Digital Scale

TITAN-Compact

MAINTENANCE MANUAL

SK-1000WP
SK-2000WP
SK-5000WP
SK-5001WP
SK-10KWP
SK-20KWP

WT:PD4000656

A&D Company, Limited

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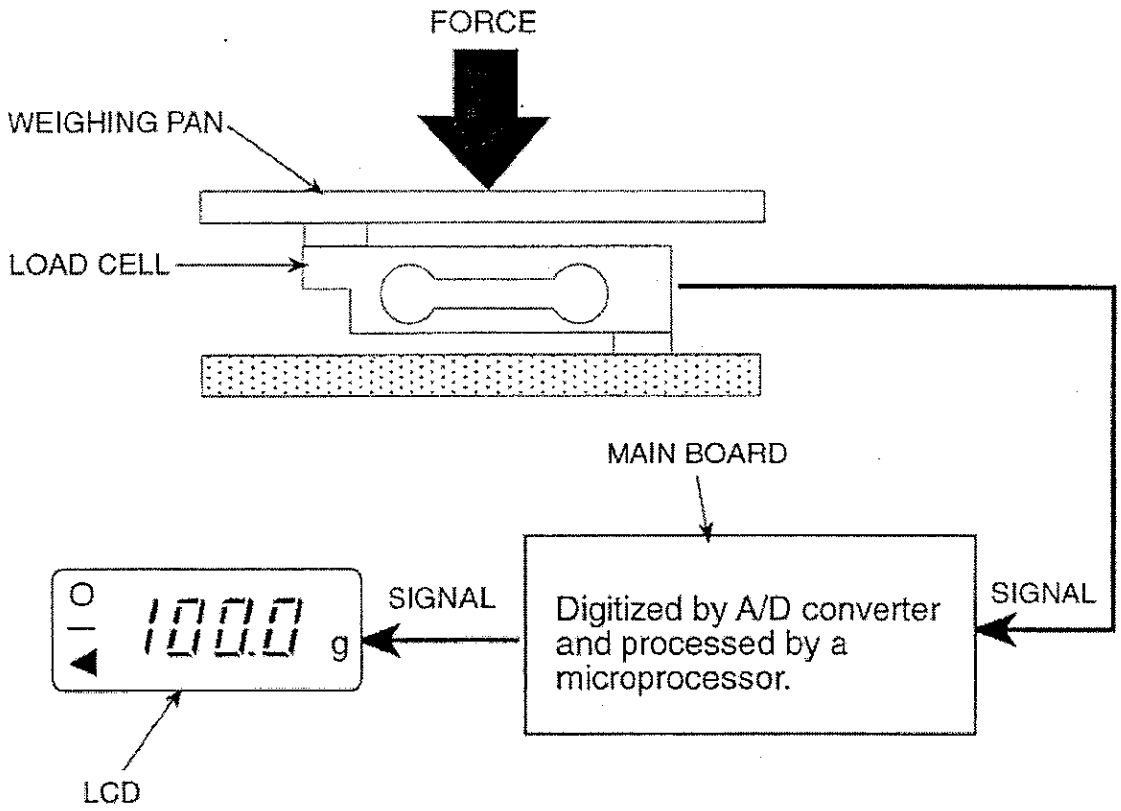
1. Introduction

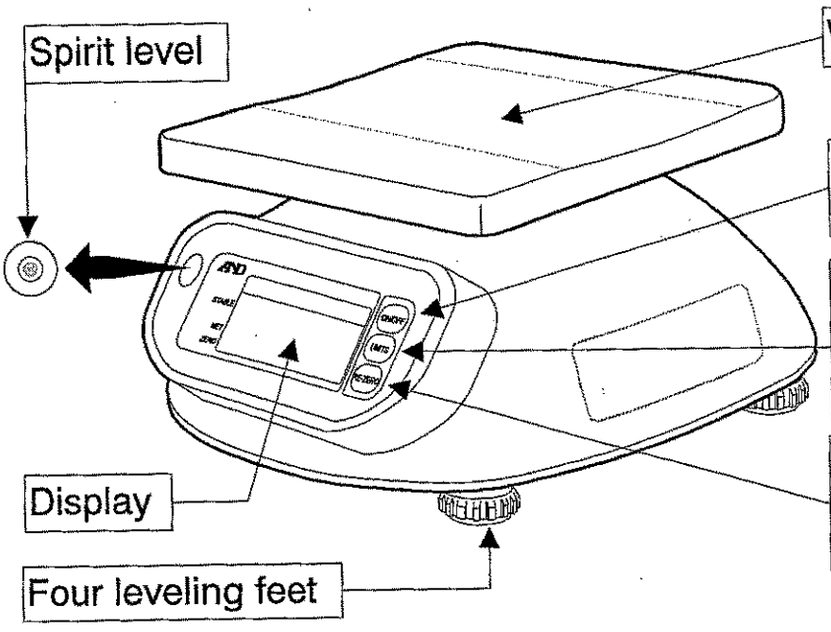
SK-WP series compact scale consists of functional units.
Defective units can be easily replaced for maintenance.

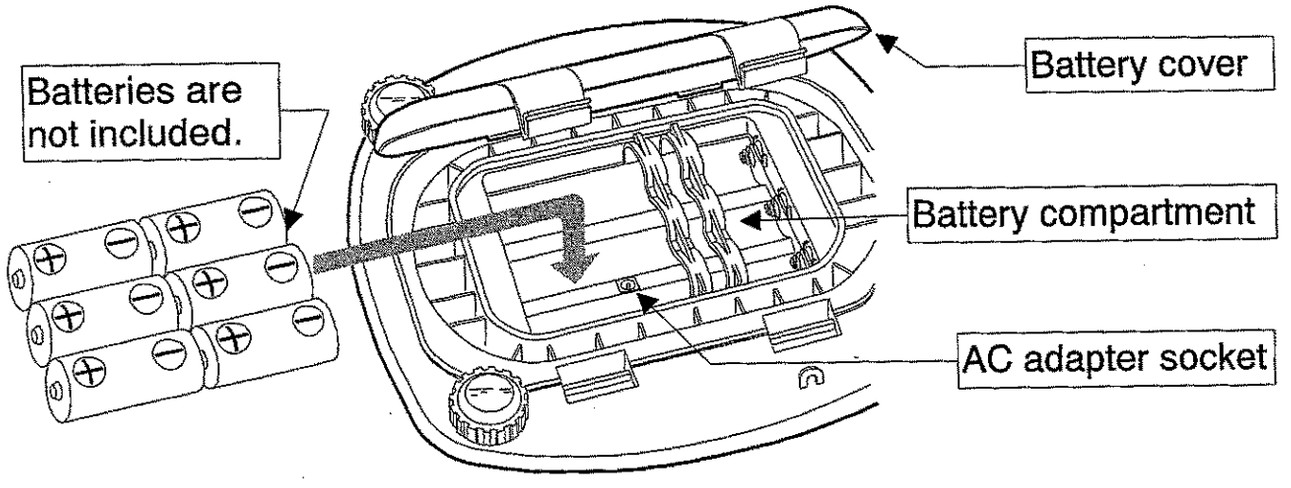
2. Operational principle

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

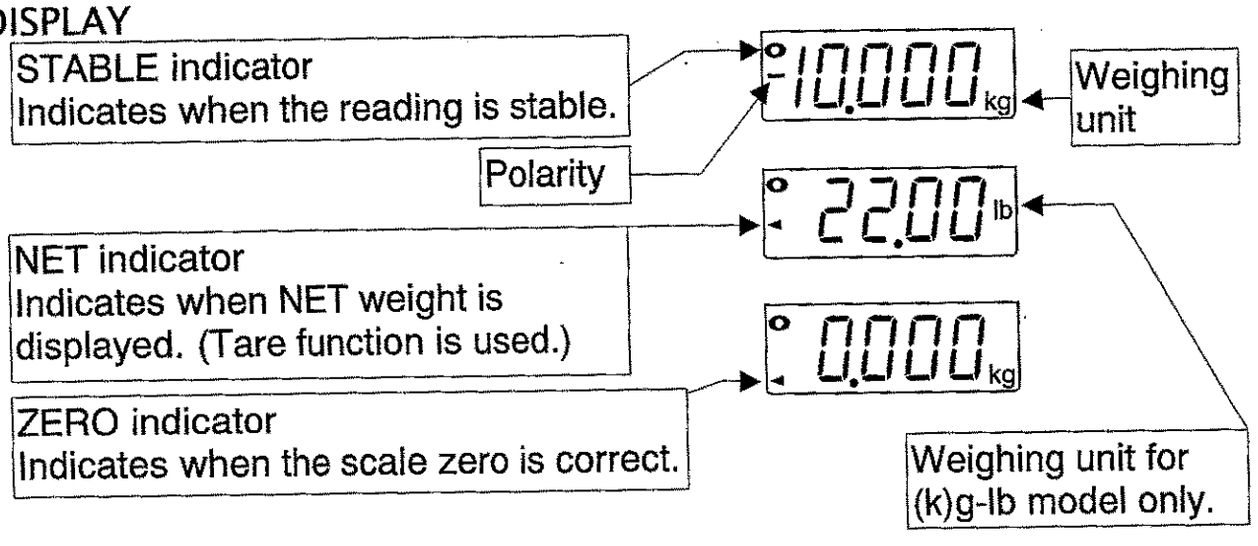


3. Parts Description



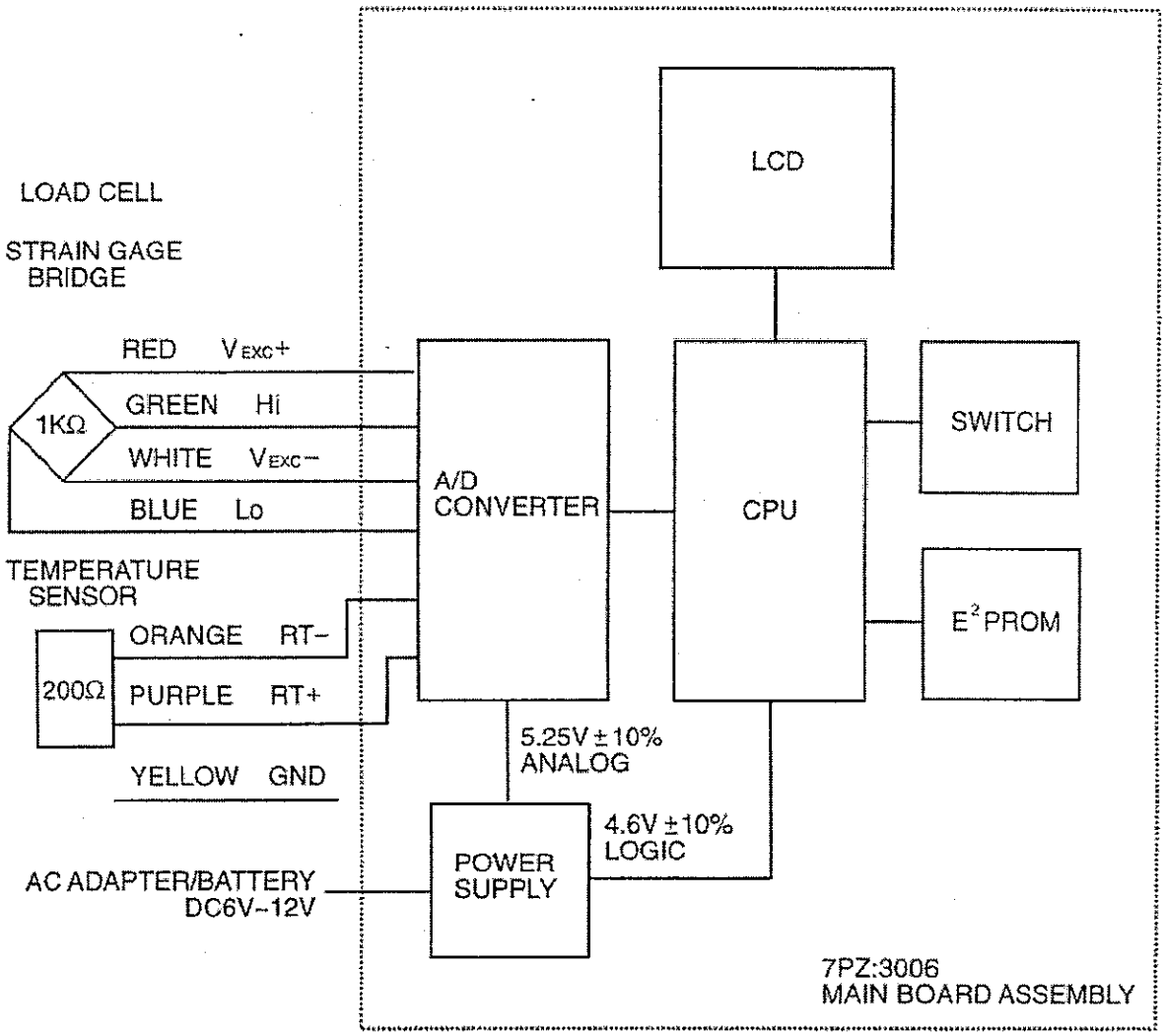


DISPLAY

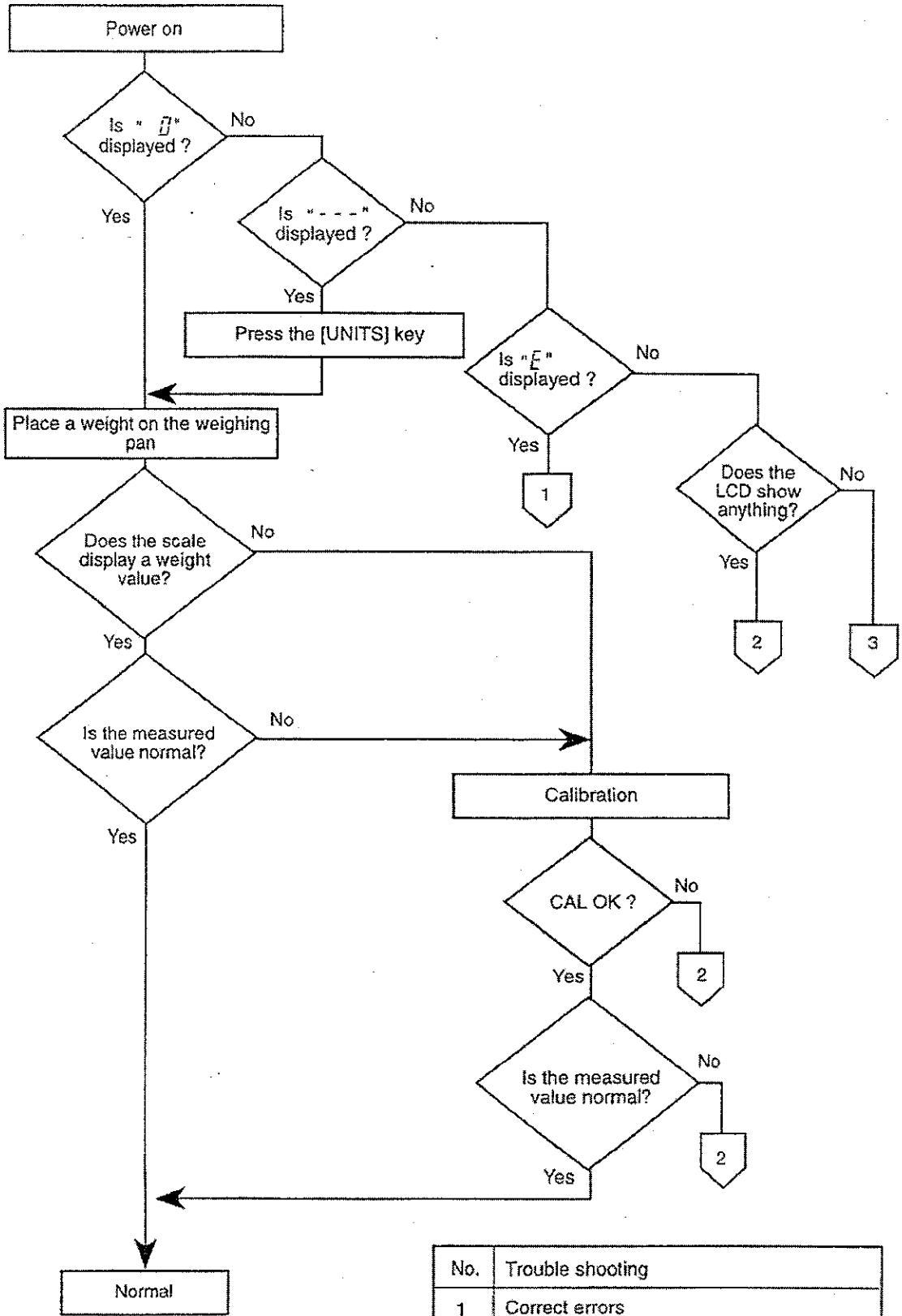


4. Block diagram

The SK series compact scale consists of functional units: case unit, weighmg 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.



