

Digital Scale

TITAN Compact

MAINTENANCE MANUAL

SJ-1000H
SJ-2000H
SJ-5000H
SJ-12KH



A&D Company, Limited

1WTPD4001513

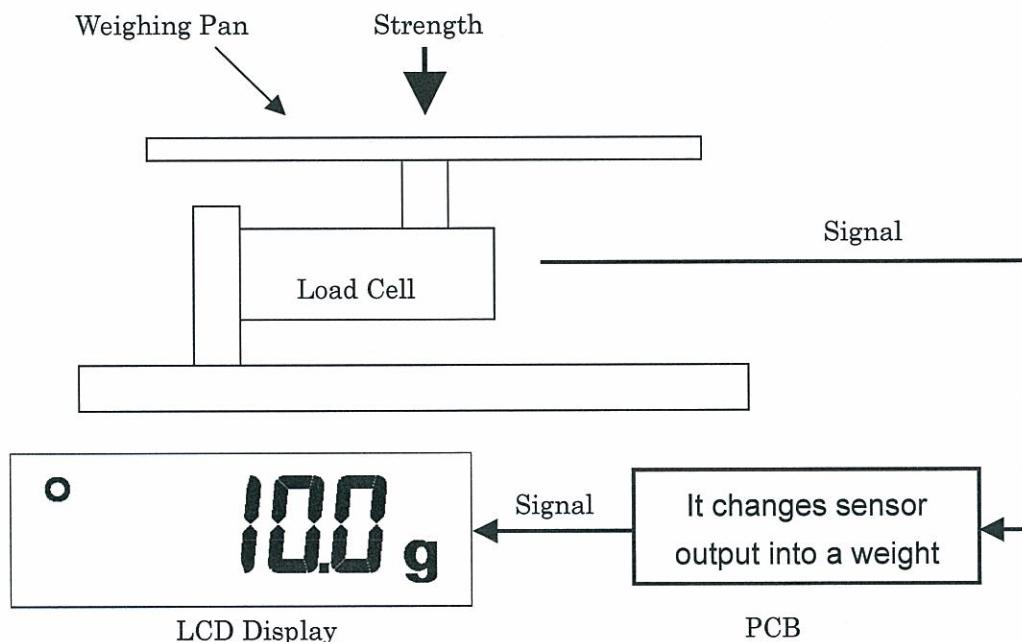
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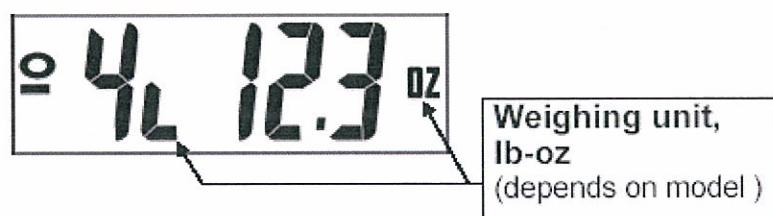
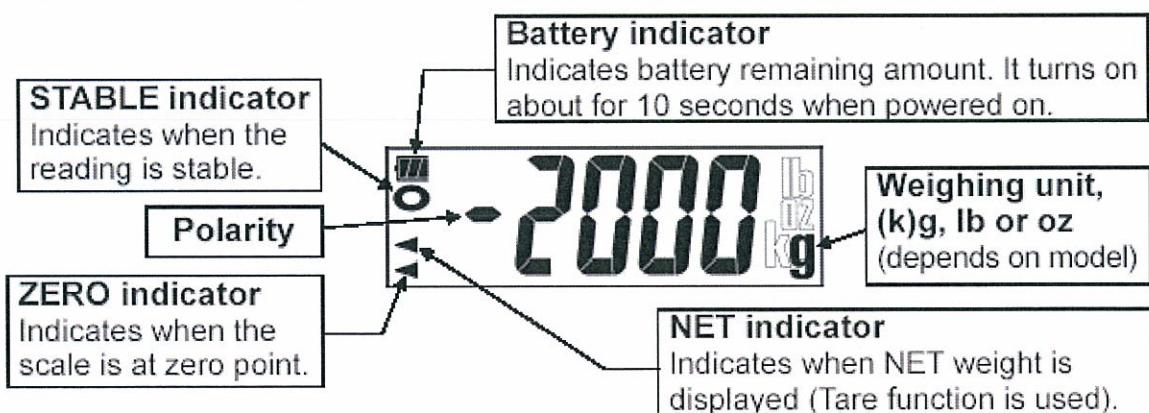
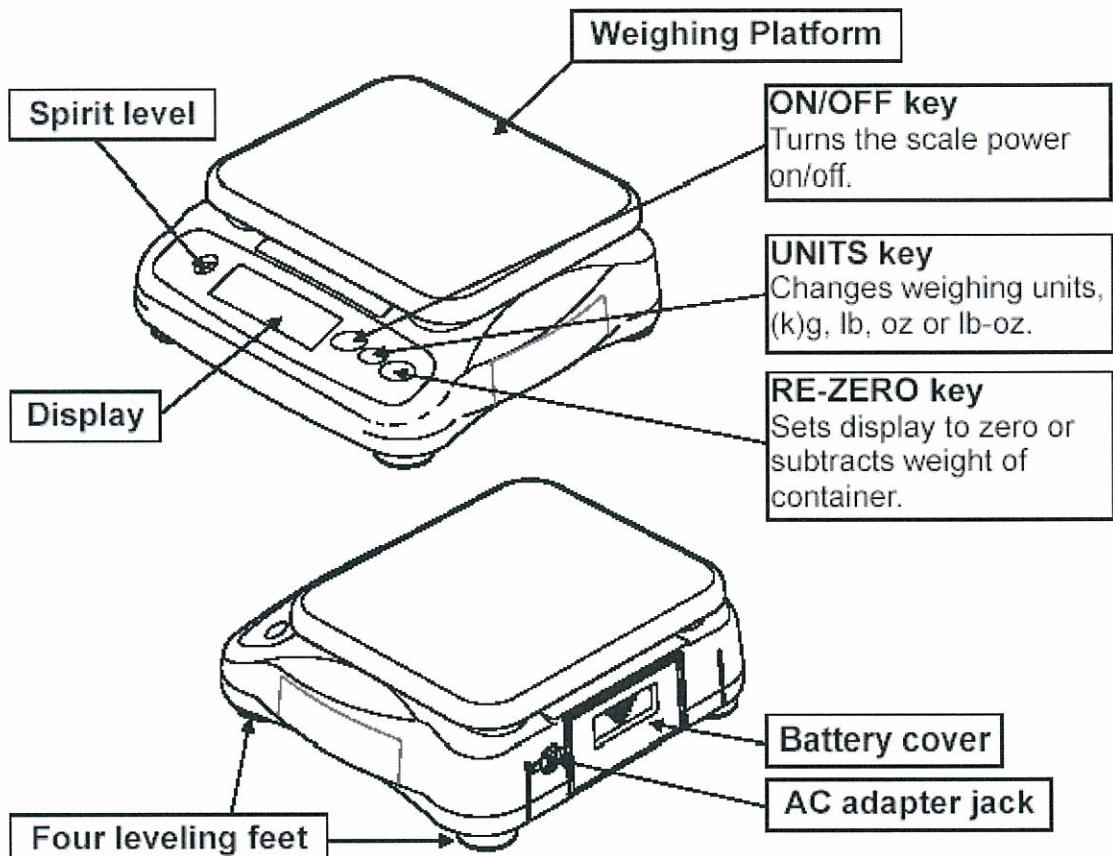
1. Operational principle

The SJ series is a load cell type electronic scale. The operational principle is shown in the figure below. The load cell detects force applied on the weighing pan. The load cell generates an analog signal, which is converted into a digital signal by the main board AD converter that is processed by a Microprocessor. The processed data is displayed on a LCD.





