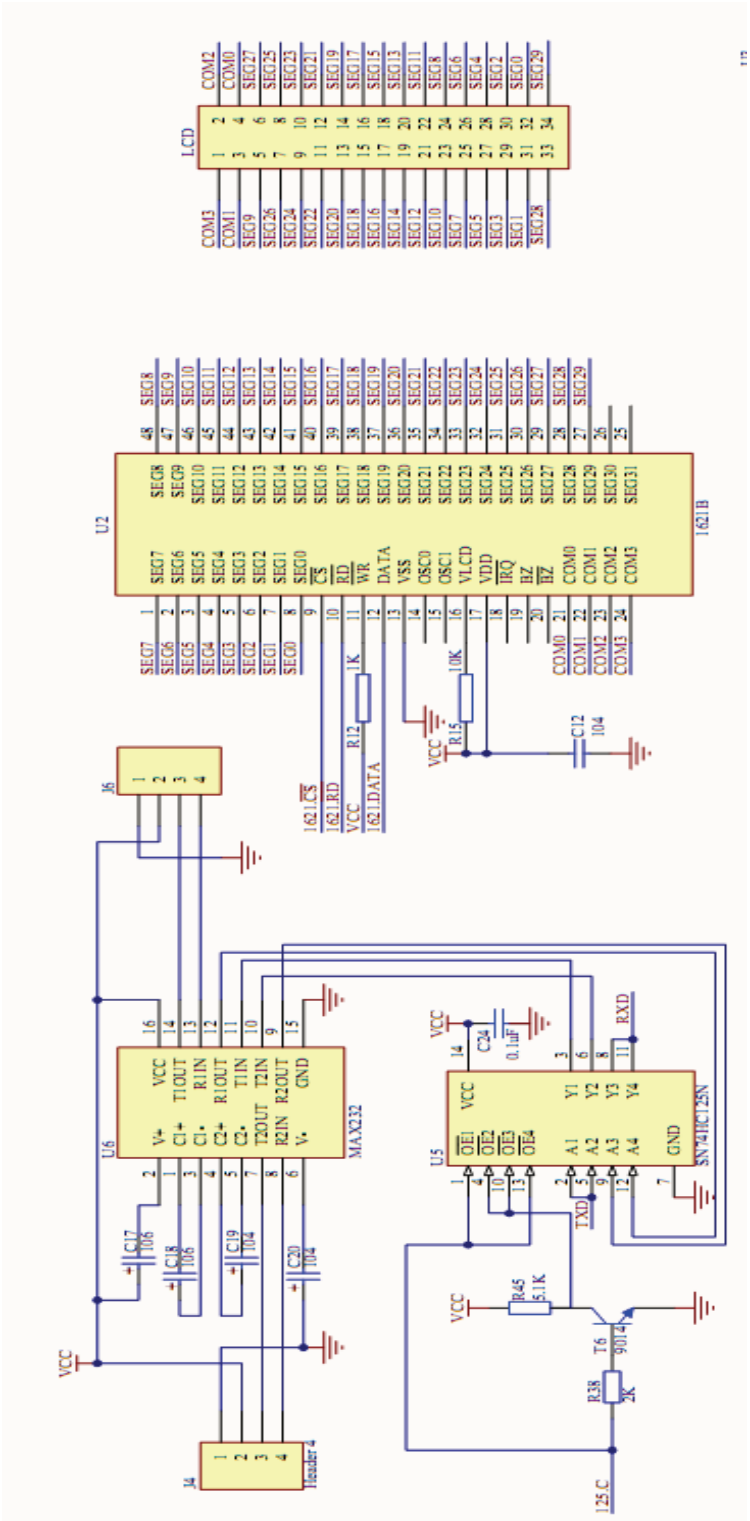
7. Error messages

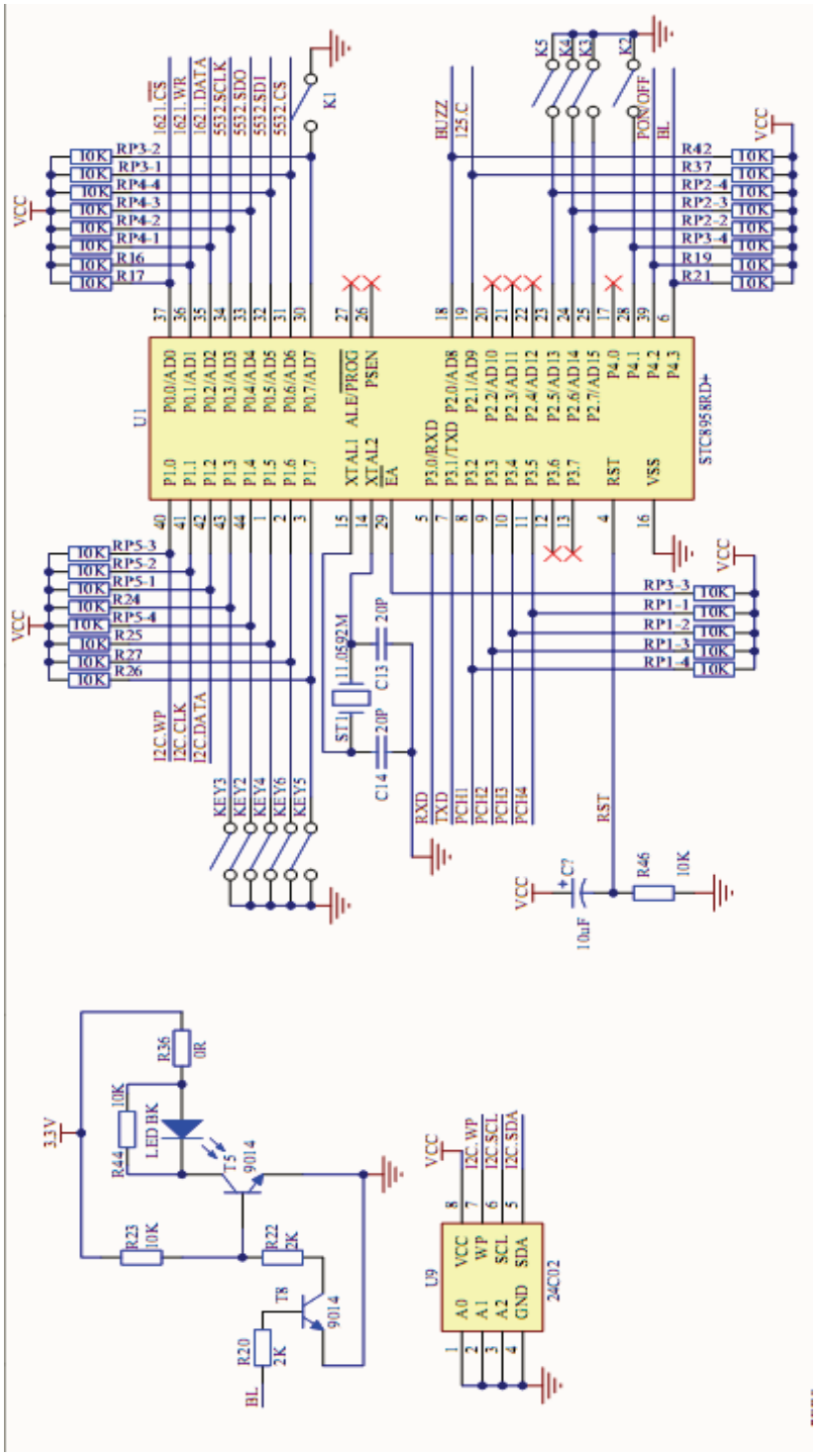
Error message	Description	Possible causes
- - - - - **- - ol - -**	Maximum load exceeded	• Unload weighing system or reduce preload. • Damaged weighing cell
Err 1	Incorrect data input	• Follow format “yy:mm:dd“
Err 2	Incorrect time entry	• Follow format “hh:mm:ss“
Err 4	Zeroing range exceeded due to switching-on balance or pressing →0← (normally 4% max)	• Object on the weighing plate • Overload when zeroing
Err 5	Keyboard error	• Check the keys and connection
Err 6	Value outside the A/D range	• Weighing plate not installed • Damaged weighing cell • Damaged electronics
Err 9	Stability display does not appear	• Check the environmental conditions. • Check the load cell
Err 17	Taring range exceeded	• Reduce load
Fai l h / Fai l l	Adjustment error	• Repeat adjustment.
Ba lo / Lo ba	Battery very low	• Recharge battery