5. Trouble shooting



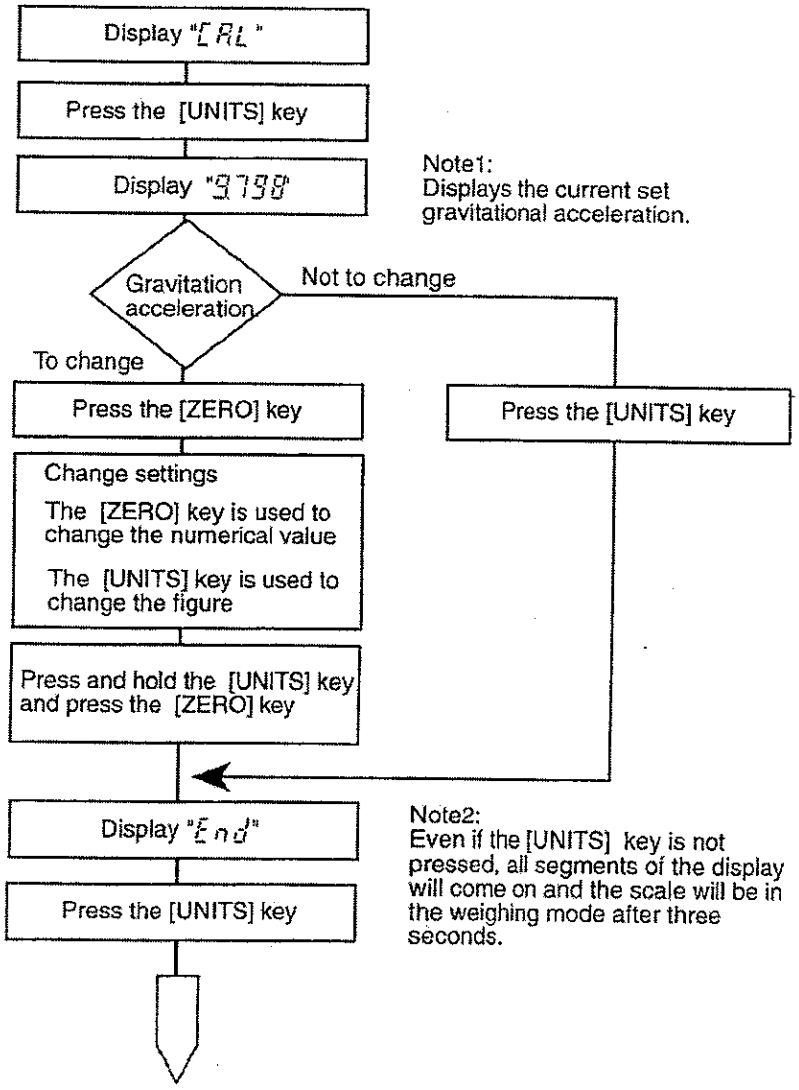
No.	Trouble shooting
1	Correct errors
2	Malfunction of main board and /or load cell
3	Malfunction of main board and/or battery

6. Calibration mode

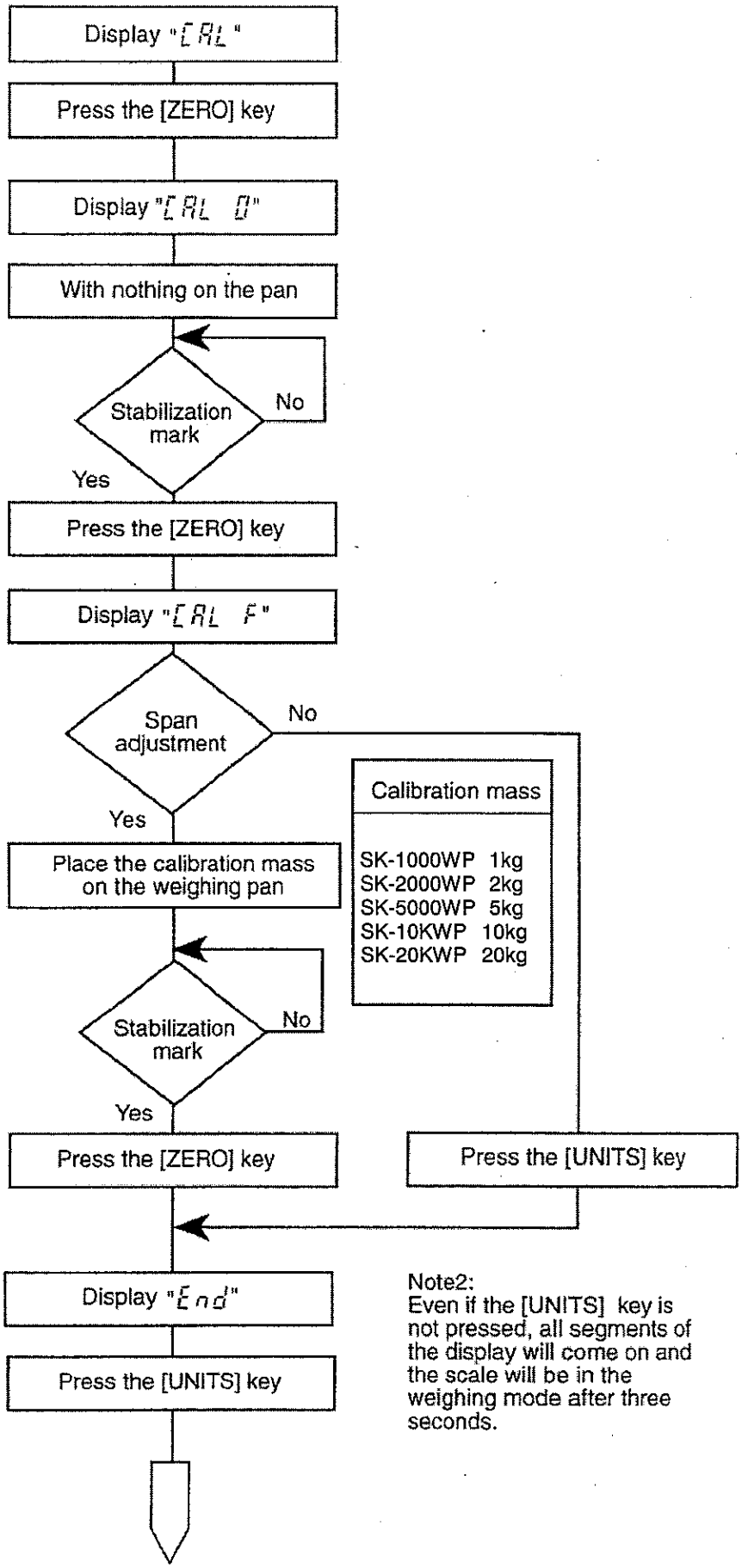
The SK series scales are equipped with a function to compensate for measuring errors caused by gravitational acceleration. If zero or span has shifted, for example, when the scales location of use is changed, check the gravitational acceleration. Change the setting or calibrate using a certified weight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

1 While holding down the [UNITS] and [ZERO] key, press the [ON/OFF] key to turn the power ON.
2 Once the display indicates "CAL", release all the keys.
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.
4 Pressing the [UNITS] key, approximately three seconds after "END" is displayed, will return the scale to the weighing mode. All segments of the display will turn on, then zero will be displayed.

Gravitational acceleration setting



Calibration using a weight



Note2:
Even if the [UNITS] key is not pressed, all segments of the display will come on and the scale will be in the weighing mode after three seconds.

7. Check mode

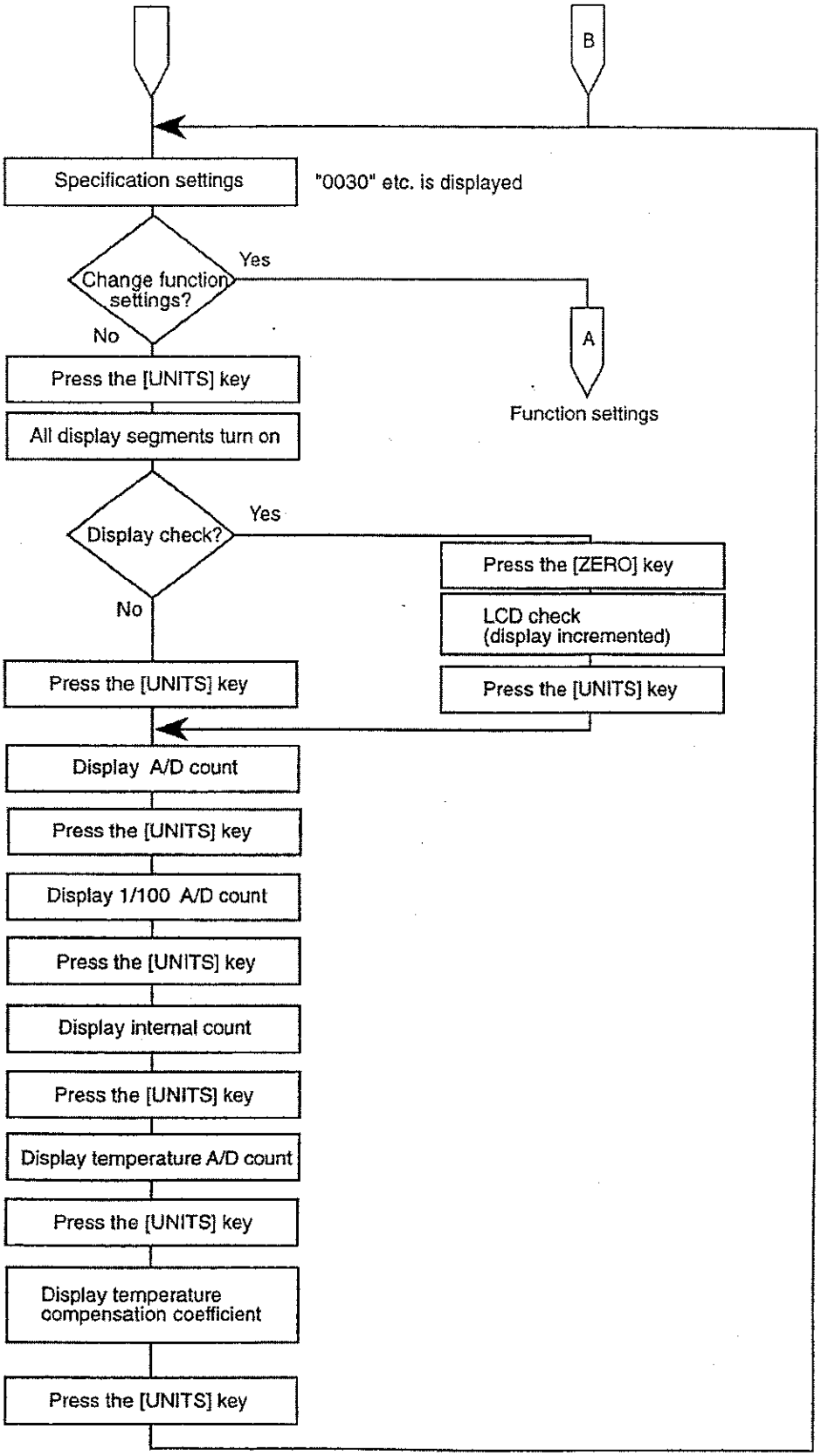
Check mode checks the display, specification settings, A/D count and temperature compensation coefficient.
While holding down the [ZERO] key, pressing the [ON/OFF] key will turn the power ON and the CPU version will be displayed. With CPU version "P-1 .2", check mode is as follows:

1 While holding down the [UNITS] and [ZERO] key, press the [ON/OFF] key to turn the power ON.
2 Keep the [UNITS] and [ZERO] keys pressed. The scale will be in the check mode after the following performance:
The display indicates "CAL". (5sec) → "CAL" disappears. (5sec) → The LCD segments are checked.
3 To exit the check mode, press the [ON/OFF] key to turn the power OFF.

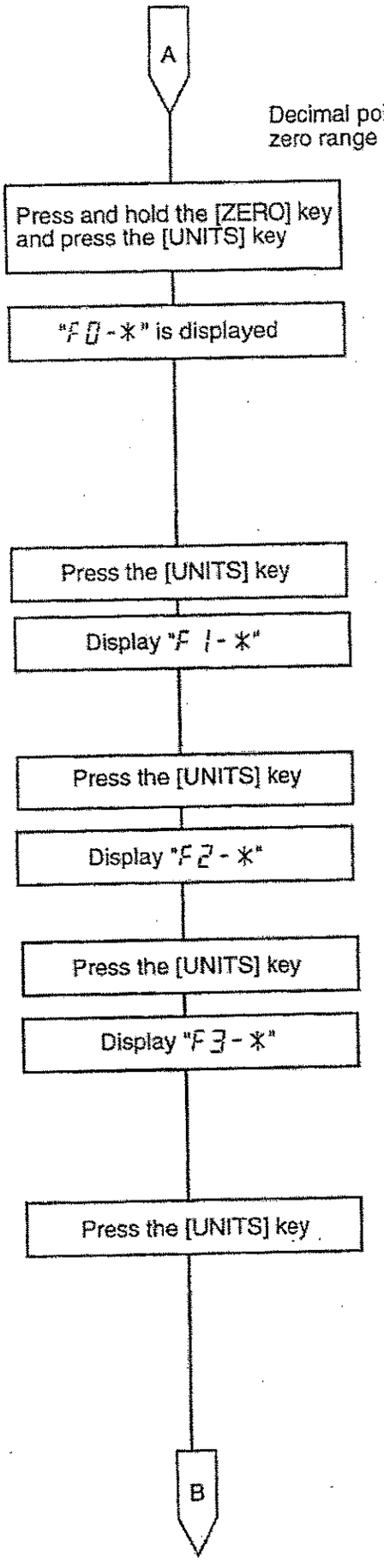
With CPU version P-2.0, and later check mode is as follows.

1 While holding down the [UNITS] and [ZERO] keys, press the [ON/OFF] key to turn the power ON. The display will show "CAL"(or all segments will turn on).
2 Press and hold the [ZERO] key and press the [UNITS] key twice. Then the display will show the CPU version "P-X.X.".
3 Press the [ZERO] key to show the pecification settings. This is the beginning of check mode.
4 To exit the check mode, press the [ON/OFF] key to turn the power OFF.

Check mode (CPU Version P-2.0 and later)



Function settings (CPU Version P-2.0 and later)



Decimal point, check/cal mode, weighing units and power-on zero range can be changed using the function settings

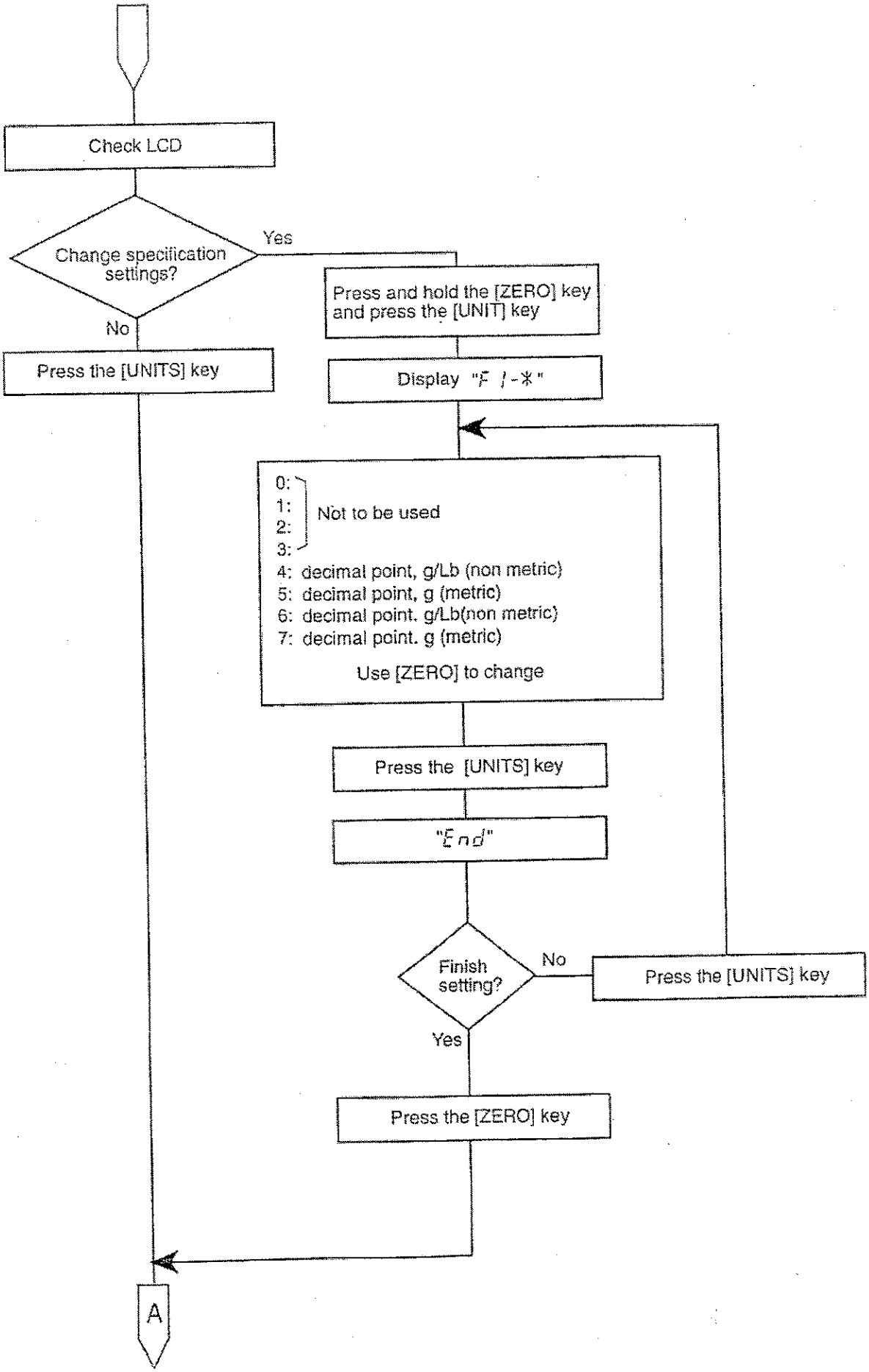
F 0 - 0 decimal point[.], cal[yes]
F 0 - 1 decimal point[,], cal[yes]
F 0 - 4 decimal point[.], cal[no]
F 0 - 5 decimal point[,], cal[no]
Use the [ZERO] key to change
Never set F 0 - 2,3,6 and 7, or the scale cannot enter check mode again