2. Parts Description

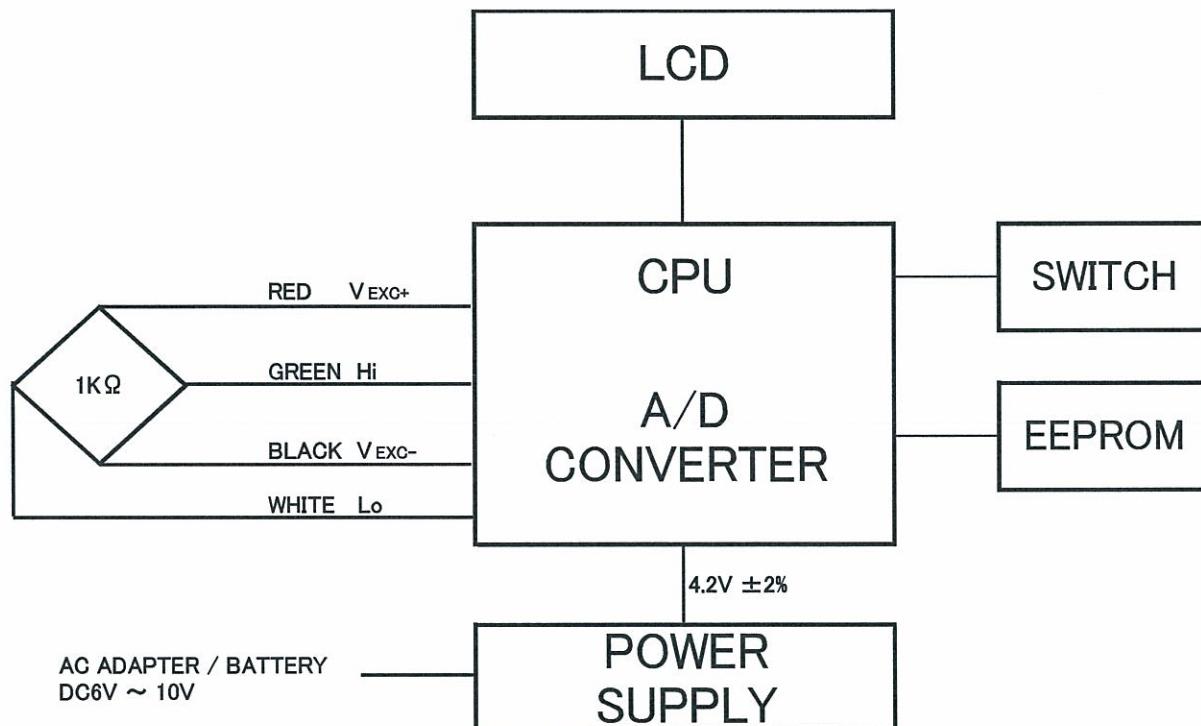




3. Block diagram

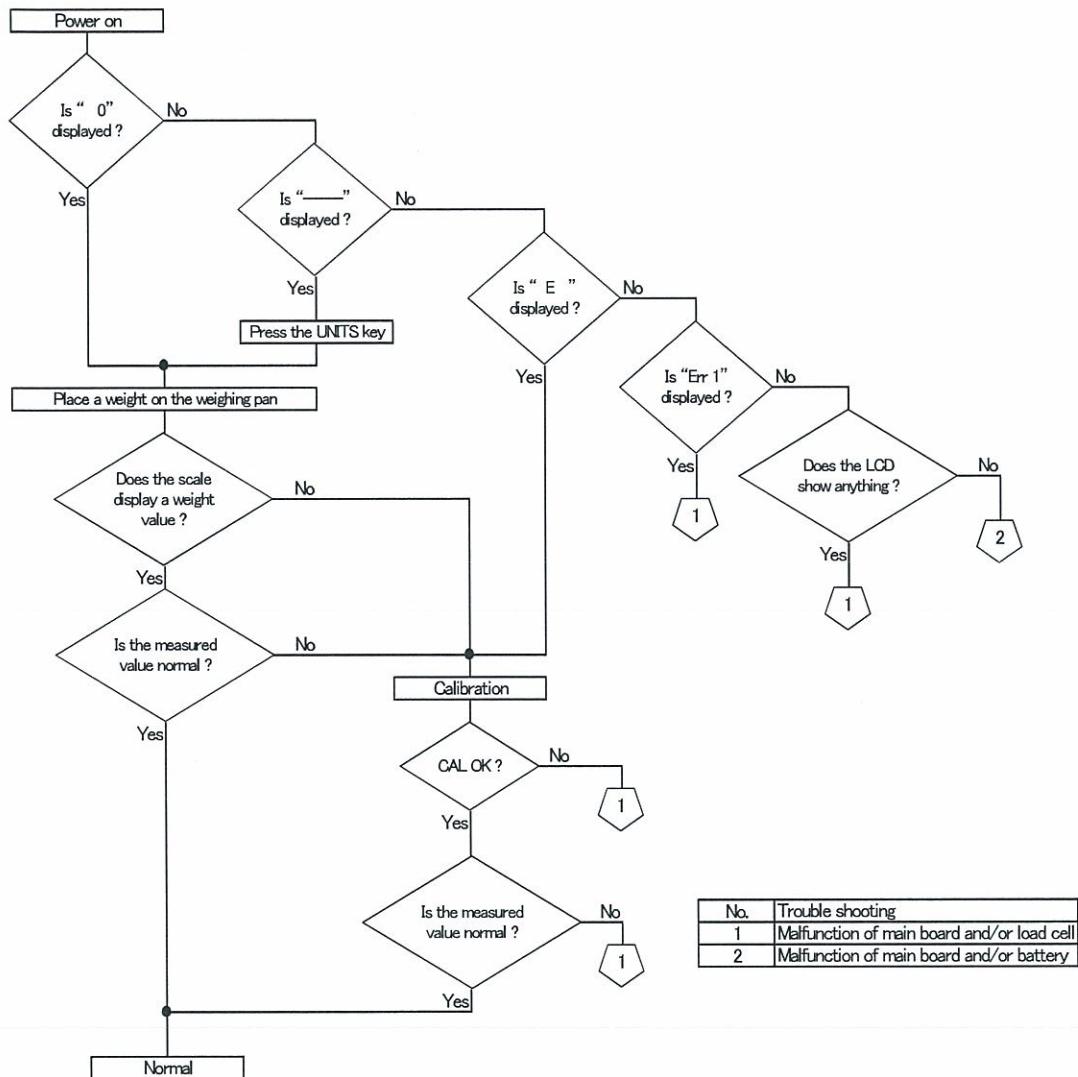
The SJ series compact scale consists of functional units: case unit, weighing pan, main board unit, load cell and battery.

The load cell detects the force. The detected force is converted into a digital signal by the main board A/D converter, processed by a microprocessor (CPU) and displayed on an LCD.





4. Trouble shooting



【 Error 】

- “ E ” : Overload
- “ ---- ” : Power-on-zero Error / Unstable Error / Input value Error
- “ Err1 ” : AD Error
- “ Err2 ” : EEPROM Error
- “ Err3 ” : Temperature AD Error
- “ Lb ” : Lo battery
- “ CALE ” : Calibration Error



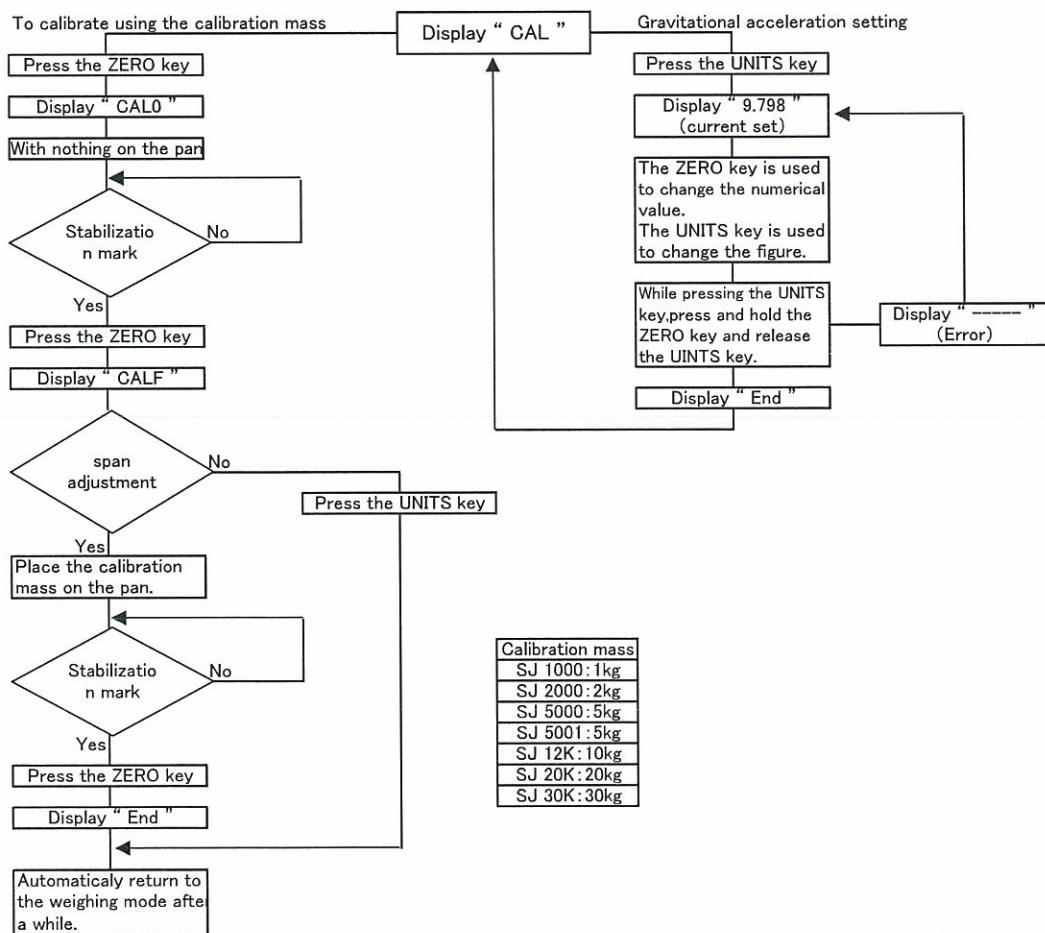
5. Calibration mode

The SJ series scales are equipped with a function to compensate for measuring errors caused by gravitational acceleration. If zero or span has shifted, for example, when the scales location of use is changed, check the gravitational acceleration. Change the setting or calibrate using a certified weight if necessary.

When the load cell or the main board is replaced, check the gravitational acceleration and make the necessary changes. Then, perform temperature compensation as described on page 16.

- Step 1. While holding down the **UNITS** and **ZERO** key, press the **ON/OFF** key to turn the power ON.
- Step 2. Once the display indicates "CAL", release all the keys.
- Step 3. Press the **ZERO** key to go to the calibration mode by a weight; press the **UNITS** key to go to the gravitational acceleration setting mode.

NOTE : Read Check mode if the display doesn't indicate "CAL".





