# Digital Scale

# MAINTENANCE MANUAL

FS-6K*i*
FS-15K*i*
FS-30K*i*

A&D Company, Limited

1WTPD4001514

# Contents

# 1. Introduction

The model name of this manual corresponds.

## 1.1 Outline of Products

The FS-i scales are based on the principal of detecting a weight using a load cell transducer. A load cell has strain gages bonded to its surface to detect a small change of strain. When a mass is placed on the weighing pan that is attached to the load cell, the force generated by a mass causes a small change of strain in the load cell. The change is transmitted to the strain gages and the resistance of strain gages changes its value. This small change of the resistance is converted to the voltage signal that is directly proportional to the force. The voltage is amplified and sent to an analog to digital converter to be digital value. The microprocessor calculates the weight value and shows it on the display.

## 1.2 Models

FS-i Series

| | |
|---|---|
| FS-6Ki | Max = 6kg, d = 0.002kg / 0.001kg / 0.0005kg |
| FS-15Ki | Max = 15kg, d=0.005kg / 0.002kg / 0.001kg |
| FS-30Ki | Max = 30kg, d=0.01kg / 0.005kg / 0.002kg |

## 1.3 About this manual

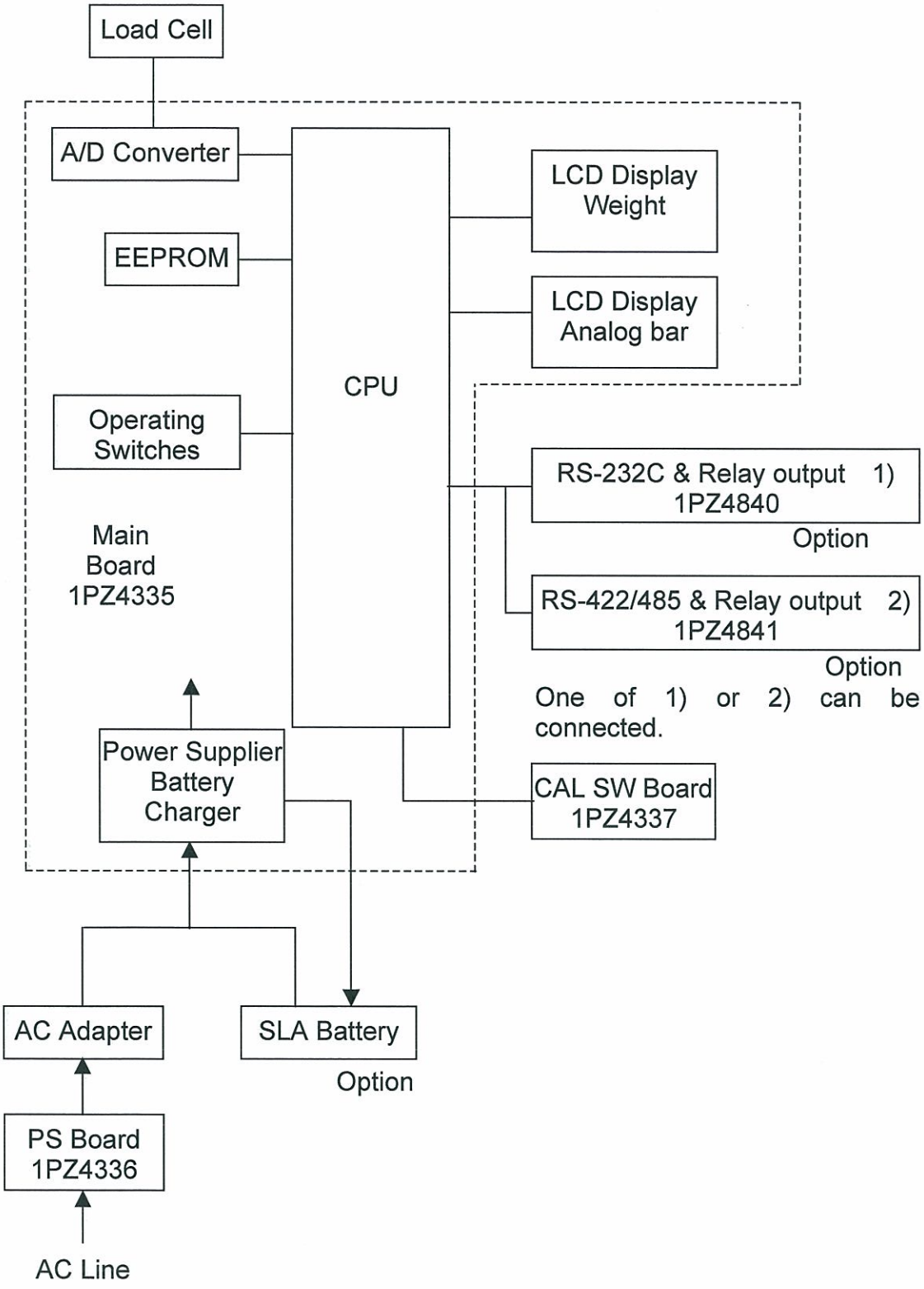
Every care has been taken during the manufacturing process of this scale to ensure that it will perform accurately and reliably for many years.

The intent of this manual is to make maintenance as easy as possible for you with a step-by-step guide through the in's and out's of the scale, or related products. Please let us know if it has accomplished the just stated goal - what works, what doesn't, and what we might have left out. We ask that you read through the entire owner's Instruction Manual, and this maintenance manual before starting any work.

When a customer has a problem, make sure that: the Best Conditions for Weighing, have been met, the scale has been calibrated and adjusted correctly, and the power is connected correctly. Next, look at the Fault Finding section, and the various flow charts.

*Keep your work area clean, remember how something came apart, and, always calibrate the scale after you have worked on it.*

# 2. Block Diagrams



# 3. Gravity acceleration correction

When the scale is first used or has been moved to different place, it should be calibrated using a calibration weight.
But if a calibration weight is not available, the gravity acceleration correction will compensate the scale. Change the gravity acceleration value of the scale to the value of area where the scale will be used. Refer to the gravity acceleration map appended to the end of this manual.

NOTE:
It is not necessary to set the gravity acceleration correction when calibrating the scale with a calibration weight at the place where it is to be used.

Step 1. At Step 3. of the previous section "4.1 Calibration using a weight", enter a new value using 10-key pad.
The integral part "9" is fixed and enter the value after the decimal point.
If you hit the wrong number, press the [ C ] key. The value returns to the original number. Enter again.

Step 2. Press the [ ENT ] key, then the [ CAL 0 ] will be displayed.

Step 3. If nessary to calibrate the scale using a calibration weight, go to step 5 of "4.1 Calibration using a weight". To finish the setting, turn the power off.

# 4. Calibration

This function adjusts the scale for accurate weighing.
Calibrate the scale in the following cases.

- When the scale is first used.
- When the scale has been moved.
- When the ambient environment has changed.
- For regular calibration.

Loose the lock screws on the rear side of the display pod, and remove the CAL switch cover. Then, there is a calibration switch inside.

## 4.1 Calibration using a weight

Step 1. Warm up the scale for at least half an hour with nothing on the weighing pan.
***Change Function setting "F1" or place something on the pan to disable the auto power-off function.***

Step 2. Press and hold the calibration (CAL) switch until [ CAL ] appears, and release the switch.
***Press and hold [ 0 ] key for about 5 seconds, then you can also enter the calibration mode.***
***Press the [ ON/OFF ] key or CAL switch to exit without calibration.***

Step 3. Press the [ ENT ] key, then the gravity acceleration value will be displayed.
***It is not necessary to set the gravity acceleration value when calibration the scale with a calibration weight at the place where it is to be used (See the section about the gravity acceleration correction.)***

Step 4. Press the [ ENT ] key, then the [ CAL 0 ] will be displayed.

Step 5. Make sure that there is nothing on the weighing pan, and wait until the STABLE annunciator turns on.

Step 6. Press the [ ENT ] key, The scale calibrate the zero point, and the display shows " SPn 1 " and the weight value to calibrate (SPAN calibration)
***The weight value is equal to the capacity. When you enter with "kg" or "g" mode, then the value is "kg". Entering with "lb" or "oz", then "lb".***
If you do not need SPAN calibration, turn the power off to exit from the calibration procedure.

Step 7. To calibrate with the different weight, change the displayed value using the 10-key pad.
If you hit the wrong number, press the [ C ] key. The value returns to the capacity and enter again.

Step 8. Place the calibration weight on the pan with the same value as displayed, and wait until the STABLE annunciator turns on.
Press the [ENT] key. The scale calibrate SPAN and [End] will be displayed. Remove the weight from the pan, and turns the power off.

## 4.2 CAL prohibition procedure

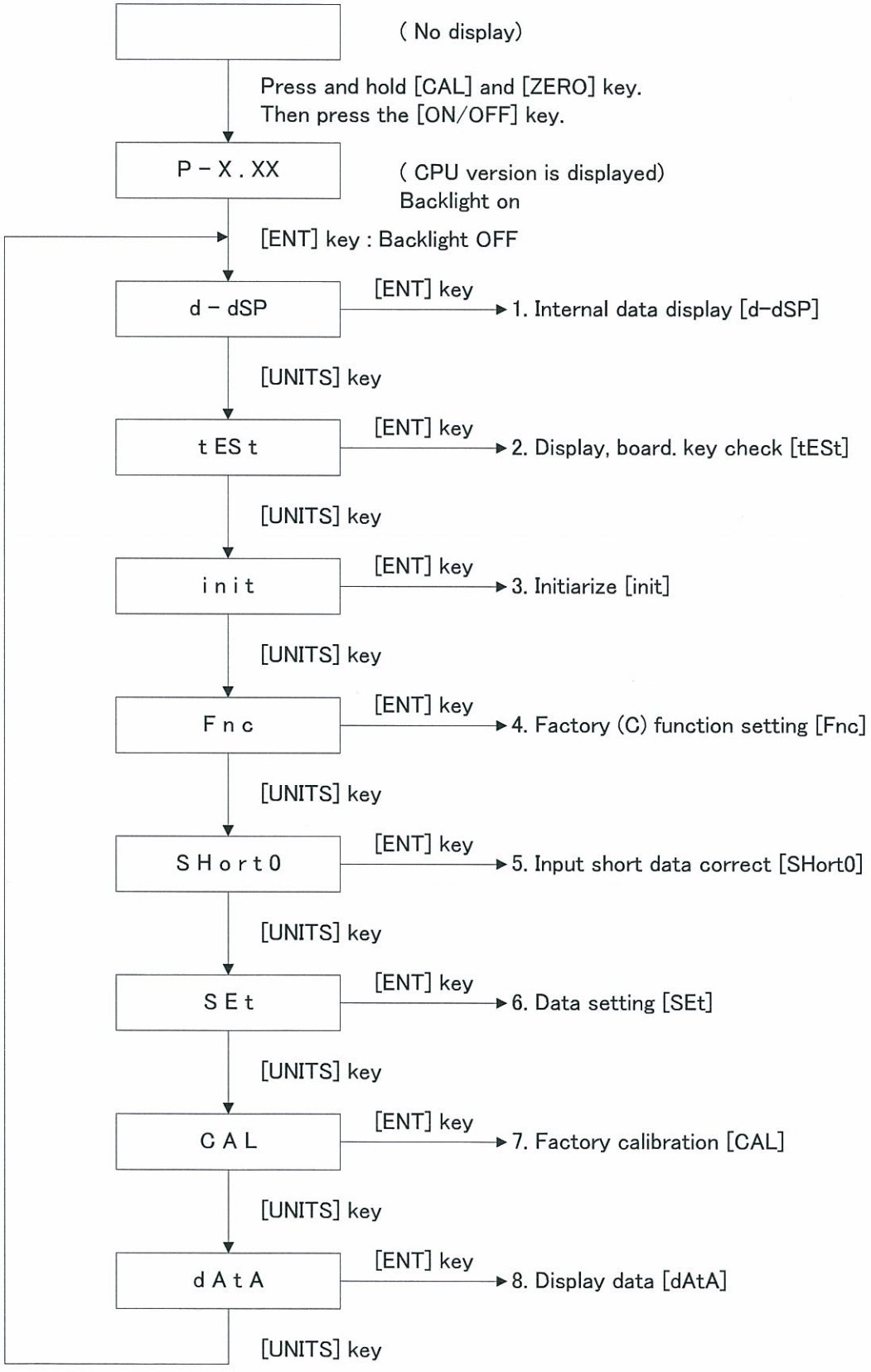
Step 1. Press and holding [CAL] switch and [ZERO] key. Then press [ON/OFF] Key. Display it as "P-X. XX." (Program version shown)
Step 2. Press the [ENT] key and go into the check mode. " d-dSP " is displayed.
Step 3. Press the [UNITS] key 3 times. " Fnc " is displayed.
Step 4. Press the [ENT] key and go into the C function setting mode. " C01- " is displayed. The number is blinking.
Step 5. Press the [ENT] key to enter the C1 function setting mode. " C01-X " is displayed. " X " is blinking.
Step 6. Using a 10-key pad to change the displayed value " C01-1 ". Set Calibration prohibition mode. 1 of the right is blinking.
Step 7. Press the [ENT] key. " End " is displayed for a few second then " SHort 0 " is displayed.
Step 8. Press the [ON/OFF] key to turn the power off.

Remarks:

C1 = 0:CAL permission [CAL] switch and [ZERO] key
C1 = 1:CAL permission [CAL] switch, [ZERO] prohibition
C1 = 2:CAL permission [CAL] only

# 5. Internal setting (Check mode)

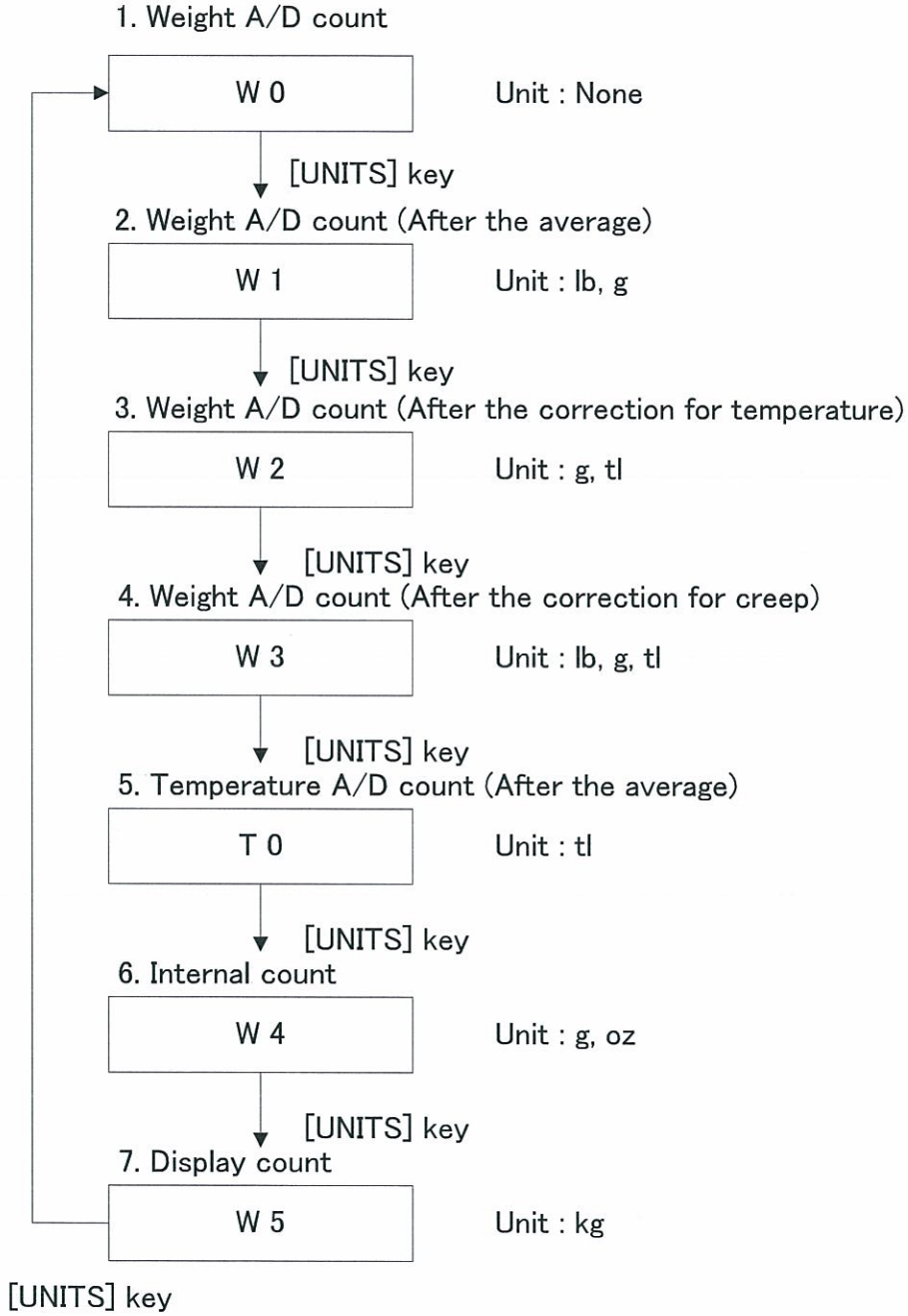
## 5.1 Check mode flow chart




* Press the [CAL] switch back to the weighing mode.

## 5.2 " d-dSP " internal setting data

| | | |
|---|---|---|
| [DISP] | key | Back light ON or OFF |
| [UNITS] | key | Change display item. |
| [ZERO] | key | Display ZERO Only 6, 7 |
| [C] | key | Turn back light off, then exit. Go to the "tESt" |



## 5.3 " tESt " Display, board, key check

Step 1. Number sift

Step 2. Number Inclement

Step 3. The segment lights up in turn.

Step 4. The analog bar shift

Step 5. The segment lights up in turn.

Step 6. All display turn on.

Output HI signal from 4 pin to 10 pin of J2. It changes to the LO signal in turn every about 0.3 seconds.

J2 - 4 pin : RS422/485 judgment port
5 pin : Comparator HI
6 pin : Comparator OK
7 pin : Comparator LO
8 pin : TXD terminal
9 pin : RXD terminal
10 pin : RS422/485 input/output switching CNT

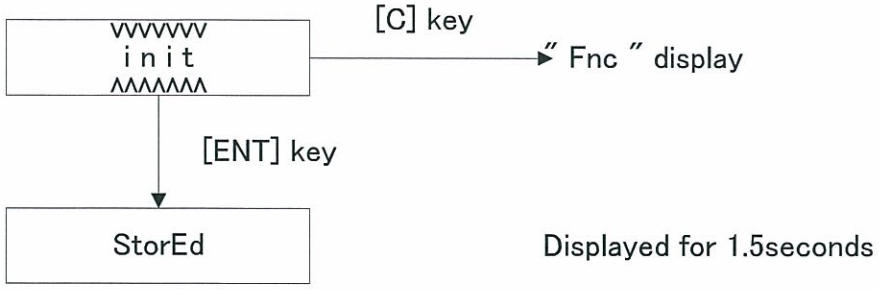
Step 7. Press the [SAMPLE] key to perform key check.

| | | | |
|---|---|---|---|
| [SAMPLE] | key : " 1" | displayed | |
| [KEY] | key : " 2" | displayed | |
| [RECALL] | key : " 3" | displayed | |
| [ON/OFF] | key : " 4" | displayed | |
| [HI] | key : " 5" | displayed | |
| [LO] | key : " 6" | displayed | |
| [STORE] | key : " 7" | displayed | |
| [PT] | key : " 8" | displayed | |
| [DISP] | key : " 9" | displayed | |
| [2] | key : "10" | displayed | |
| [UNITS] | key : "11" | displayed | |
| [TARE] | key : "12" | displayed | |
| [ENT] | key : "13" | displayed | "HI" turned on |
| [C] | key : "14" | displayed | "OK" turned on |
| [0] | key : "15" | displayed | "LO" turned on |
| [ZERO] | key : "16" | displayed | Backlight on, Buzzer on |
| [CAL] | key : "17" | displayed | |
| [CAL] | key | end and display change to " init " | |

*Press and hold

## 5.4 " init " Initialize

It does all the initialization of EEPROM.
Input short data, the correction-for-temperature data, the CAL data, the factory function, the user function, the user setting data (The bound pair value, the target value and so on)

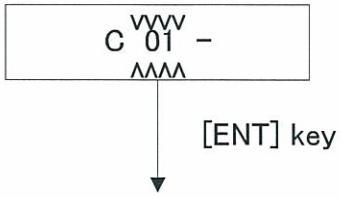



Initiarize each value, then go to ″Fnc″

## 5.5 " Fnc " Factory (C) function setting

[0]-[9] key : The entry of the number of the functions.
[C] key : It returns to the "C01" display.
[ENT] key : It fixes the number of the functions in case of being the corresponding number of the C functions and it move to the setting of the number of the function selection. The buzzer is sounding just as it is when not corresponding.