F 1 - 0 metric (k)g
F 1 - 1 non-metric lb & (k)g
F 1 - 2 to 7 should not be used
Use the [ZERO] key to change

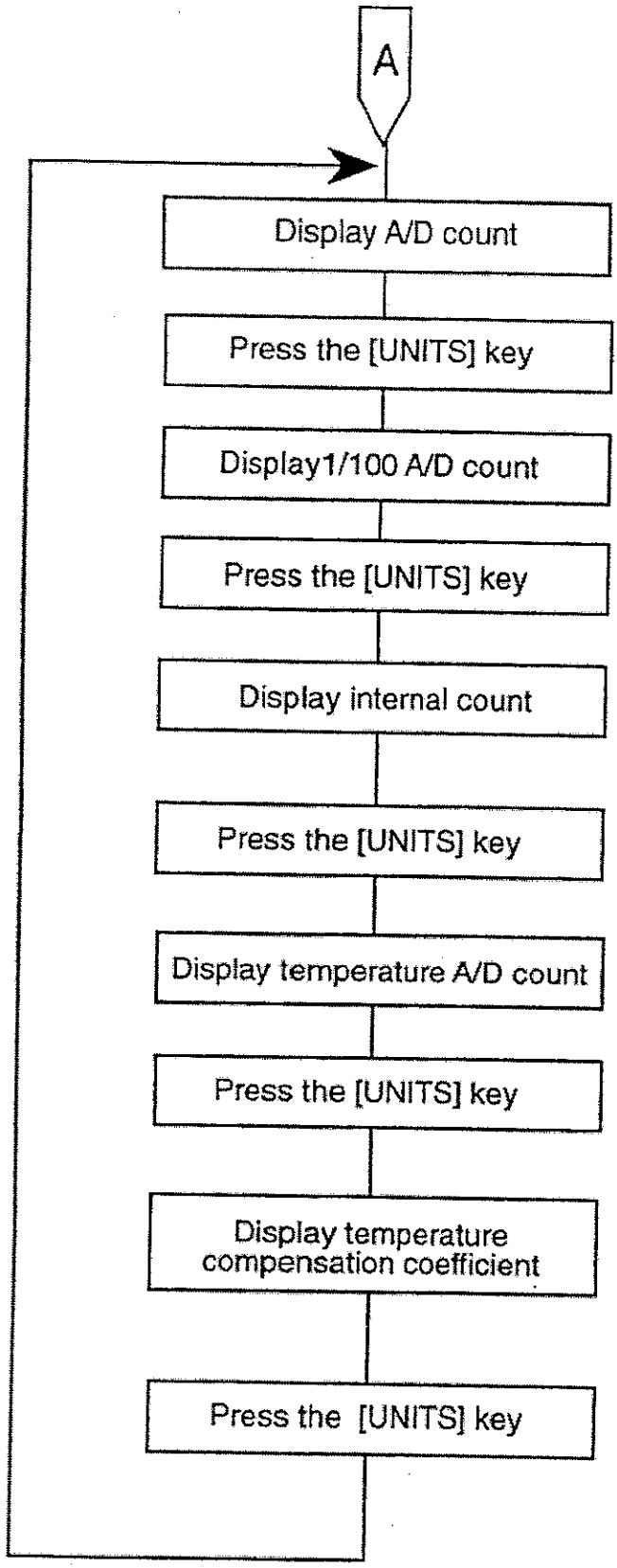
F 2 - 0 no tael
F 2 - 1 Taiwan tael
F 2 - 2 Hong Kong tael
F 2 - 3 to 7 should not be used
Use the [ZERO] key to change

F 3 - 0 power-on zero range : 50% of cap (default setting)
F 3 - 1 power-on zero range : 10% of cap
F 3 - 2 power-on zero range : 100% of cap
F 3 - 3 power-on zero range : no limit
Use the [ZERO] key to change

Check mode (CPU Version P-1.2)



(CPU Version P-1.2)



8. Setting mode

8.1.1. Setting mode (CPU version. P-1.2)

Set the scale model and perform temperature compensation as follows:
Temperature compensation is required whenever the main board or the load cell is replaced. Before temperature compensation, be sure to check the gravitational acceleration and make the necessary changes as described in chapter 6.

In the setting mode, the following is set:
Scale model, to initialize or not, temperature coetficient temperature at CAL.

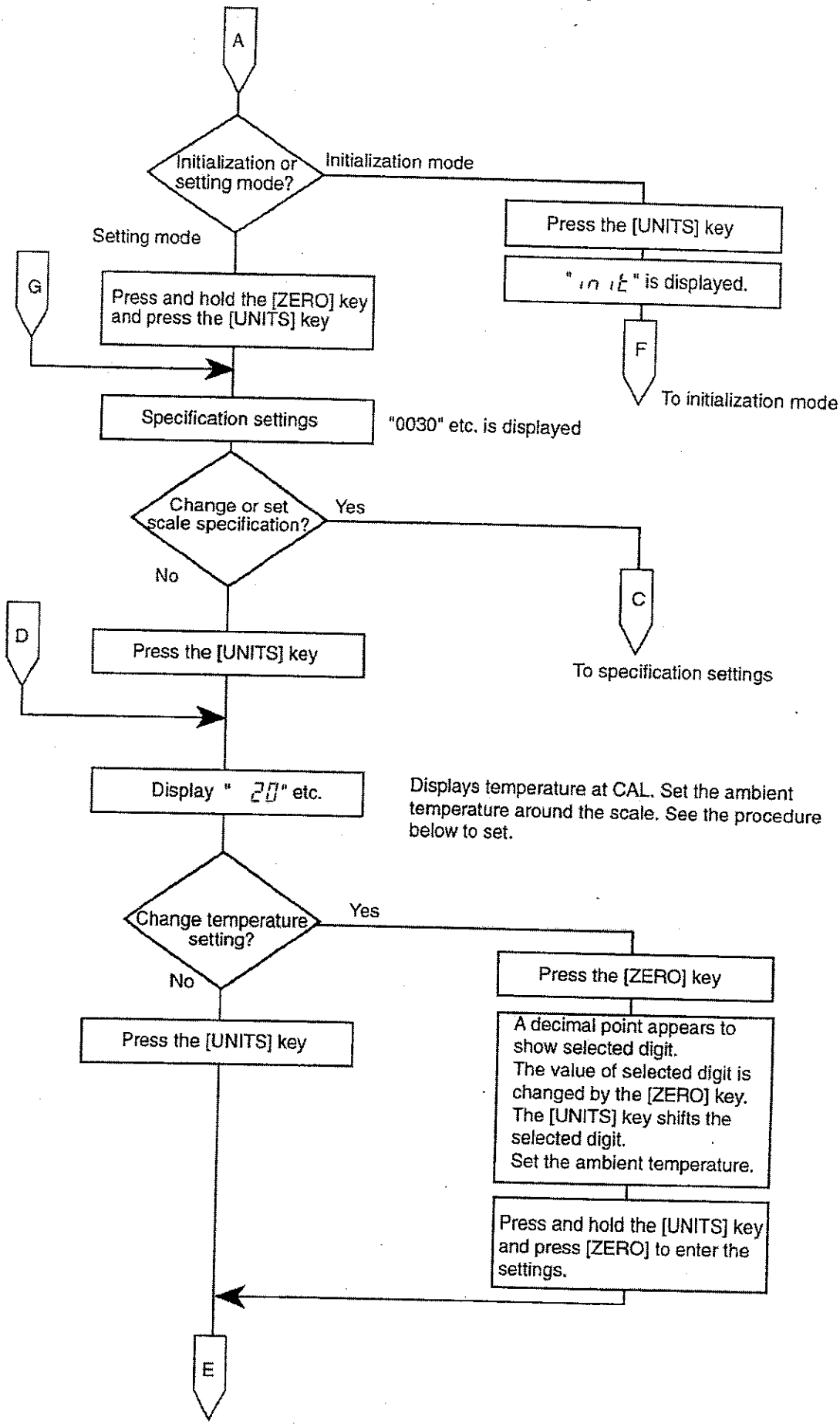
1. While holding down the [UNITS] and [ZERO] keys, press the [ON/OFF] key to turn the power ON. "CAL" appears from the display.
2. Keep the [UNITS] and [ZERO] keys pressed. After five seconds, "CAL" disap-pears from the display. Here, release the [UNIT] key. Keep the [ZERO] key pressed Afterflve seconds, the LCD mdlcates "FO-＊" (＊=the set value) and the scale will be in the setting mode.
3. To exit the setting mode, press [ON/OFF] to turn the power OFF. When the settings were changed, press the [ZERO] key after "END" being displayed to proceed to the temperature compensation mode.

8.1.2. Setting mode (CPU version. P-2.0 and later)

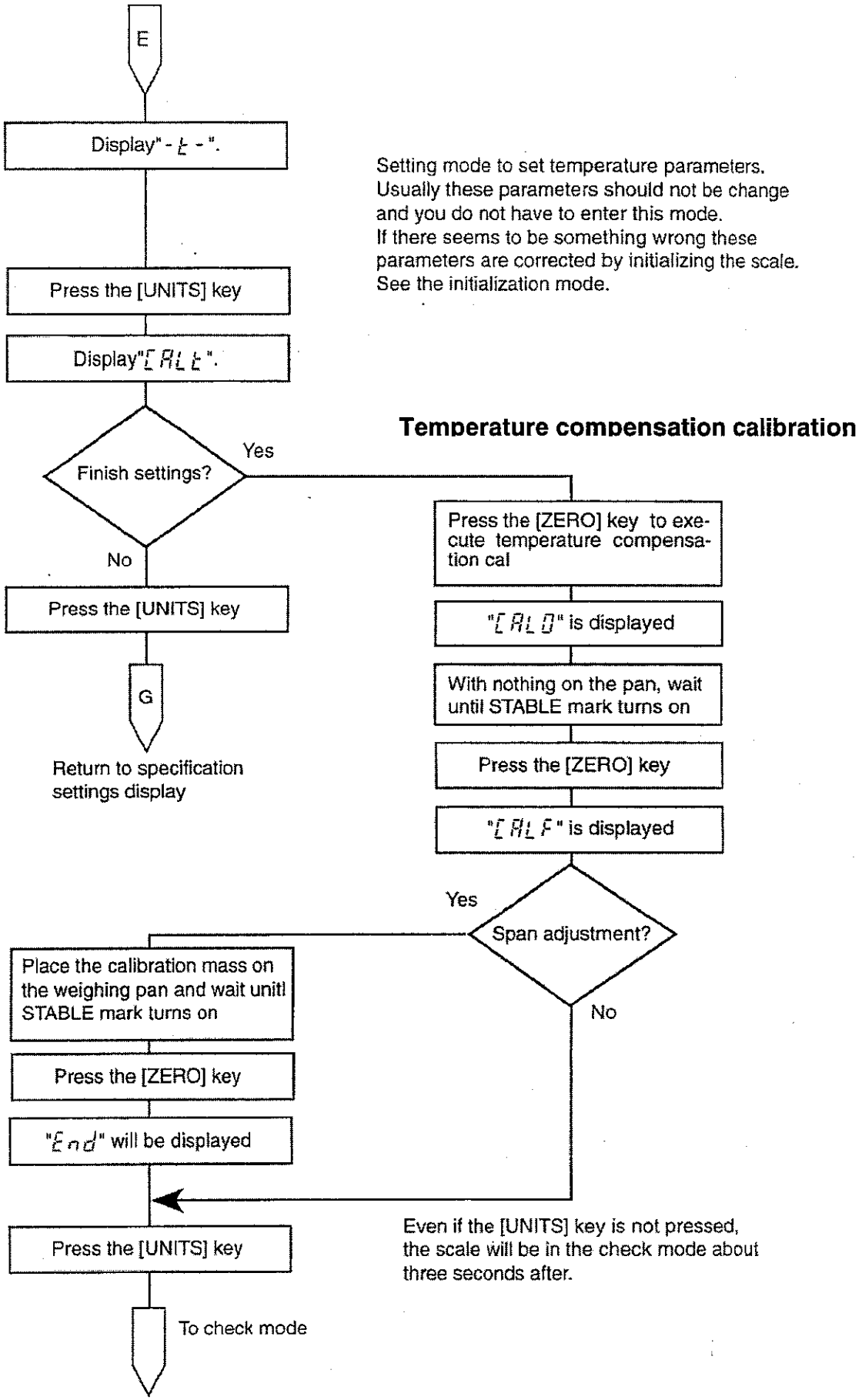
The capacity, weighing units, decimal point and temperature parameters are set in the setting mode.

1. While holding down the [UNITS] and [ZERO] keys, press the [ON/OFF] key to turn the power ON. The display will show CAL(or all segments will turn on).
2. Release the [UNITS] key but keep the.[ZERO] key pressed, and press the[UNITS] key twice. Then the dlsplay wlil show the CPU verslon"P-X.X."
3. Press the [UNITS] key twice, then the display shows "CAL" first and "AdJ" second.
4. If you go to the initialization mode, press the [UNITS] key.
5. To enter the setting mode, press and hold the [ZERO] key and press the [UNITS] key. Then the scale shows the setting mode.In this mode, capacity, weighing units, temperature parameters can be set and temperature calibration will be done.
6. To exit the setting mode, press [ON/OFF] to turn the power OFF.
   Once settings were changed, the temperature calibration should be done to exit this mode.

Setting mode (CPU Version. P-2.0 and later)



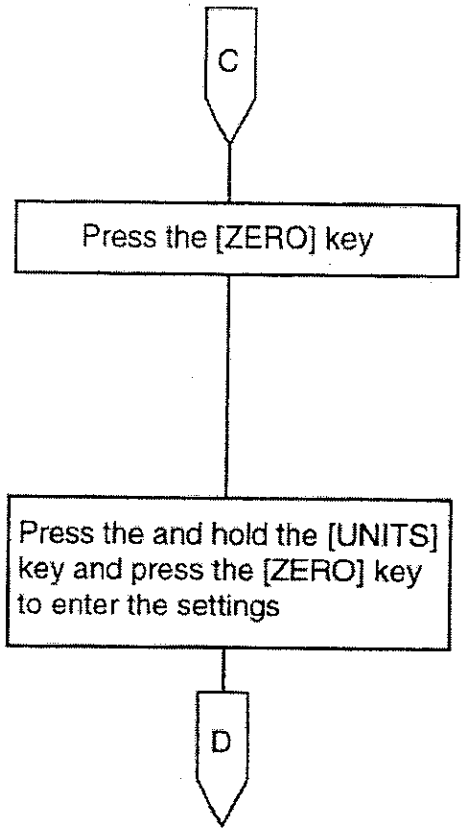
(CPU Version. P-2.0 and later)



Setting mode to set temperature parameters.
Usually these parameters should not be change and you do not have to enter this mode.
If there seems to be something wrong these parameters are corrected by initializing the scale.
See the initialization mode.

Even if the [UNITS] key is not pressed, the scale will be in the check mode about three seconds after.