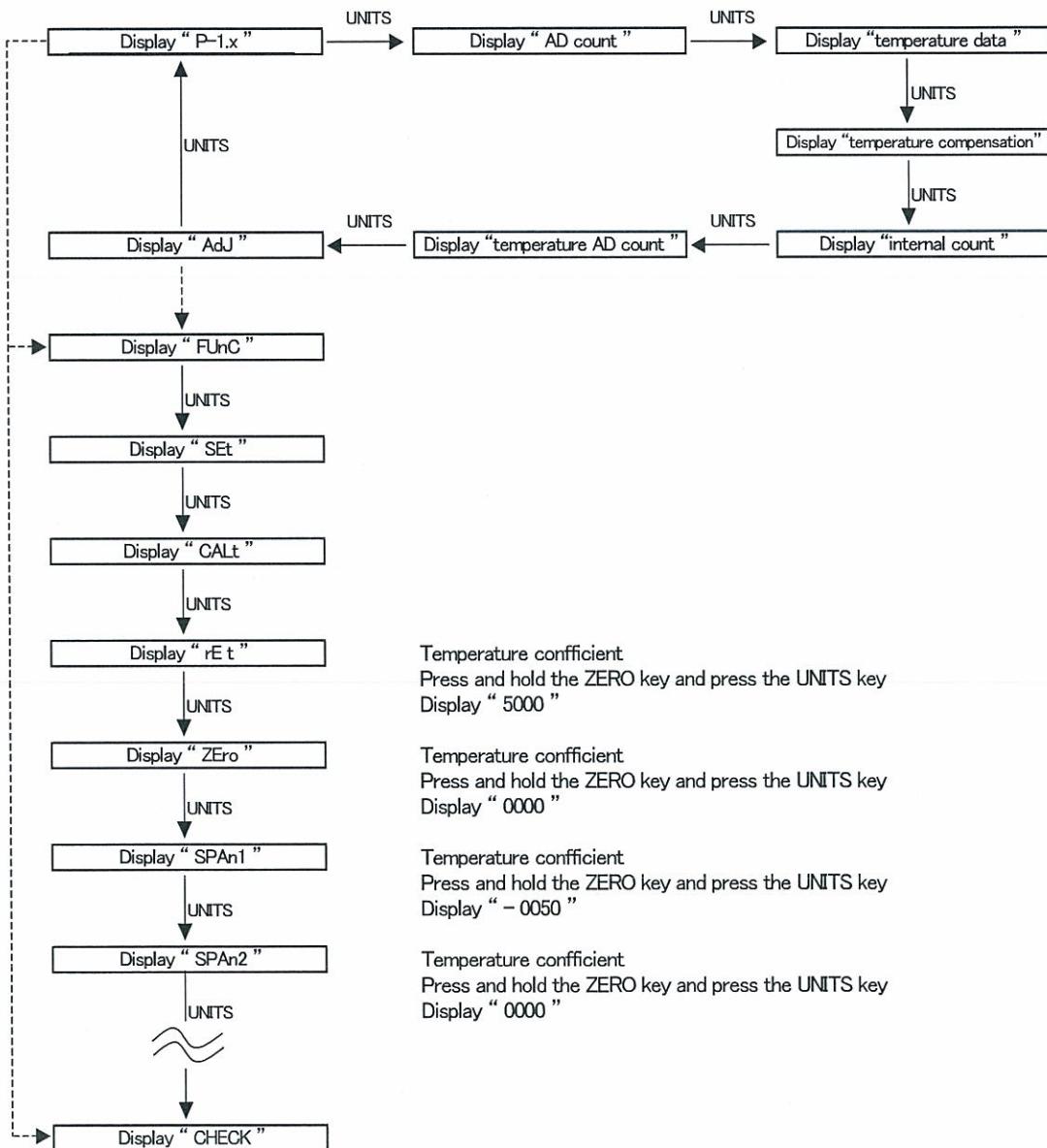
6. Check mode

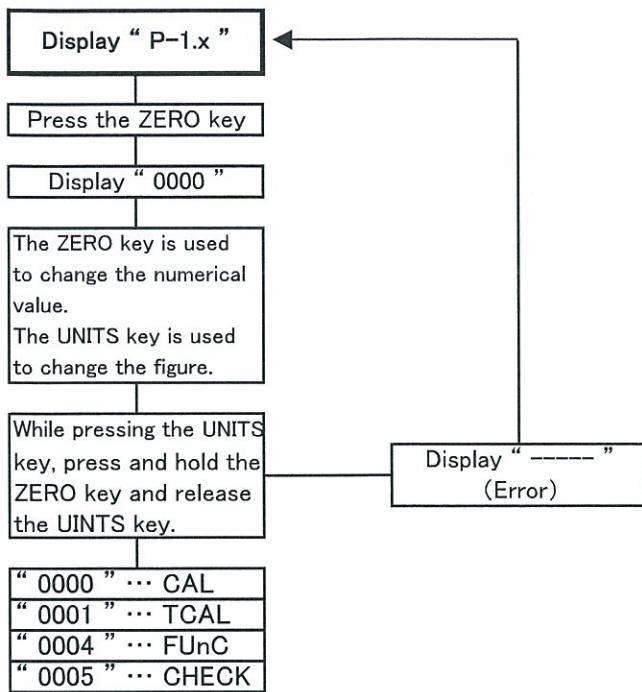
Check mode checks the display, specification settings, AD count and temperature compensation coefficient.

Step 4. While holding down the UNITS and ZERO key, press the ON/OFF key to turn the power ON. *

Step 5. Press and hold the ZERO key and press the UNITS key twice. Then the display will show the CPU version " P-1.x ".

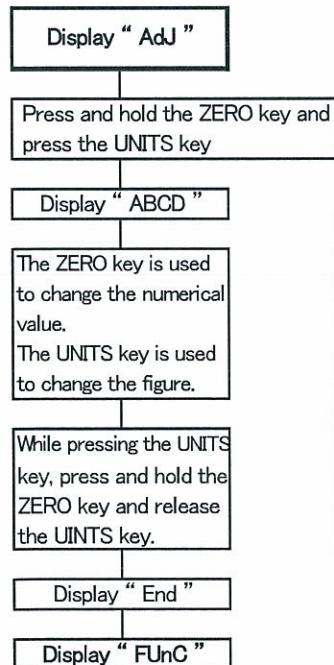
* Press and hold the CAL key too if necessary.



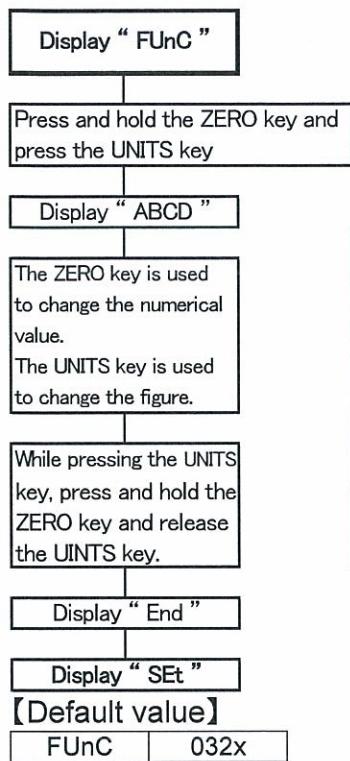


TCAL: This mode is temperature compensation calibration ! It's necessary when main board or load cell is replaced. (page 10)

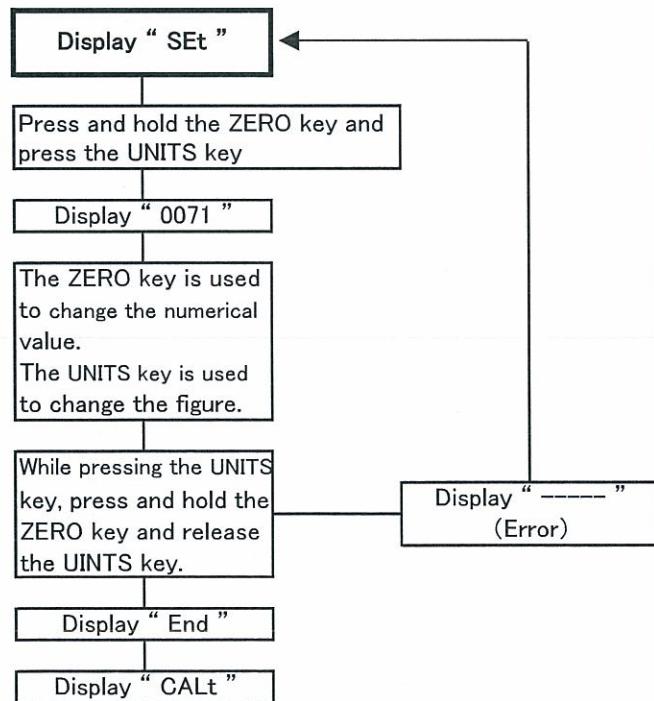
CHECK: Key check , Initialize and display check (page 11)



	A	B	C	D		
	check mode	USER CAL	CAL key	compensation	UNITS	SERIES
0	O	O	O		g	SJ1000
1					lb , g	SJ2000
2	O	x	O	Don't change	oz , g	SJ5000
3	O	x	x		g (APV)	SJ12K
4	x	x	O		g , lb , tl(T)	SJ20K
5					g , lb , tl(H)	SJ30K
6					Lboz , g	SJ5001
7					set	
8					NTEP	
9						



	A decimal point	B AD interval	C zero track	D power-on-zero
0	.		0.5d/0.5sec	±20%
1	,		0.5d/1.0sec	±10% (APV)
2			0.5d/1.5sec	±50% (DEFAULT)
3		Don't change	0.5d/2.0sec	No limit
4			No track	
5				
6				
7				
8				
9				