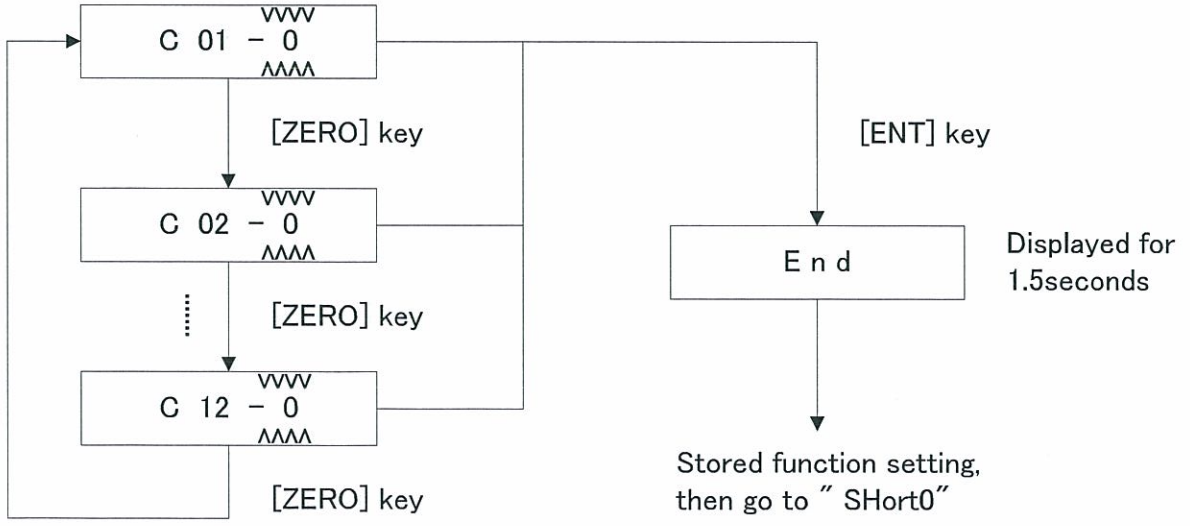
Step 1. The setting of the number of the functions.




[0]-[9] key : The entry of the number of the function choices
[C] key : It returns to the subscription value in the last time.
[ZERO] key : It goes to the following number of the functions in case of being the corresponding number of the function choices.
The buzzer is sounding just as it is when not corresponding.
[ENT] key : It subscribes EEP by the "End" display in case of being the corresponding number of the function choices and it goes to the "SHort0" display.
The buzzer is sounding just as it is when not corresponding.

Step 2. The setting of the number of the function choices

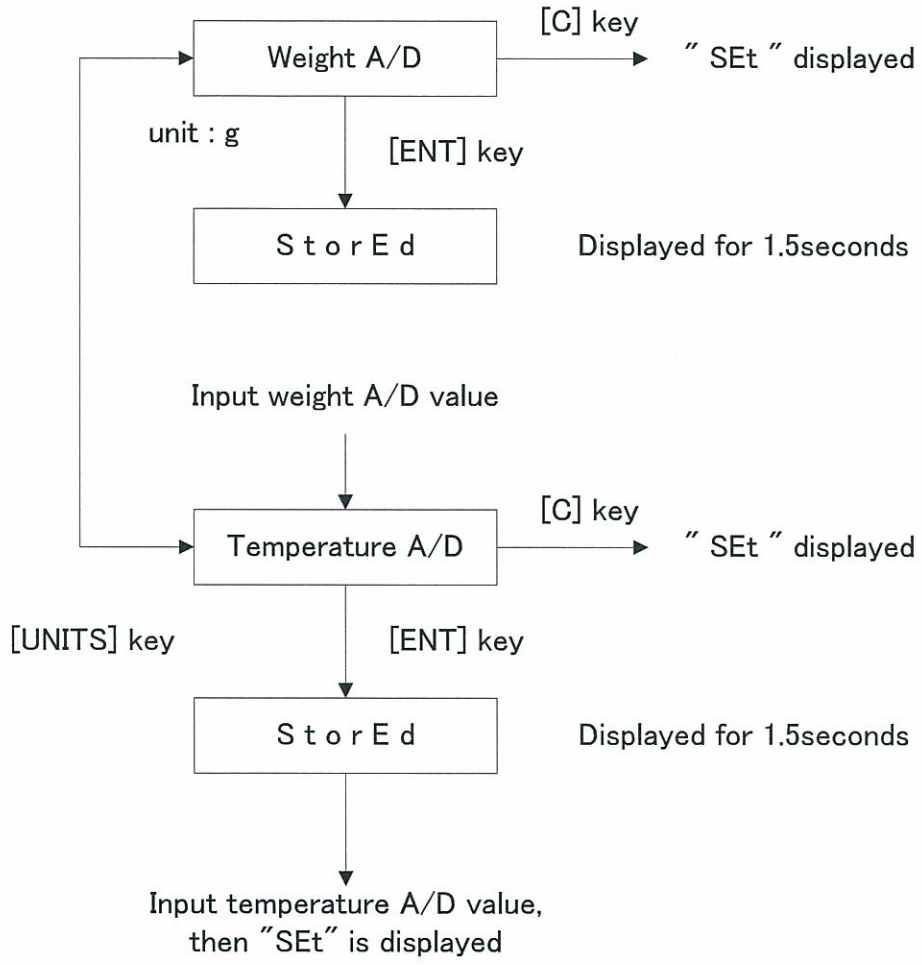
- It first displays the value which is subscribed at present.
- When the value which is the same as the value which is subscribed at present is displaying, the stable mark lights up.

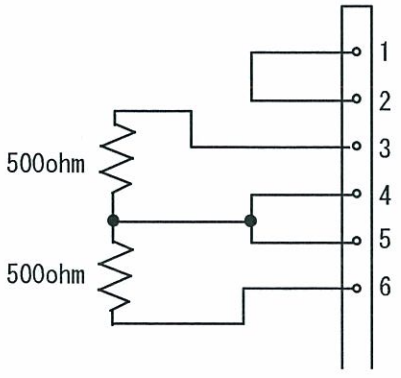


## 5.6 " SHort0 " The data crection of input short

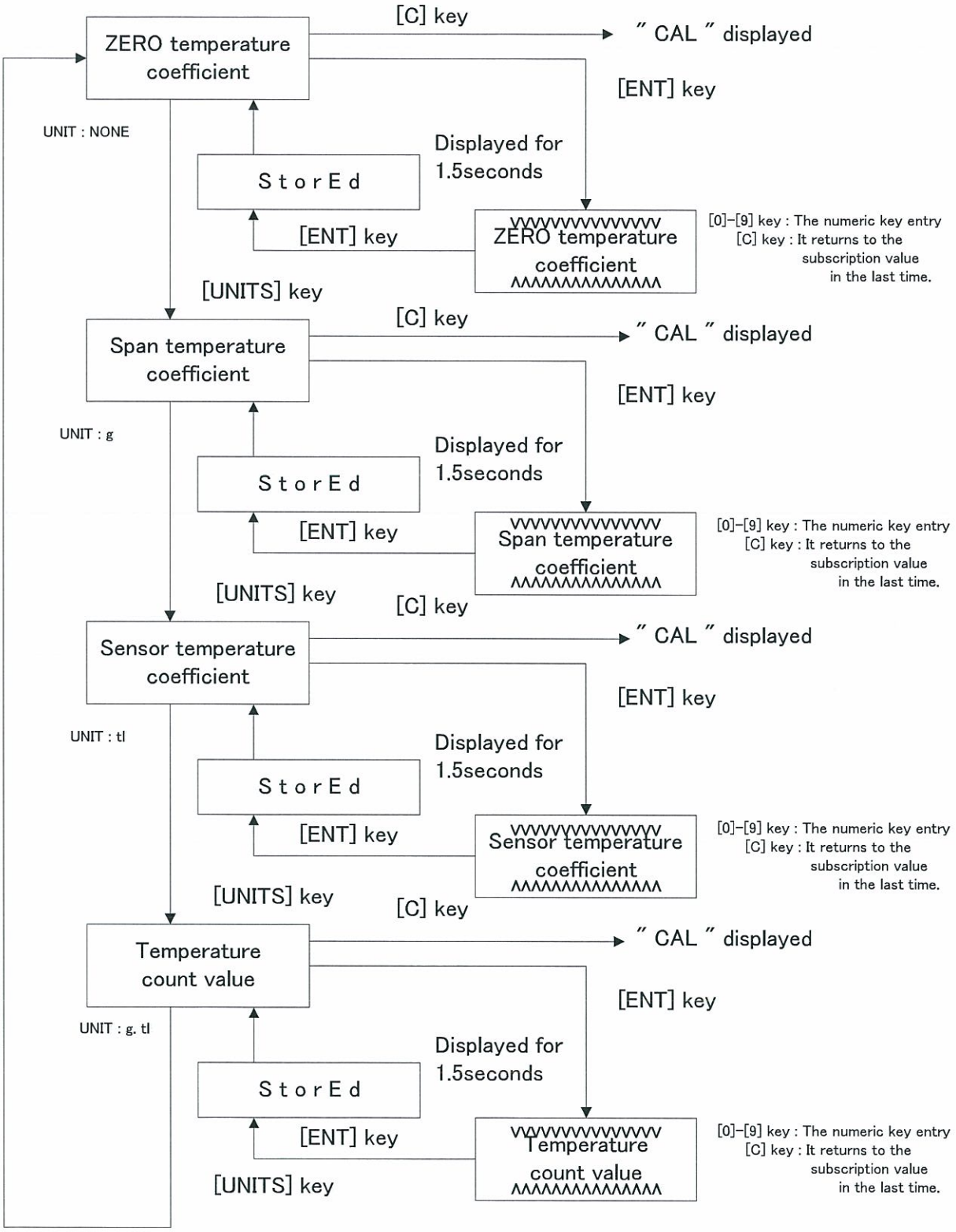
It puts the following jig (the input short jig) in J4 and it captures a value after making a load-cell 0mV/V after making thermosensitivity resistance 0 Ω.

If capturing a value, it pulls out and it joins a jig to the original cell cable once more.



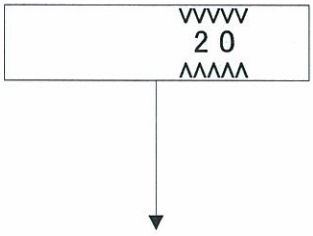



# 5.7 " SEt " Setting data



## 5.8 " CAL " Factory calibration

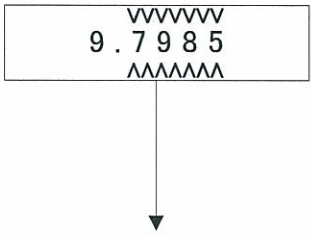
Step 1. Temperature setting




[0]-[9] 10key pad input
[C] It returns to the subscription value in the last time.

[ENT] key
The within-the-limits
To (0-40)'s fixing a temperature value and setting Step 2.
In the range
The buzzer is sounding just as it is as the error.

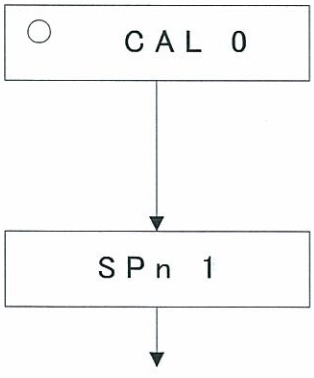
Step 2. Gravity acceleration correction




[0]-[9] 10key pad input
[C] It returns to the subscription value in the last time.

[ENT] key
The within-the-limits
If gravity acceleration correction value within 9.7700 to 9.8350, store the value. Then go to Step 3.
In the range
The buzzer is sounding just as it is as the error.

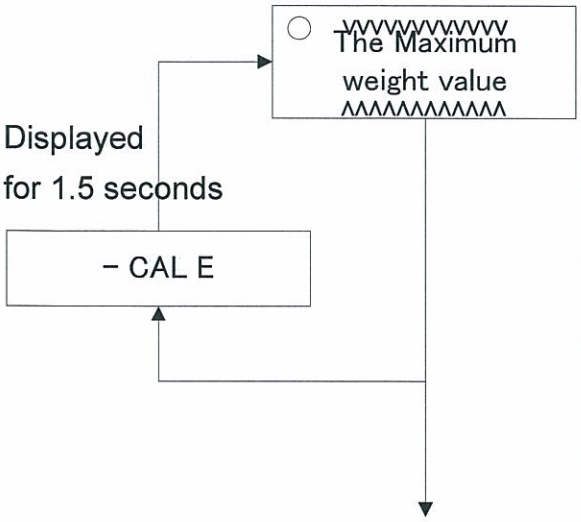
Step 3. CAL 0




[ENT] key : Stable (Store the CAL 0 data, Then go to Step 4.)
Unstable (It doesn't recognize as the key)

Displayed for 1.5 seconds

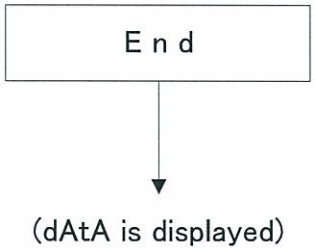
Step 4. CAL S




[0]-[9] 10key pad input
[C] It returns to the subscription value in the last time.

[ENT] key
Stable and the within-the-limits
(Store the span data, then go to step 5.)
Unstable
(It doesn't recognize as the key)
In the range
(The buzzer is sounding just as it is as the error.)
Count value is small
( "- CAL E " will be displayed, then go to Step 4 .)

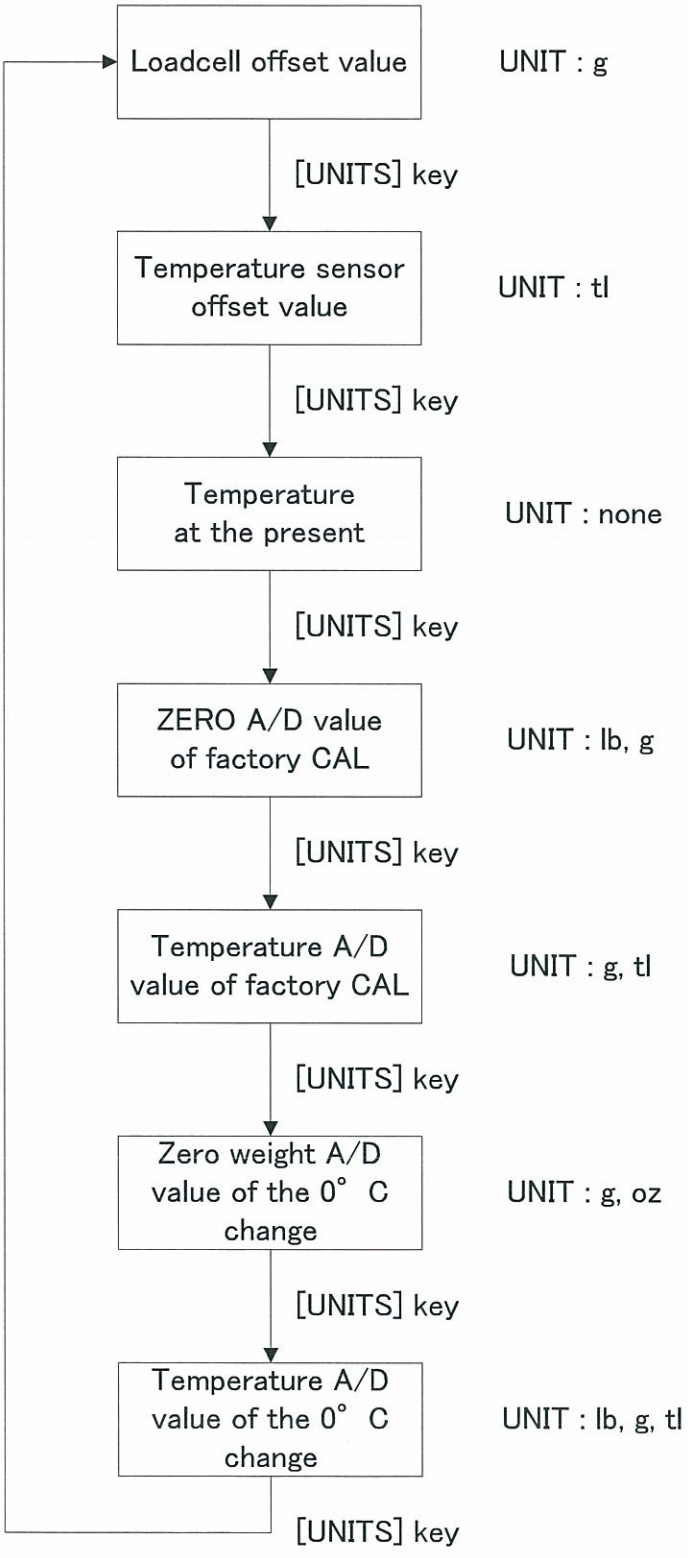
Step 5. End




Displayed for 1.5 seconds

## 5.9 " dAtA " Data display

[UNITS] key : The display item change.
[C] key : It is possible to pull out a mode and it goes to the "d-dSP" display.



# 6. Software Parameter Settings

C1 Calibration

0 Both are a permission
1 Both are a ban
2 Only [CAL] is a permission

C2 The maximum weight

0 6kg
1 15kg
2 30kg

C3 Unit

0 The metric (kg,g)
1 The non metric (kg,g,lb,oz,lb-oz)

C4 The zero-powering possible range

0 ±10%
1 ±50%

C5 Sri Lanka specification

0 The invalidity
1 The validity

C6 The decimal point

0 . (The point)
1 , (The comma)

C7 The tare clearance by zero key at the time of NET

0 None
1 Yes

C8 NET content weight display

0 The display count
1 The internal count

C9 Preset tare

0 The ban
1 The permission

C10 (lb – oz) Display

0 The ban
1 The permission

C11 The possible range of zero push

0 ±2%
1 Unlimited

C12 The range fixation

0 It is due to the setting of F2
1 It fixes on F2=0(1/3000)
2 It fixes on F2=1(1/6000)
3 It fixes on F2=2(1/12000)

# 7. Troubleshooting

This section can be photocopied and used as a check sheet.
Simply tick the boxes provided after each step is successfully completed.

## Troubleshooting

# Check the Keyboard to see if it is functioning properly. (See Keyboard Check)
# Zero calibration may be needed if the ZERO key will not set the display to zero, or if "----" is displayed when the power is turned on. (See Calibration section) .
# If the display remains "E" or is not stable - then do a full recalibration, including resetting "g" if necessary. (see Calibration section)
# If calibration is not possible:
  - If "-CAL E" is displayed when you press ENT key, the scale cannot enter the maximum capacity value because the calibration mass is under-weight (minus Calibration Error). Check everything is correctly set.
  - Check the analog and main boards for broken leads, and the cable from the Load Cell to J4 of the main board.

  * Don't forget to do a full recalibration, including resetting "g" (see Calibration section) if you make any electronic repairs.

## Load cell stopper check

# If the weighing pan is loaded to just over full scale, does it hit the overload stopper? ☐ ok

## Pan check

# Is the weighing pan touching anything? ☐ ok
# Is the weighing pan mounted correctly? ☐ ok
# Is the weighing pan perfectly horizontal? ☐ ok

## Power supply check

# AC cable, the power board, the AC adapter (which is included in the indicator part) and Main board lead neatly or do the battery and main board lead neatly ? ☐ ok
# If pushing [ON/OFF] key, pulling out AC cable when a battery is included, is it turned on? ☐ ok
# Check the output of the Battery /AC cable to see that it is at least 5.8 volts. ☐ ok

# When pressing the ON/OFF key, check the resistance between S4 pins to see if they read less than 10 Ω. If so, then it is normal. ☐ ok
  - If not, replace the switch. ☐ ok
  - If the resistance is correct but the problem remains, try a different main board. ☐ ok
# When the ON/OFF key is pressed, the voltage at J4 pins 3 and 6 should be 5V ±10%, and pin 18 of CPU (RESET ) at ≈5V (Hi). ☐ ok

## CPU check

# Check all solder connections. ☐ ok
# Check that the voltage between pin 3 and 6 of J4 of the main board, it should be 5V ±10%. ☐ ok
# Is the RESET at the Hi level? [ pin 18 of U1 (RESET ) at ≈5V (Hi)] ☐ ok
# Check the voltage levels for the LCD at U1 pin 1 ≈5.0V, 2 ≈ 3.3V ,3 ≈ 1.7V ☐ ok
# Check that the clock pulse is 20MHz (see #1 Waveform table). ☐ ok

## LCD check

# Check the glass for cracks (visible as dark spots). ☐ ok
# Check the soldering for breaks. ☐ ok
# Check for missing segments during the sequential and 'power on' tests. ☐ ok

## Backlight check

# Whether or not to light up both two by the backlight? ☐ ok
# Is it a rank with the same light of the 2 corner backlight? ☐ ok
# Is the voltage LCD1-A、LCD2-A and GND about 4V(≒4V)? ☐ ok

## LED check

# Does the 3 color LED (the yellow, the green, the red) light up? ☐ ok
# Is it a rank with the same light of the 3 color LED (the yellow, the green, the red)? ☐ ok
# Is the directivity of the light the direction of the front? ☐ ok
# Is the voltage D3、D6、D9 of anode side and GND about 4.5V(≒4.5V)? ☐ ok

## Buzzer check

# Is the volume of the key click sound, the buzzer sound at the time of the comparator right? ☐ ok
# Is the timbre of the key click sound, the buzzer sound at the time of the comparator right? ☐ ok
# Is the frequency of the square wave of U1 from 26 pins 4.88 kHz? ☐ ok

## Load cell check

# Check the following cable assembly - pin to wire - connections of J4 on the main board:

| | | |
|---|---|---|
| 1 | Orange | ☐ ok |
| 2 | Purple | ☐ ok |
| 3 | Red | ☐ ok |
| 4 | Green | ☐ ok |
| 5 | Blue | ☐ ok |
| 6 | White | ☐ ok |
| 7 | Yellow | ☐ ok |

# Check that the voltage between pins 1 & 6 of J4 is ≈ 2.5V. ☐ ok
# Check that the voltage between pins 2 & 6 of J4 is ≈ 2.5V. ☐ ok
# Check that the voltage between pins 3 & 6 of J4 is 5V ±10%. ☐ ok
# Check that the voltage between pins 4 & 6 of J4 is ≈ 2.5V. ☐ ok
# Check that the voltage between pins 5 & 6 of J4 is ≈ 2.5V. ☐ ok
# Check that the voltage between pins 4 & 5 of J4 is 0.5 ~ 2mV with no weight on the weighing pan. ☐ ok
# Check that the voltage between pins 4 & 5 of J4 is 5 ~ 8mV with full span weight on the weighing pan. ☐ ok
# Check that the voltage of U2 at pin 14 on the analog board is 5V ±10%. ☐ ok
# Check that the A/D converter waveforms are correct. ☐ ok
# Check that the wiring is correct. ☐ ok
# Check that the voltage is correct. ☐ ok

## Other voltage check

RE-install the battery(OP-02), and the AC cable, if used.