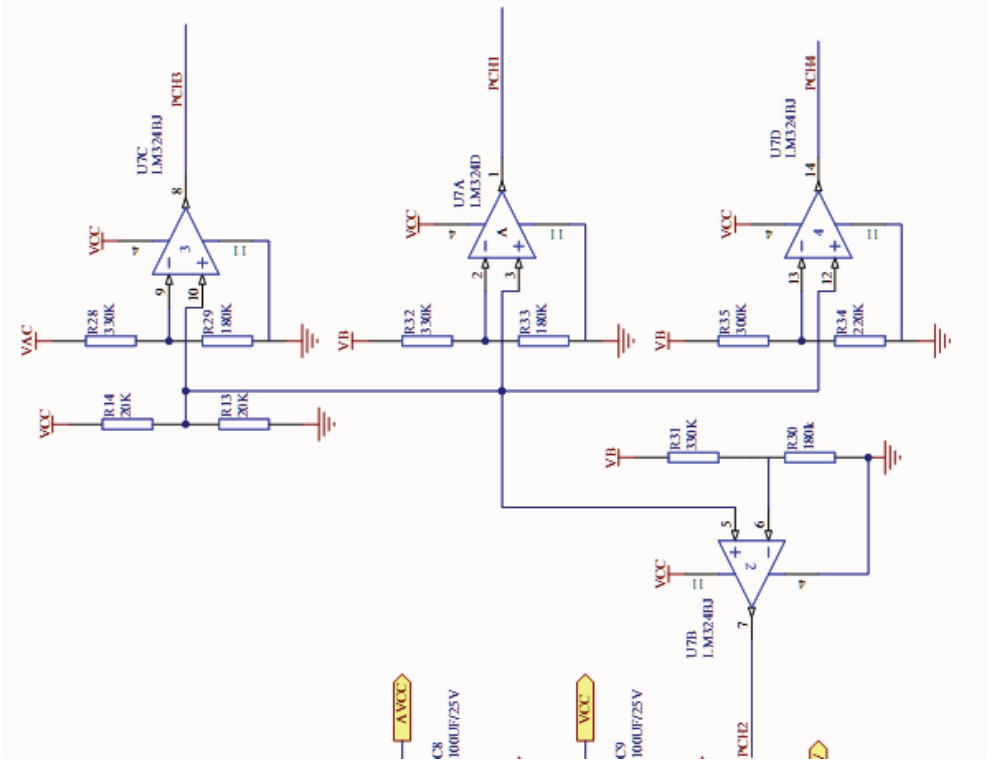
Should other error messages occur, switch balance off and then on again. If the error message remains inform manufacturer.