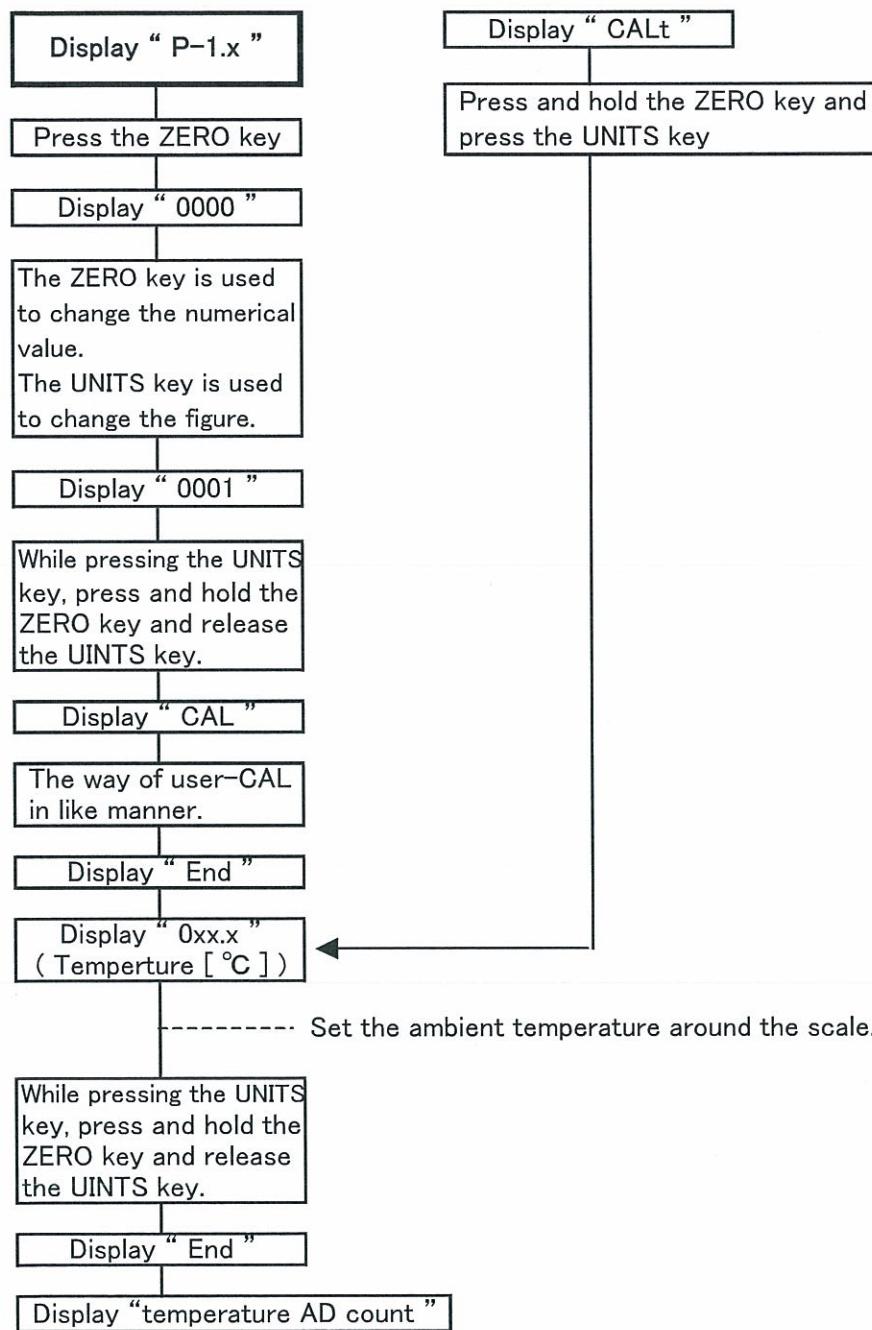
units	bit	default
g	1	○
lb	2	○
oz	4	○
JA-K	8	✗
tael (T)	16	✗
tael (H)	32	✗
Lboz	64	○

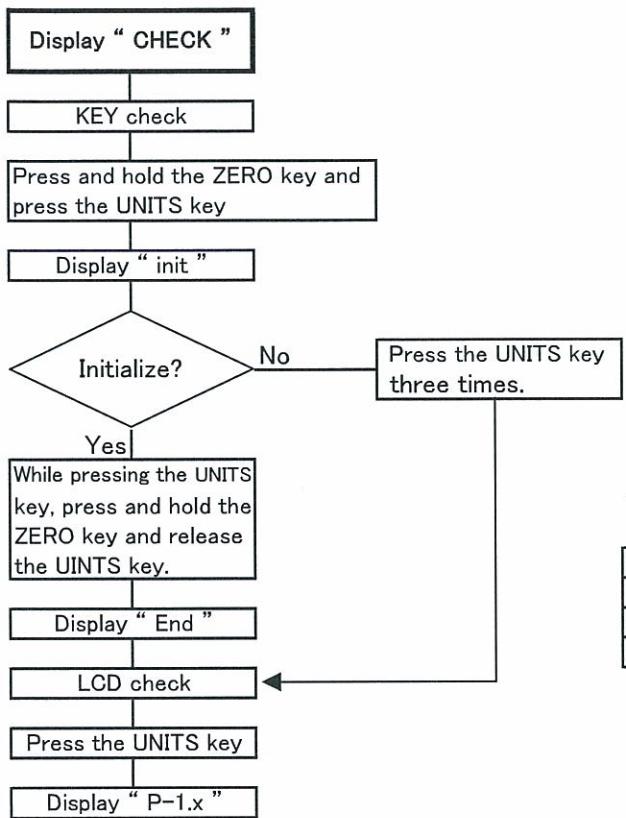
$$\text{SUM}[\text{bit}] = 1 + 2 + 4 + 64 = 71$$

【 TCAL 】Temperature compensation calibration

Perform temperature compensation and calibrate using a certified weight when the load cell or the main board is replaced.

Be sure to warm up the scale more than thirty minutes.





The results of initialization is as follows.

AdJ	“ 0000 ”
FUnC	“ 0322 ”
set	“ 0071 ”
Gravitaion	“ 9.788 ”



7. Disassembling & Assembling

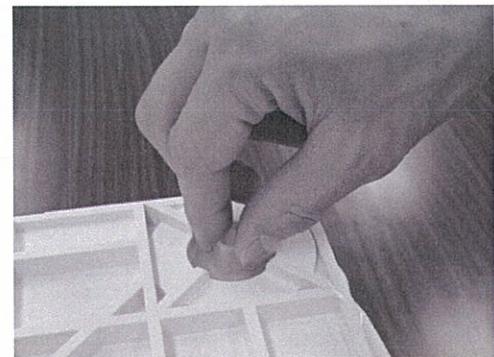


7.1 Disassembling

Step 1. Remove the weighing pan.



Step 2. Remove the four plastic screws at the corner of the pansupport. Then remove the pan support.



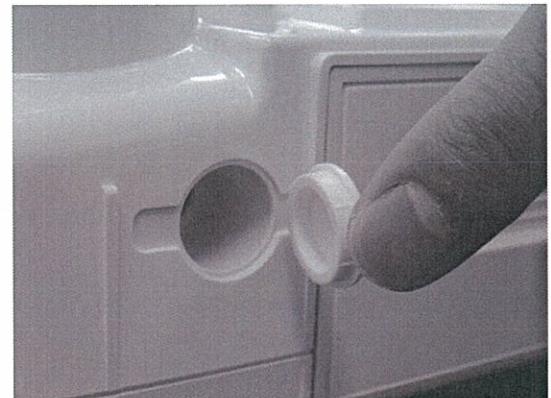
Step 3. Remove the blank seals which is in the main unit back. It comes easily when making to lift to mean mainly one like the pointed bodkin at the end and to return a wrist. Because it isn't possible to re-apply when removing once, in case of the resolution, prepare blank seals.



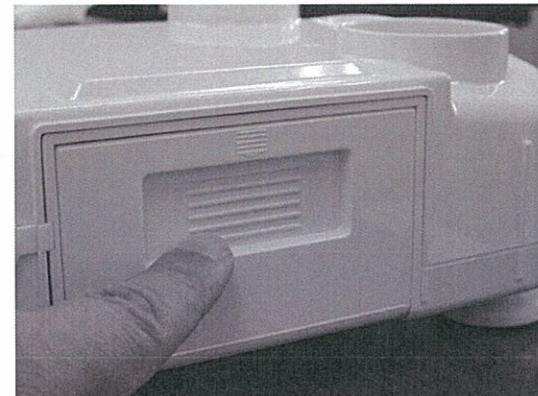
Step 4. Remove nine screws which secure the lower case.



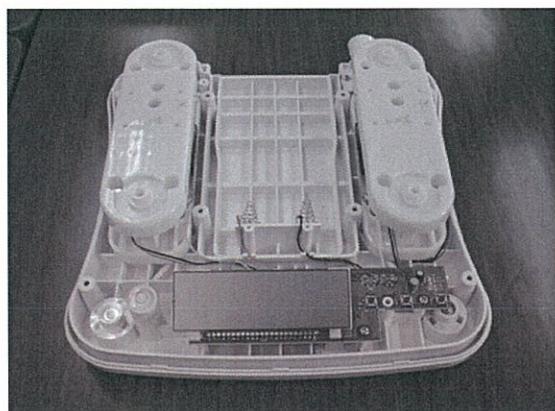
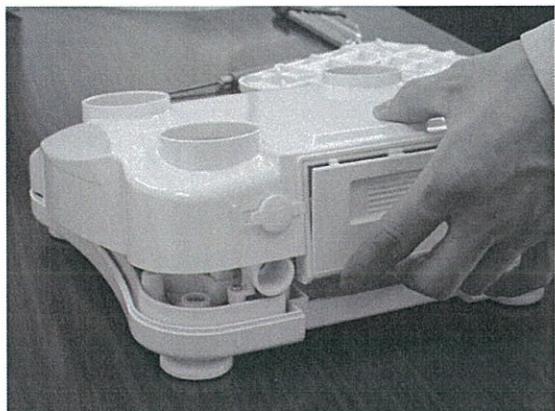
Step 5. Remove the AC adapter cap which is behind the upper case.