# Check that the voltage between pins J+ & J- is 7.5V(AC adaptor). ☐ ok
# Check that the voltage between pins BAT+ & BAT- is 6V(Battery). ☐ ok
# Check that the voltage between pins 2 & 4 of U14 is 5V. ☐ ok
# Check that the voltage between pins 2 & 4 of U15 is 5V. ☐ ok
# Check that the voltage between pins 1 & 2 of J2 is 5V. ☐ ok

# Keyboard check

Operation of each key

| | KEY: | Function: | |
|---|---|---|---|
| # | [ON/OFF] | On and OFF of the power | ☐ ok |
| # | [RECALL] | It enters a memory call mode. | ☐ ok |
| # | [KEY] | It enters the key program mode of the target value. | ☐ ok |
| # | [SAMPLE] | It enters the sample create-mode of the target value. | ☐ ok |
| # | [PT] | It enters a preset tare setting mode. | ☐ ok |
| # | [STORE] | It enters a memory store mode. | ☐ ok |
| # | [LO] | It enters the key setting mode of the lower limit. | ☐ ok |
| # | [HI] | It enters the key setting mode of the upper value. | ☐ ok |
| # | [TARE] | It subtracts the weight of the tare. | ☐ ok |
| # | [UNITS] | It changes an unit of display. | ☐ ok |
| # | [2] | The entry which is ("2") in numeric key entry | ☐ ok |
| # | [DISP] | It changes an analog bargraph display. | ☐ ok |
| # | [ZERO] | It changes a display in zero. | ☐ ok |
| # | [0] | The entry which is "0" in numeric key entry. | ☐ ok |
| # | [C] | It clears an input value in numeric key entry. | ☐ ok |
| # | [ENT] | It subscribes a value in numeric key entry. | ☐ ok |
| # | [CAL] | The data transmission by the OP-03/04 connection<br>It enters a calibration mode with Holding and pressing (about 2 seconds). | ☐ ok |

Remove the battery(OP-02), and the AC cable, if connected.
Check that each individual key is working by measuring the resistance between the pins of the switches.
The resistance with the key pressed should be less than 10Ω for:

| | | | |
|---|---|---|---|
| # | [SAMPLE] | between pins of S1 | ☐ ok |
| # | [KEY] | between pins of S2 | ☐ ok |
| # | [RECALL] | between pins of S3 | ☐ ok |
| # | [ON/OFF] | between pins of S4 | ☐ ok |
| # | [HI] | between pins of S5 | ☐ ok |
| # | [LO] | between pins of S6 | ☐ ok |
| # | [STORE] | between pins of S7 | ☐ ok |
| # | [PT] | between pins of S8 | ☐ ok |
| # | [DISP] | between pins of S9 | ☐ ok |
| # | [2] | between pins of S10 | ☐ ok |
| # | [UNITS] | between pins of S11 | ☐ ok |
| # | [TARE] | between pins of S12 | ☐ ok |
| # | [ENT] | between pins of S13 | ☐ ok |
| # | [C] | between pins of S14 | ☐ ok |
| # | [0] | between pins of S15 | ☐ ok |
| # | [ZERO] | between pins of S16 | ☐ ok |

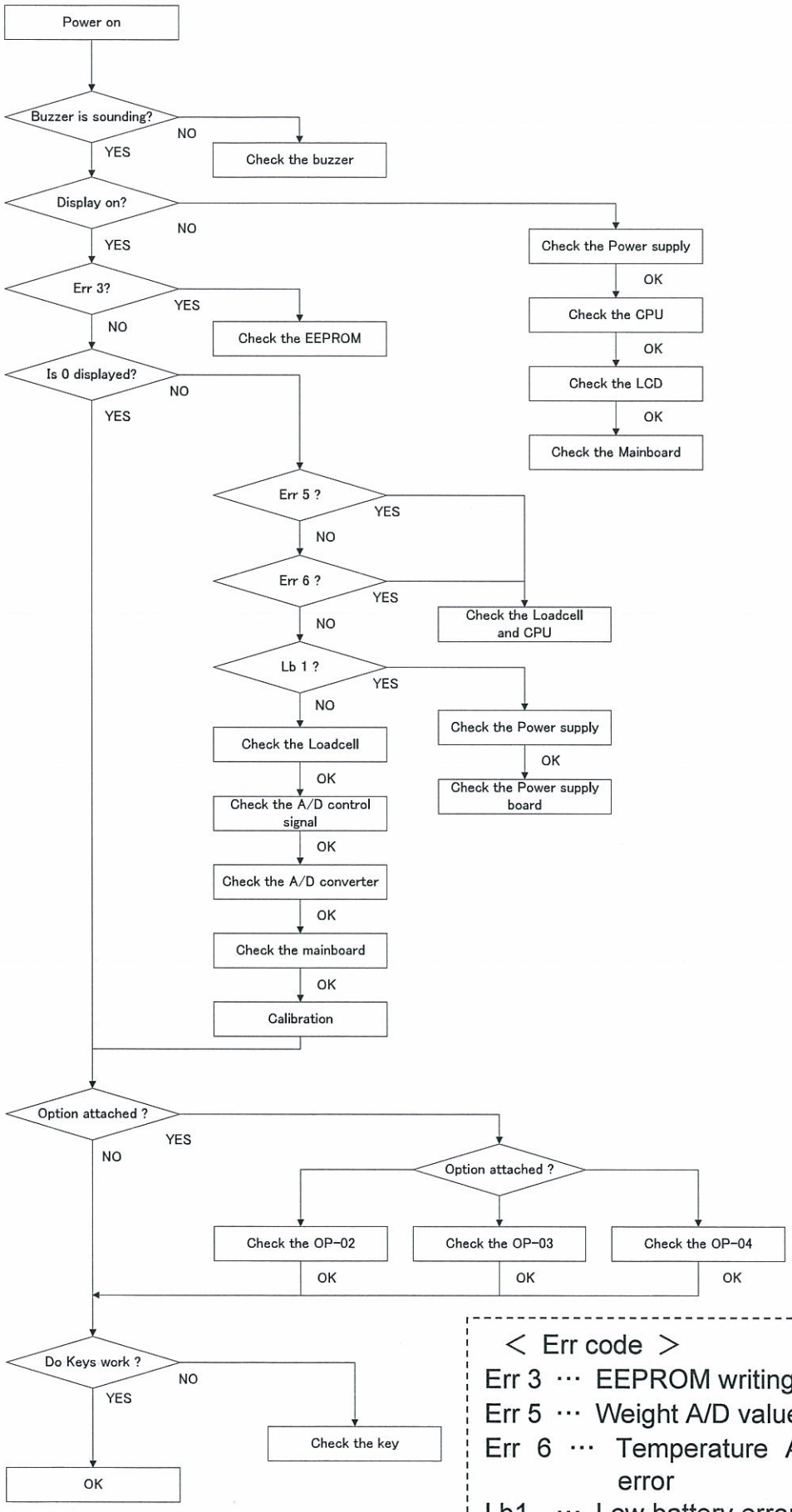
| | | | |
|---|---|---|---|
| # | [CAL] | between pins of S17 | ☐ ok |

If any of the above are out of the correct resistance range, that switch is defective

## Tolerance check

| | Model | Linearity | Corner error(Test load) | |
|---|---|---|---|---|
| # | FS- 6Ki | ± 2g | ± 2g( 2kg) | ☐ ok |
| # | FS-15Ki | ± 5g | ± 5g( 5kg) | ☐ ok |
| # | FS-30Ki | ±10g | ±10g(10kg) | ☐ ok |

# Troubleshooting flow chart




< Err code >

Err 3 ··· EEPROM writing error

Err 5 ··· Weight A/D value error

Err 6 ··· Temperature A/D value error

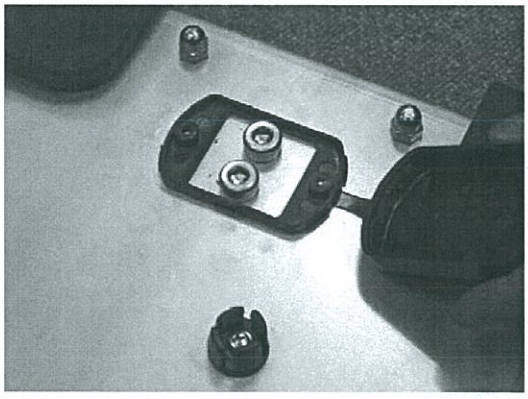
Lb1 ··· Low battery error

# 8 Disassembly and assembly

## 8.1 Disassembly

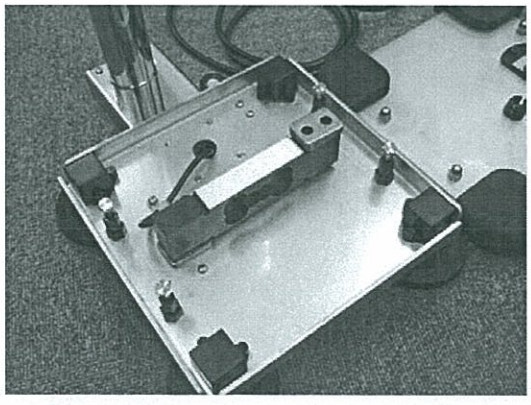
Step 1. Remove weighing pan.

Step 2. Remove the cover.

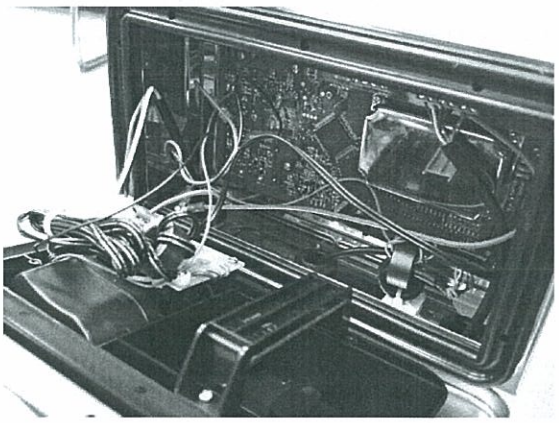


Step 3. Remove two hexagon bolts that fix upper frame. Then remove the upper frame.

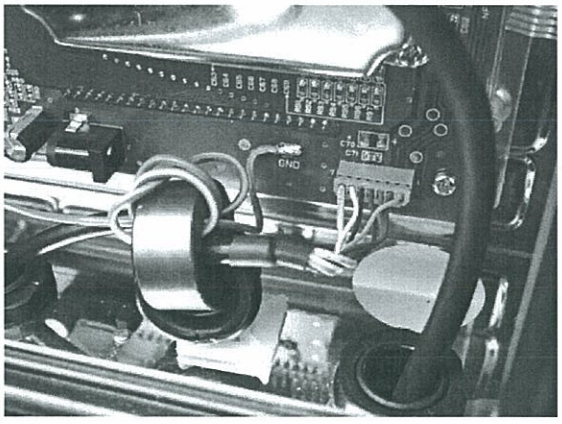
Step 4. Remove the upper frame.

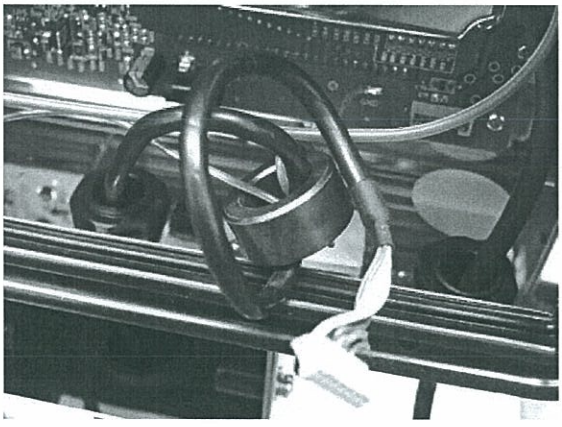


Step 5. Remove the ten screws that secure the rear panel of display. Then remove the rear panel.

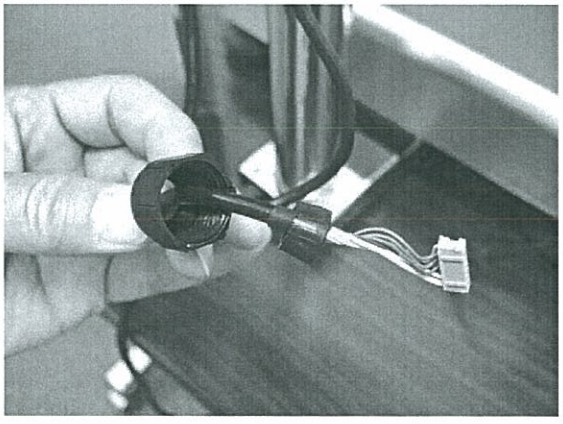


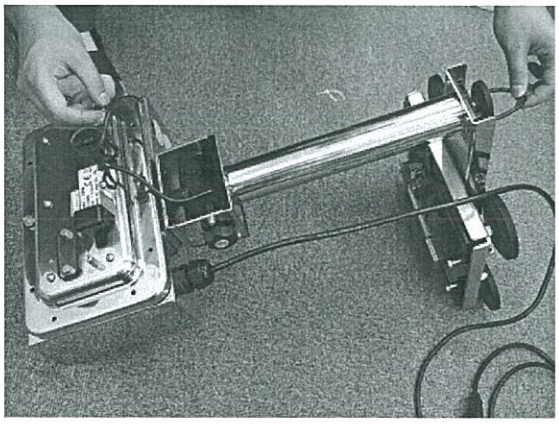
Step 6. Remove the Loadcell cable from the main board, then remove the cable clamp and core.



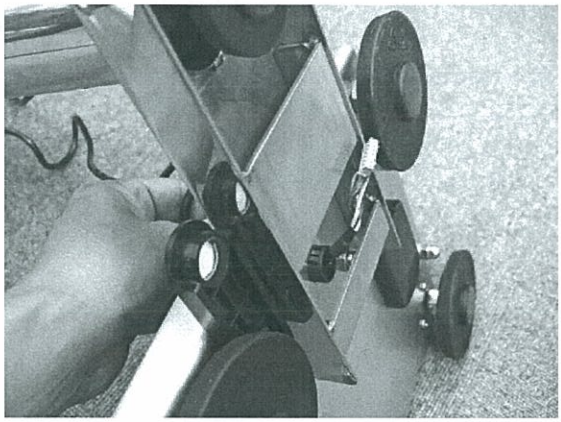


Step 7. Extract the cable assembly of load cell from poll. Be careful not to damage to the cable assembly at this time.

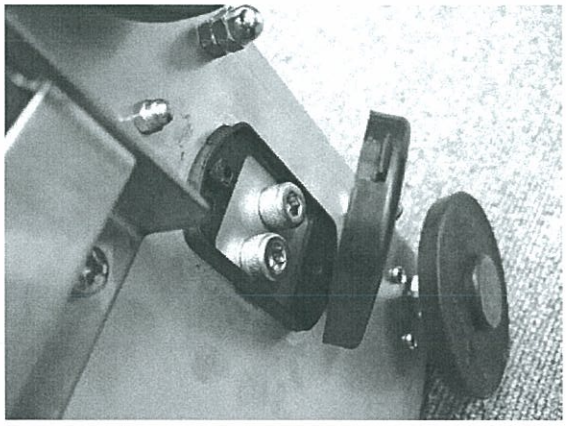




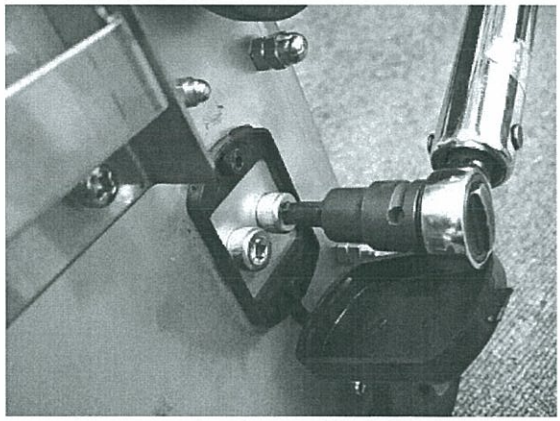
Step 8. Remove the load cell cable from the base unit



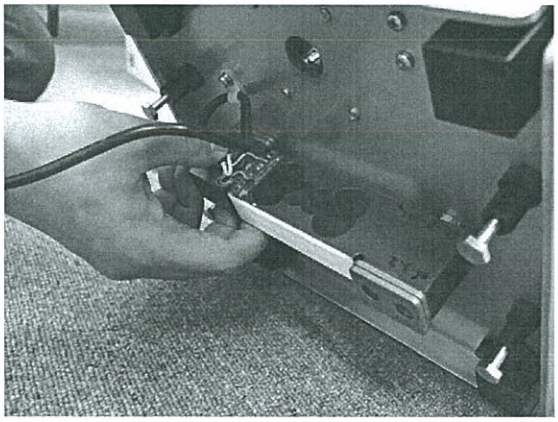
Step 9. Remove the cover.



Step 10. Then remove the two screws.



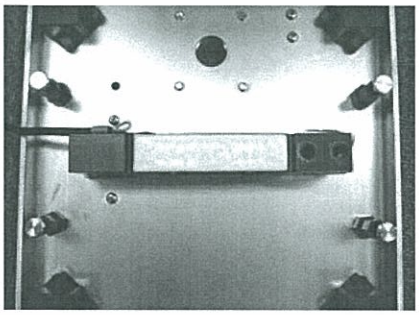
Step 11. Remove the load cell unit. Load cell spacer is glued to load cell with silicon (Only small size). This spacer will use when the load cell is installed.



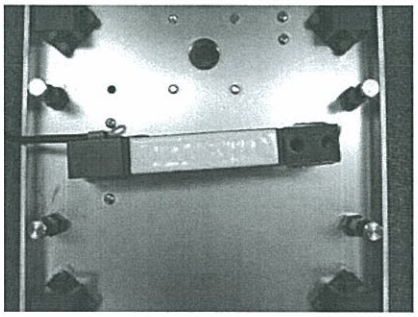
## 8.2 Assembly

Step 1. Install load cell on base and fix from the reverse side of a basis with four hexagon bolts. Place the loadcell straight.

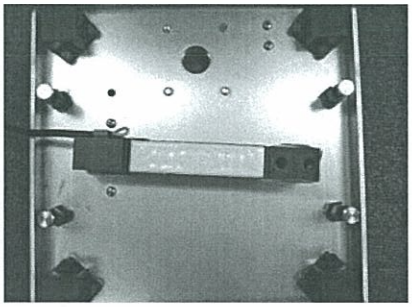
- It applies silicon between the load cell and spacer. (TORAY SE9140 or such a thing)
- It puts the number which is the same as the time to have removed the number which puts a spacer. (Weighing pan side 3 pieces, base side 2 pieces. ( Only S size )



OK

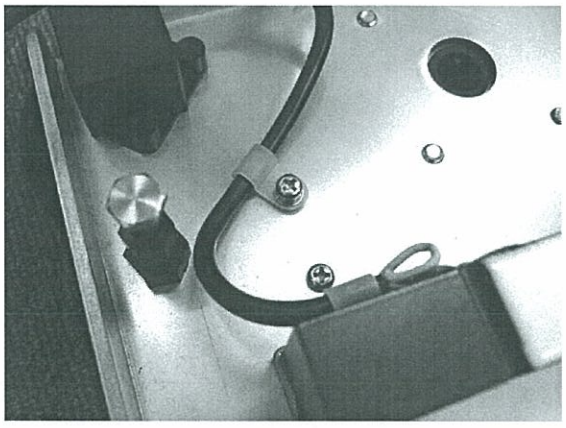


NG

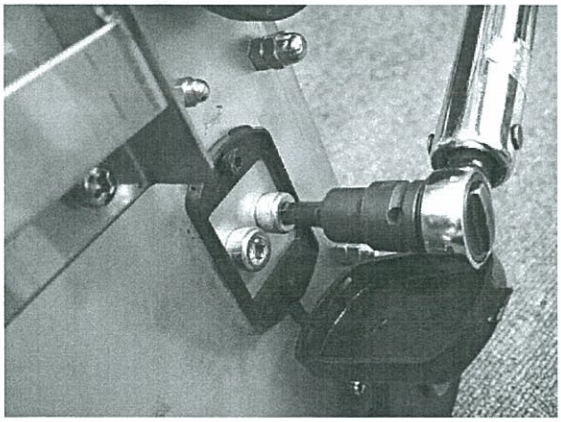


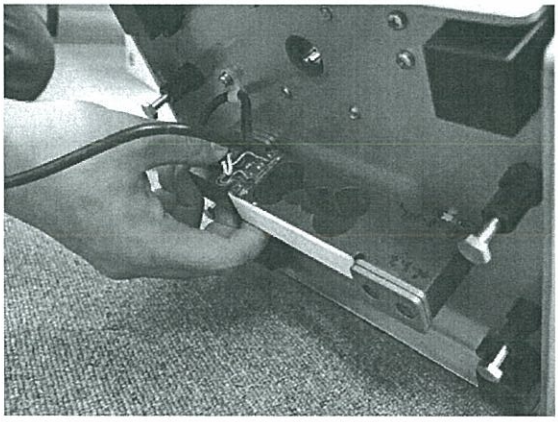
NG

Step 2. Attach the cable clamp.