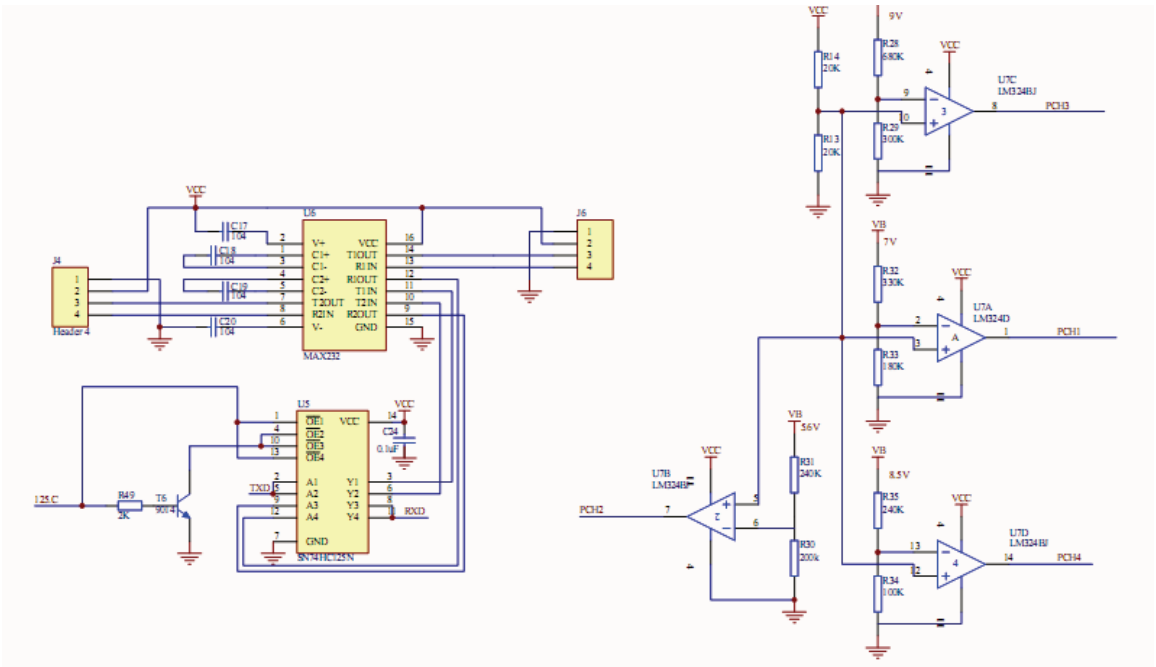
8. Circuit diagram

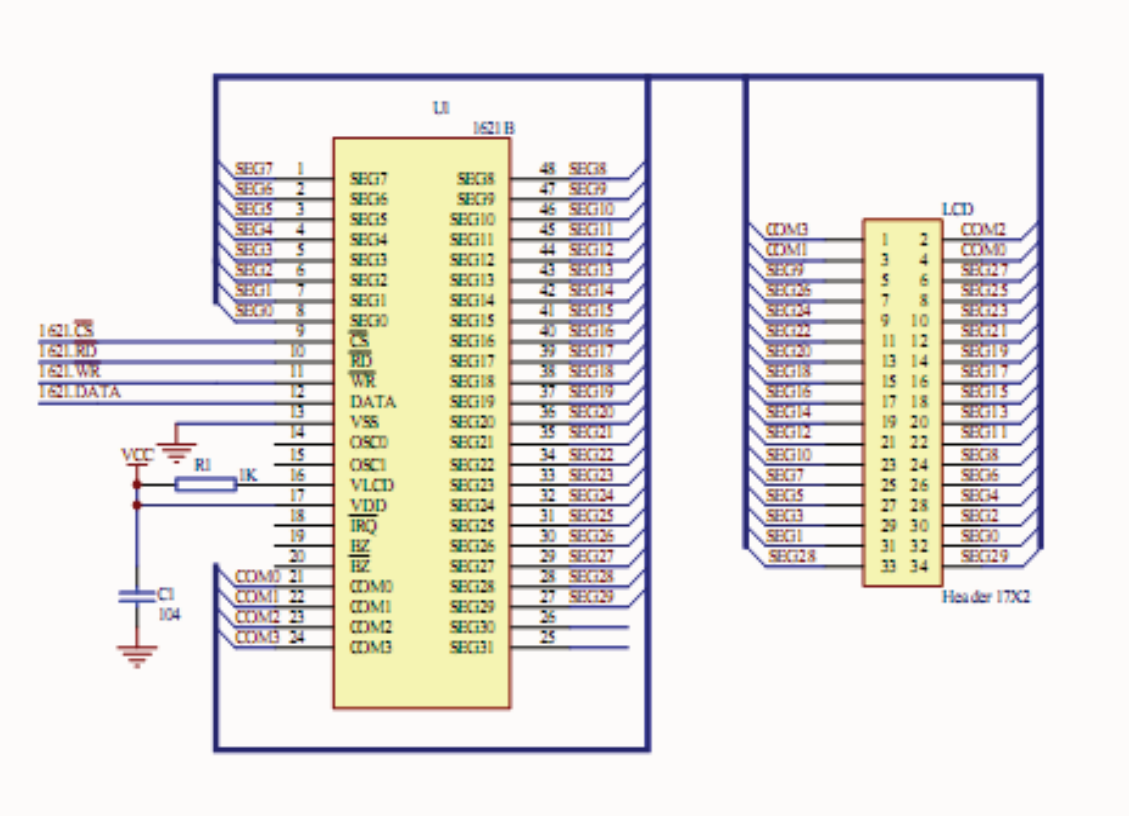



LCD
U2
1621B
U6
MAX232
U5
SN74HC125N
J6
J4
Header 4
VCC
GND
TXD
RXD
R12
1K
R15
10K
C12
104
R45
5.1K
R38
2K
T6
9014
C24
0.1uF
C17
106
C18
106
C19
104
C20
104
125.C