Step 6. Open a battery cover and it takes out a battery box.



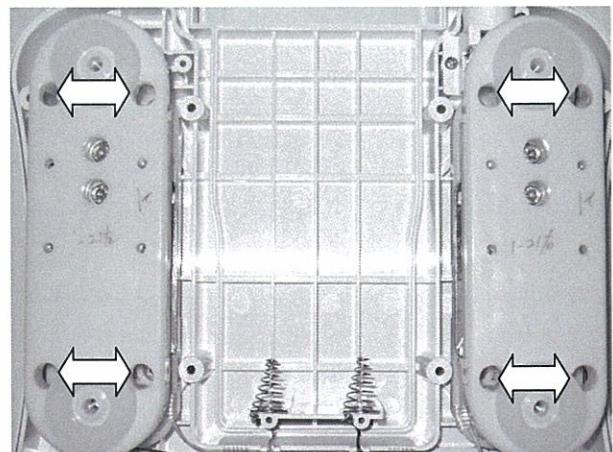
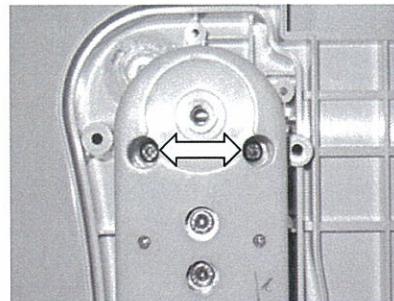
Step 7. Remove the upper case. It makes the top lift the back of the upper case.



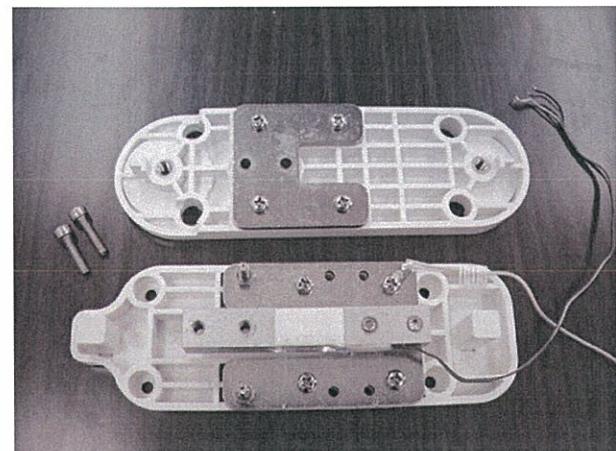
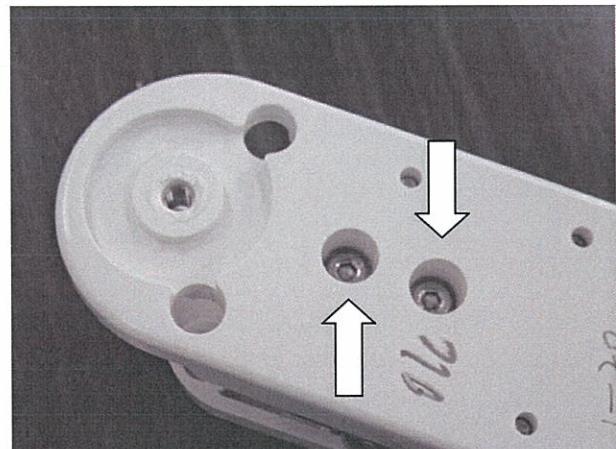


7.2 Replace the load cell unit

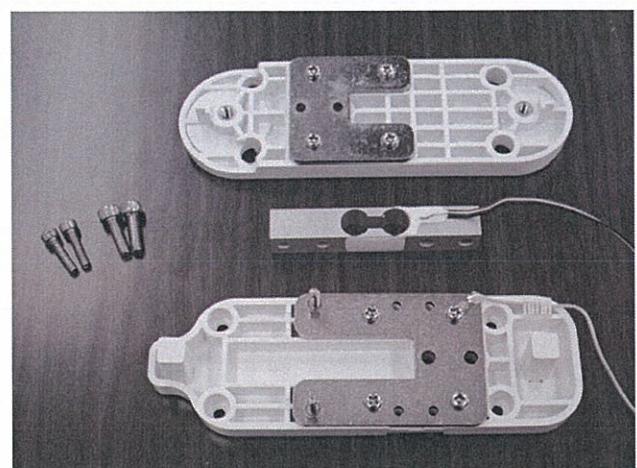
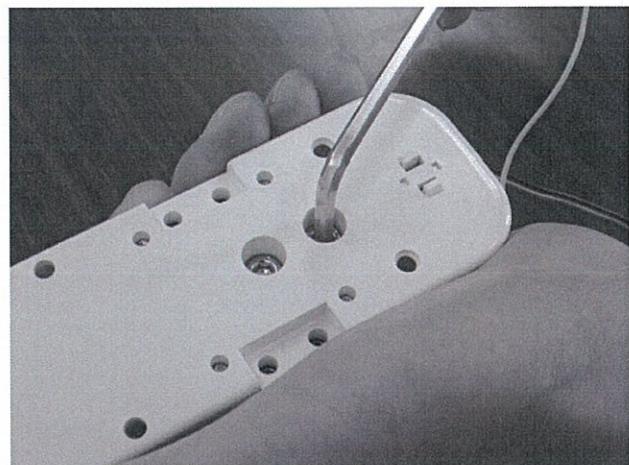
- Step 1. Remove four screws which are fixing the loadcell unit. (Four pieces of either side for each)



- Step 2. Remove two screws which are fixing load cell support. (CAP M4 × 15)



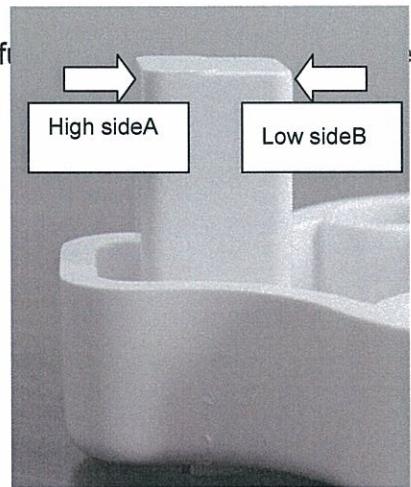
- Step 3. Remove two screws which are fixing a load cell base and load cell.(CAP M5×15)





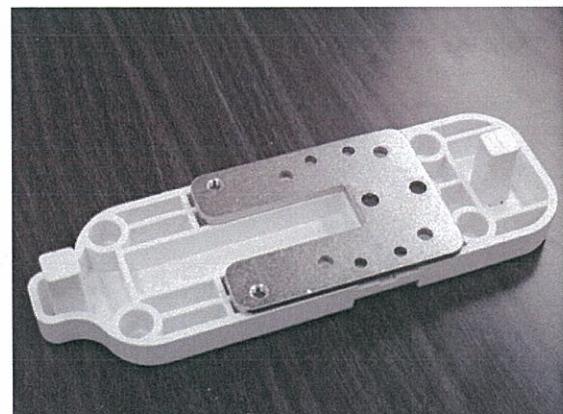
7.3 Assembling the load cell unit

- Step 1. When assembling the load cell unit, be careful. The stopper depends on the model.

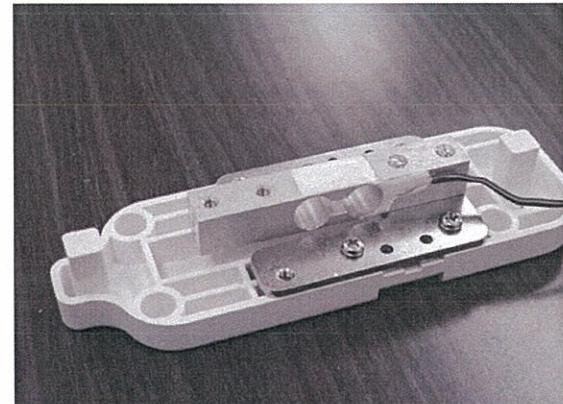
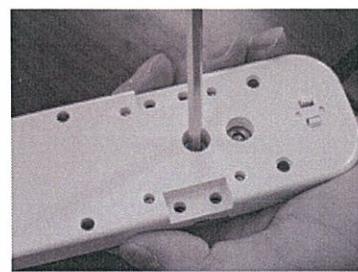


Model	Left (front)			Center	Right (Back)		
	Number	Side	Gap		Gap	Number	Side
SJ1000	1074018480-1	A	0.5	0.3	1074018480-1	A	0.5
SJ2000	1074018480-1	A	0.5	0.3	1074018480-1	A	0.5
SJ5000	1074018480-1	A	0.5	0.3	1074018480-1	A	0.5
SJ12K	1074018480-2	B	2.5	0.5	1074018480-2	B	2.5

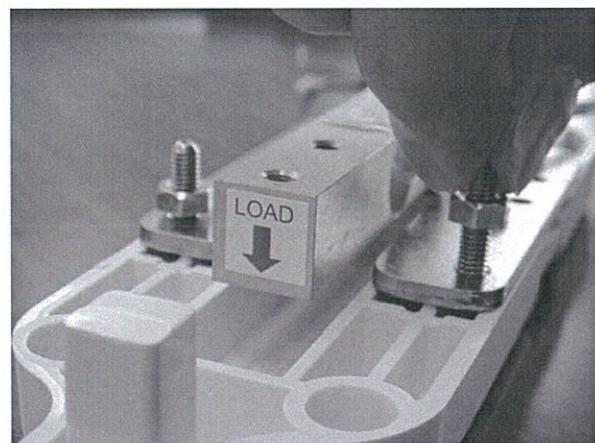
- Step 2. Installs load cell frame 2 in the cell base.