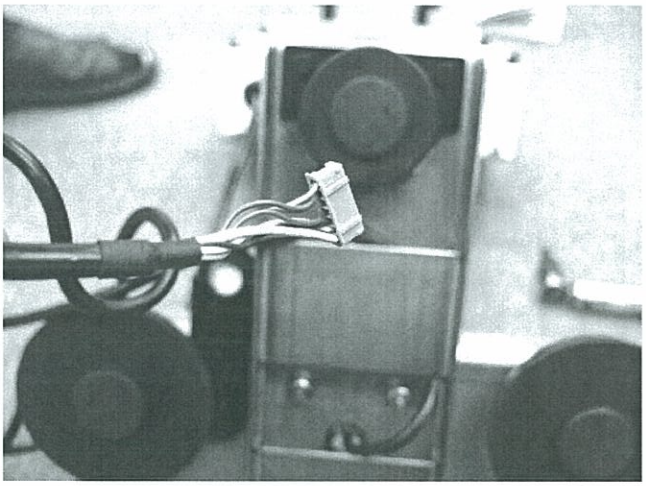


Step 3. Attach the load cell.
Tighten torque:200kgf・cm

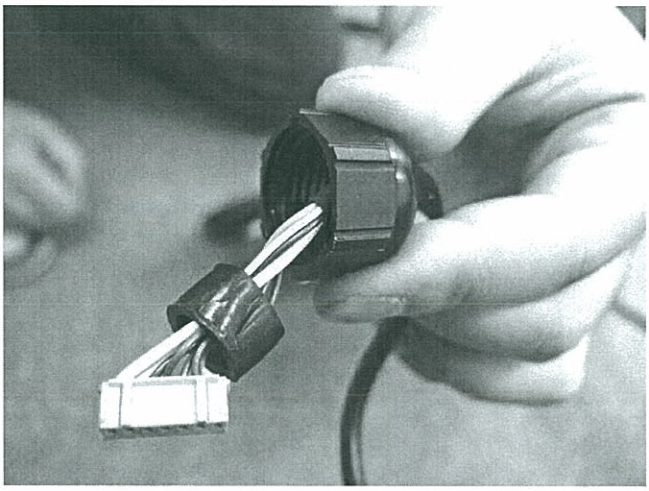




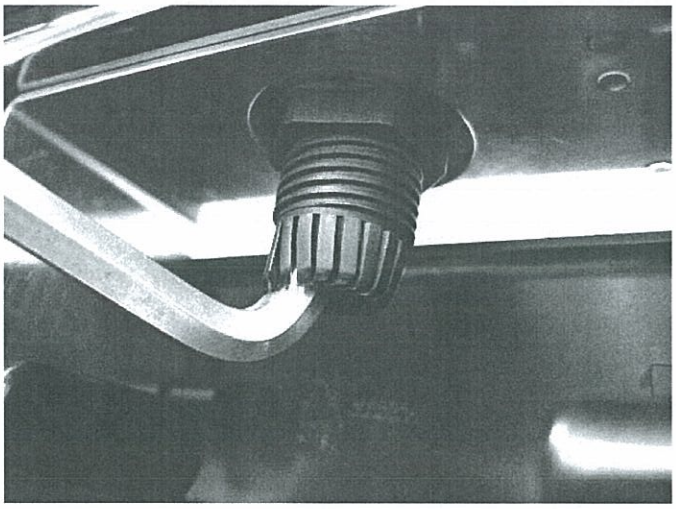
Step 4. Let the load cell cable assembly pass on the pole.



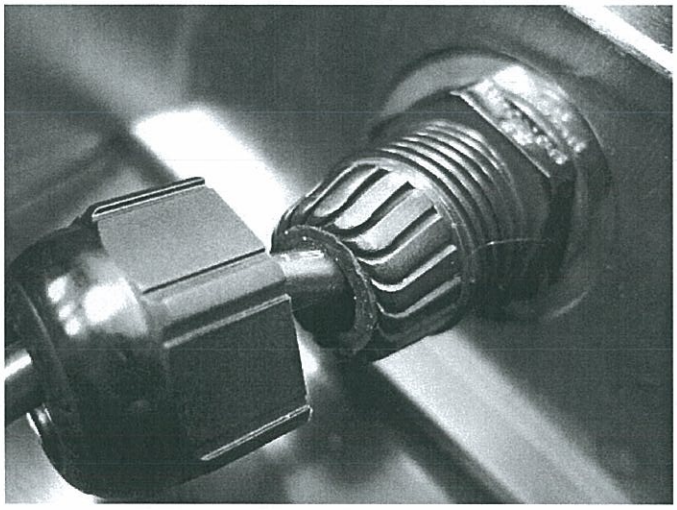
Step 5. Attach the cap and packing to load cell cable.



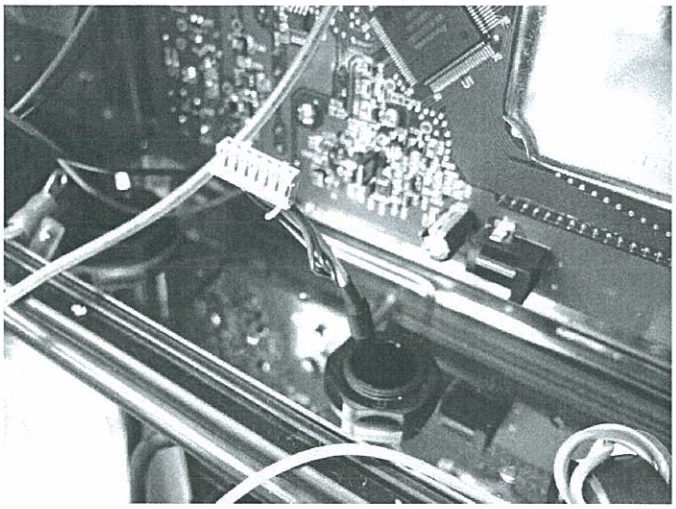
Step 6. It enlarges a little hole on the side of the main unit.



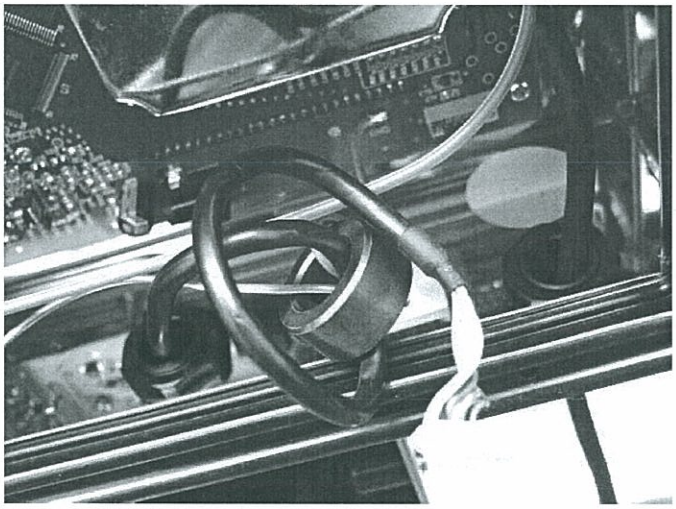
Step 7. Trough the load cell cable to hole of the main unit. Insert the packing too. Secure the cap.



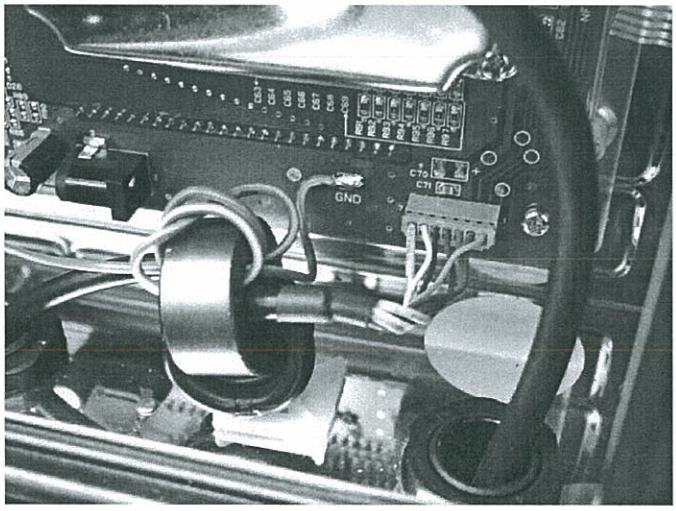
Step 8. Take the load cell cable into the main unit.



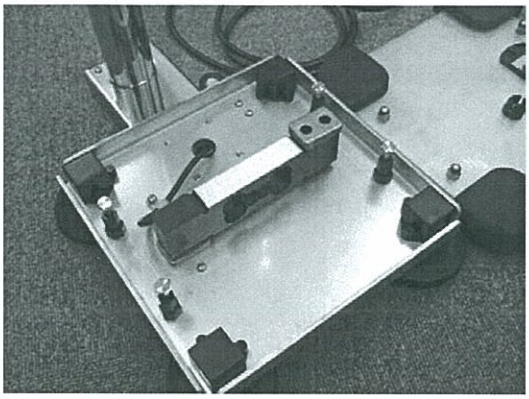
Step 9. Round load cell cable to core 3 times.



Step 10. Connect the load cell cable onto the main board unit.

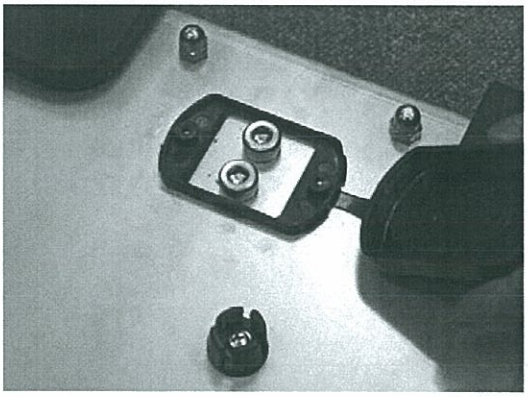


Step 11. Attach the upper frame.



Step 12. Secure the bolts of fixing upper frame.
(Tighten torque: 200kgf · cm)

Step 13. Attach the cover.



Step 14. Attach the weighing pan.

# 9 Initialization & Display Check

Initialization readjustment is required when the load cell or main board is replaced.

Please do not initialize during regular repairs without first replacing the above-mentioned parts.

Since an important internal parameter will be lost if it is initialized, accuracy cannot be guaranteed unless it is readjusted.

The warm-up can shine sufficiently for the load-cell to match the temperature in the stable environment where there is little temperature change.

## 9.1 Check mode

Step 1. Press and holding [CAL] switch and [ZERO] key, Then press [ON/OFF] to display "P-X.XX" (program version)

Step 2. Press the [ENT] key to enter check mode. " d-dSP " is displayed.

## 9.2 Initialize

Step 1. Press the [UNIT] key two times. " init " will be displayed.

Step 2. Press the [ENT] key. " StorEd " will be displayed for about.

## 9.3 Model setting

Step 1. The factory (C) It sets (referring to the function setting table clause) a function.

Step 2. It becomes "SHort0" display when ending.

## 9.4 Temperature coefficient setting

Step 1. [UNITS] It becomes "SEt" display when pushing a key.

Step 2. Refer to step 6 of Internal setting. It subscribes the zero temperature coefficient, the span temperature coefficient of the new load-cell and being specified at the load-cell cable of the value. (The zero temperature coefficient=the span temperature coefficient)

Step 3. It becomes "CAL" display when ending.

## 9.5 Calibration

Step 1. Press the [ENT] key to enter temperature setting mode. "20" will be displayed and blinking.

Step 2. Enter the temperature (the temperature around) of the load-cell with the numeric key and press the [ENT] key.

Step 3. Go to the gravity acceleration correction. Then "9.7985" on the display blinks.

Step 4. Enter the gravity acceleration with 10 key pad. Then press the [ENT] key.

Step 5. Go to the CAL0 setting mode. Then " CAL 0" will be displayed.

Step 6. It confirms that nothing is on the weighing pan and press the [ENT] key if the stable mark lights up.

Step 7. "SPn 1" will be displayed 1.5 seconds. Then the display change to calibration weight value.

Step 8. It puts a calibration weight which is the same as the display at the center of the weighing pan and press the [ENT] key if the stable mark lights up.

| | |
|---|---|
| FS- 6Ki | 6kg |
| FS- 15Ki | 15kg |
| FS- 30Ki | 30kg |

Step 9. "End" will be displayed about 1.5 seconds. Then "dAtA" will be displayed.

# 10. Function setting list

| Function | FS-6Ki | FS-15Ki | FS-30Ki |
|---|---|---|---|
| C2 | 0 | 1 | 2 |

| Function | ---- | -- JA | Approval | NTEP |
|---|---|---|---|---|
| C1 | 0 | 0 | 2 | 2 |
| C3 | 1 | 0 | 0 | 1 |
| C4 | 1 | 1 | 0 | 0 |
| C5 | 0 | 0 | 0 | 0 |
| C6 | 0 | 0 | 0 | 0 |
| C7 | 0 | 1 | 1 | 0 |
| C8 | 1 | 1 | 1 | 0 |
| C9 | 1 | 1 | 1 | 1 |
| C10 | 1 | 1 | 0 | 0 |
| C11 | 0 | 0 | 0 | 0 |
| C12 | 0 | 0 | 1 | 1 |

| Function | ---- | -- JA | Approval | NTEP |
|---|---|---|---|---|
| F1 | 0 | 0 | 0 | 0 |
| F2 | 0 | 1 | 0 | 0 |
| F3 | 2 | 0 | 0 | 2 |
| F4 | 0 | 0 | 0 | 0 |
| F5 | 0 | 0 | 0 | 0 |
| F6 | 2 | 2 | 2 | 2 |
| F7 | 1 | 1 | 1 | 1 |
| F8 | 1 | 1 | 0 | 0 |
| F9 | 0 | 0 | 0 | 0 |
| F10 | 1 | 1 | 3 | 3 |
| F11 | 1 | 1 | 1 | 1 |
| F12 | 1 | 1 | 1 | 1 |
| F13 | 1 | 1 | 1 | 1 |
| F14 | 0 | 0 | 0 | 0 |
| F15 | 6 | 6 | 6 | 6 |
| F16 | 0 | 0 | 0 | 0 |
| F17 | 1 | 1 | 1 | 1 |
| F18 | 00 | 00 | 00 | 00 |
| F19 | 0 | 0 | 0 | 0 |
| F20 | 1 | 1 | 1 | 1 |

# 11 User Function setting list

F1 Auto power off

0 OFF
1 ON

F2 Resolution

0 1/3000
1 1/6000
2 1/12000

*2

F3 Unit

0 Kg
1 G
2 Lb
3 Oz
4 Lb-Oz

F4 Borate

0 2400 bps
1 4800bps
2 9600bps

F5 Bit, parity

0 7bit Even
1 7bit ODD
2 8bit NON

F6 Output mode

0 Stream
1 Command
2 [PRINT] key
3 Auto print +
4 Auto print +/-
5 Waiting (For RS422/485)

F7 The comparative size judgment value

0 Upper , Lower
1 Target value + upper, Target, Target value - Lower
2 Target value x upper [%] , Target, Target value x Lower [%]

F8 Comparator judgment condition

0 Not compare
1 Always compare
2 Compare at the time of stable
3 Always compare except around zero
4 Compare at the time of stable except around zero
5 Always compare more than around zero
6 Compare at the time of stable more than around zero

F9 Buzzer output

0 No sound
1 LO
2 OK
3 LO, OK
4 HI
5 LO, HI
6 OK, HI
7 LO, OK, HI

F10 Characteristic response

0 Quick measurement, Quick response
1 ↑ ↓
2 ↑ ↓
3 ↑ ↓
4 Slow measurement, Slow response

F11 Stable detection

| | | |
|---|---|---|
| 0 | Strictly judgment | ±0.5 count |
| 1 | ↑ ↓ | ±1.0 count |
| 2 | Gentle judgment | ±2.0 count |

F12 Stable detection time

| | | |
|---|---|---|
| 0 | Quickly | 0.1 second |
| 1 | ↑ ↓ | 0.2 second |
| 2 | Slowly | 0.5 second |

F13 Zero tracking

0 No
1 Yes

F14 Key operate prohibition

0 NO
1 5 keys [ON/OFF], [±/ZERO], [TARE], [9/SAMPLE], [PRINT/ENT]
2 3 keys [ON/OFF], [±/ZERO], [TARE]

F15 LED Brightness

0 Dark
1 ↑
2 |
3 |
4 |
5 |
6 |
7 ↓
8 Bright

F16 Bar display select

0 Normal
1 Weighing mode
2 Weight check mode
3 No display

F17 Back light control

0 Always OFF
1 Always ON
2 Light on when the display change more than ±4 count or key operation. Light off 30 seconds after stabilized.
3 Light on when the display change more than ±4 count or key operation. Light off 60 seconds after stabilized.

F18 The equipment-identification-number

| | | |
|---|---|---|
| 0 | 00 | RS232C |
| ~ 99 | 01 ~ 99 | RS422/485 |

F19 RS control

| | | |
|---|---|---|
| 0 | NO | RS232C |
| 1 | YES | RS422 |
| 2 | YES | RS485 |

F20 Output format

0 Response
1 No response
2 UFC
3 MT

# 12 Option

## 12.1 OP-02 (Battery)

### 12.1.1 Using the OP-02 SLA Battery

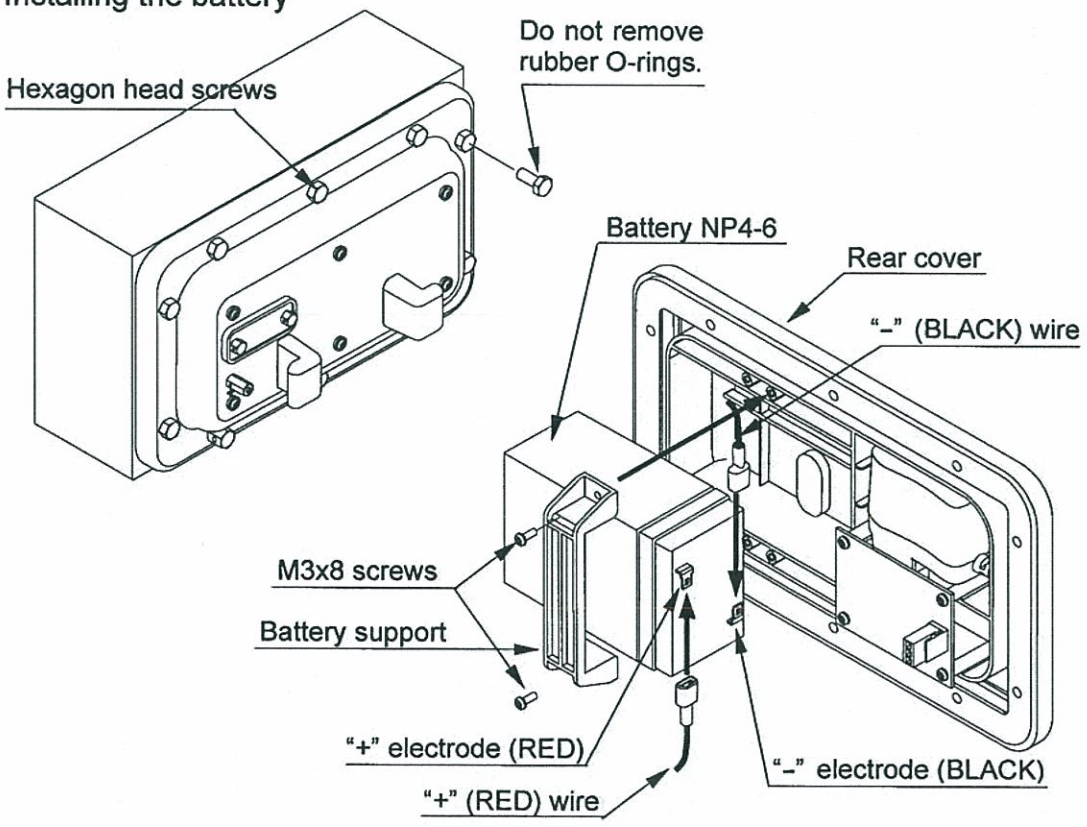
- The scale can be operated with an SLA (Sealed Lead Acid) battery that will be commercially available.
- The scale (with no other options) can be operated with a fully charged battery for;

  LCD backlight OFF and Comparator light OFF: approximately 80 hours
  LCD backlight OFF and Comparator light ON: approximately 55 hours
  LCD backlight ON and Comparator light ON: approximately 25 hours

- The battery will take about 15 hours to be fully charged.
- The battery life will vary depending on how the scale is used, the ambient temperature and so on.

- Use a Yuasa Battery NP4-6 (6V, 4Ah).
- There will be risk of explosion if the battery is connected improperly or replaced with the incorrect type.
- Dispose of a used battery according to the local laws and regulations.

Installing the battery



1. Disconnect the main power cord from the outlet.
2. Remove the ten hexagon head screws and open the rear cover.

⚠ ***Take care not to drop the rear cover or the wires connecting between front display and rear cover will be damaged.***

3. Loosen the screws fixing the battery support and remove it.
4. Connect the wires inside the display pod to the battery.

⚠ ***Be sure to connect RED wire to positive (+ / RED) terminal and BLACK wire to negative (- / BLACK) terminal. Or there is a risk of explosion.***

5. Place the battery into the rear cover and fix with screws and battery support that removed at step 3 above.
6. Attach the rear cover to the front display firmly using the ten hexagon head bolts.
7. Connect the main power cord to the outlet.
8. Press the [ON/OFF] key and check that the scale works normally.
9. Disconnect the main power cord again and check that the scale still works.