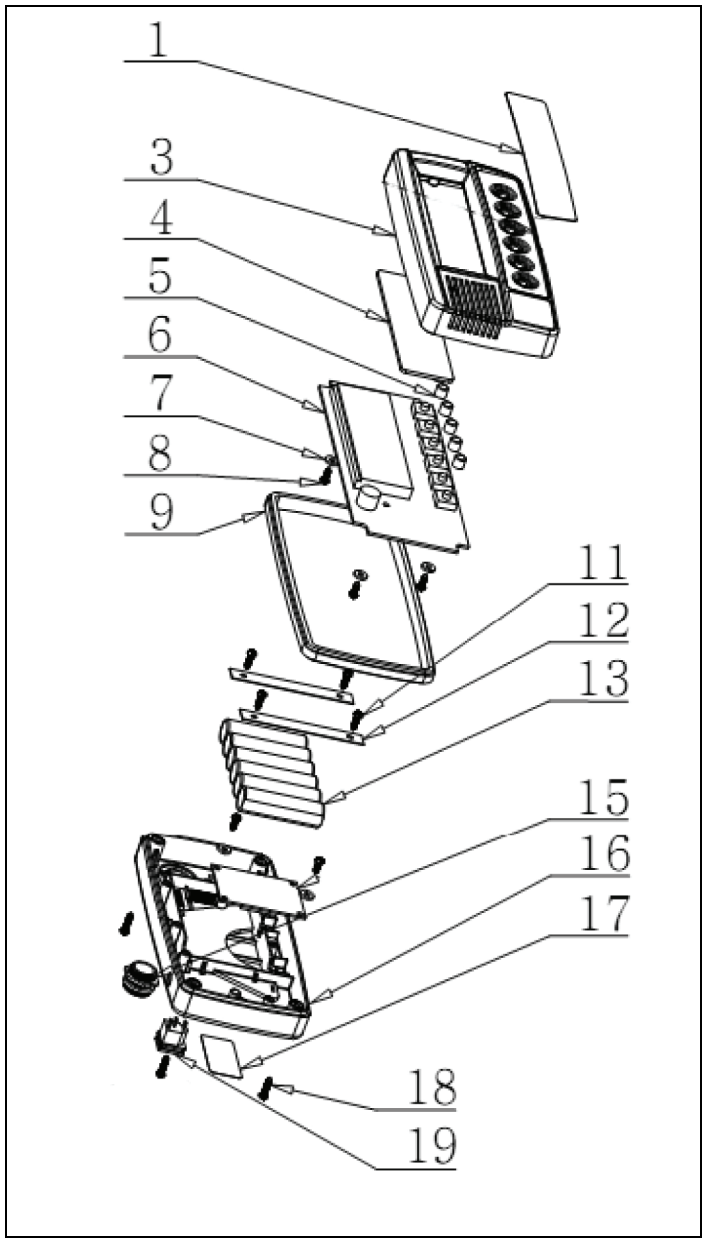

U1
STC8958RD+
P1.0
P1.1
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
P0.0/AD0
P0.1/AD1
P0.2/AD2
P0.3/AD3
P0.4/AD4
P0.5/AD5
P0.6/AD6
P0.7/AD7
XTAL1
XTAL2
EA
ALE/PROG
PSEN
P3.0/RXD
P3.1/TXD
P2.0/AD8
P2.1/AD9
P2.2/AD10
P2.3/AD11
P2.4/AD12
P2.5/AD13
P2.6/AD14
P2.7/AD15
P4.0
P4.1
P4.2
P4.3
RST
VSS
VCC
K1
K2
K3
K4
K5
BUZZ
125C
PON/OFF
BL
R42
R37
RP2-4
RP2-3
RP2-2
RP3-4
R19
R21
RP3-2
RP3-1
RP4-4
RP4-3
RP4-2
RP4-1
R16
R17
RP5-3
RP5-2
RP5-1
R24
RP5-4
R25
R27
R26
RP3-3
RP1-1
RP1-2
RP1-3
RP1-4
10K
1621.CS
1621.WR
1621.DATA
5532.SCLK
5532.SDO
5532.SDI
5532.CS
I2C.WP
I2C.CLK
I2C.DATA
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KEY2
KEY4
KEY6
KEY5
ST11
11.0592M
C13
C14
20P
RXD
TXD
PCI11
PCI12
PCI13
PCI14
C7
10uF
R46
3.3V
R36
0R
R44
LED BK
T5
9014
R23
R22
2K
T8
R20
U9
A0
A1
A2
GND
WP
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SDA
24C02
I2C.SCL
I2C.SDA


U7C
LM324BJ
PCH3
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LM324D
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U7D
LM324BJ
PCH4
U7B
LM324BJ
PCH2
VCC
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VAC
R28
3.90K
R29
180K
R32
3.90K
R33
180K
R35
3.00K
R34
2.20K
R14
20K
R13
20K
R31
330K
R30
180K
AVCC
C8
100UF/25 V
C9
100UF/25 V


VCC
9V
7V
5.6V
8.5V
VB
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MAX232
U5
SN74HC125N
J4
Header 4
J6
C17
C18
C19
C20
C24
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R49