Specification settings **(CPU version, P-2.0 and later)**



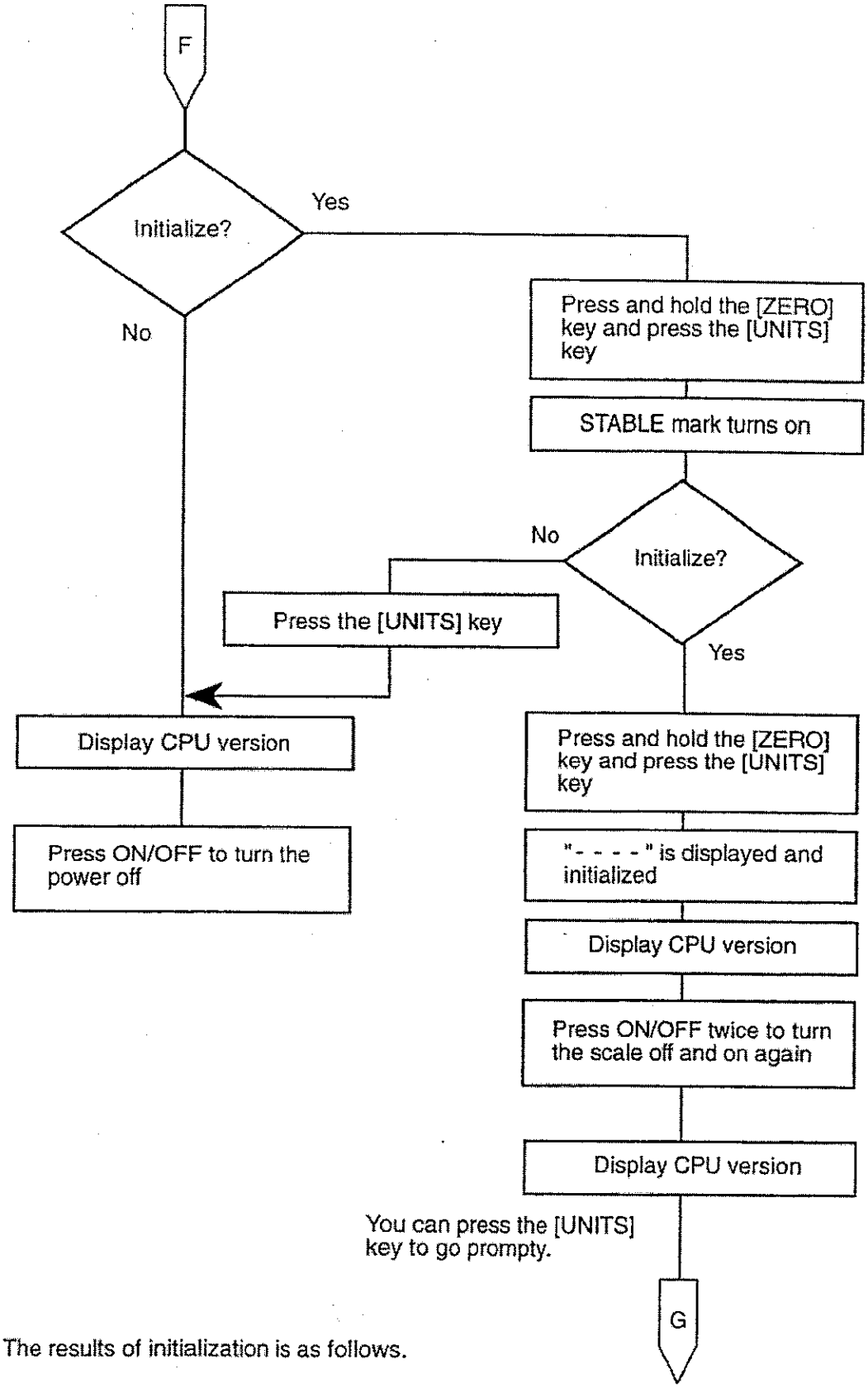
A decimal point appears to show selected digit. The value of selected digit is changed by the [ZERO] key. The [UNITS] key shifts the selected digit.
Refer to the table of model settings.

Model settings / SK-WP series

	(k)g only	lb, (k)g	Lb, (k)g T tael	Lb,(k)g HK tael
SK-1000WP	＊000	＊100	0400	0500
SK-2000WP	＊010	＊110	0410	0510
SK-5000WP	＊020	＊120	0420	0520
SK-10KWP	＊030	＊130	0430	0530
SK-20KWP	＊040	＊140	0440	0540

＊＝0 : Decimal point [.]
1 : Decimal point [,]
T :Taiwan
HK :Hong Kong

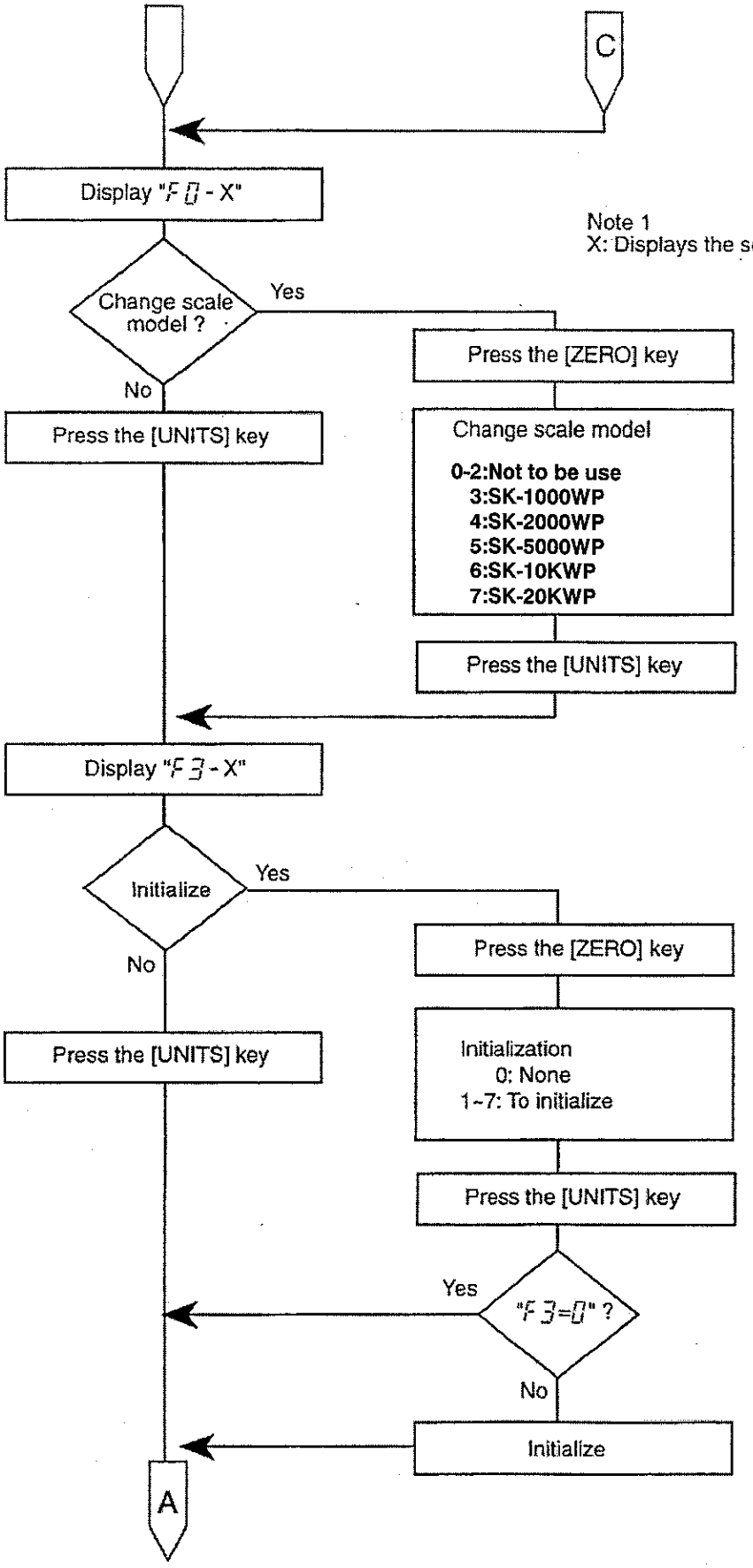
Initialization mod (CPU version, P-2.0 and later)



The results of initialization is as follows.

Specification settings : 0030
Gravitation setting : 9.798
Power-on zero range : 50% of capacity

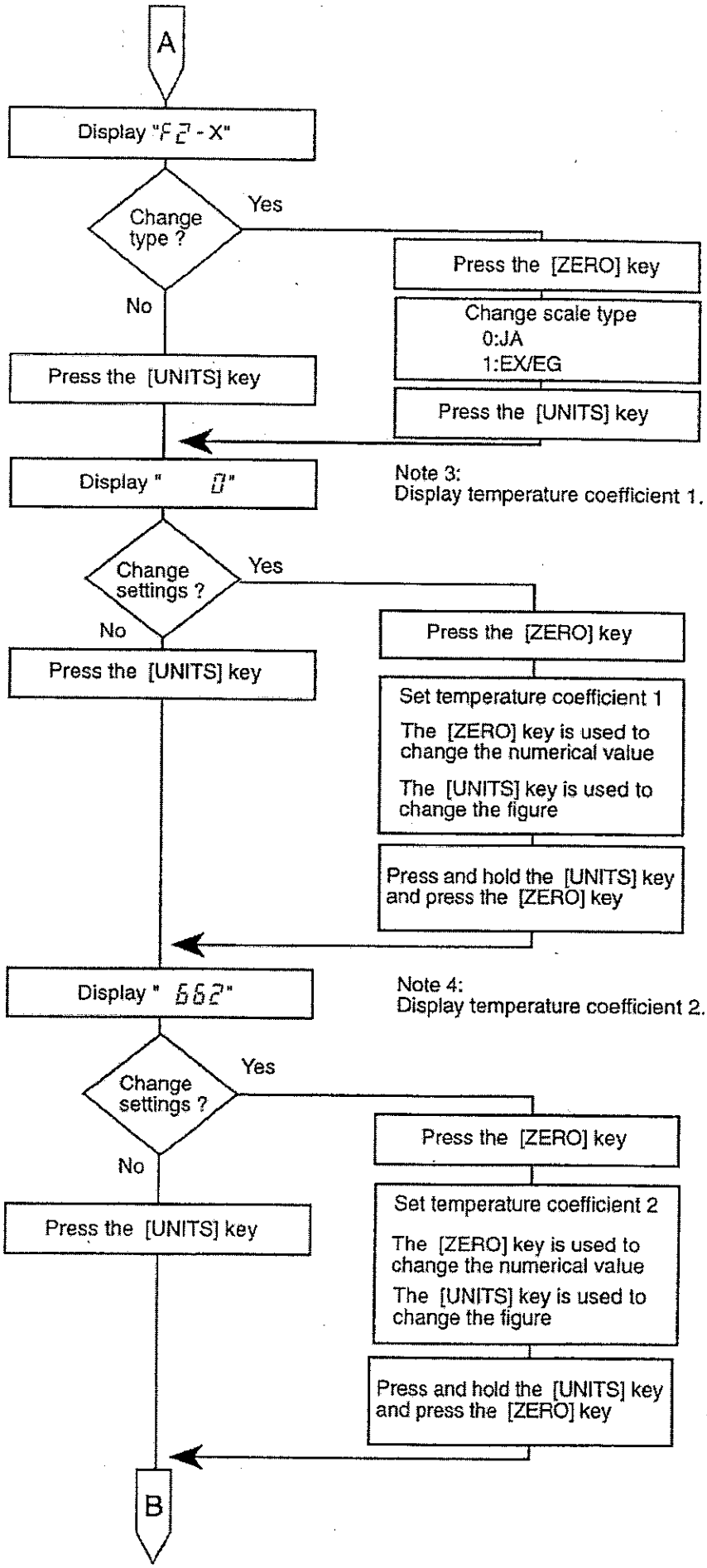
Setting mode(CPU version P-1.2)



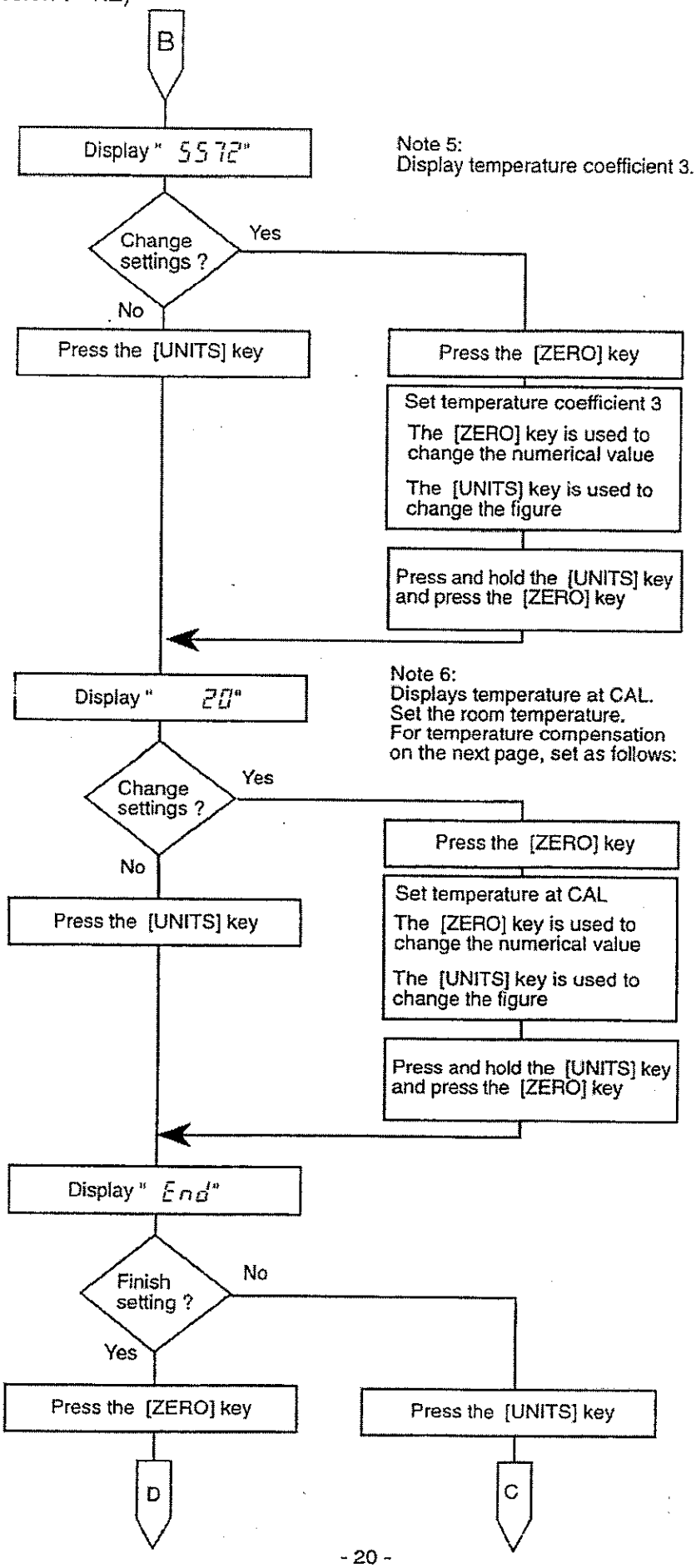
Note 1
X: Displays the set scale model.

Note 2:
Maintenance board has been initialized. With "F3=0", press the [UNITS] key.
Initialization will rewrite the gravitational acceleration and Initialized temperature coefficients.

(CPU version P-1.2)



(CPU version P-1.2)

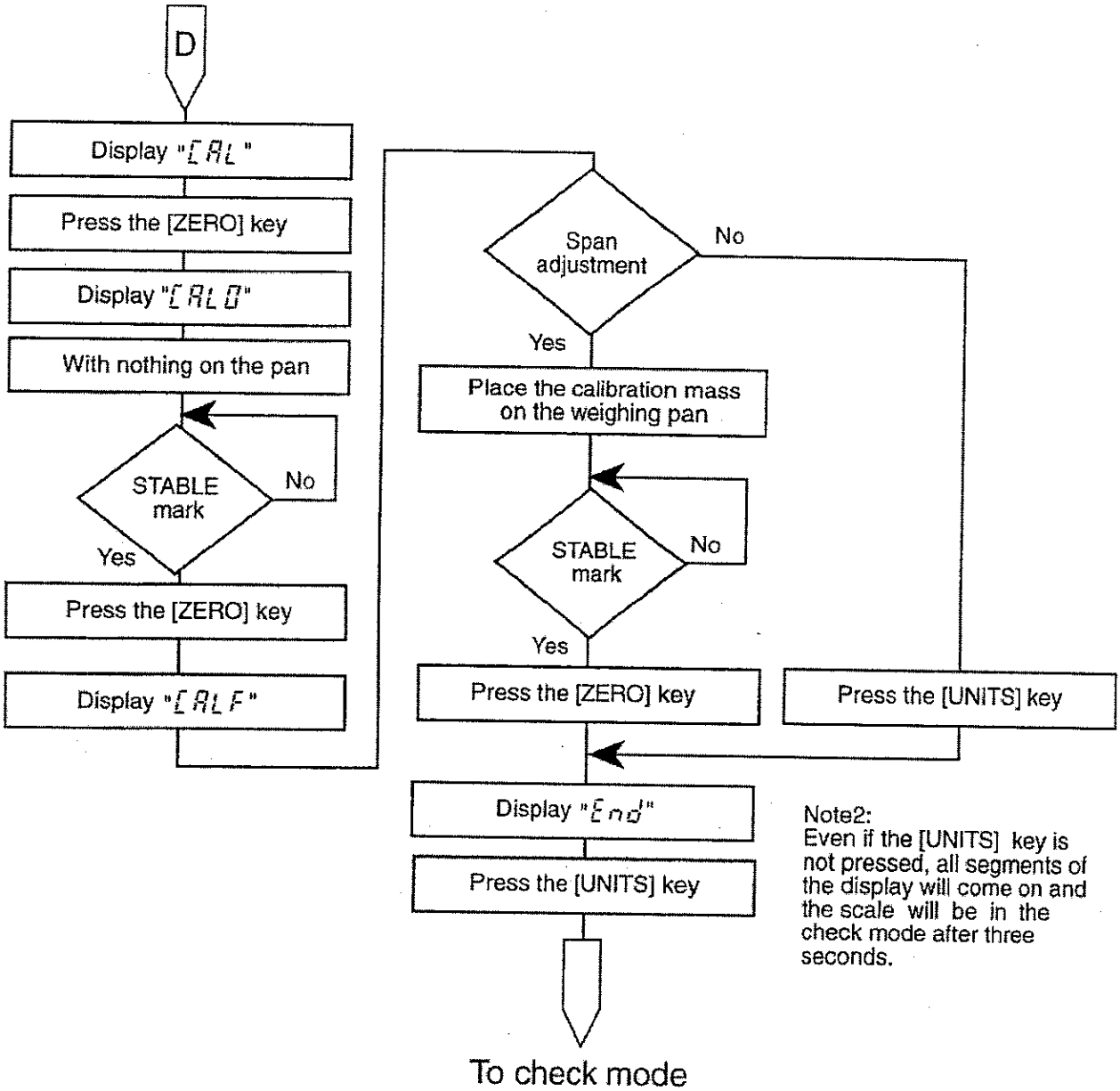


8.2. Temperature compensatilon

Perform temperature compensation and calibrate using a cetified weight when the settings are changed in the setting mode, or when the load cell or the main board is replaced.
Before temperature compensation, be sure to warm up the scale more than thirty minutes and set the temperature at CAL.