## Charging the battery

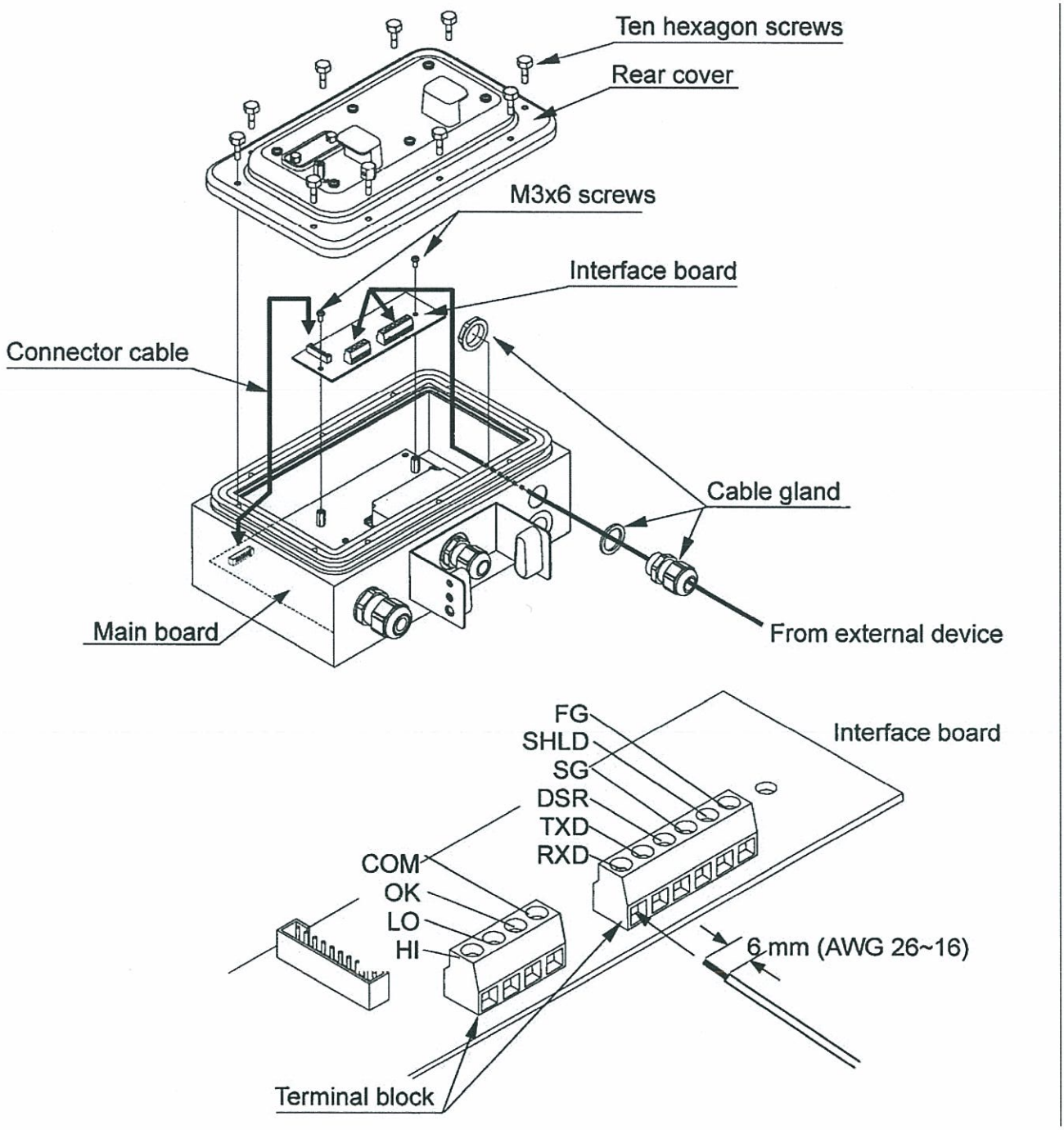
- ❑ When the weight display shows "Lb I", the battery voltage is low in voltage and should be recharged. Connect the main power cord to the outlet. The charging process will start while the scale is powered on or not.
- ❑ When the battery is getting close to the low battery, the annunciator (PRECAUTION AGAINST LOW BATTERY) will come on. Prepare to charge the battery.
- ❑ The scale can be used while the battery is charging. After fully charged, the scale will change the charging process to trickle charge automatically.
- ❑ The battery cannot be charged with the OP-04 in operation. Turn the power off to charge.
- ❑ ***Charge the battery at a temperature between 0°C (32°F) and 40°C (104°F). Preferably 5°C (41°F) ~ 35°C (95°F) is recommended.***
- ❑ ***Charge the battery when using for the first time.***
- ❑ ***The battery must be recharged regularly if the scale is not used for a long period of time. Every 3 months in a warmer area and every 6 months in a cooler area will be needed.***

## 12.2 OP-03 (RS-232C/Relay output)

This interface allows the FS-*i* series to be connected with a multifunction printer or a personal computer, and the relay outputs for comparator result are obtained.

- ❑ The OP-03 unit includes an interface board, a connector cable, a cable gland and two screws (M3x6).

### 12.2.1 Installation



1. Disconnect the main power cord from the outlet.
2. Remove the ten hexagon screws and open the rear cover.
3. Connect the cable from external device through the cable gland to the terminal blocks on the interface board. Also connect a yellow/green wire inside the display pod directly to "FG" on the terminal block.

⚠ ***Take care not to drop the rear cover or the wires connecting between front display and rear cover will be damaged.***

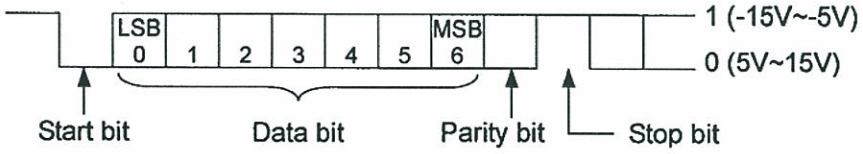
4. Connect the connector cable included in the OP-03 to the connectors on the interface board and the main board inside the display pod.
5. Fix the interface board with 2 M3 x 6 screws included in the OP-03.
6. Tighten the cable gland and attach the rear cover to the front display firmly using the ten hexagon bolts.
7. Connect the main power cord to the outlet.
8. Set the function parameters F04, F05, F06, F18, F19 and F20 according your application.

❑ *The OP-03 RS-232C must have settings F18-00 and F19-0.*

### 12.2.2 OP-03 Specifications

#### RS-232C Specification

| | | |
|---|---|---|
| Transmission form | Asynchronous, bi-directional, half-duplex | |
| Data format | Baud rate: | 2400, 4800, 9600 bps |
| | Data: | 7 bits + parity 1bit (even / odd) or 8 bits (non-parity) |
| | Start bit: | 1 bit |
| | Stop bit: | 1 bit |
| | Code: | ASCII |
| | Terminator: | $C_RL_F$ |

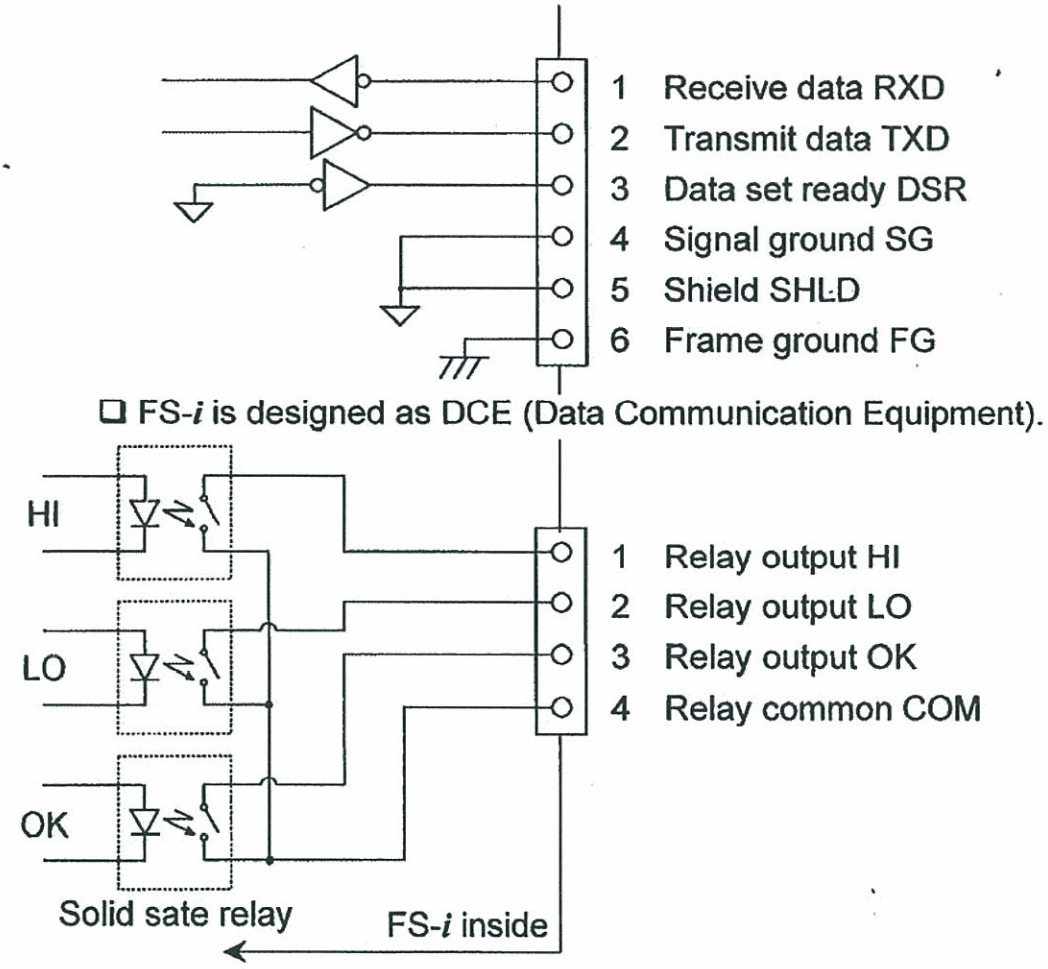



#### Maximun rating of the Relau Outoput

The maximum rating of the replay output is as follows.

- ❑ Maximum voltage: 50V DC
- ❑ Maximum current: 100 mA DC
- ❑ Maximum ON resistance: 8 Ω

## Circuit diagram

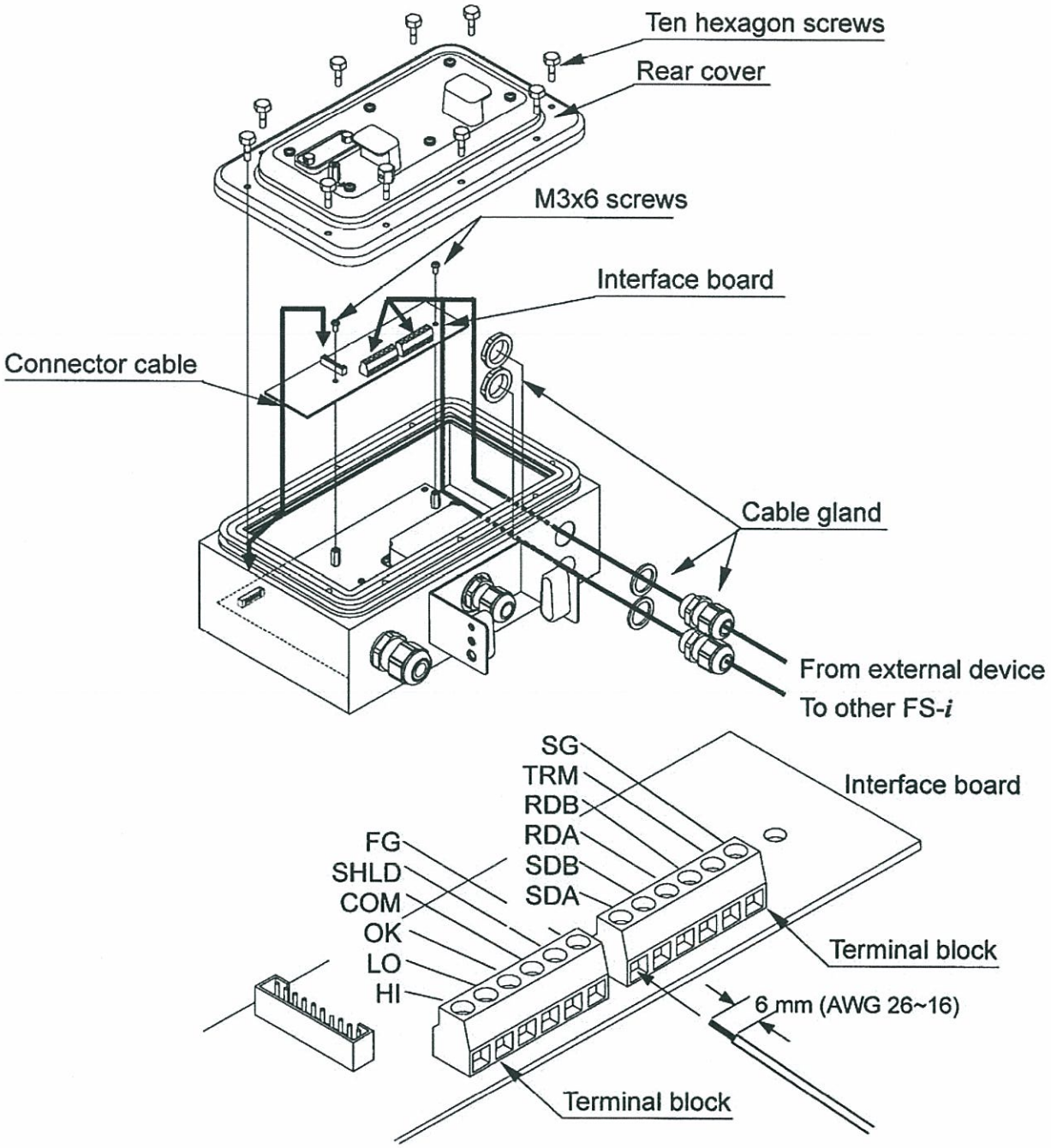


## 12.3 OP-04 (RS-422/485/Relay output)

This interface allows a personal computer to connect and control up to 16 FS-I scales and the relay outputs for comparator result are abtained.

- The OP-04 unit includes an interface board, a connector cable, two cable glands and two screws (M3x6).
- The relay output specifications are same as the OP-03. See " 12.2.2 OP-03 Specifications"

### 12.3.1 Installation

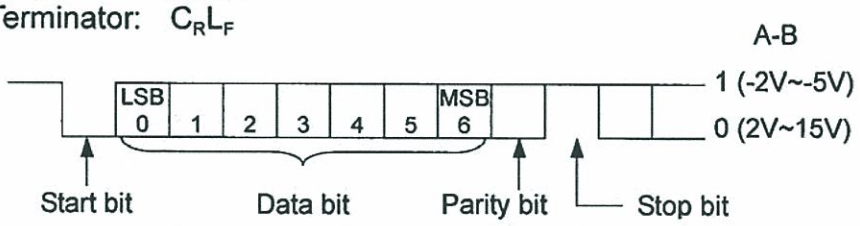


- Installation is similar to the OP-03. See "12.2.1 Installation"
- Set the function parameters F04, F05, F06, F18, F19 and F20 according your application.
- The function setting F19-1 must be set for RS-422 and F19-2 must be RS-485. To connect more than one scale with comparator, set a different address to each scale by F18-##

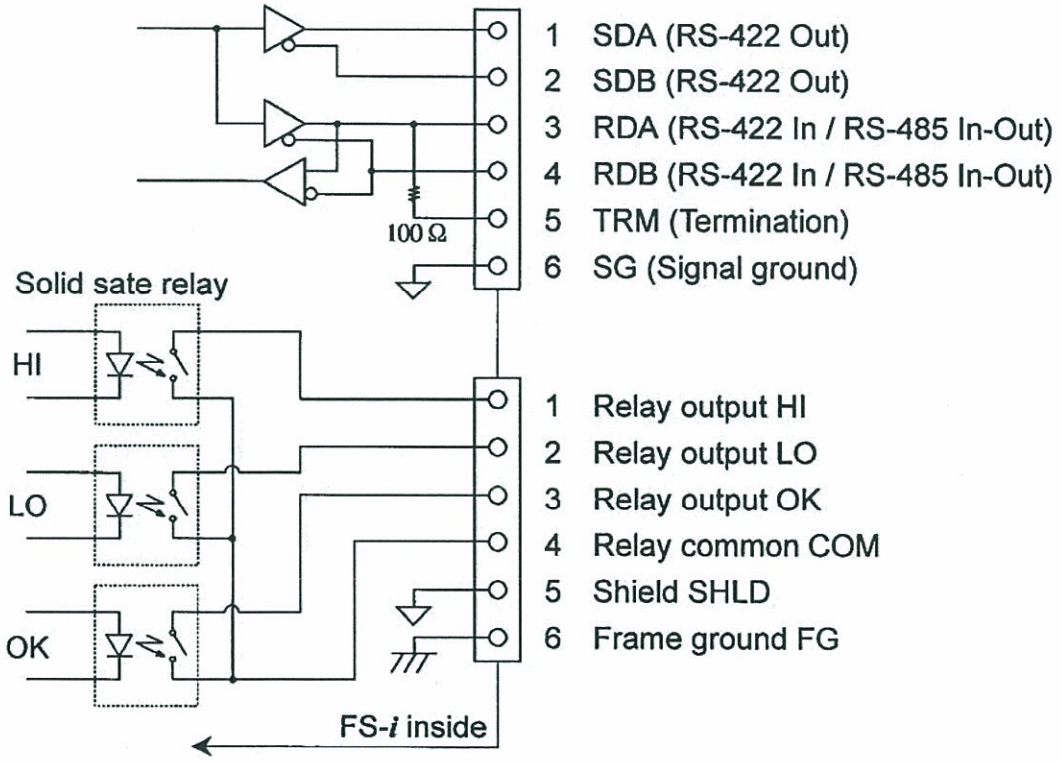
### 12.3.2 OP-04 Specifications

#### RS-422/485 Specifications

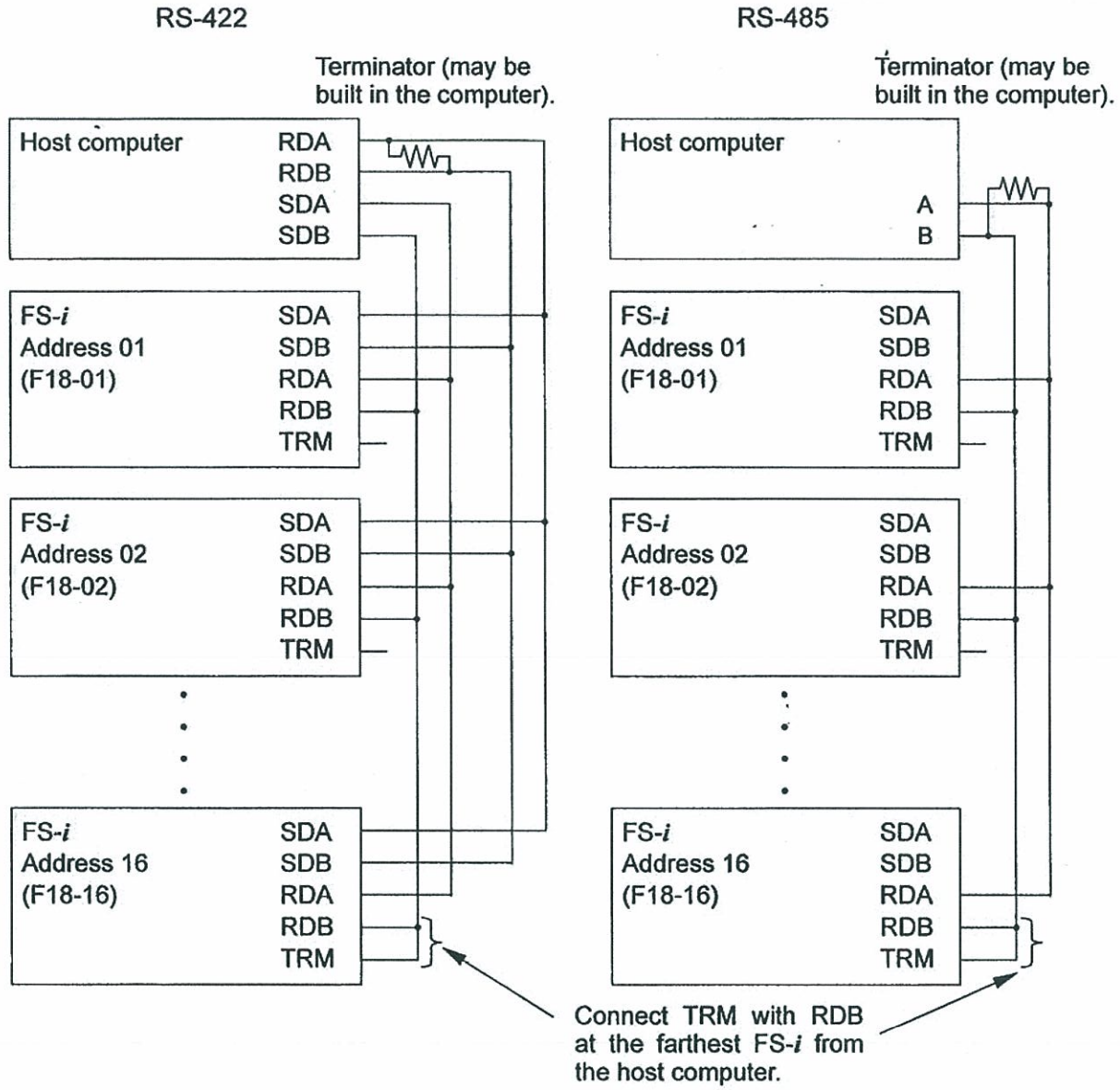
| | | |
|---|---|---|
| Transmission form | Asynchronous, bi-directional, half-duplex | |
| Data format | Baud rate: | 2400, 4800, 9600 bps |
| | Data: | 7 bits + parity 1bit (even / odd) or 8 bits (non-parity) |
| | Start bit: | 1 bit |
| | Stop bit: | 1 bit |
| | Code: | ASCII |
| | Terminator: | $C_RL_F$ |