- Step 3. Installs a load cell. It fixes on the cell base. (CAP M5×15)



Step 4. Attach load cell stopper at the temporary.



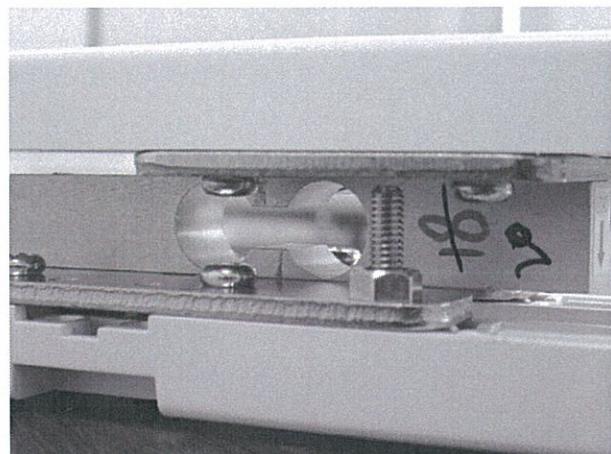
Step 5. Install load cell frame 1 in the load cell support.



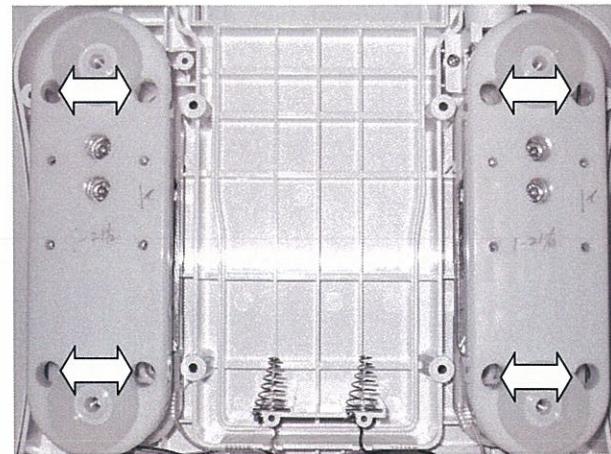
Step 6. Installs load-cell frame in the load cell. (CAP M4×15)



Step 7. Adjusts the height of the load cell stopper.



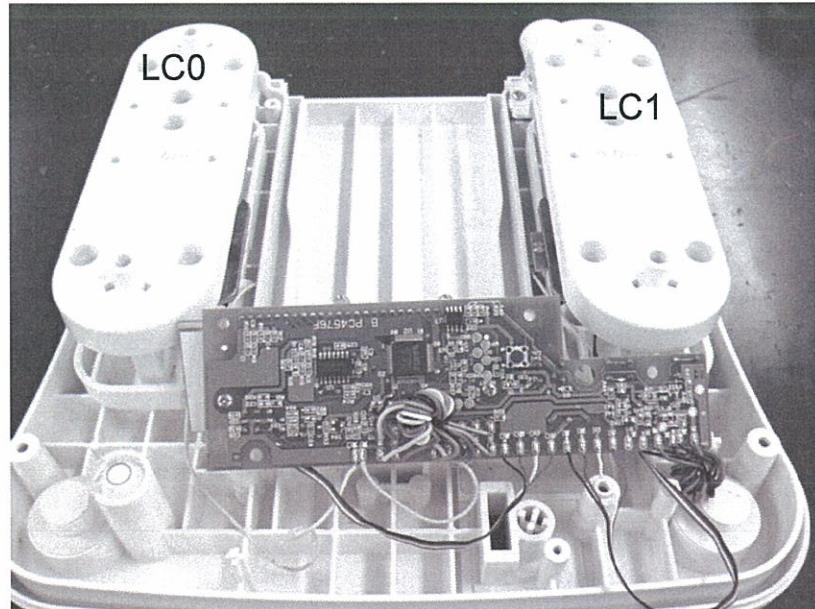
Step 8. Installs a load cell unit in the lower case.



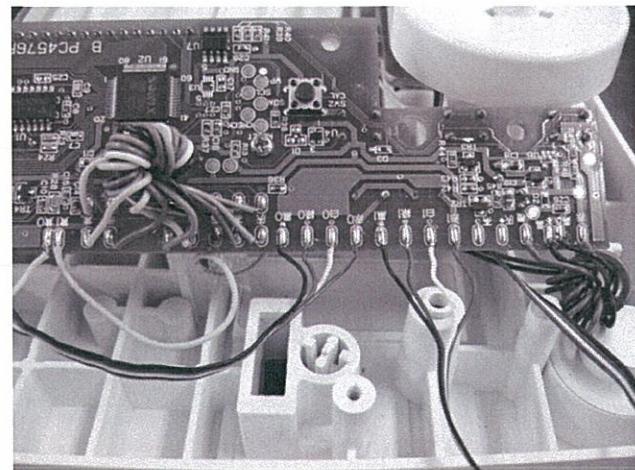


7.4 Output adjustment of the load-cell unit

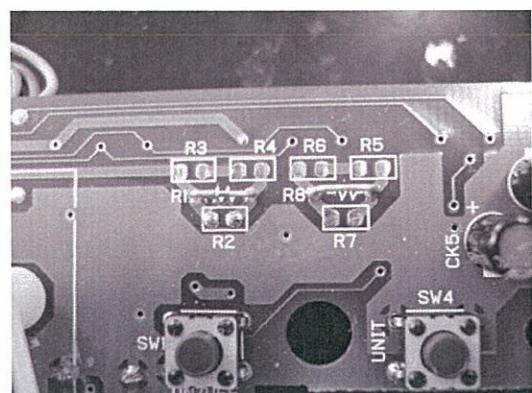
SJ is using two Load Cell. The output of Load cell on either side must be adjusted. The adjustment needs the weight of 1/2 of Calibration mass and carbon-resistance (1Ω - 10Ω).



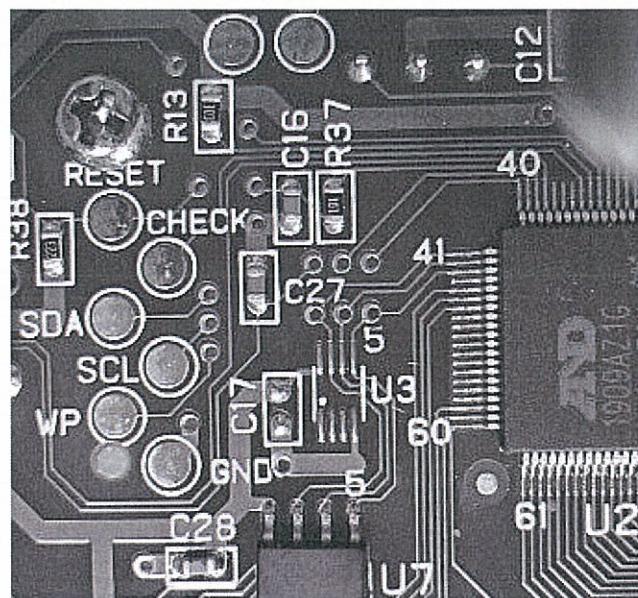
- Step 1. It wires right in the butt cable, Load cell cable like the figure.



- Step 2. Short R1 and R8 to make its resistance is 0Ω .



- Step 3. Connects CHECK and GND which is on the Main board B side (short).



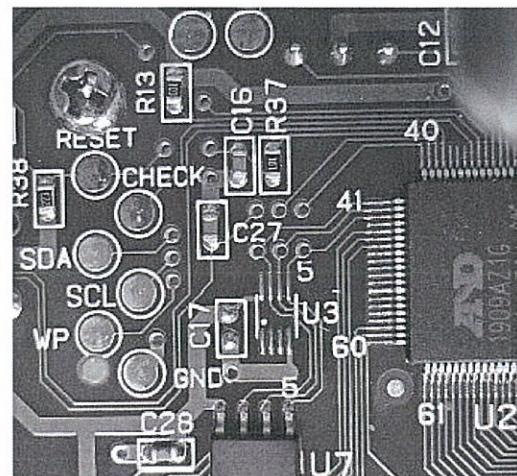
- Step 4. When turning on (displaying in on) the power, " CHECK " is displayed.
- Step 5. It follows page 11 and it advances towards Key check, Initialize, LCD check.
※ It doesn't do Initialize.
- Step 6. " P-1.x " is displayed.
- Step 7. AD count is displayed when pressing **UNITS** key once.
- Step 8. It loads down LC0 with the weight of 1/2 of Calibration mass.
- Step 9. " 0-0.0 " is displayed when pressing **UNITS** key once if stable.
- Step 10. When loading down LC1 with the weight of LC0, it computes and it displays the difference of the output of two Load Cell.
- Step 11. It compares a display and table 1 and it puts resistance with the solder.
(Ex.) When the display is " 0-2.4 ", because it means "doing 2.4-Ω adjustment to the side of LC0", it cut R1 and it puts 2 Ω to R2 with the solder.