For CPU version P-2.0 and later, see the flow chart of setting mode.

Temperature compensation calibration(CPU version P-1.2)

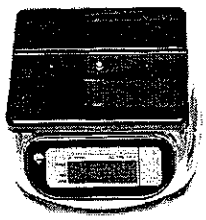


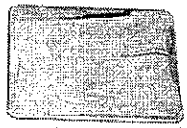
Note2:
Even if the [UNITS] key is not pressed, all segments of the display will come on and the scale will be in the check mode after three seconds.

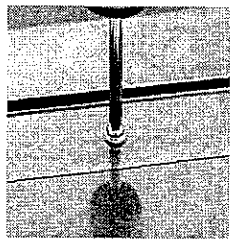
9. Disassembling

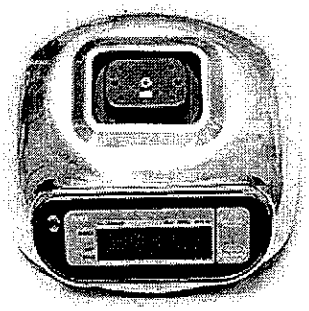
9.1. Disassembling the main unit

1 Remove the sus platform. Remove the screws securing the platform and remove the pla form.

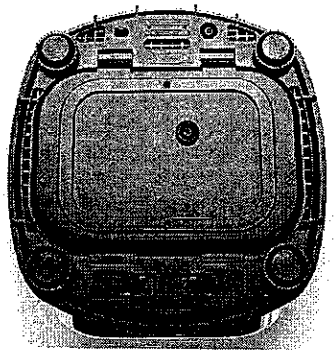


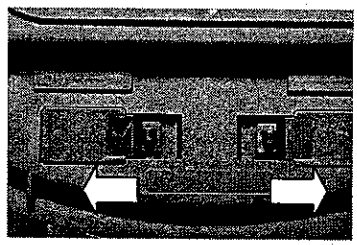


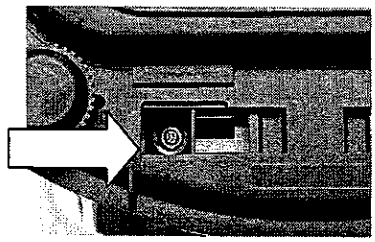




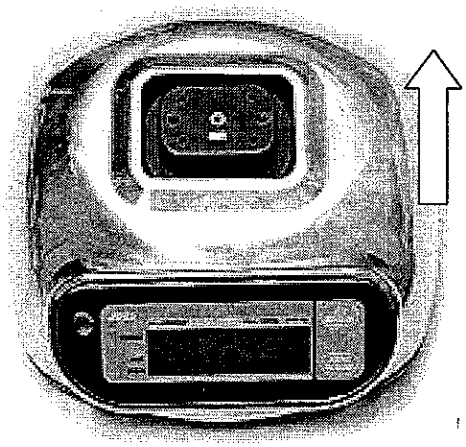
2 Place the main unit upside down. Open the cover. Remove the two screws as shown as in the figure at right.



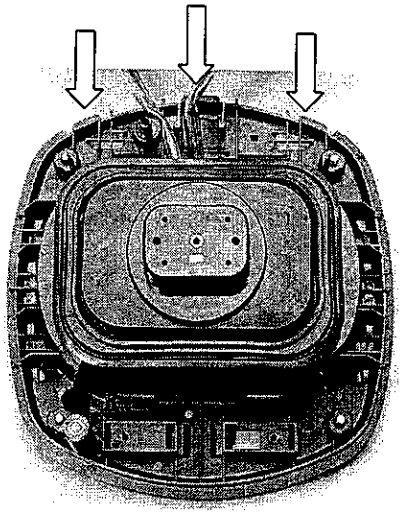




3 Place the main unit back in the normal position. Remove the cover as shown in the figure at the right. Lift the cover following as the arrows on the picture. Take the hook off that is shown on the picture in the following page. Then remove the cover.



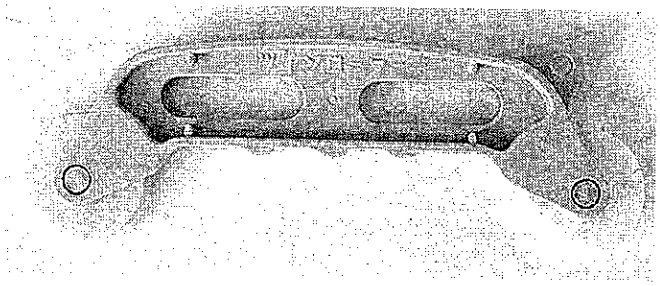
4 Remove the cover.



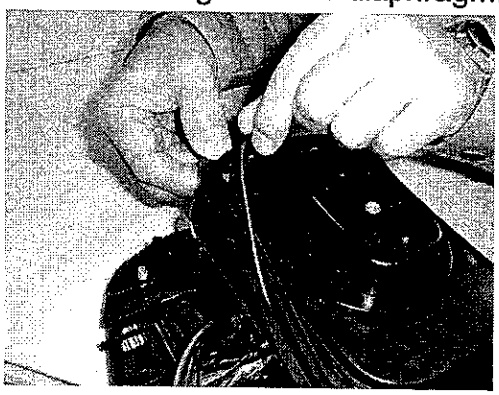
9.2. Removing the Diaphragm

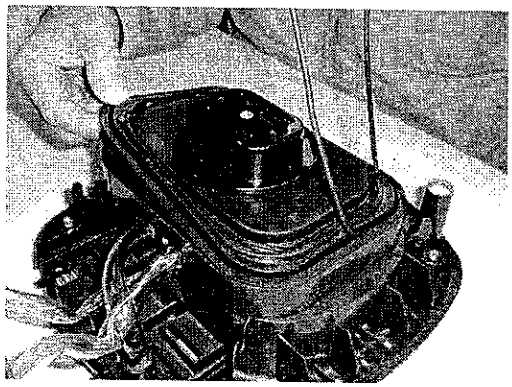
JIG

Removing the diaphgram, this JIG (picture as right) is needed

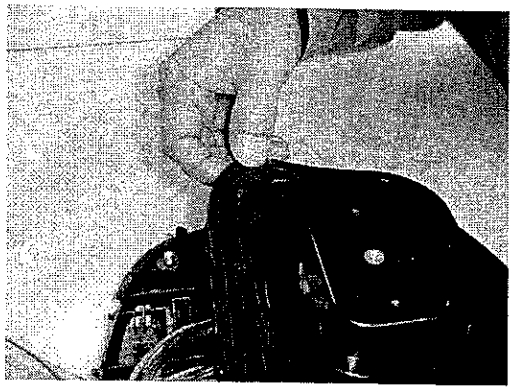


1 Remove the rubber ring from the diaphragm.

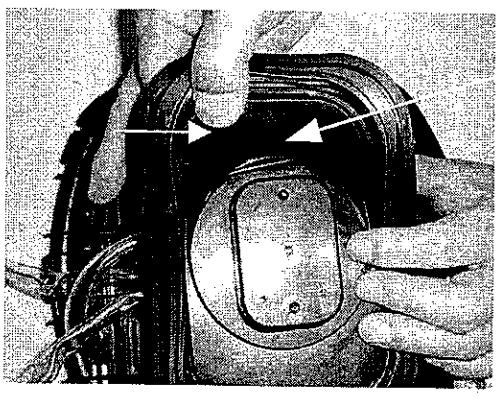


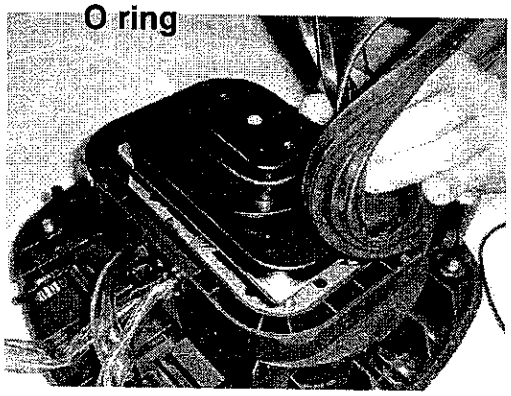


2 Lift the corner of the diaphragm to rised from case.



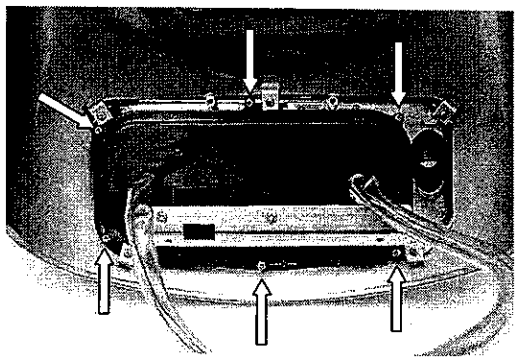
2 Hold the top of the diaphragm and pull it to remove. At this time take the O ring off together.
Attention: Please to not damage the thin part of the diaphragm.

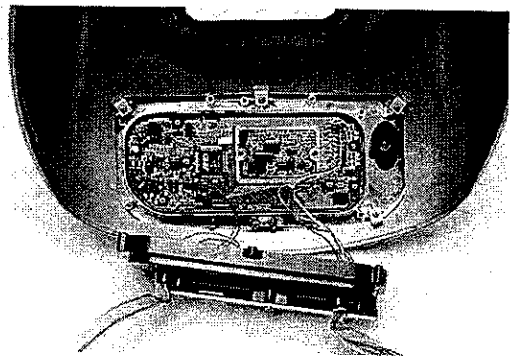




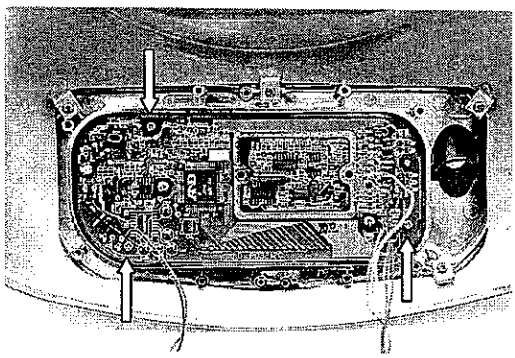
9.3. Remove the load cell unit

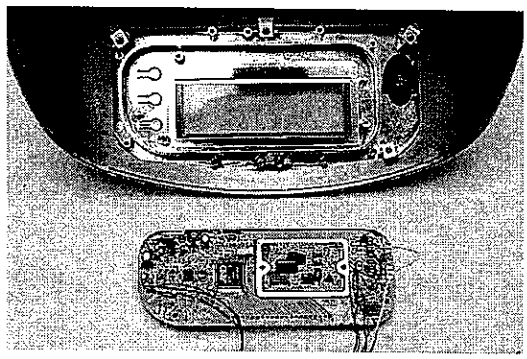
1 Remove these six screws that securing the under case. Then remove the under case with pay attention to scrach or get damage to key sheet and upper case.



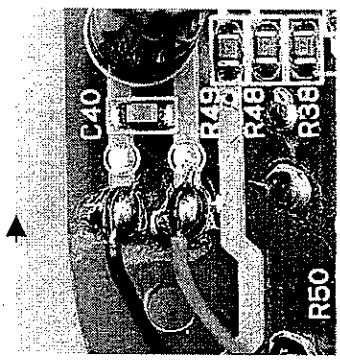


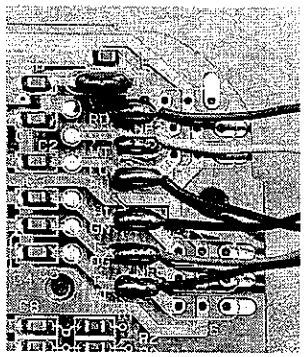
2 Remove these three screws that securing the display board. Then remove the display board.



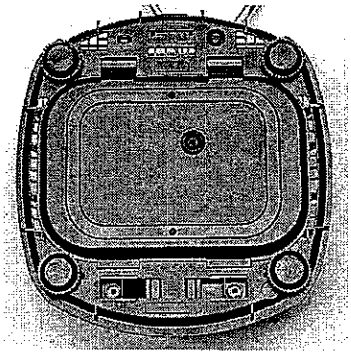


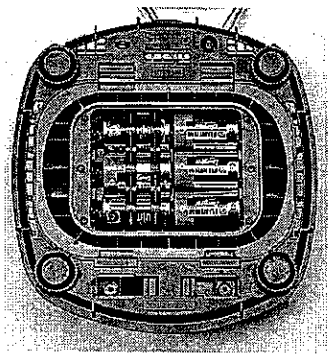
3 Remove these cables using the soldering iron.



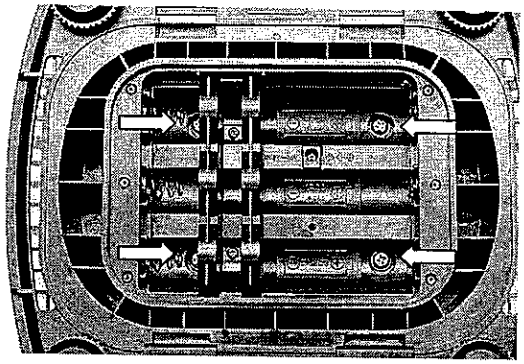


4 Place the main unit upside down. Then remove the battery cover and battery.

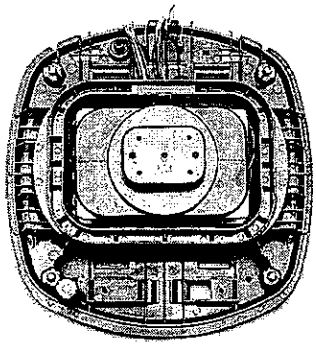


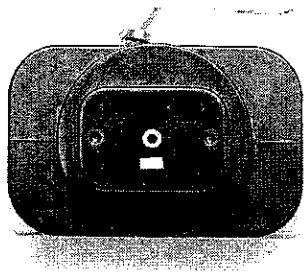


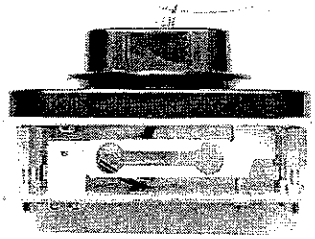
4 Remove these four screws.



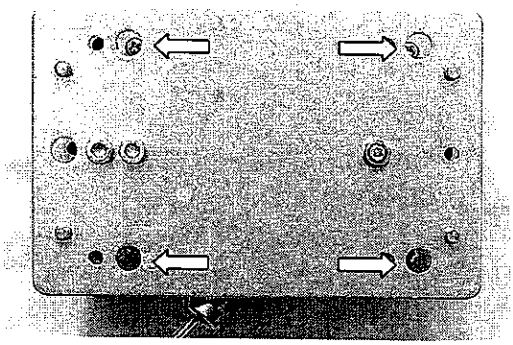
5 Place the main unit upside down again. Then remove the load cell unit.