#### Circuit diagram

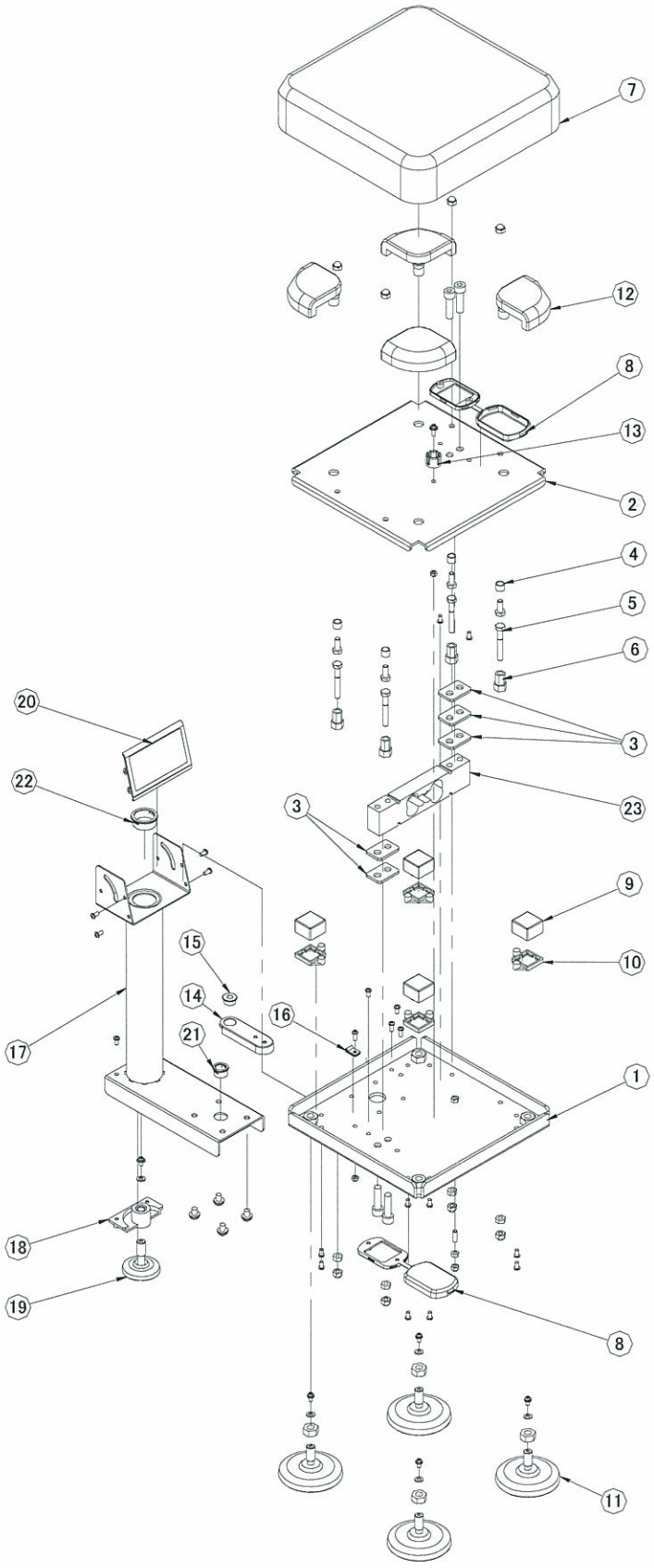


## Example of connection

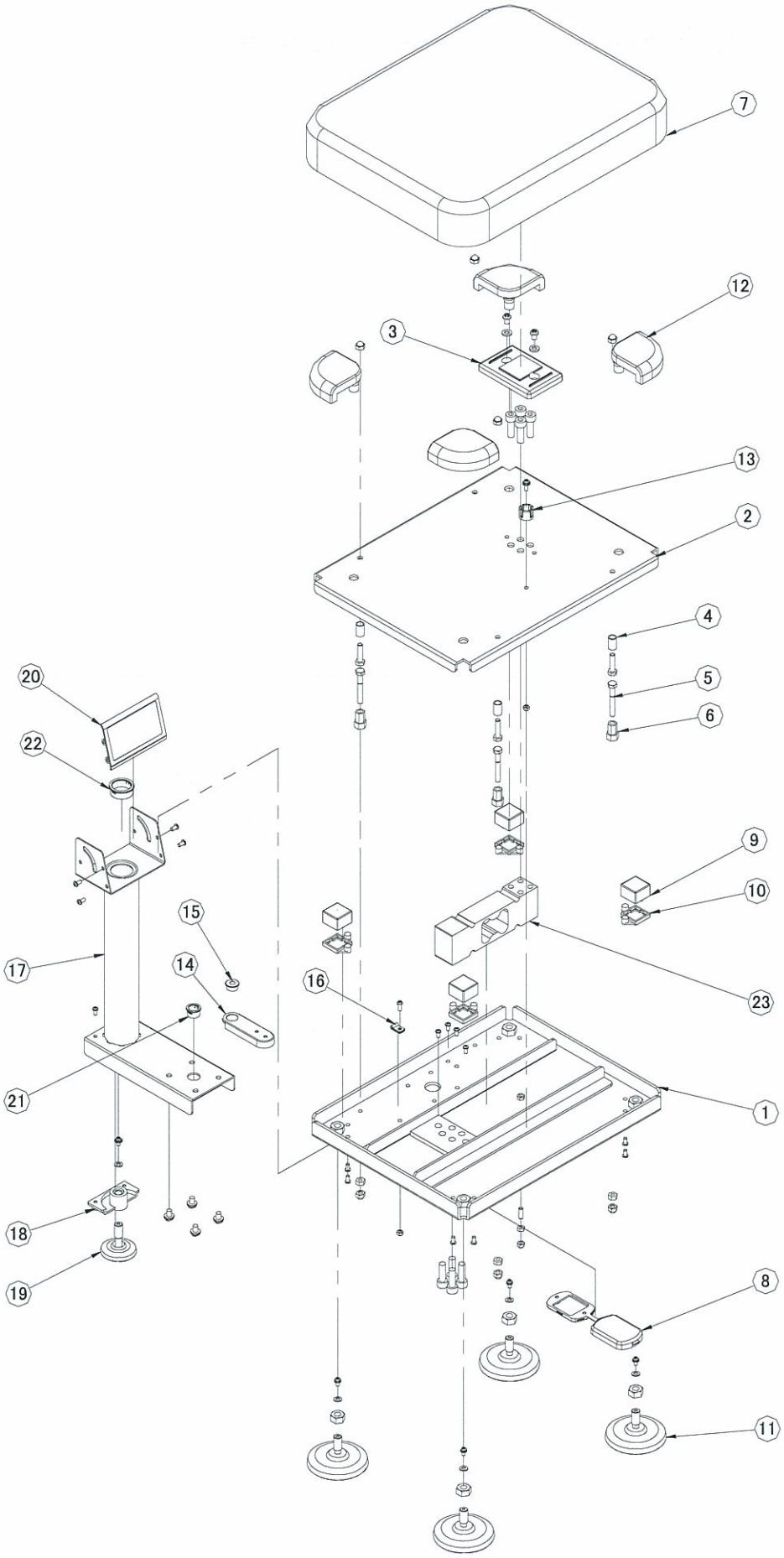



❑ The polarity (A, B) of the host computer signal depends on model. Check the technical manual of the computer.

# 13 Exploded View and Parts List



| No. | Stock No. | Description | Quantity |
|---|---|---|---|
| 1 | 1043009061 | BASE(S) | 1 |
| 2 | 1043009060 | PAN SUPPORT(S) | 1 |
| 3 | 1044018790 | SPACER(S) | 5 |
| 4 | 1054018787-2 | COLLAR 8 | 4 |
| 5 | 1054018788 | STOPPER BOLT | 4 |
| 6 | 1074018789 | STOPPER COVER | 4 |
| 7 | 1043003955 | PAN(S) | 1 |
| 8 | 1073008853 | CELL COVER | 2 |
| 9 | 1074018398 | LEVEL FOOT CASE | 4 |
| 10 | 1074018399A | LEVEL FOOT BASE | 4 |
| 11 | 1073008855 | LEVEL FOOT 76 | 4 |
| 12 | 1073008851A | CORNER PAD FS | 4 |
| 13 | 1064018396 | CARBON CAP | 1 |
| 14 | 1074018397 | LEVEL VIAL HOLDER | 1 |
| 15 | 110MR14 | LEVEL VIAL MR14 | 1 |
| 16 | 110NK-3N | CABLE CRAMP | 1 |
| 17 | 1043009062 | POLE ASSY | 1 |
| 18 | 1073008856 | FOOT HOLDER | 1 |
| 19 | 1074018400 | LEVEL FOOT 45 | 1 |
| 20 | 1073008854 | POLE BRACKET COVER | 1 |
| 21 | 110DASB-625-8 | CABLE BUSH | 1 |
| 22 | 110DASB-1000-14 | CABLE BUSH | 1 |
| 23 | | LOAD CELL | 1 |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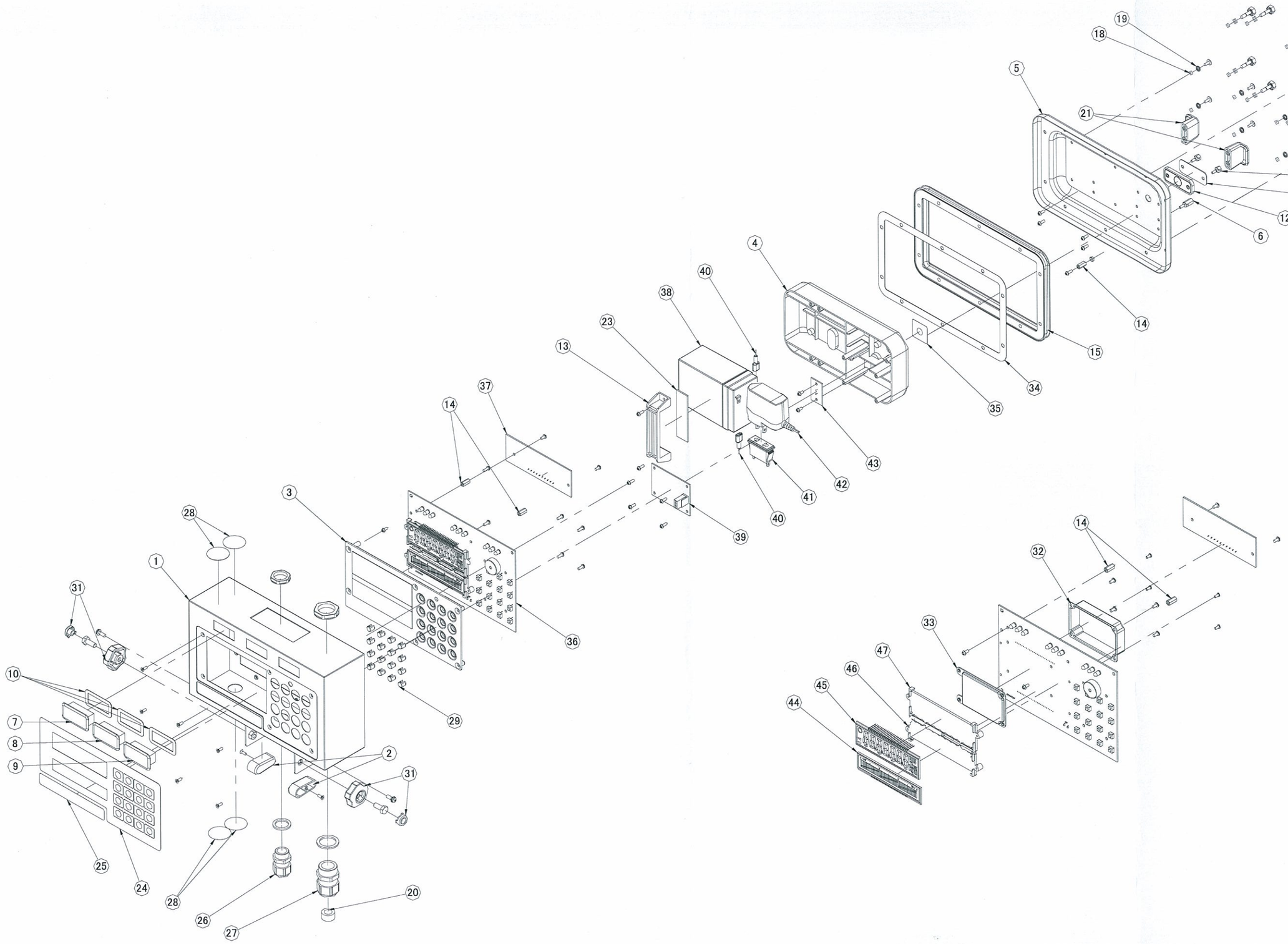
| No. | Stock No. | Description | Quantity |
|---|---|---|---|
| 1 | 1043009059 | BASE(M) | 1 |
| 2 | 1043009058A | PAN SUPPORT(M) | 1 |
| 3 | 1073008852B | CENTER PAD FS | 1 |
| 4 | 1054018787-1 | COLLAR 16 | 4 |
| 5 | 1054018788 | STOPPER BOLT | 4 |
| 6 | 1074018789 | STOPPER COVER | 4 |
| 7 | 1043007268 | PAN-SUS304 | 1 |
| 8 | 1073008853 | CELL COVER | 1 |
| 9 | 1074018398 | LEVEL FOOT CASE | 4 |
| 10 | 1074018399A | LEVEL FOOT BASE | 4 |
| 11 | 1073008855 | LEVEL FOOT 76 | 4 |
| 12 | 1073008851A | CORNER PAD FS | 4 |
| 13 | 1064018396 | CARBON CAP | 1 |
| 14 | 1074018397 | LEVEL VIAL HOLDER | 1 |
| 15 | 110MR14 | LEVEL VIAL MR14 | 1 |
| 16 | 110NK-3N | CABLE CRAMP | 1 |
| 17 | 1043009062 | POLE ASSY | 1 |
| 18 | 1073008856 | FOOT HOLDER | 1 |
| 19 | 1074018400 | LEVEL FOOT 45 | 1 |
| 20 | 1073008854 | POLE BRACKET COVER | 1 |
| 21 | 110DASB-625-8 | CABLE BUSH | 1 |
| 22 | 110DASB-1000-14 | CABLE BUSH | 1 |
| 23 | | LOAD CELL | 1 |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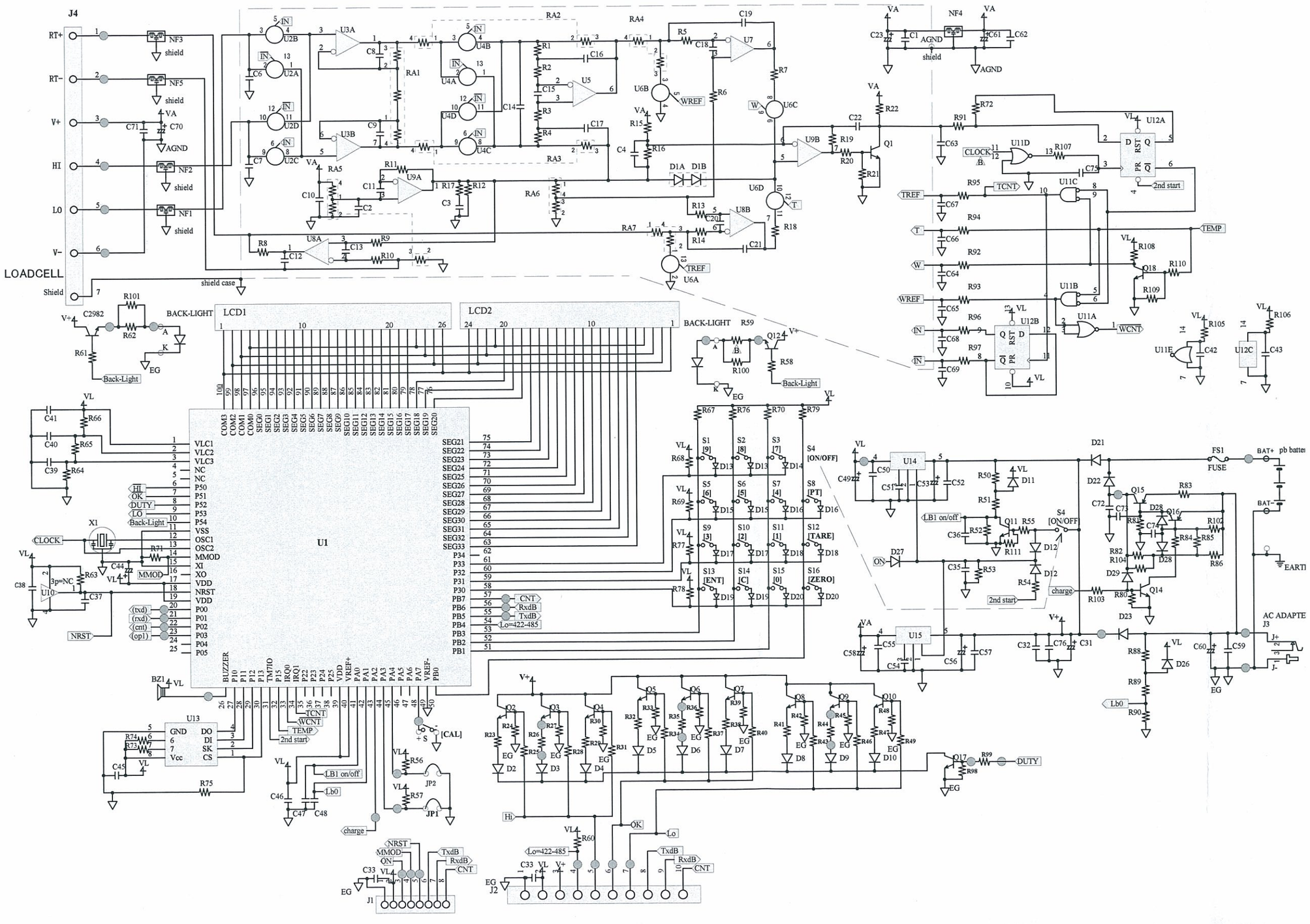
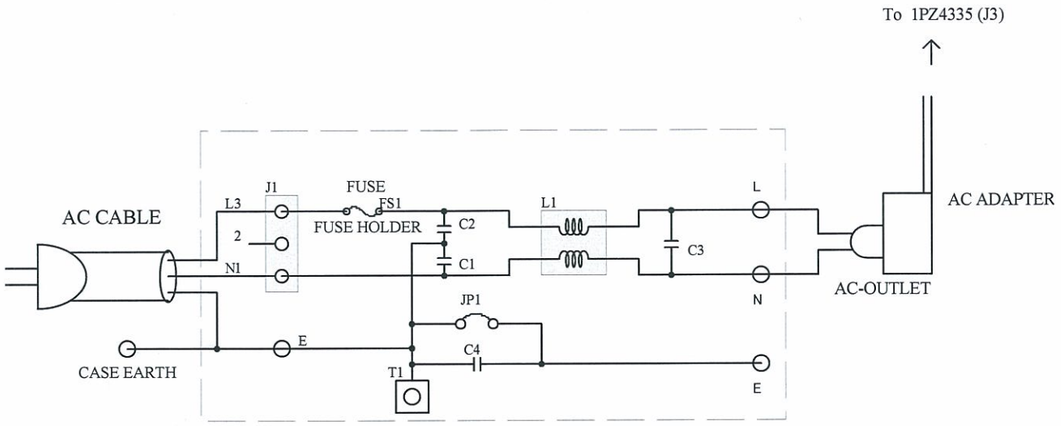
| No. | Stock No. | Description | Quantity |
|---|---|---|---|
| 1 | 1042001151 | FRONT CASE | 1 |
| 2 | 1074018362 | BOLT CAP | 2 |
| 3 | 1072001153A | PCB CHASSIS | 1 |
| 4 | 1072001154A | INLET HOLDER | 1 |
| 5 | 1042001152 | REAR CASE | 1 |
| 6 | 1054018373 | EARTH BOLT | 1 |
| 7 | 1073008825-1 | LED LENS A | 1 |
| 8 | 1073008825-2 | LED LENS B | 1 |
| 9 | 1073008825-3 | LED LENS C | 1 |
| 10 | 1084018374A | LENS TAPE | 3 |
| 11 | 1044018360 | CAL COVER | 1 |
| 12 | 1064018365 | CAL COVER PACKING | 1 |
| 13 | 1074018361 | BATTERY HOLDER | 2 |
| 14 | 1054018371 | 12mm SPACER M3 | 3 |
| 15 | 1063008826 | MAIN PACKING | 1 |
| 16 | 1054008782 | WP BOLT | 9 |
| 17 | 1064008666 | O-RING( $\phi$ 5.5) | 10 |
| 18 | 110P3 | O-RING( $\phi$ 6x2.8x1.9) | 16 |
| 19 | 1044018366 | O-RING HOLDER M4 | 6 |
| 20 | 1064018370 | ST-16 INNER PACKING | 1 |
| 21 | 1074018364 | CABLE HOOK | 2 |
| 22 | 1054008627 | SEALING BOLT | 1 |
| 23 | 1064018375 | BATTERY SPONJI | 1 |
| 24 | | KEY SHEET | 1 |
| 25 | | MODEL LABEL | 1 |
| 26 | 110DACL 11 | CABLE GLAND DACL 11 | 1 |
| 27 | 110DACL 16 | CABLE GLAND DACL 16 | 1 |
| 28 | 1084014720 | BLANK SEAL B | 4 |
| 29 | 1074016820 | KEY TOP | 16 |
| 30 | 54008881 | CAL SCREW | 2 |
| 31 | 110M6KNOB | SUPER KNOB | 2 |
| 32 | 1044005255 | SHIELD CASE A | 1 |
| 33 | 1043004953 | SHIELD CASE B | 1 |
| 34 | 1083008926 | MAIN PACKING TAPE | 1 |
| 35 | 1084012455A | CAL KEY SHEET | 1 |
| 36 | | MAIN PCB | 1 |
| 37 | | OPTION PCB | 1 |
| 38 | | BATTERY | 1 |
| 39 | | PS PCB | 1 |
| 40 | | BATTERY TERMINAL | 2 |
| 41 | | AC INLET | 1 |
| 42 | | AC ADAPTER | 1 |
| 43 | | CAL PCB | 1 |
| 44 | | BAR LCD | 1 |
| 45 | | SEG LCD | 1 |
| 46 | | BAR BACKLIGHT | 1 |
| 47 | | SEG BACKLIGHT | 1 |