部品番号				
x.x	R1	R2	R3	R4
0.6~1.5	cut	1R0		
1.6~2.5	cut	2R0		
2.6~3.5	cut	3R0		
3.6~4.5	cut	3R9		
4.6~5.5	cut	5R1		
5.6~6.5	cut	6R2	3R0	3R0
6.6~7.5	cut	6R8	3R0	3R9
7.6~8.5	cut	8R2	3R0	5R1
8.6~9.5	cut	9R1	3R9	5R1
9.6~10.5	cut	100		
10.6~11.5	cut		100	1R0
11.6~12.5	cut		100	2R0
12.6~13.5	cut		100	3R0
13.6~14.5	cut		100	3R9
14.6~15.5	cut		100	5R1

部品番号				
x.x	R8	R7	R6	R5
0.6~1.5	cut	1R0		
1.6~2.5	cut	2R0		
2.6~3.5	cut	3R0		
3.6~4.5	cut	3R9		
4.6~5.5	cut	5R1		
5.6~6.5	cut	6R2	3R0	3R0
6.6~7.5	cut	6R8	3R0	3R9
7.6~8.5	cut	8R2	3R0	5R1
8.6~9.5	cut	9R1	3R9	5R1
9.6~10.5	cut	100		
10.6~11.5	cut		100	1R0
11.6~12.5	cut		100	2R0
12.6~13.5	cut		100	3R0
13.6~14.5	cut		100	3R9
14.6~15.5	cut		100	5R1

表1

Step 12. It opens CHECK and GND which is on the Main board side B (open).



Step 13. It does TCAL (Temperature compensation calibration) after doing AdJ, Func, Gravitational acceleration setting after assembling so as not to put in each cable.

Step 14. Above, the adjustment work ends.

※ When doing Initialize, AdJ, Func, Gravitational acceleration have been changed into the default.



7.5 Assembling

After attaching the upper case, loosen the screws of load cell unit. (The load cell fixing screws are not removed.) Use the load cell attachment jig and tighten the screws of load cell that is loosen

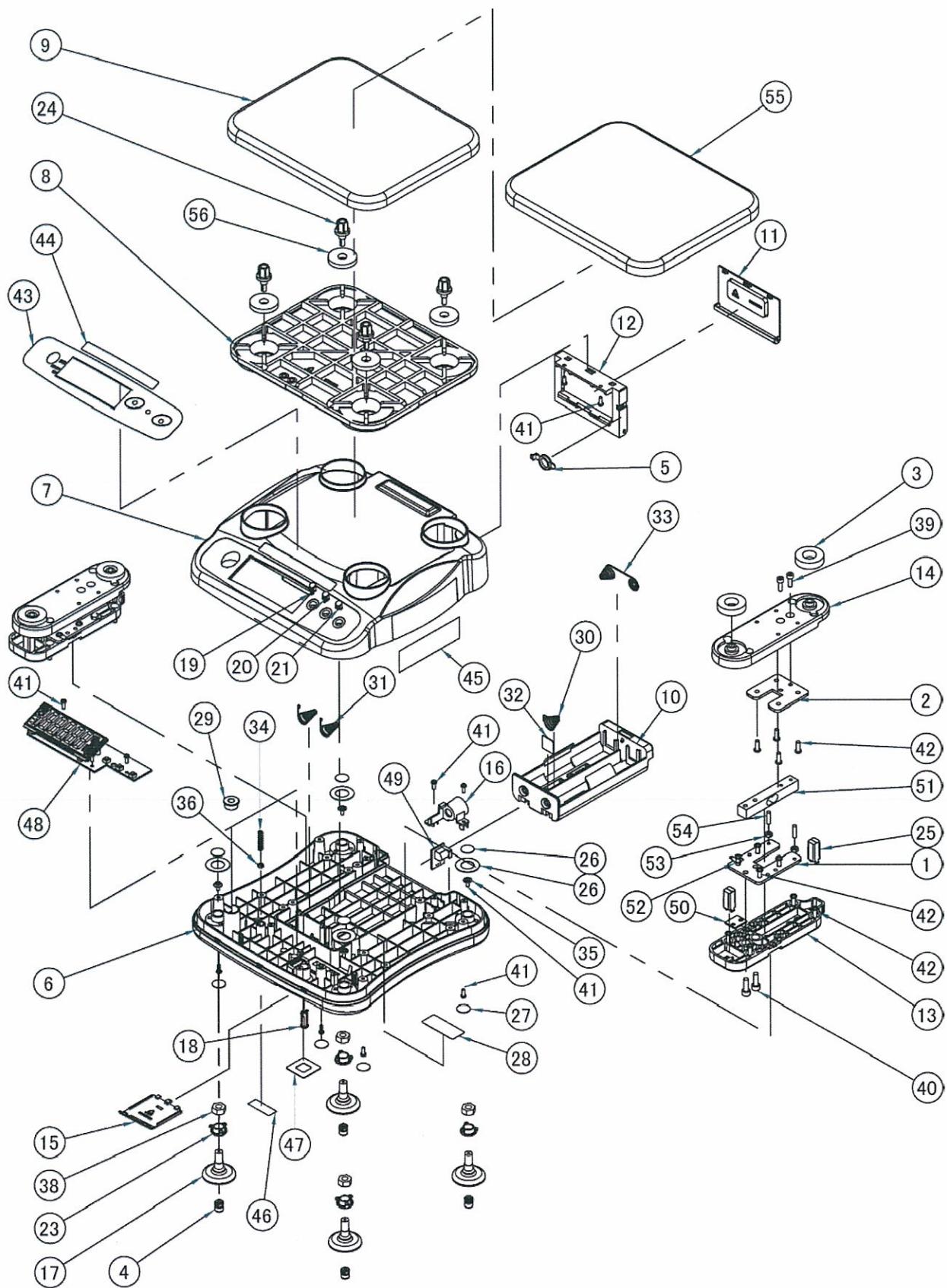


8. Specifications

MODEL		SJ-1000H	SJ-2000H	SJ-5000H	SJ-12KH
Capacity × Resolution	(k)g	1000g×0.5g	2000g×1g	5000g×2g	12kg×5g
	lb	2.2lb×0.001lb	4.4lb×0.002lb	11lb×0.005lb	26lb×0.01lb
	oz	35oz×0.02oz	70oz×0.05oz	176oz×0.1oz	423oz×0.2oz
	lb-oz	2.2lb×0.1oz	4.4lb×0.1oz	11lb×0.1oz	26lb×1oz
Non-linearity		±1 g	±2 g	±5 g	±10 g
Repeatability		1 g	2 g	5 g	10 g
Span drift		±0.015% / °C TYP (5°C~35°C / 41° F~95° F)			
Operating temp.		−10°C~40°C / 14° F~104° F, Less than 85%RH (No condensation)			
Display		25mm / 0.98inches, 7segment liquid crystal display			
Display update		Approximately 10 times per second			
Power		4×R20P / LR20 / “D” size batteries or AC adapter			
Battery life		Approximately 800 hours with alkaline cells at 20°C / 68° F			
Platform size		230 (W) ×190 (D) mm / 9.05 (W) ×7.48 (D) inches			
Dimensions		265 (W) ×250 (D) ×103 (H) mm 10.4 (W) ×9.8 (D) ×4.1 (H) inches			
Calibration weight		1000g±0.1g	2000g±0.2g	5000g±0.5g	10kg±1g
Options		AC adapter			