2K
T6
9014
125 C
TXD
RXD
R14
20K
R13
20K
R28
6.80K
R29
3.00K
R32
3.30K
R33
1.80K
R31
240K
R30
200K
R35
2.40K
R34
1.00K
U7C
LM324BJ
U7A
LM324D
U7B
LM324BJ
U7D
LM324BJ
PCH3
PCH1
PCH2
PCH4


U1
1621 B
SEG7 1
SEG6 2
SEG5 3
SEG4 4
SEG3 5
SEG2 6
SEG1 7
SEG0 8
1621.CS 9
1621.RD 10
1621.WR 11
1621.DATA 12
13
14
15
16
17
18
19
20
COM0 21
COM1 22
COM2 23
COM3 24
SEG7
SEG6
SEG5
SEG4
SEG3
SEG2
SEG1
SEG0
CS
RD
WR
DATA
VSS
OSC0
OSC1
VLCD
VDD
IRQ
HZ
HZ
COM0
COM1
COM2
COM3
SEG31
SEG30
SEG29
SEG28
SEG27
SEG26
SEG25
SEG24
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SEG22
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SEG20
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34 SEG22
33 SEG23
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31 SEG25
30 SEG26
29 SEG27
28 SEG28
27 SEG29
26
25
VCC
R1
1K
C1
104
LCD
COM3
COM1
SEG9
SEG26
SEG24
SEG22
SEG20
SEG18
SEG16
SEG14
SEG12
SEG10
SEG7
SEG5
SEG3
SEG1
SEG28
1 2
3 4
5 6
7 8
9 10
11 12
13 14
15 16
17 18
19 20
21 22
23 24
25 26
27 28
29 30
31 32
33 34
COM2
COM0
SEG27
SEG25
SEG23
SEG21
SEG19
SEG17
SEG15
SEG13
SEG11
SEG8
SEG6
SEG4
SEG2
SEG0
SEG29
Header 17X2

9. Spare parts



No	Parts Name
1	Key board overlay
3	Upper cover
4	Display protection Plate
5	Key pad hat
6	Main board PCB
7	Insulated washer
8	screw
9	Rubber sealing ring
11	screw
12	Battery bar
13	Ni-MH battery 7.2V 2000 mAh
15	5 pin air connector
16	Bottom cover
17	Name plate
18	screw
19	Adaptor jack