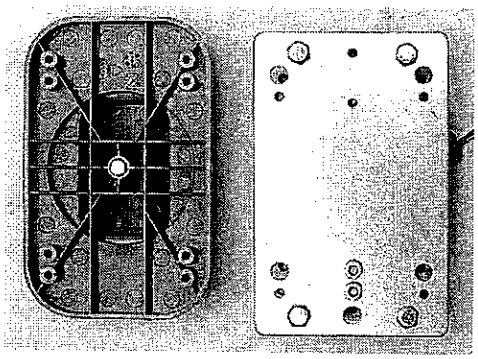




6 Place the load cell unit upside down. Then remove four screws.

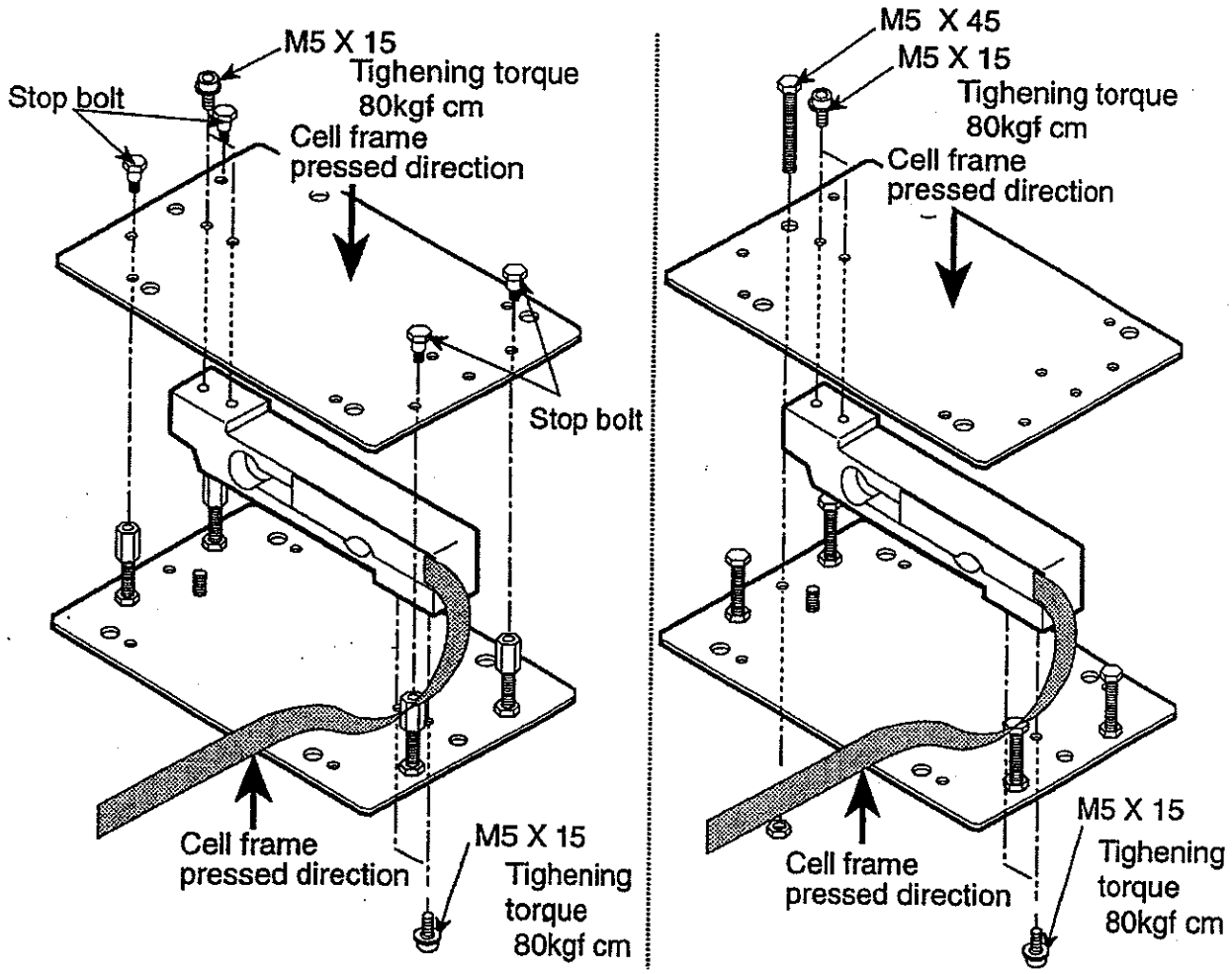


7 Remove the pan support.



10. Disassembling and replace the load cell unit

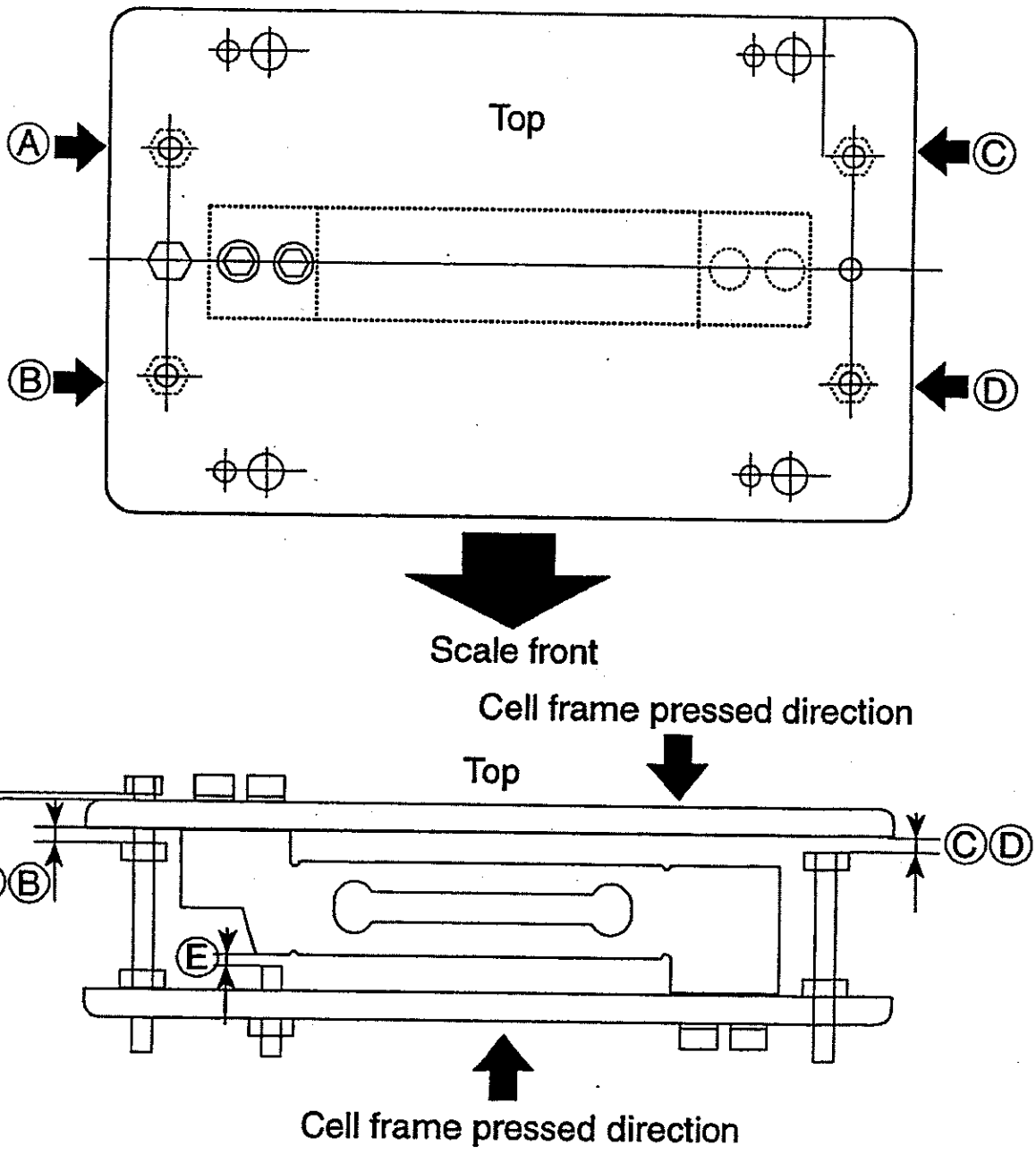
1. Remove the cell frame and replace the load cell as shown in the figre at the below. Fasten the load cell to the specified torque of 80kgf · cm.



SK-1000WP
SK-2000WP

SK-5000WP
SK-10KWP
SK-20KWP

2. After sttaching the load cell to the cell frames adjust the clealance between the bolts and the frames, refering to the figure and the tables at the below.



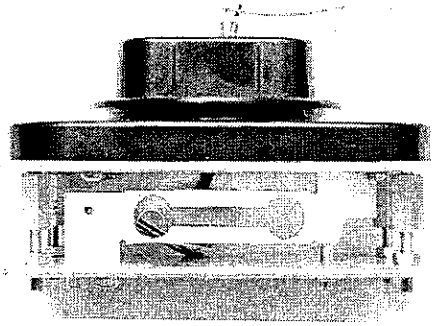
	A	B	C	D	E	F
SK-1000WP	0.6	0.6	0.6	0.6	0.3	
SK-2000WP	1.1	1.1	1.1	1.1	0.5	
SK-5000WP	0.8	0.8	0.8	0.8	0.4	0.5
SK-10KWP	1.2	1.2	1.5	1.5	0.5	0.5
SK-20KWP	0.9	0.9	1.2	1.2	0.5	0.5

(mm)

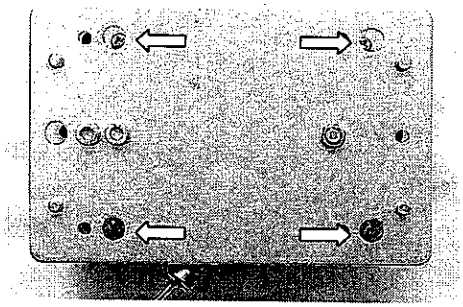
11. Assembling

11.1. Install the load cell unit

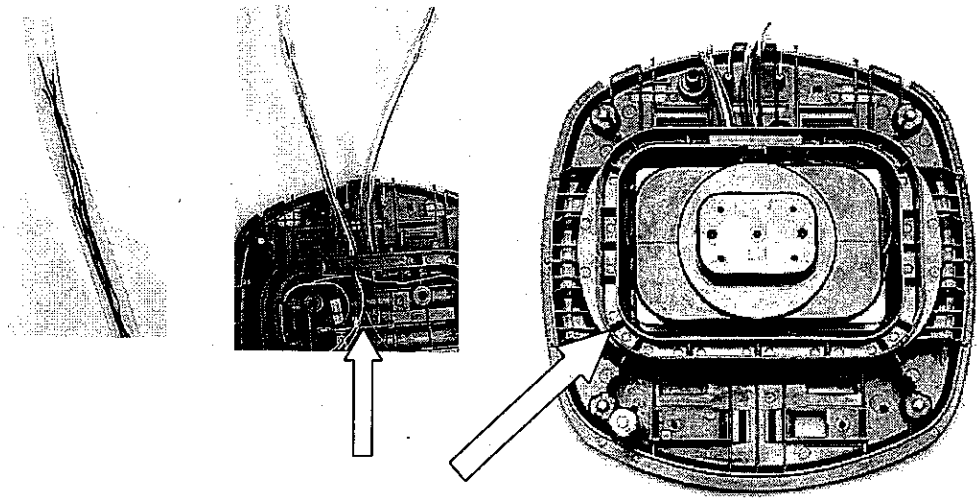
1 Place the pan support on the load cell unit.



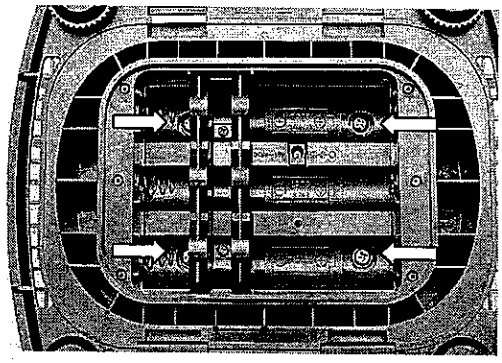
2 Fasten these four screws.



3 Then insert the cable from the load cell unit into the plastic tube. Place the load cell unit into the case. Do not place load cell unit on the any cables (as follows the arrows)

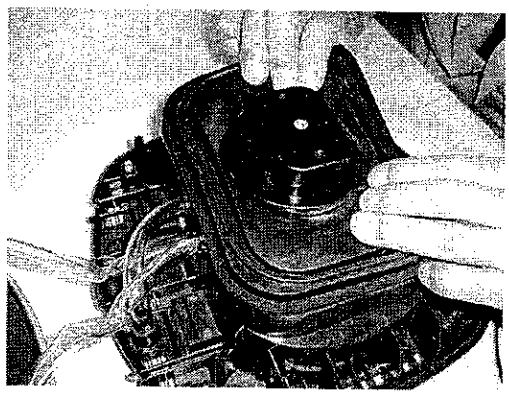


4 Place the case upside down. Then fasten these four screws.

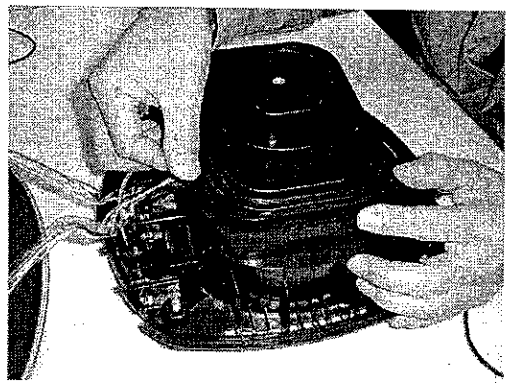


11.2. Attach the Diaphragm

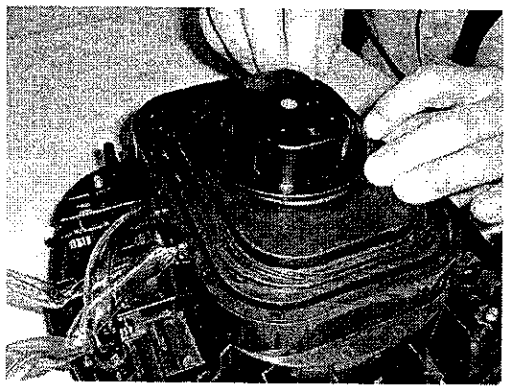
1 Attach the round part (center) of the diaphrgm to the gap of the pan support.

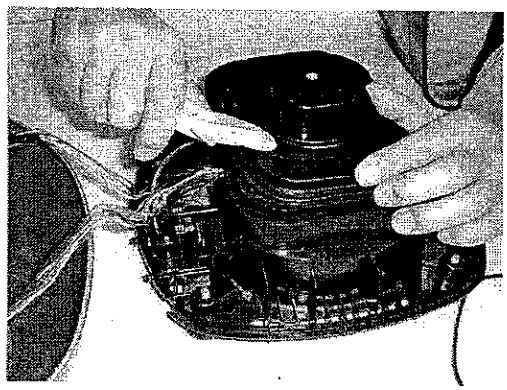


2 Attach the edge of the diaphragm the case.

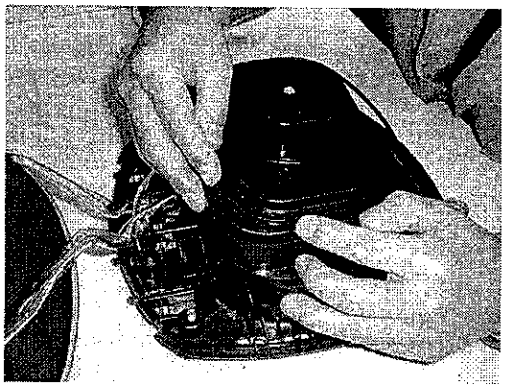


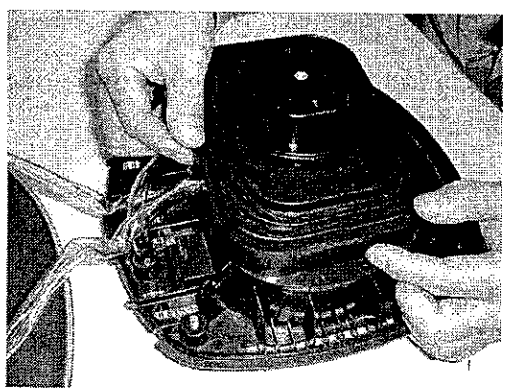
3 Attach the O-ring using the JIG.