9. Exploded view



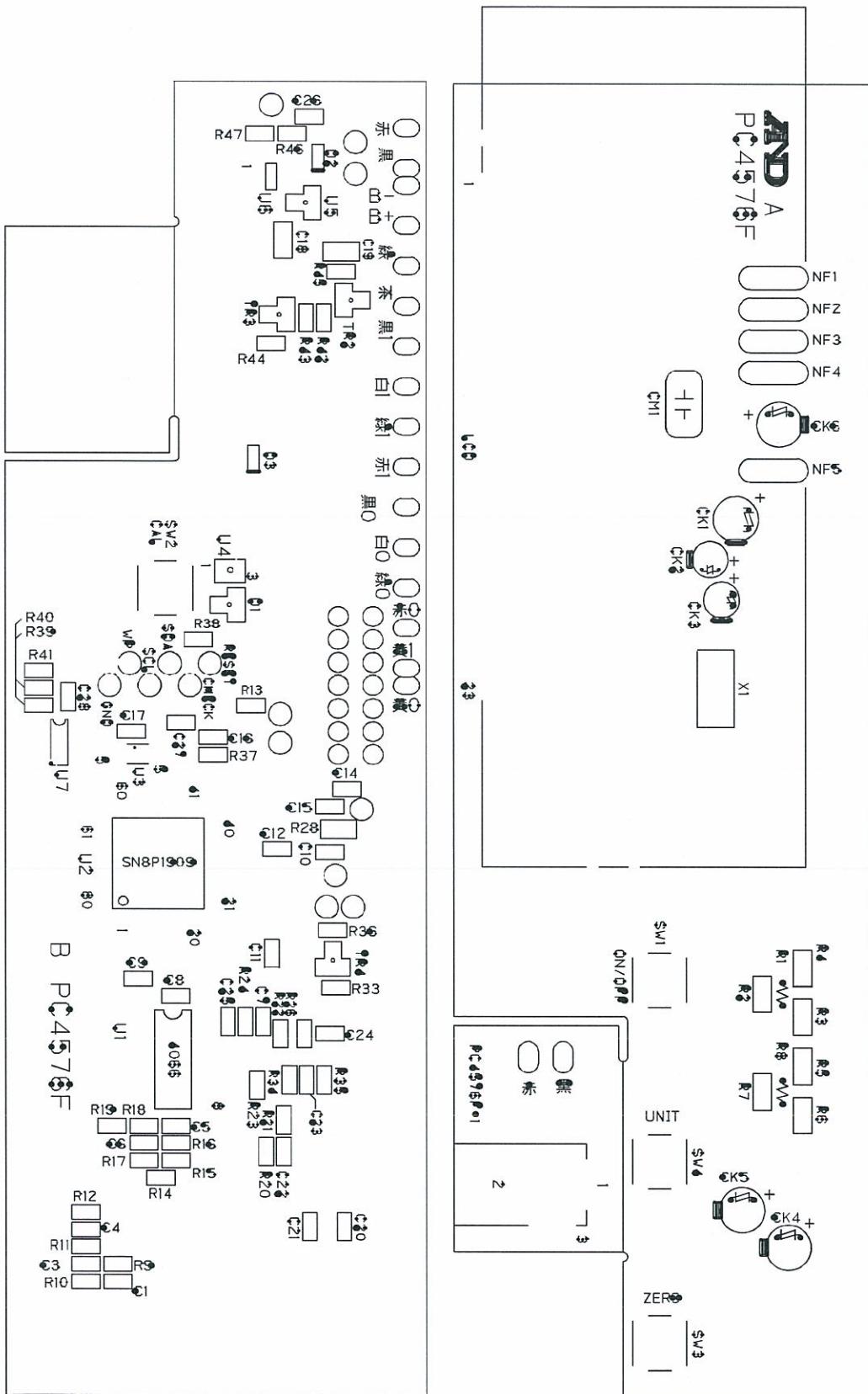
Parts list

No.	Description	Name	Q'ty
1	1044017766A	LC FRAME-2	2
2	1044017767	LC FRAME-1	2
3	1064017768C	PAD	4
4	1064018233A	FOOT RUBBER	4
5	1064015418A	PS COVER	1
6	1071000436A	UNDER CASE	1
7	1071000437A	UPPER CASE	1
8	1071000438A	PAN SUPPORT	1
9	1072001080A	PAN	1
10	1072001081	BATTERY BOX	1
11	1073008539	BATTERY COVER	1
12	1073008540	COVER GUIDE	1
13	1073008541A	LC BASE	2
14	1073008542B	LC SUPPORT	2
15	1073008739	CAL COVER	1
16	1073008866A	PS SUPPORT	1
17	1074018232	FOOT	4
18	1074018234A	CAL KEY TOP	1
19	1074018236A-1	KEY TOP-1	1
20	1074018236A-2	KEY TOP-2	1
21	1074018236A-3	KEY TOP-3	1
23	1074018241	NUT CAP M8	4
24	1074018417B	LOCK BOLT	4
25	1074018480A-1	LC STOPPER-1 (SJ-1000/2000/5000)	4
	1074018480A-2	LC STOPPER-2 (SJ-12K)	4
26	108401953A	HOLE COVER-1	4
27	1084018454	HOLE COVER-2	9
28	1084018479	HOHE COVER-3	1
29	110MR14	LEVEL VIAL HL100	1
30	1154017765	BATTERY SPRING (-)	1
31	1154017769A	HOLDER SPRING	2
32	1154017771	SPRING SUPPORT	1
33	1154017842	BATTERY SPRING (+-)	1
34	1154018478	CONTACT SPRING	1
35	1044018553	WASHER	4
36	11703-11-FZ3	HEX NUT M3	1
38	11703-11-FZ8	HEX NUT M8	4
39	11705FZ-4X15	HEX BOLT M4X15	4
40	11705FZ-5X15	HEX BOLT M5X15	4
41	1UZ4+0051	PAN HEAD TAP SCREW 3X8	20
42	11714FZ-P4X12	PAN HEAD TAP SCREW 4X12	24
43	1083009416	KEY SHEET (SJ-EX)	1

	1083008774-15	MODEL SHEET (SJ-1000H)	1
44	1083008774-16	MODEL SHEET (SJ-2000H)	1
	1083008774-17	MODEL SHEET (SJ-5000H)	1
	1083008774-18	MODEL SHEET (SJ-12KH)	1
47	1084018235	CAL KEY SHEET	1
48	7PZ-4576	MAIN BOARD	1
49		POWER SUPPLY BOARD	1
50		SENSOR BOARD	1
	1ETTS103B-1K	LOAD CELL (SJ-1000)	2
51	1ETTS103B-2K	LOAD CELL (SJ-2000)	2
	1ETTS103B-5K	LOAD CELL (SJ-5000)	2
	1ETTS103B-10K	LOAD CELL (SJ-12K)	2
52	1044019487	RAG-4(B3)	2
53	11703-11-FZ4	HEX NUT M4	4
54	11711FZ-H4X15	HEX BOLT M4X15	4
55	1043008583-2	SUS PAN	1
56	1064019859A	GUM WASHER	4

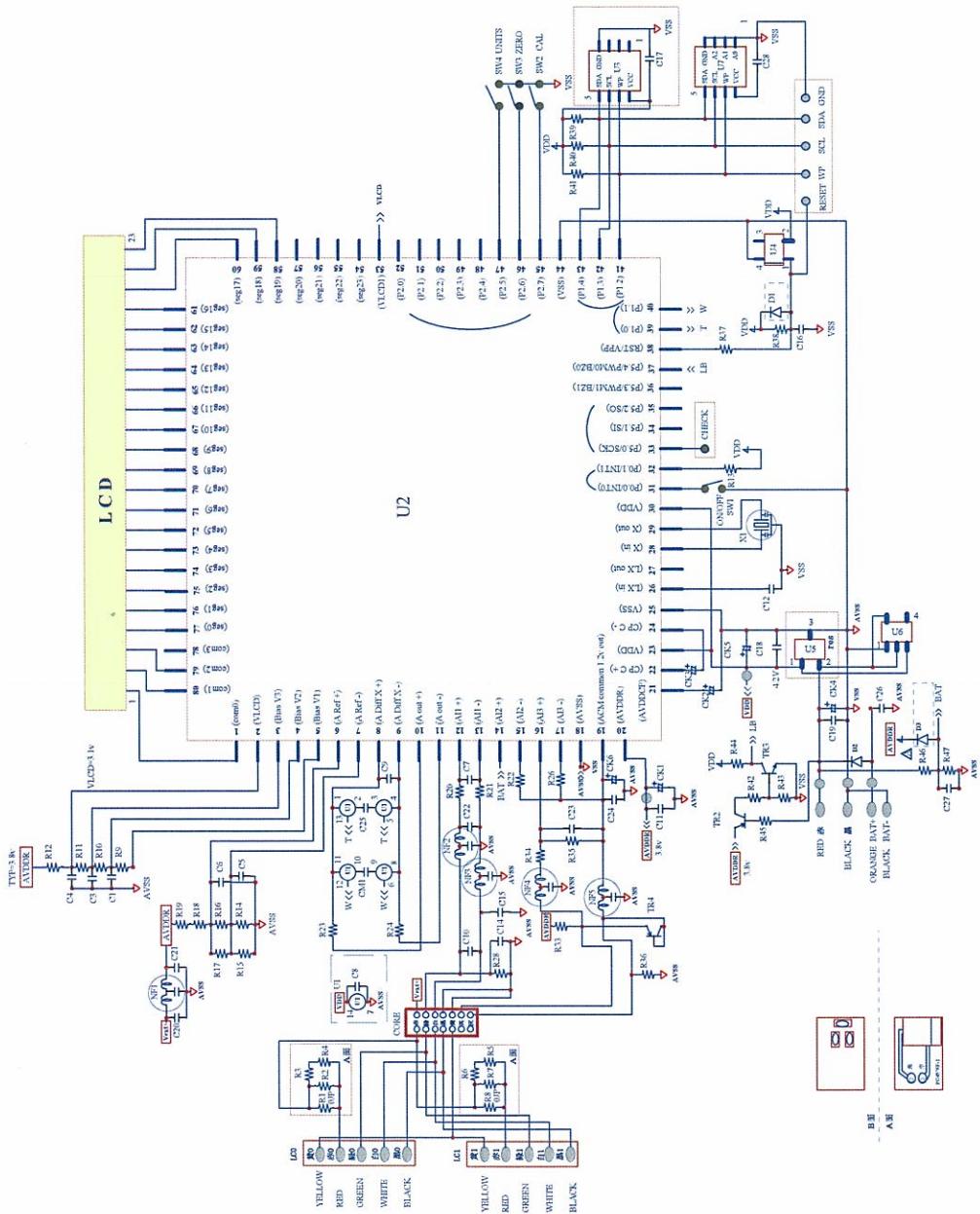


10. Parts layout



Parts		Stock No.	Lot
TR 3	1QT	C2712Y-C	1
TR 2,4	1QT	A1162Y-C	2
D2	1DS	RB521S-30	1
CK5	1CK	ECEA0JKA221	1
CK2,CK3	1CK	EEAFC1E100	2
CK1,CK4,CK6	1CK	ECEA1EKA220	3
U1	1UC	HC4066F	1
U2	1UC	1909AZ3G	1
U4	1UC	S-80824ANNP	1
U6	1UR	S-812C42AMC	1
U7	1UC	S-24CS01AFJ	1
CM1	1CM	V1H224JL2-T	1
PCB	1PC	4576F	1
LCD	1ED	TA2037TR-P	1
LCD holder	107	4017956A	2
screw	117	14FZ-P2.6×6	2
NF1～NF5	1NF	EXCEMT102ADK	5
X1	1XT	EFOEC4004T3	1
SW 1～4	1SK	EVQPAG05R	4
C1,3～6,8,26,27	1CC	1608-1H103Z	8
C10,11,14,15,16,24,28	1CC	1608-1H104Z	7
C12	1CD	20PCT1608	1
C7,9,23	1CC	1608-1H101J	3
C18,19	1CC	105-16V2012	2
R1,8	1KJ	000R5F	2
R20,21,37	1RC	1608-101J	3
R38	1RC	1608-223J	1
R13,39,40,41	1RC	1608-103J	4
R42	1RC	1608-333J	1
R36,44,45	1RC	1608-104J	3
R28	1RM	2125-4703F	1
R14,16～19	1RF	1608-103D25	5
R33,34,35	1RF	1608-303D25	3
R9,10,11	1RC	1608-1002F	3
R23,24	1RC	1608-1003F	2
R12	1RC	1608-5101F	1
R47	1RC	1608-473J	1
R46	1RC	1608-204J	1

III. Circuit Diagram





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