# 14 Circuit diagram

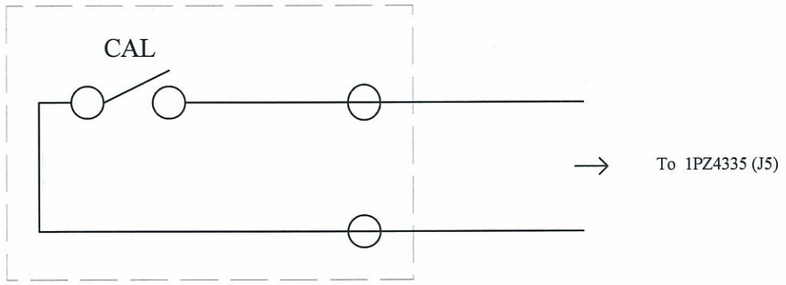
## 1PZ4335 Circuit diagram



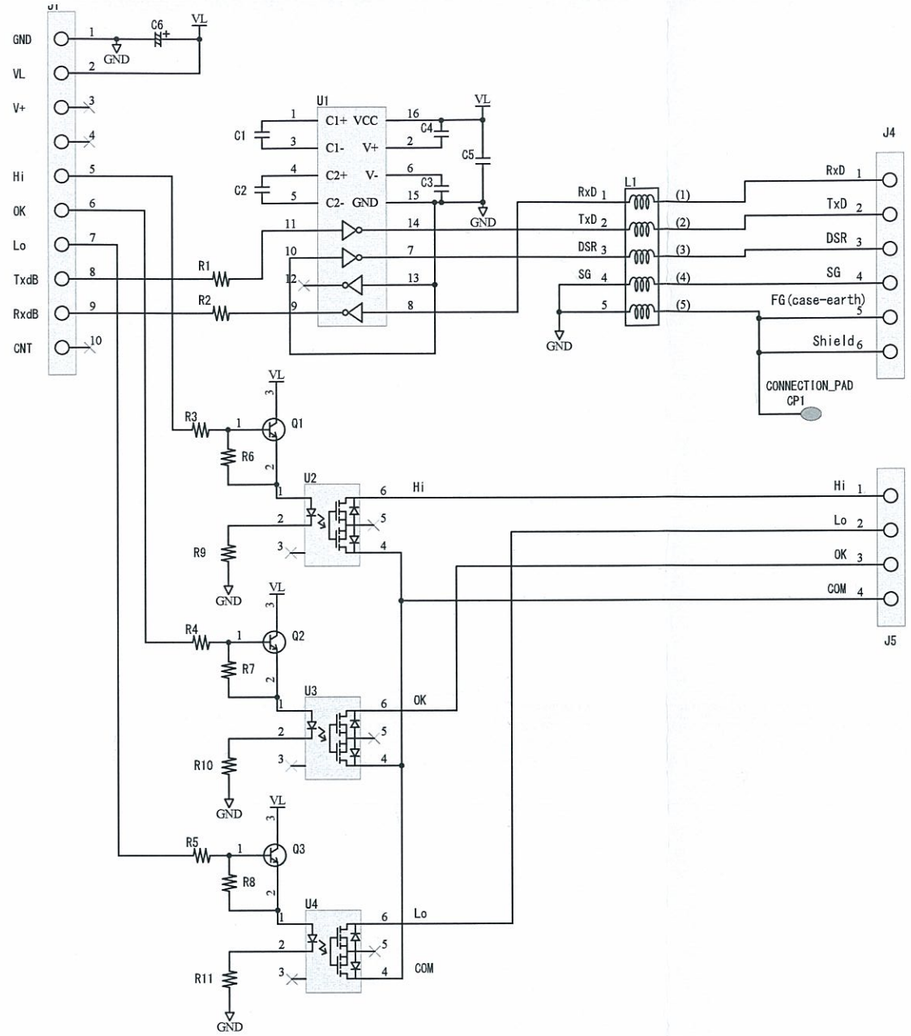
## 1PZ4336 Circuit diagram



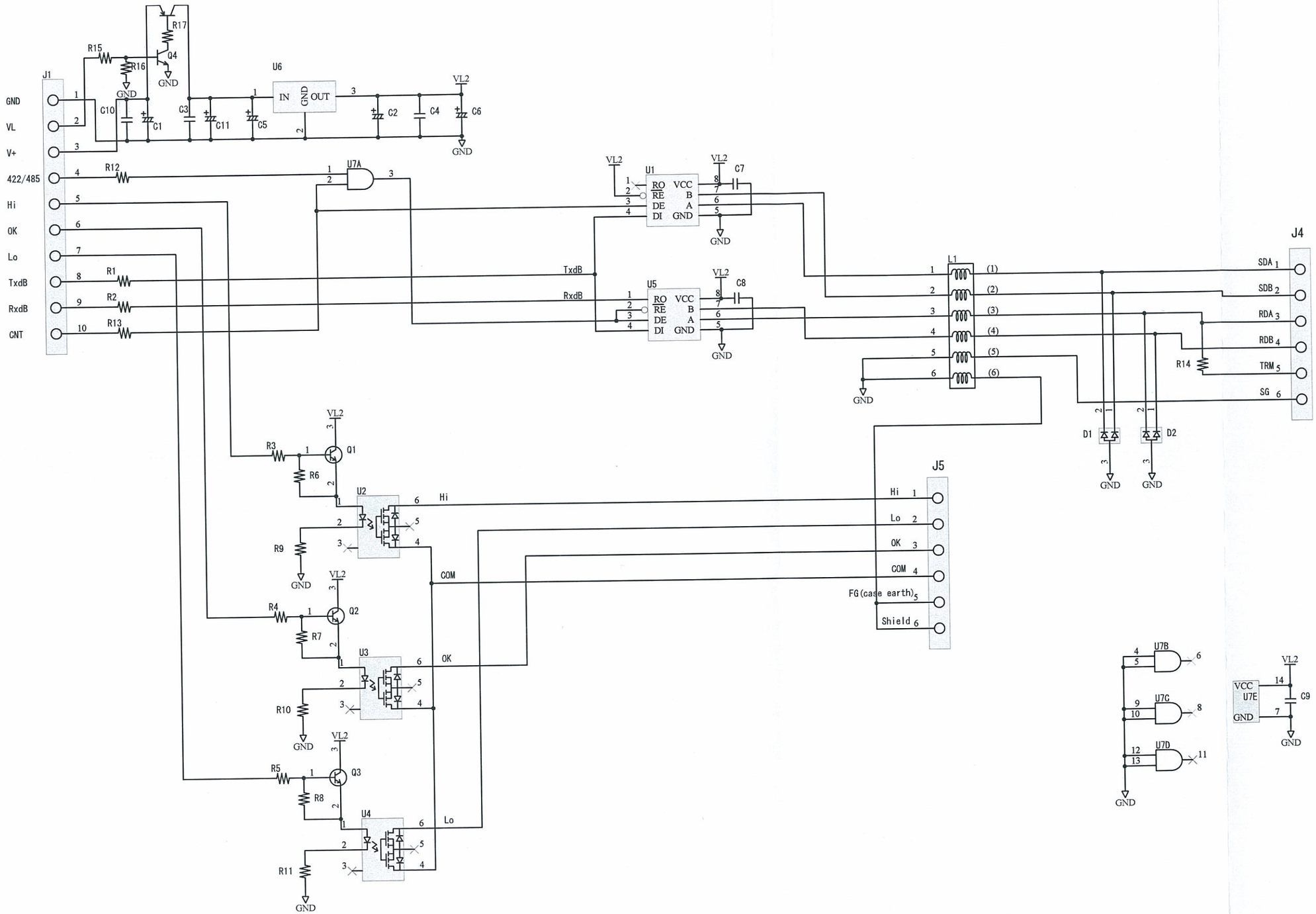

## 1PZ4337 Circuit diagram




## 1PZ4840 Circuit diagram

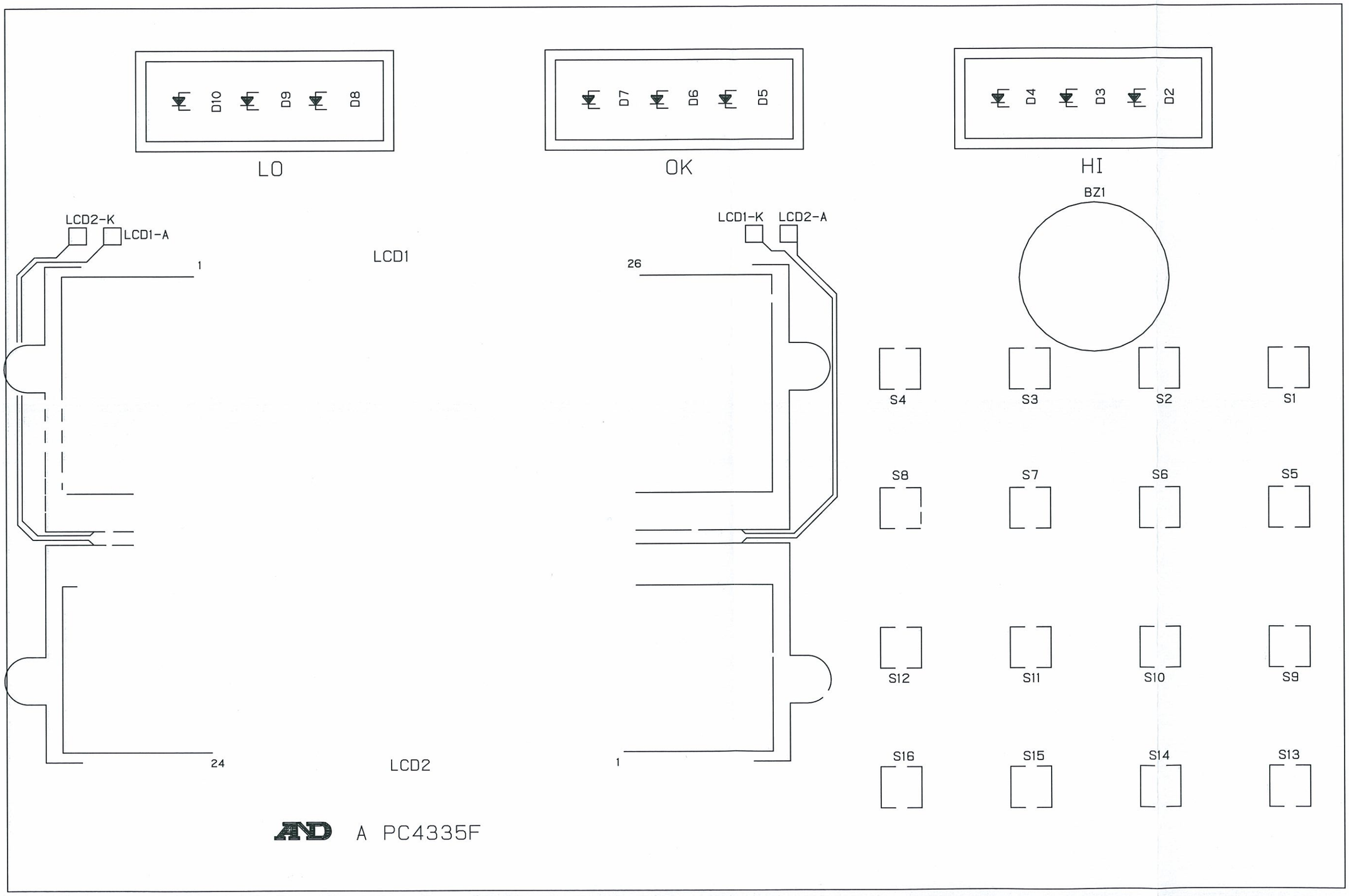


# 1PZ4841 Circuit diagram

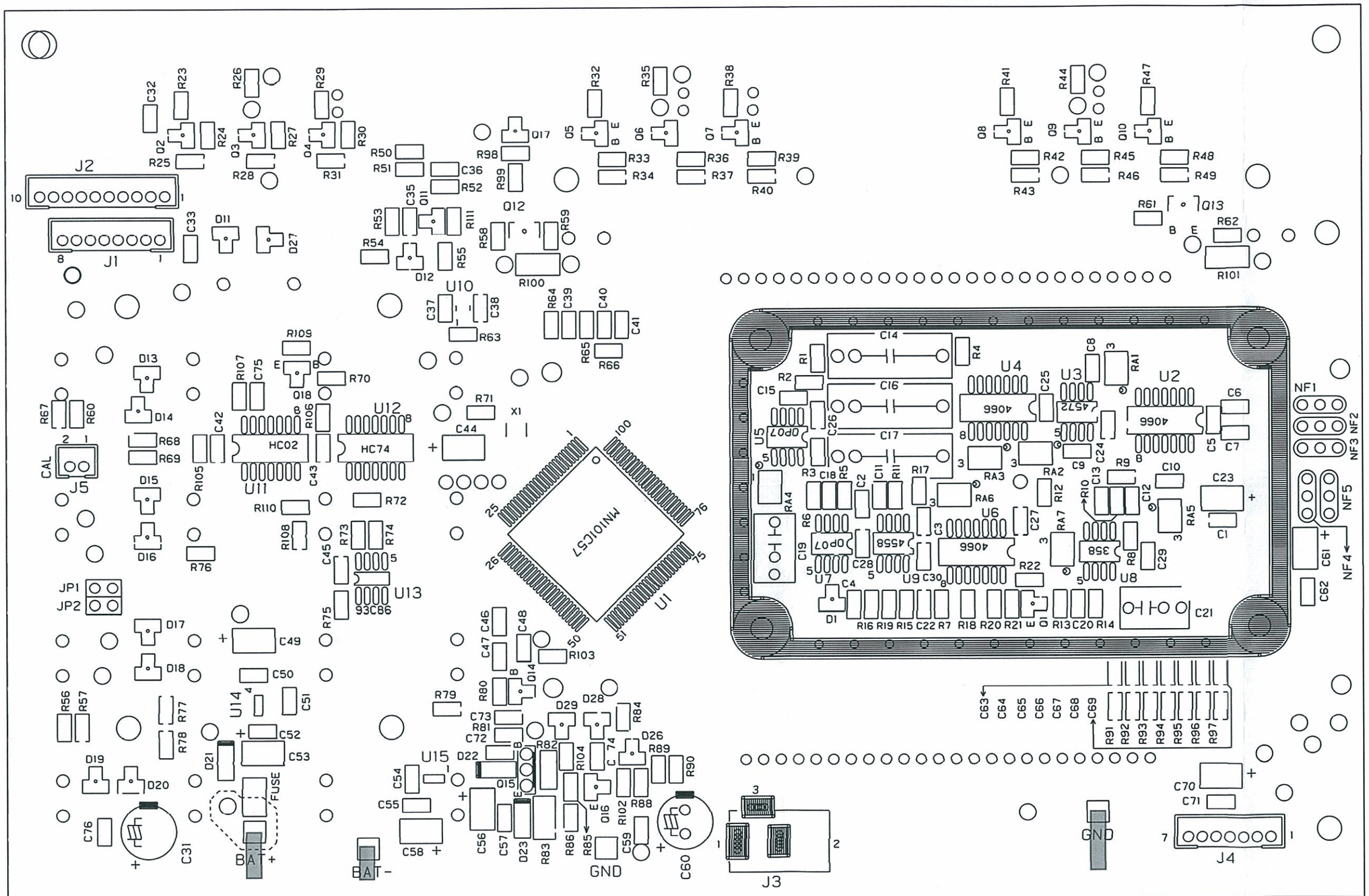


# 15 Parts layout and parts list

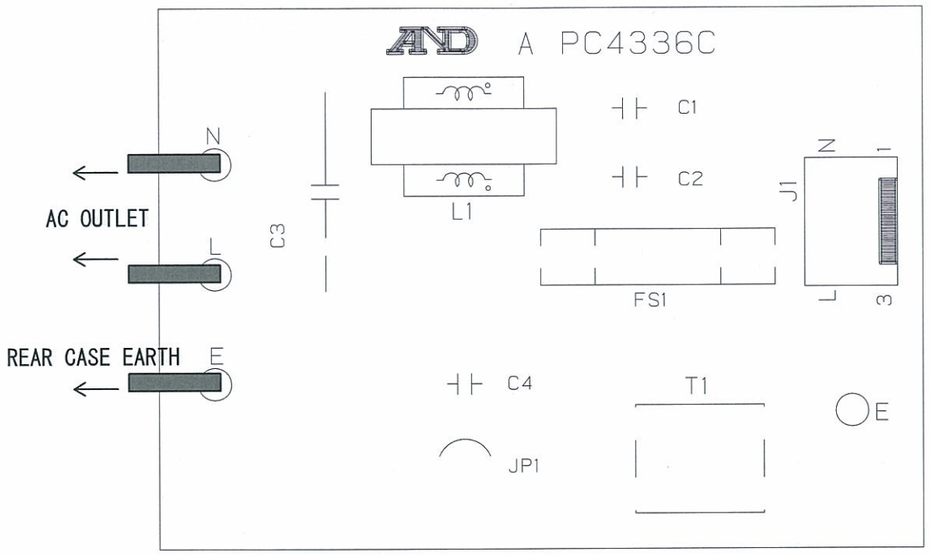
1PZ4335(1/2) Parts layout



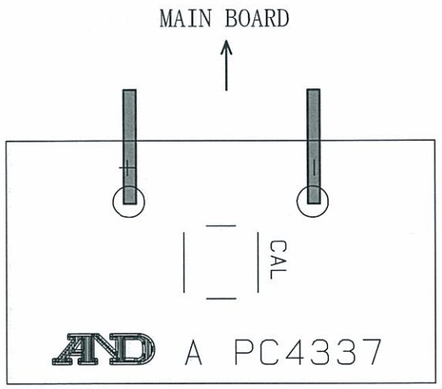
1PZ4335(2/2) Parts layout



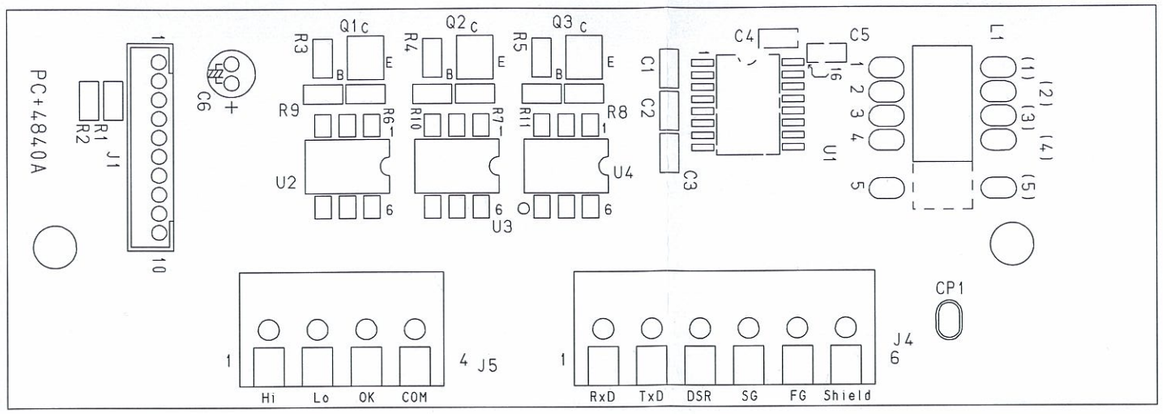
## 1PZ4336 Parts layout



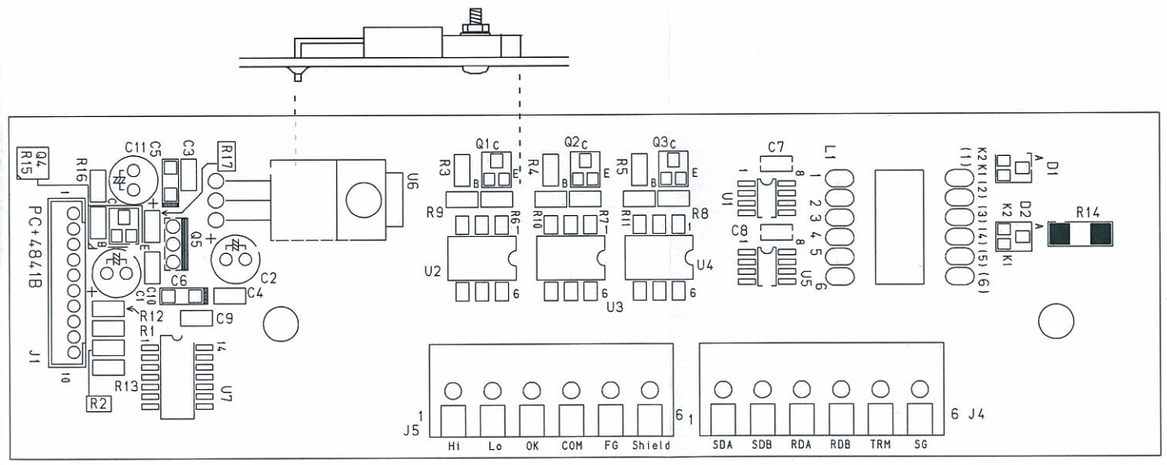

## 1PZ4337 Parts layout




## 1PZ4840 Parts layout




## 1PZ4841 Parts layout



| Symbol | Parts Name | Parts No. | Qty |
|---|---|---|---|
| | PCB | 1PC4335F | 1 |
| U1 | uCPU | 1UCMN101CF57DAF | 1 |
| U2,4,6 | ANALOG SWITCH | 1UC4066F | 3 |
| U3 | OP-AMP | 1UAC4572G | 1 |
| U5,7 | OP-AMP | 1UAOP07CS8 | 2 |
| U8 | OP-AMP | 1UAC358G2 | 1 |
| U9 | OP-AMP | 1UAC4558G2 | 1 |
| U10 | VOLTAGE DETECTOR 4V | 1UCS-80840ANNP | 1 |
| U11 | NOR GATE | 1UCHC02F | 1 |
| U12 | FLIP-FLOP | 1UCHC74F | 1 |
| U13 | EEPROM 16K | 1UC93C86 | 1 |
| U14,15 | REGULATOR 5V | 1URTAR5S50 | 2 |
| Q1,3,6,9,11,14,17,18 | TRANSISTOR | 1QTC2712Y-C | 8 |
| Q12,13 | TRANSISTOR | 1QTC2982B | 2 |
| Q15 | TRANSISTOR | 1QTA1242Y | 1 |
| Q16 | TRANSISTOR | 1QTA1162Y-C | 1 |
| D1 | DIODE | 1DI1SS226-C | 1 |
| D11～20,27 | DIODE | 1DI1SS184-C | 11 |
| D21～23 | DIODE | 1DIMA2H735 | 3 |
| D28 | DIODE | 1DI1SS181-C | 1 |
| D29 | DIODE | 1DZRD6.8MB2-C | 1 |
| BZ1 | BUZZER | 1ETKBS-20DB-4P0 | 1 |
| LCD1 | LCD (WEIGHT) | 1EDBSJ061 | 1 |
| LCD2 | LCD (BAR) | 1EDBRJ058 | 1 |
| | BACK LIGHT (WEIGHT) | 1EDBDJ057 | 1 |
| | BACK LIGHT (BAR) | 1EDBDJ056 | 1 |
| D3 | LED YELLOW (HI) | 1DLUY5366X | 1 |
| D6 | LED GREEN (OK) | 1DLUG5304X | 1 |
| D9 | LED RED (LO) | 1DLUR5366X | 1 |
| X1 | CERAMIC RESONATOR 20MHz | 1XTEFJC2005E5B | 1 |
| NF1～5 | EMI FILTER | 1NFEXCEMT102BC | 5 |
| J1 | CONNECTOR (FLASH) | 1JI08P-S2T2-EF | 1 |
| J2 | CONNECTOR (OPTION) | 1JI10P-S2T2-EF | 1 |
| J3 | DC-JACK | 1EJ0470-01-230 | 1 |
| J4 | CONNECTOR (L/C) | 1JI7P-S2T2-EF | 1 |
| J5 | CONNECTOR (CAL) | 1JI2P-S2T2-EF | 1 |
| S1～16 | SWITCH | 1SKEVQ21405R | 16 |
| C1,2,3,10,12,33,37,39～41, 45,46,50,55,71～73 | CAPACITOR (CERAMIC) 0.1u | 1CC0.1U25V-C | 17 |
| C5,24～30,35,36,38,42,43, 47,48,51,54,59,76 | CAPACITOR (CERAMIC) 0.01u | 1CC0.01U-C | 19 |
| C8,9 | CAPACITOR (CERAMIC) 3P | 1CC3P-C | 2 |
| C11,13,15,18,20,64～69 | CAPACITOR (CERAMIC) 100P | 1CC100P-C | 11 |
| C14,16,17 | CAPACITOR (POLYPROPYLENE) 0.022u | 1CPECWF2224JB | 3 |

| | | | |
|---|---|---|---|
| C19,21 | CAPACITOR (POLYPROPYLENE) 0.0022u | 1CPP1H223JZT | 2 |
| C23,44,49,58 | CAPACITOR (TANTALUM) 4.7u | 1CT1A4R7-C | 4 |
| C53,56 | CAPACITOR (TANTALUM) 1u | 1CT1V010-C | 2 |
| C60 | CAPACITOR (ALUMINUM) 100u/35V | 1CKSME35VB100 | 1 |
| C63 | CAPACITOR (CERAMIC) 47P | 1CC47P-C | 1 |
| C75 | CAPACITOR (CERAMIC) 22P | 1CC22P-C | 1 |
| R1,4 | RESISTOR (39K 1%) | 1RC1/10W3902F | 2 |
| R2,3,5,6,8～11,13,14,26, 35,86,91～97,107 | RESISTOR (100 5%) | 1RC1/10W101J | 21 |
| R7,18,28,37,44,46 | RESISTOR (220 5%) | 1RC1/10W221J | 6 |
| R15 | RESISTOR (22K 1%) | 1RC1/10W2202F | 1 |
| R16 | RESISTOR (9.1K 1%) | 1RC1/10W9101F | 1 |
| R17,58,61,62,105,106 | RESISTOR (10 5%) | 1RC1/10W100J | 6 |
| R20,53,55～57,60,67～70, 75～79,98,102,108～111 | RESISTOR (47K 5%) | 1RC1/10W473J | 21 |
| R21 | RESISTOR (18K 5%) | 1RC1/10W183J | 1 |
| R50 | RESISTOR (100K 1%) | 1RC1/10W1003F | 1 |
| R51 | RESISTOR (15K 1%) | 1RC1/10W1502F | 1 |
| R52 | RESISTOR (150K 1%) | 1RC1/10W1503F | 1 |
| R54 | RESISTOR (1K 5%) | 1RC1/10W102J | 1 |
| R59 | RESISTOR (15 5%) | 1RC1/10W150J | 1 |
| R63,80,81,103 | RESISTOR (4.7K 5%) | 1RC1/10W472J | 4 |
| R64～66 | RESISTOR (11K 1%) | 1RC1/10W1102F | 3 |
| R71,72,84,99 | RESISTOR (10K 5%) | 1RC1/10W103J | 4 |
| R83 | RESISTOR (1 5%) | 1RC1/2W1R0J | 1 |
| R104 | RESISTOR (120 5%) | 1RC1/10W121J | 1 |
| RA1 | RESISTOR (24.5K/1K/24.5K) | 1RFRR282 | 1 |
| RA2,3 | RESISTOR (100K/100K) | 1RFRR248 | 2 |
| RA4,7 | RESISTOR (44K/66K) | 1RFRR284 | 2 |
| RA5 | RESISTOR (12K/10K/11K) | 1RFRR286 | 1 |
| RA6 | RESISTOR (100/10K) | 1RFRR285 | 1 |
| | CORE (L/C)(ADAPTER) | 1LRDF-R-25A-M-A | 2 |
| BAT+ | CABLE (RED) | 1KO2882-1 | 1 |
| BAT- | CABLE (BLACK) | 1KO2882-2 | 1 |
| GND | CABLE (EARTH) | 1KO2436-035 | 1 |
| CAL | CABLE(CAL) | 1KO964-02S040 | 1 |
| FS1 | FUSE(2A) | 1FSCCP2E20 | 1 |
| | SHIELD CASE (UP) | 1044005255 | 1 |
| | SHIELD CASE (DOWN) | 1043004953 | 1 |

## 1PZ4336

| Symbol | Parts Name | Parts No. | Qty |
|---|---|---|---|
| FS1 | FUSE | 1FSEAWK-315MA | 1 |
| | FUSE HOLDER | 1FHD504-ADK | 2 |
| L1 | INDUCTOR | 1LLSU9V-02080 | 1 |
| C1,2,4 | CAPACITOR (CERAMIC) | 1CC0.001U2KV | 3 |