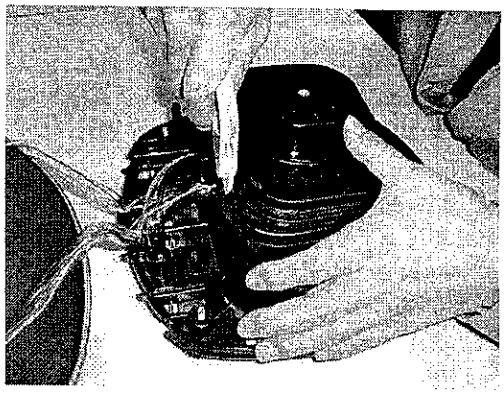


4 Attach the rubber cable to the gap to the diaphragm.

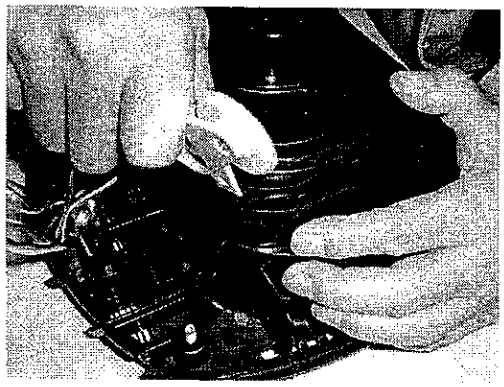




5 Insert the rubber cable using the JIG

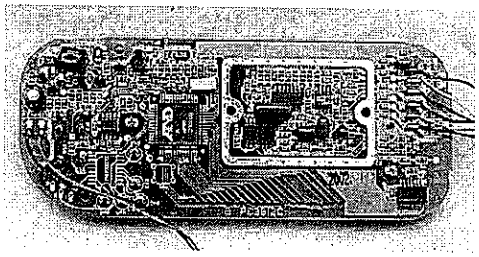


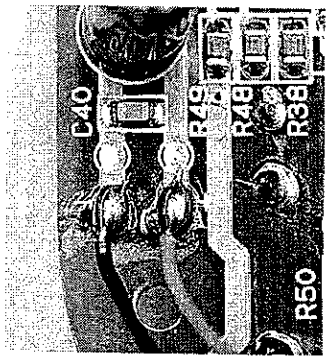
6 Insert the corner of the rubber cable by using JIG.

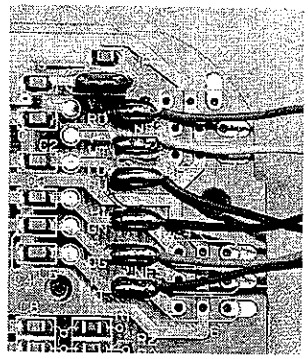


11.3. Assembling the main unit

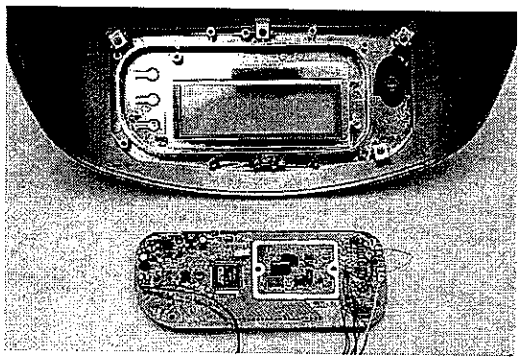
1 Attach the cables to the display board using soldering iron.

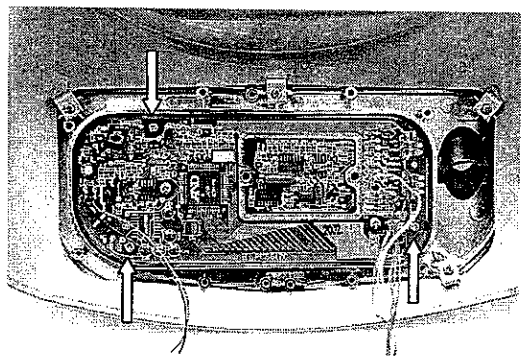




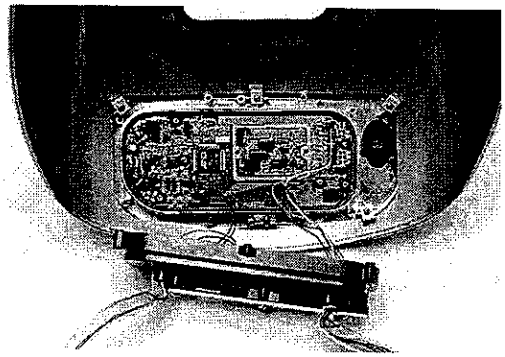


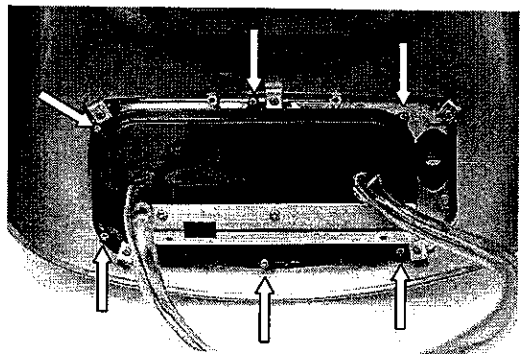
2 Attach the display board to the cover. Then fasten these three screws.



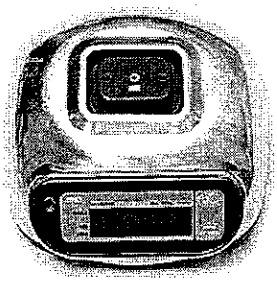


3 Attach the under case to the cover. Fasten these six screws.

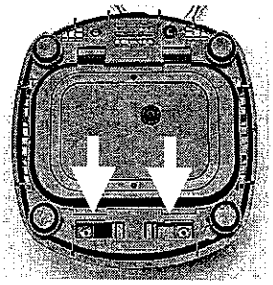


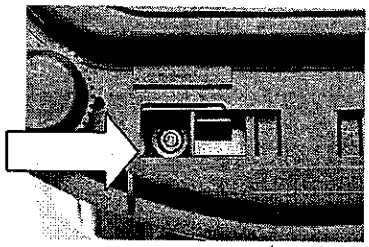


4 Place the cover on the main unit. Please make sure plastic tube is fixed on.

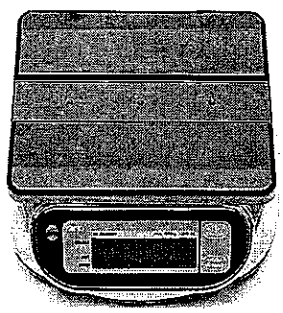


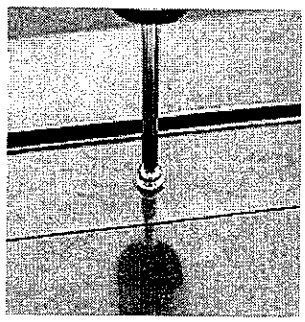
5 Place the main unit upside down. Fasten two screws.



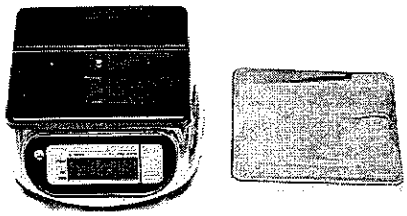


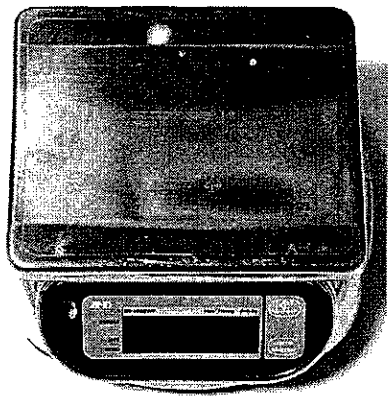
6 Place the platform on the main unit.
Fasten the screws.





7 Place the sus platform.

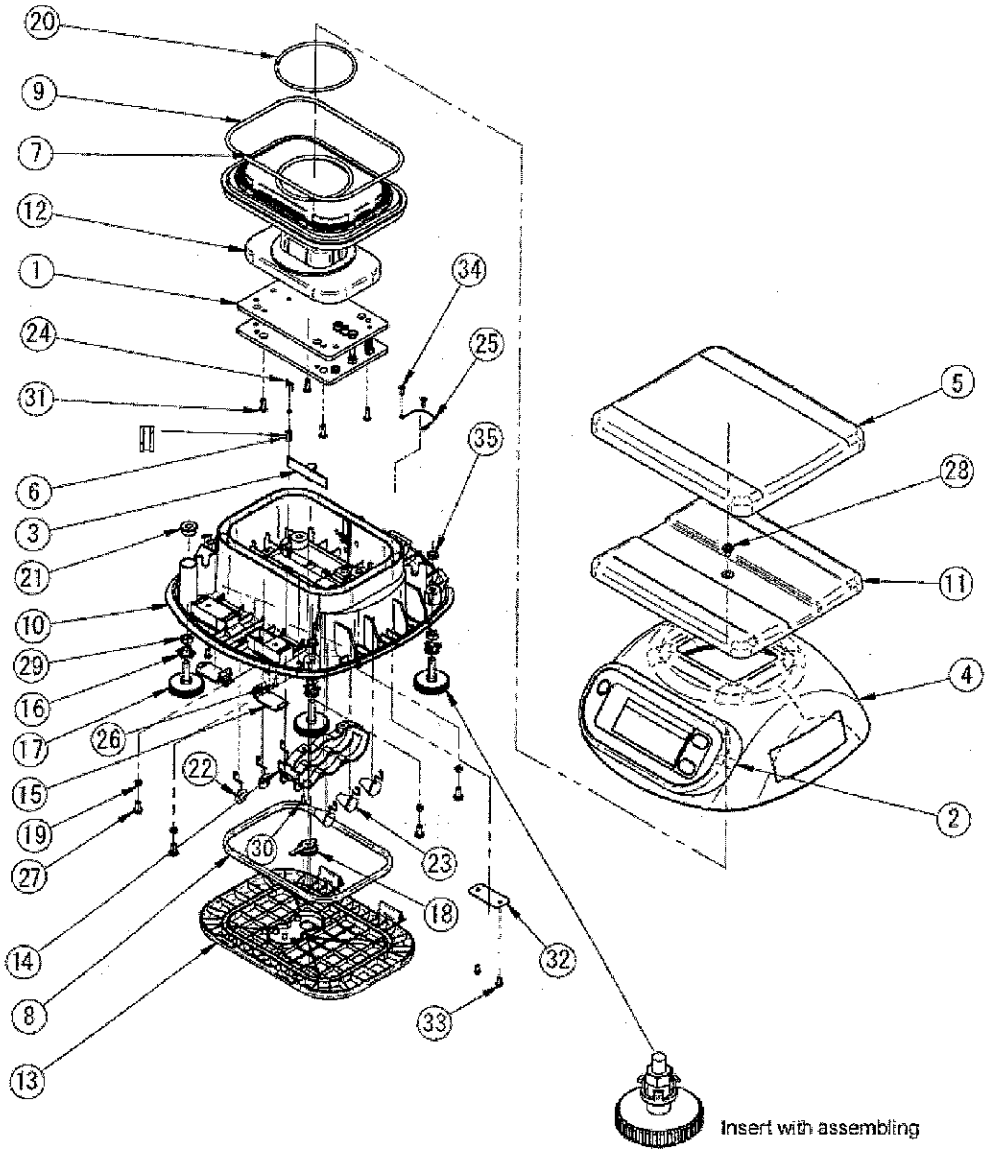




12. Specification

Model	SK-1000WP	SK-2000WP	SK-5000WP	SK-5001WP	SK-10KWP	SK-20KWP
Capacity	1000 g 2.2 lb	2000 g 4.4 lb	5000 g 11 lb	5000 g ---	10 kg 22 lb	20 kg 44 lb
Calibration Weight	1000g±0.1g	2000g±0.2g	5000g±0.5g	5000g±0.5g	10kg±1g	20kg±2g
Resolution	0.5 g 0.001 lb	1 g 0.002 lb	2 g 0.005 lb	1 g ---	0.005 kg 0.01 lb	0.01 kg 0.02 lb
Non-linearity	±1g	±2g	±4g	±4g	±0.01k g	±0.02kg
Repeatability	±0.5g	±1g	±2g	±2g	±0.005kg	±0.01kg
Span drift	±0.015% / °C TYP (5°C~35°C / 41°F~86°F)					
Display	25mm / 0.98inch, 7segment liquid crystal display					
Platform size	230mm(W) x 190mm(D) / 9.05in(W) x 7.48in(D)					
Dimensions	266mm(W) x 280mm(D) x146mm(H) / 10.48 in(W) x 11.03 in(D) x 5.75 in(H)					
Weight (approximately)	2.9 kg 6.4 lb					3.2 kg 7.1 lb
Power	6 x R20P / LR20 / "D" size batteries or AC adapter					
Battery life	Approximately 600 hours with manganese type cells, 1200 hours with alkaline cells at 20°C / 68°F					
Operating temp.	-10°C~40°C / 14°F~104°F, Less than 85%RH					
Accessories	This manual					
Options	AC adapter					

13. Exploded view SK-WP series



No.	Parts No.	Description	数量	備考
1		Load cell unit	1	
2		Display unit	1	
3	PZ:3812 (PC3813)	Power supply unit	1	
4	04:1000195	Cover	1	
5	04:4004099	Sus platform M	1	
6	05:4008667	Hexagon spacer	1	
7	06:2000631	Diaphragm	1	
8	06:3005111-1	Paking A	1	
9	06:4012571A	Rubber code	1	
10	07:1000197A	Case	1	
11	07:1000198A	Platform	1	
12	07:2000632	Pan support	1	
13	07:2000638	Battery cover	1	
14	07:3005110	Battery keeper	1	
15	07:4011071	CAL plate	2	
16	07:4011265	Nut cap	4	
17	07:4011266A	Adjuster foot	4	
18	07:4012375	AC cap	1	
19	10:13823095030	Spacer D5X3	4	
20	10:G70	O ring	1	
21	10:MR14		1	
22	15:4003492A	Battery spring (+)	3	
23	15:4003493A	Battery spring (-)	3	
24	15:4012451	Pin	1	
25	15:4012732A	Contact spring	1	
26	17:02SX-L3X8	M3X8 SUS	2	
27	17:02FN-S5X10	M5X10	4	
28	17:02SX-S5X10	Tapping pan head screw 5X10	1	
29	17:03-11-SX6	Hexagon nut M6 SUS	4	
30	17:14FZ-B3X8	Tapping pan head screw 3X8	2	
31	17:14FZ-B4X12	Tapping pan head screw 4X12	4	
32	07:4012454	Blank plate	1	
33	17:14SX-B3X6	Tapping pan head screw 3X6 SUS	2	
34	17:14SX-B3X8	Tapping pan head screw 3X8 SUS	2	
35	17:03-21-DX6	Volume nut M6	4	

Model	SK-WP Series
	Exploded view 2/2
Drawing No.	QD-AS3-001177F-2/2

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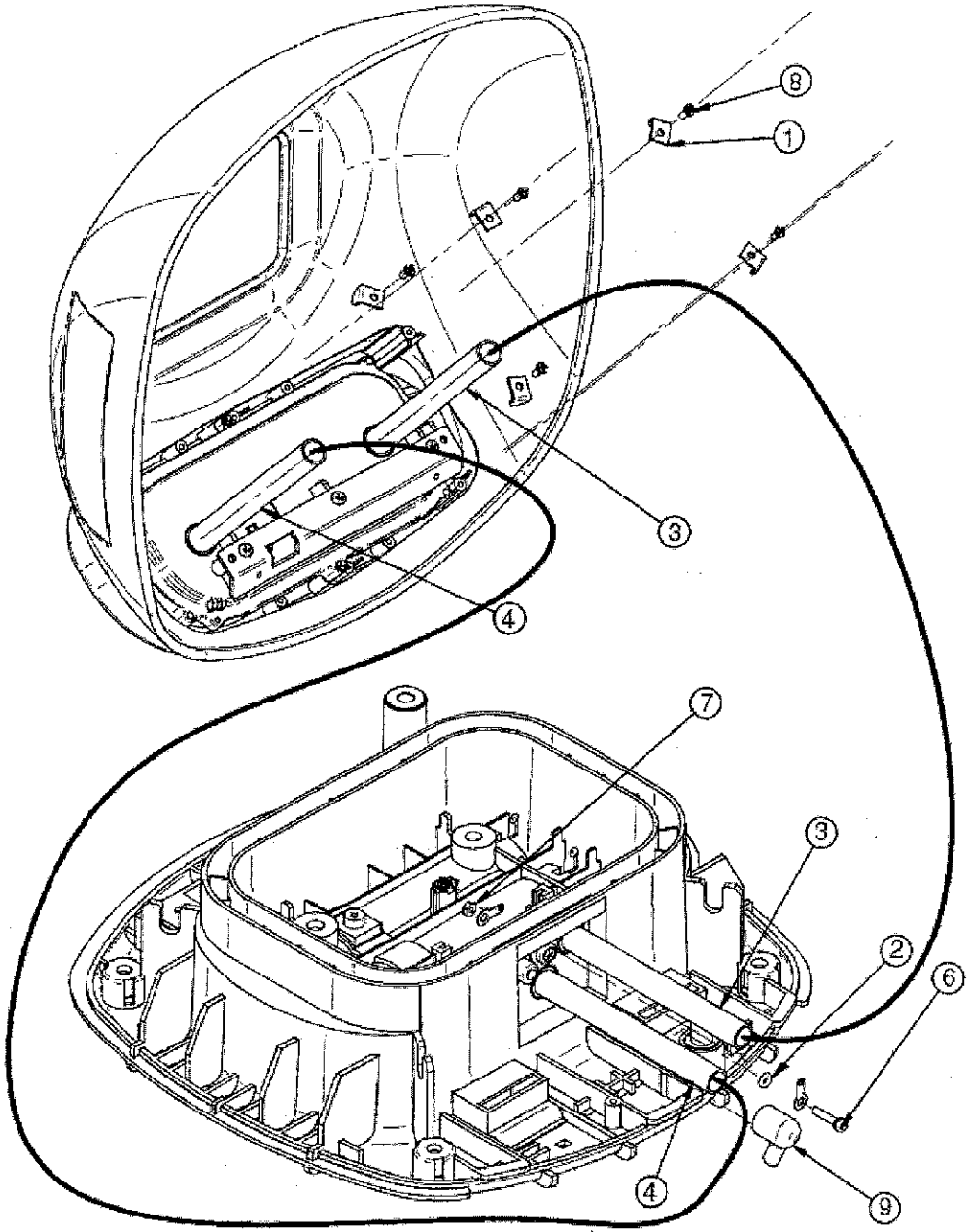

No.	Parts No.	Discription	Q'ty
1	04:4011605A	ANGLE	5
2	10:P3	O ring	1
3	16:4012569A	Plastic tube A	1
4	16:4012569A	Plastic tube A	1
6	17:02SX-L3X15	+ナベWセル(大)M3 X15	1
7	17:03-11-FZ3	Hexagon nut M3	1
8	17:14SX-2.6X6	Tapping Pan head screw 26X6 SUS	5
9	07:4013762	ELBOW	1

Model	SK-WP Series
	Exploded view 1/2
Drawing No.	QD-AS3-001177F-1/2

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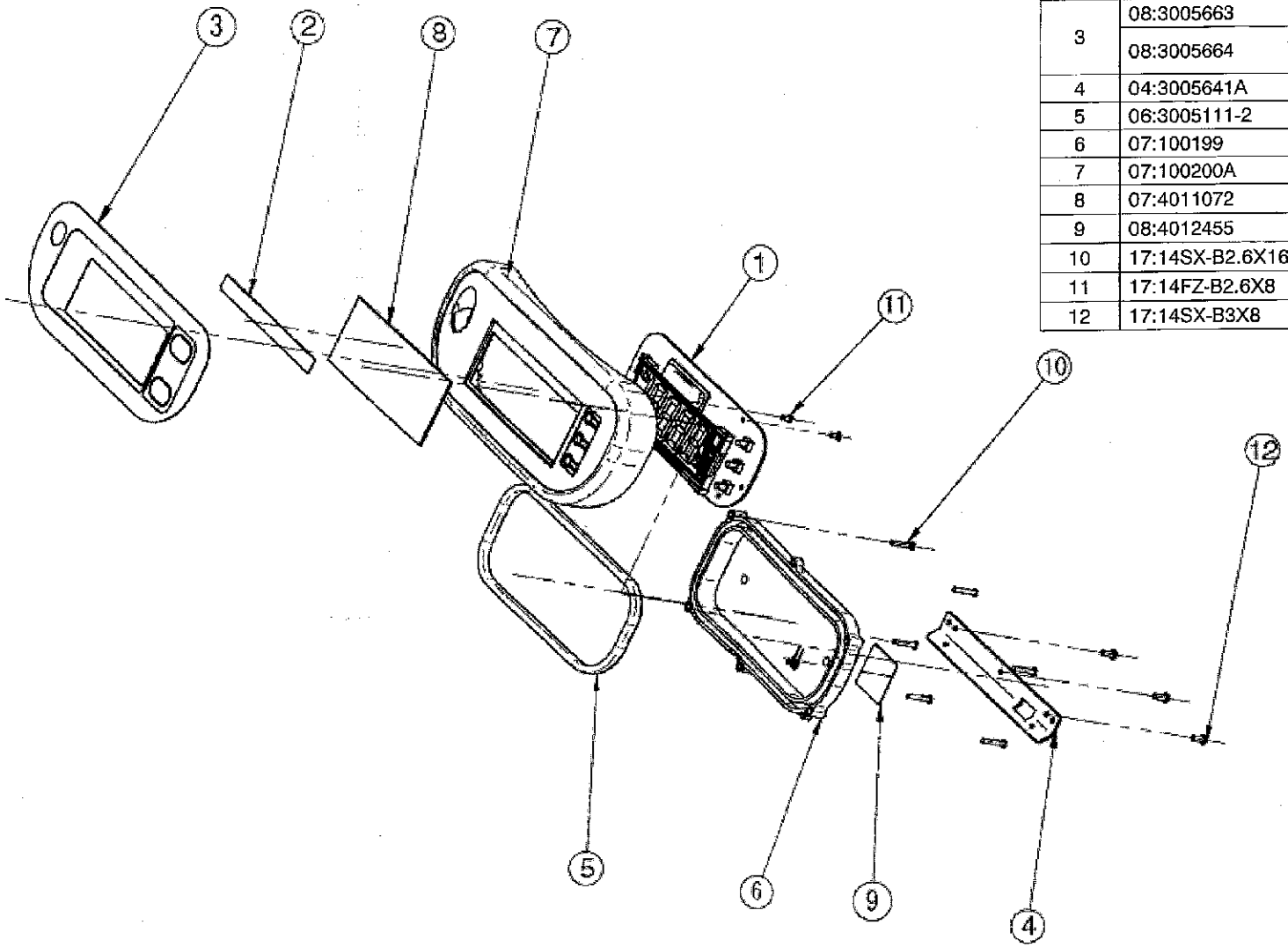

No	Parts No.	Discription	Q'ty
1		Main board	1
2	08:3005736-6	Model seal SK-1000WP	1
	08:3005736-7	Model seal SK-2000WP	
	08:3005736-8	Model seal SK-5000WP	
	08:3005736-9	Model seal SK-10KWP	
	08:3005736-10	Model seal SK-20KWP	
	08:3005736-11	Model seal SK-5001WP	
3	08:3005663	Key sheet (ON/OFF, RE-ZERO)	1
	08:3005664	Key sheet (ON/OFF, RE-ZERO, UNITS)	
4	04:3005641A	Fix angle	1
5	06:3005111-2	Packing-B	1
6	07:100199	Under case	1
7	07:100200A	Upper case	1
8	07:4011072	Filter	1
9	08:4012455	CAL key sheet	1
10	17:14SX-B2.6X16		6
11	17:14FZ-B2.6X8		3
12	17:14SX-B3X8		3

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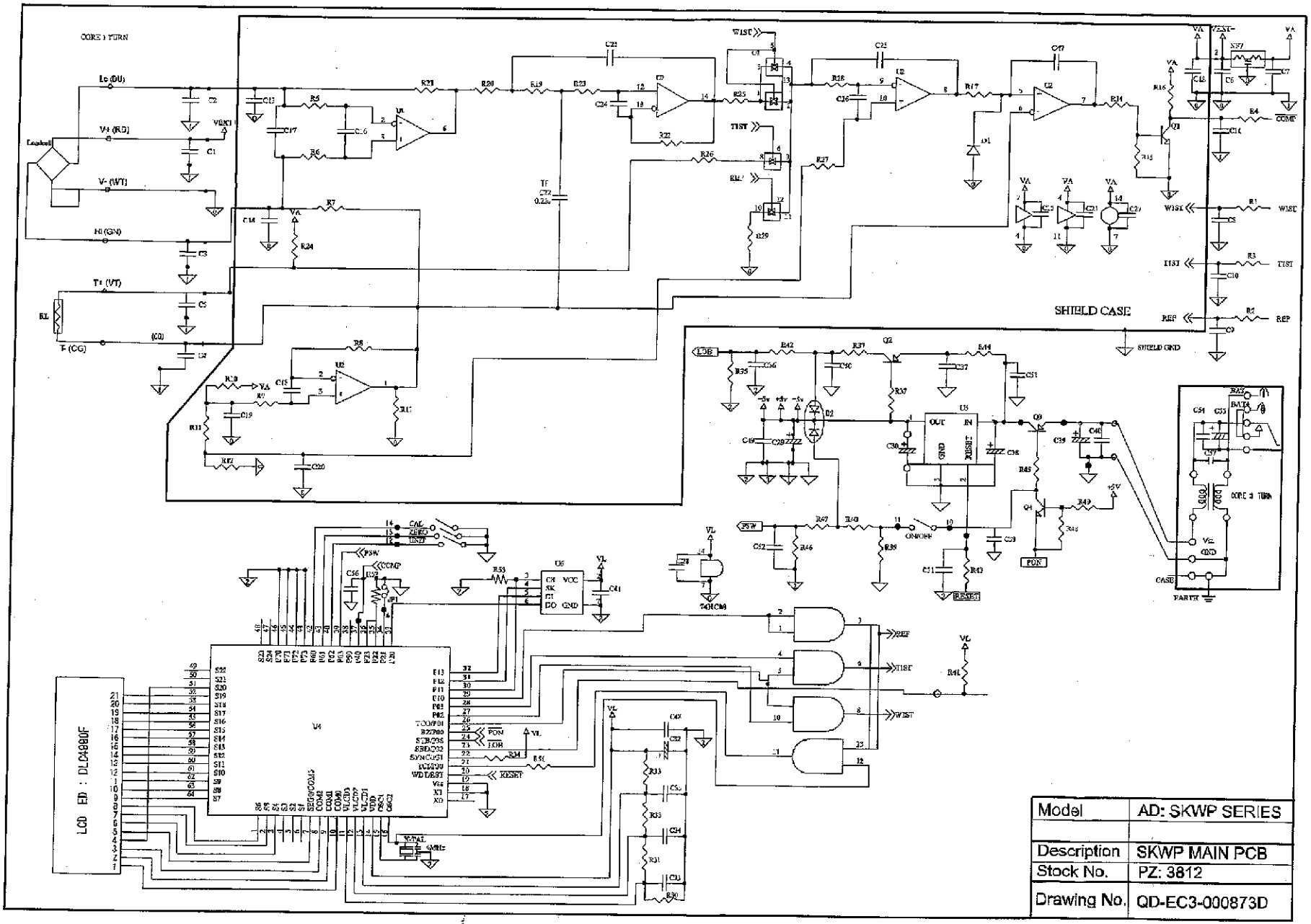
14. Schematic diagrams (Main board)



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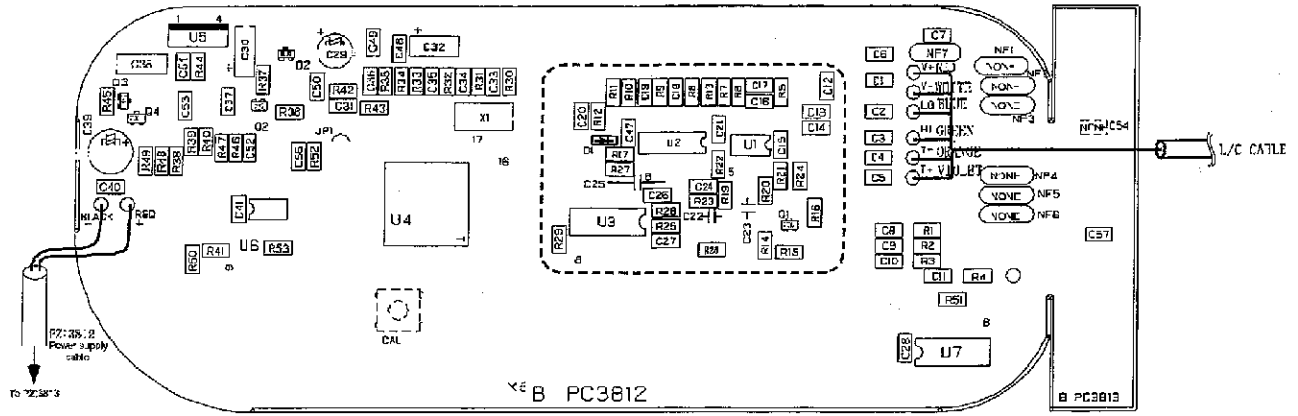
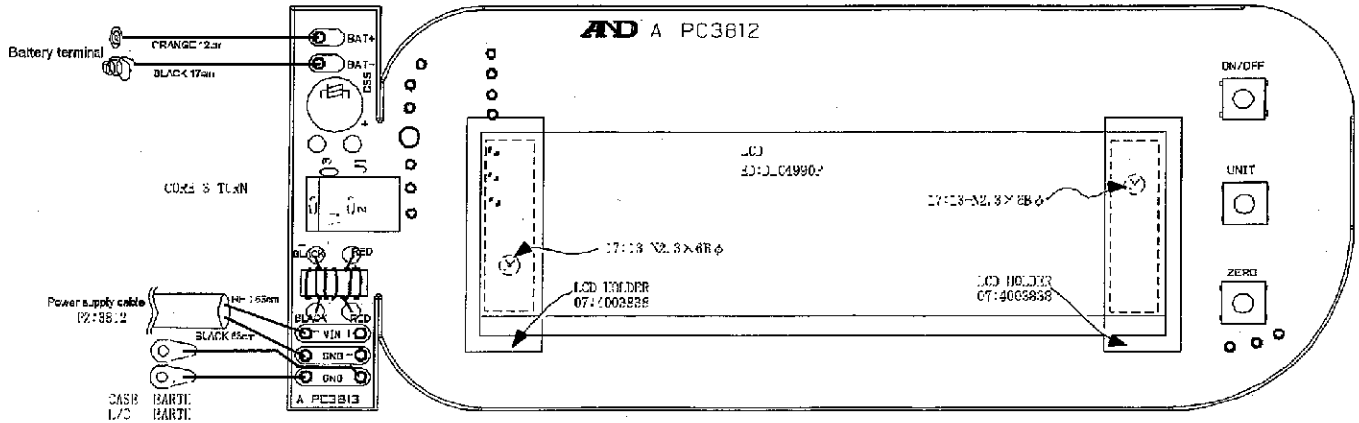
15. Parts location (Main board)





Model	AD:SK-WP Series
Description	SK-WP PCB
Stock No.	PZ:3812
Drawing No.	QD-KZ3-000649

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16. PZ3812 Parts list

No.	Stock No.		Lot
C47	CC	10P-C	1
C1-6, 13, 14, 17, 37, 40, 49, 50-53, 57	CC	0.01U-C	17
C7, 12, 15, 21, 27, 28, 31, 33-35, 41, 48	CC	0.1U25V-C	12
C8-10, 11, 16, 18-20, 24, 26, 36, 56	CC	100PC	12
C38, 32, 38	CT	1V010-C	3
C29	CK	SME25VB22	1
C39	CK	SME35VB47	1
C22, 23	CM	V1H224JL2-T	2
C25	CP	P1H473JZ	
R1-3, 5, 6, 8, 9, 22, 23, 27, 28	RC	1/10W 101J	11
R45	RC	1/10W 271J	1
R42, 47	RC	1/10W 681J	2
R4, 17, 43, 44, 50-52	RC	1/10W 102J	7
R13	RC	1/10W 272J	1
R36, 40	RC	1/10W 472J	2
R38, 39	RC	1/10W 822J	2
R15, 31-33, 49	RC	1/10W 103J	5
R35	RC	1/10W 153J	1
R30	RC	1/10W 183J	1
R14, 37, 46	RC	1/10W 273J	3
R16, 34, 41, 48, 53	RC	!/10W 563J	5
R19, 20	RC	1/10W 1003F	2
R12	RF	2125-243D25	1
R7, 10, 21	RF	2125-303D25	3
R26	RF	2125-473D25	1
R25	RF	2125-683D25	1
R29	RF	2125-104D25	1
R11	RF	2125-122D25	1
R24	RF	2125-472D25	1

No.	Stock No.		Lot
D1	DI	MA729	1
D2	DI	ISS184-C	1
Q1, 4	QT	C2712Y-C	2
Q2, 3	QT	A1162Y-C	2
U1	UA	OP07CS8	1
U2	UA	C324G	1
U3	UC	HC4066F	1
U7	UC	HC08F	1
U4	UC	MN150813-AN	1
U6	UC	S-2914AIF10	1
U5	UR	C2255H	1
	PC	3812C	1
	ED	DLC4990P	1
	07	4003838	2
	17	13-B2.3X6B0	2
	XT	EF0EC4004T3	2
	SK	SKHHAN	4
NF7	NF	EXCEMT103DT	1
J1	EJ	0470-01-230	1
	LR	BFR120507	1
	KB	1-026011RD44	1
	KB	1-026011BK44	1

17. Cable List

Description			Stock No.	Q'ty
	Battery spring (+)		15:4003492	3
	Battery spring (-)		15:4003493	3
	Contact spring		15:4012732A	1
V+	Main PCB – PC3813	RED	KB1-026063 RD44	1
GND	Main PCB – PC3813	BLACK	KB1-026063 BK44	1
EARTH	Load cell unit	BLACK	KB1-026005 BK44	1
EARTH	CASE GND	BLACK	KB1-026008 BK44	1
EARTH	CASE GND	BLACK	KB1-026012 BK44	1
BAT		ORANGE	KB1-026022 OG44	2
VBAT+		ORANGE	KB1-026012 OG44	1
VBAT-		BLACK	KB1-026017 BKK44	1
	Load cell cable core		LRBFR120507	1

18. Load cell unit and Main PCB

MODEL	LOAD CELL	MAIN PCB	
SK-1000WP	LC:121-2000WP	PZ:3812 (Main board + Power supply board)	
SK-2000WP			
SK-5000WP	LC:121-10KWP		
SK-10KWP			
SK-20KWP	LC:121-20KWP		

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