| C3 | CAPACITOR (FILM) | 1CME2A104MW | 1 |
| J1 | CONNECTOR | 1JTLW1143-03ADK | 1 |
| T1 | PCB TERMINAL | 1TMF4050AS | 1 |
| | PCB | 1PC4336C | 1 |
| N | CABLE (N) | 1KB1-020007BU44 | 1 |
| L | CABLE (L) | 1KB1-020005BN44 | 1 |
| E | CABLE (E) | 1KO2436-008 | 1 |

## 1PZ4337

| Symbol | Parts Name | Parts No. | Qty |
|---|---|---|---|
| | PCB | 1PC4337 | 1 |
| CAL | SWITCH | 1SKSKHHAK | 1 |

## 1PZ4840

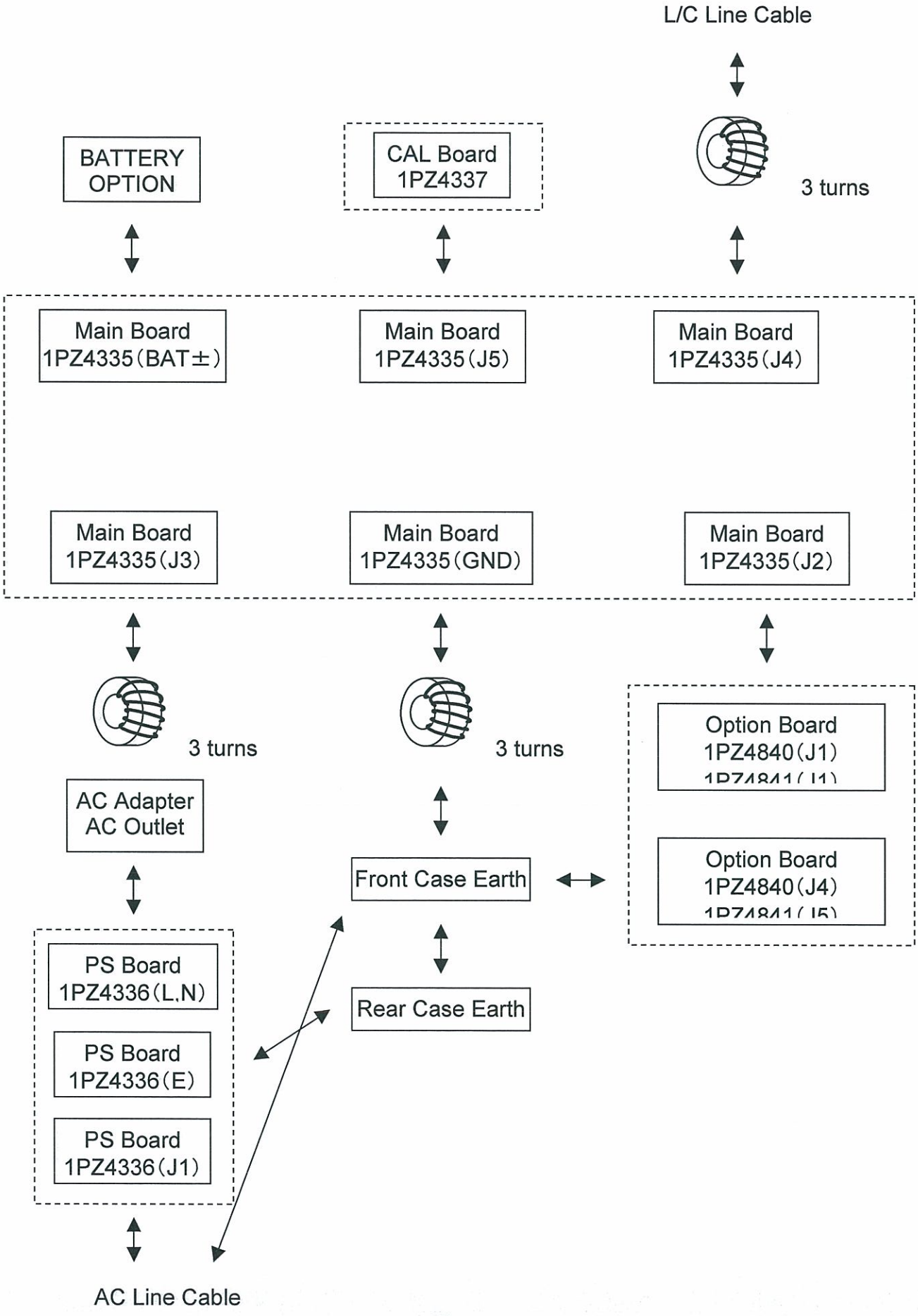
| Symbol | Parts Name | Parts No. | Qty |
|---|---|---|---|
| | PCB | 1PC4840A | 1 |
| R1～5 | RESISTOR (100 5%) | 1RC1/10W101J | 5 |
| R6～8 | RESISTOR (56K 5%) | 1RC1/10W563J | 3 |
| R9～11 | RESISTOR (560 5%) | 1RC1/10W561J | 3 |
| C1～5 | CAPACITOR (CERAMIC) 1u/50V | 1CC1U50V-C | 5 |
| U1 | RS232C DRIVE IC | 1UCMAX232CWE | 1 |
| U2～4 | PHOTO MOS RELAY | 1DFAQV253HA | 3 |
| J1 | CONNECTOR | 1JI10P-S2T2-EF | 1 |
| J4 | TERMINAL (6P) | 1TMMKDSN1.5/6 | 1 |
| J5 | TERMINAL (4P) | 1TMMKDSN1.5/4 | 1 |
| L1 | CORE | 1LRBFR120507ADK | 1 |
| Q1～3 | TRANSISTOR | 1QTC2712Y-C | 3 |
| 1 | CABLE (BROWN) | 1KB1-030011BN44 | 1 |
| 2 | CABLE (RED) | 1KB1-030011RD44 | 1 |
| 3 | CABLE (ORANGE) | 1KB1-030011OG44 | 1 |
| 4 | CABLE (YELLOW) | 1KB1-030011YW44 | 1 |
| 5 | CABLE (BLACK) | 1KB1-030011BK44 | 1 |

1PZ4841

| Symbol | Parts Name | Parts No. | Qty |
|---|---|---|---|
| | PCB | 1PC4841B | 1 |
| R1～5,12,13 | RESISTOR (100 5%) | 1RC1/10W101J | 7 |
| R6～8,15 | RESISTOR (56K 5%) | 1RC1/10W563J | 4 |
| R9～11 | RESISTOR (560 5%) | 1RC1/10W561J | 3 |
| R14 | RESISTOR (100 5%) | 1RC1/2W101J | 1 |
| R16 | RESISTOR (12K 5%) | 1RC1/10W123J | 1 |
| R17 | RESISTOR (3.3K 5%) | 1RC1/10W332J | 1 |
| C1,2,11 | CAPACITOR (ALUMINUM) 100u/16V | 1CKSME16VB100 | 3 |
| C3,4,10 | CAPACITOR (CERAMIC) 1u/50V | 1CC1U50V-C | 3 |
| C5,6 | CAPACITOR (TANTALUM) 4.7u | 1CT1A4R7-C | 2 |
| C7～9 | CAPACITOR (CERAMIC) 0.1u/25V | 1CC0.1U25V-C | 3 |
| U1,5 | TRANSCEIVER | 1UCLTC1484CS8 | 2 |
| U2～4 | PHOTO MOS RELAY | 1DFAQV253HA | 3 |
| U6 | REGULATOR 5V | 1UR24M05HF | 1 |
| U7 | NAND GATE | 1UCHC08F | 1 |
| Q1～4 | TRANSISTOR | 1QTC2712Y-C | 4 |
| Q5 | TRANSISTOR | 1QTA1242Y | 1 |
| D1,2 | DIODE | 1DZRD6.2Z-C | 2 |
| J1 | CONNECTOR | 1JI10P-S2T2-EF | 1 |
| J4,5 | TERMINAL (6P) | 1TMMKDSN1.5/6 | 2 |
| L1 | CORE | 1LRBFR120507ADK | 1 |
| | PAN HEAD SEMS M3x10 | 11701SX-N3X10 | 1 |
| | HEX NUT M3 | 11703-11-SX3 | 1 |
| | WASHER M3 | 11704-21-BN3 | 1 |
| 1 | CABLE (BROWN) | 1KB1-030011BN44 | 1 |
| 2 | CABLE (RED) | 1KB1-030011RD44 | 1 |
| 3 | CABLE (ORANGE) | 1KB1-030011OG44 | 1 |
| 4 | CABLE (YELLOW) | 1KB1-030011YW44 | 1 |
| 5,6 | CABLE (BLACK) | 1KB1-030011BK44 | 2 |

| Symbol | Parts Name | Parts No. | Qty |
|---|---|---|---|
| | AC OUTLET | 1JSDCZ-01 | 1 |
| | AC ADAPTER | 1TB230 | 1 |
| | AC CABLE (A PLUG) | 1KO3008 | 1 |
| | AC CABLE (C PLUG) | 1KO3009 | (1) |
| | AC CABLE (BF PLUG) | 1KO3010 | (1) |
| | AC CABLE (S PLUG) | 1KO3011 | (1) |
| | EARTH WASHER | 1044020208 | 1 |
| | EARTH CABLE (CASE) | 1KO2561-013O3O3 | 1 |
| | EARTH CABLE (OPTION) | 1KO2561-025O3B7 | 1 |
| | CABLE THAILAND BASE | 110DAMB10 | 1 |
| | PAN HEAD W-SEMS M3x8 | 11702FN-S3×8 | 1 |

# 16 Wiring Diagram

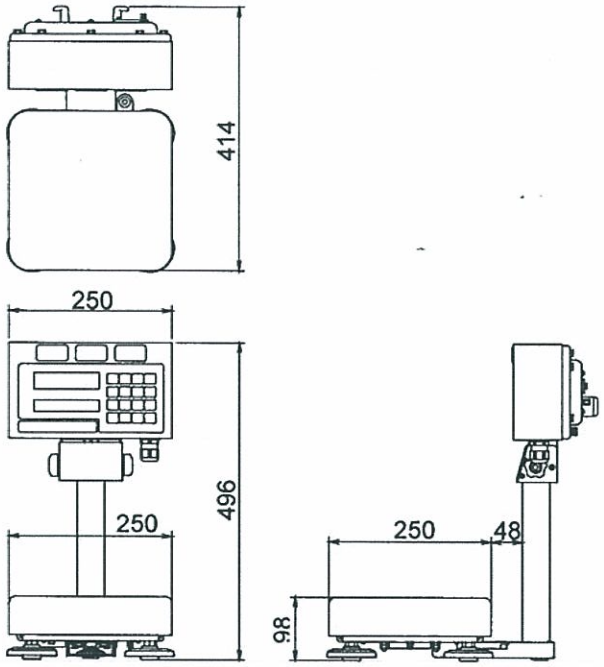


# 17 Specifications

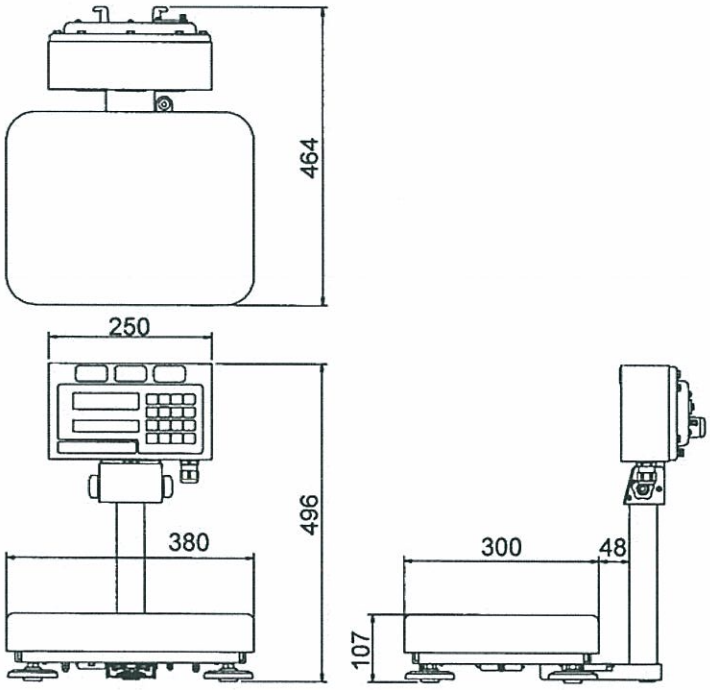
| MODEL | | FS-6Ki | FS-15Ki | FS-30Ki |
|---|---|---|---|---|
| kg | Capacity | 6 | 15 | 30 |
| | Min. display | 0.002* | 0.005* | 0.01* |
| | | 0.001 | 0.002 | 0.005 |
| | | 0.0005 | 0.001 | 0.002 |
| g | Capacity | 6000 | 15000 | 30000 |
| | Min. display | 2* | 5* | 10* |
| | | 1 | 2 | 5 |
| | | 0.5 | 1 | 2 |
| lb | Capacity | 15 | 35 | 70 |
| | Min. display | 0.005* | 0.01* | 0.02* |
| | | 0.002 | 0.005 | 0.01 |
| | | 0.001 | 0.002 | 0.005 |
| oz | Capacity | 240 | 560 | 1120 |
| | Min. display | 0.1* | 0.2* | 0.5* |
| | | 0.05 | 0.1 | 0.2 |
| | | 0.02 | 0.05 | 0.1 |
| lb-oz | Capacity | 15 | 35 | 70 |
| | Min. display | 0.1 | 0.1 | 0.1 |
| Repeatability (Std. Deviation) | | 0.001kg | 0.002kg | 0.005kg |
| Linearity error | | ±0.002kg | ±0.005kg | ±0.01kg |
| Span drift | | ±20 ppm / ℃ (5℃～35℃) | | |
| Display | | 7 segment LCD display (Character height 18.6 mm) with backlight<br>60 segment analog sweep display with backlight | | |
| Display update | | Approximately 20 times per second | | |
| Operating temp. | | -10℃～40℃ / 14˚F～104˚F, Less than 85% R.H. | | |
| Power supply | | AC main (100V～240V) or SLA battery (option) | | |
| Weighing pan size | | 250×250 mm | | 380×300 mm |
| Dimension | | 250(W)×414(D)×496(H) mm<br>9.8(W) X 16.3(D) X 19.5(H) in. | | 380(W)×464(D)×496(H) mm<br>15.0(W) X 18.3(D) X 19.5(H) in. |
| Weight (apporoximately) | | 8.1lg | | 14.9kg |
| Calibration weight | | 6kg<br>15lb | 15kg<br>30lb | 30kg<br>60lb |

*) Factory setting

FS-6K*i*
FS-15K*i*




FS-30K*i*




Unit: mm

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