SF/SG Series

SF-6KA/SF-15KA/SF-30KA

SF-6KB/SF-15KB/SF-30KB

SF-6KC/SF-15KC/SF-30KC

SG-6KA/SG-15KA/SG-30KA

Price Computing Scales

MAINTENANCE MANUAL

A&D Company, Limited

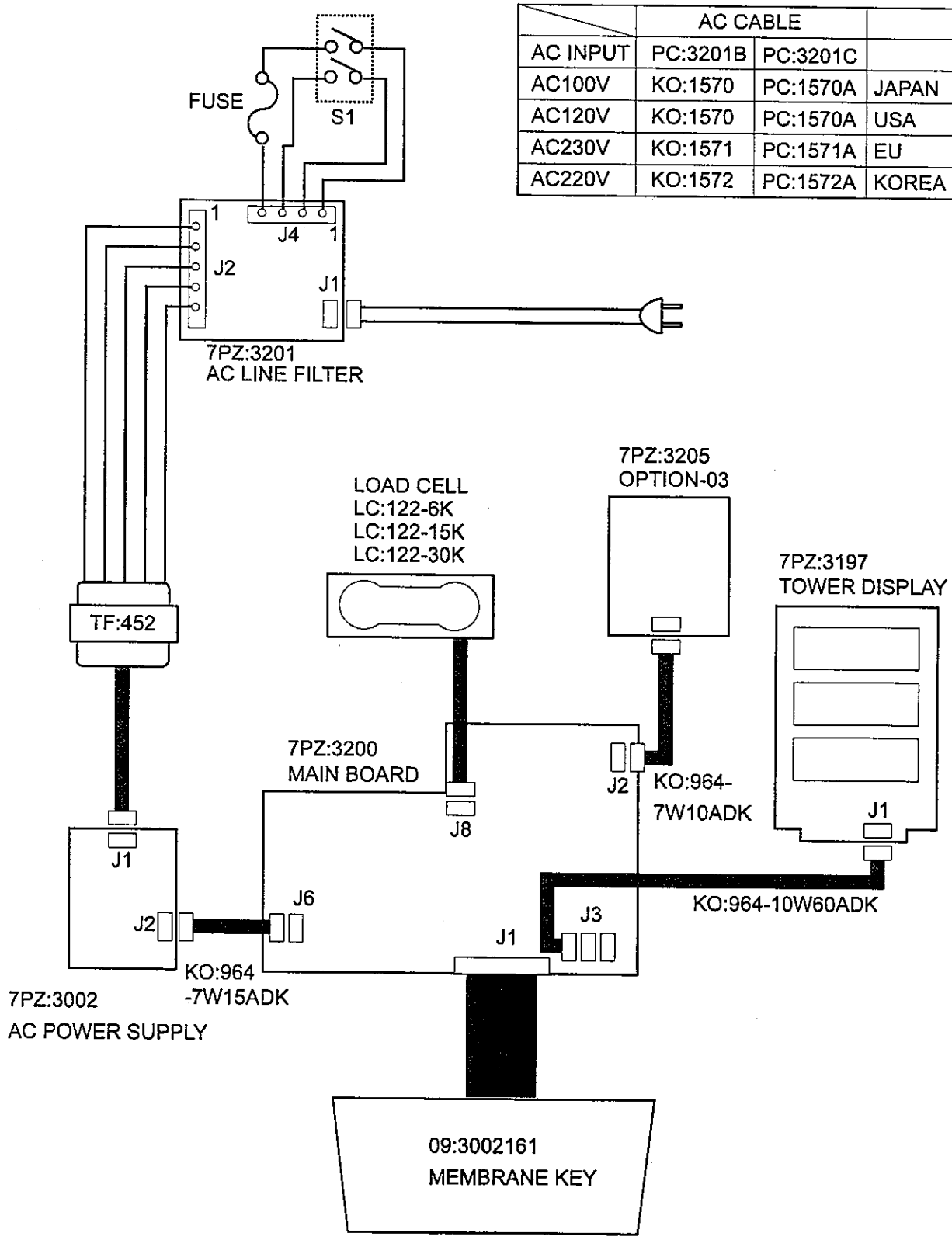
1539 – 1A - ME

CONTENTS

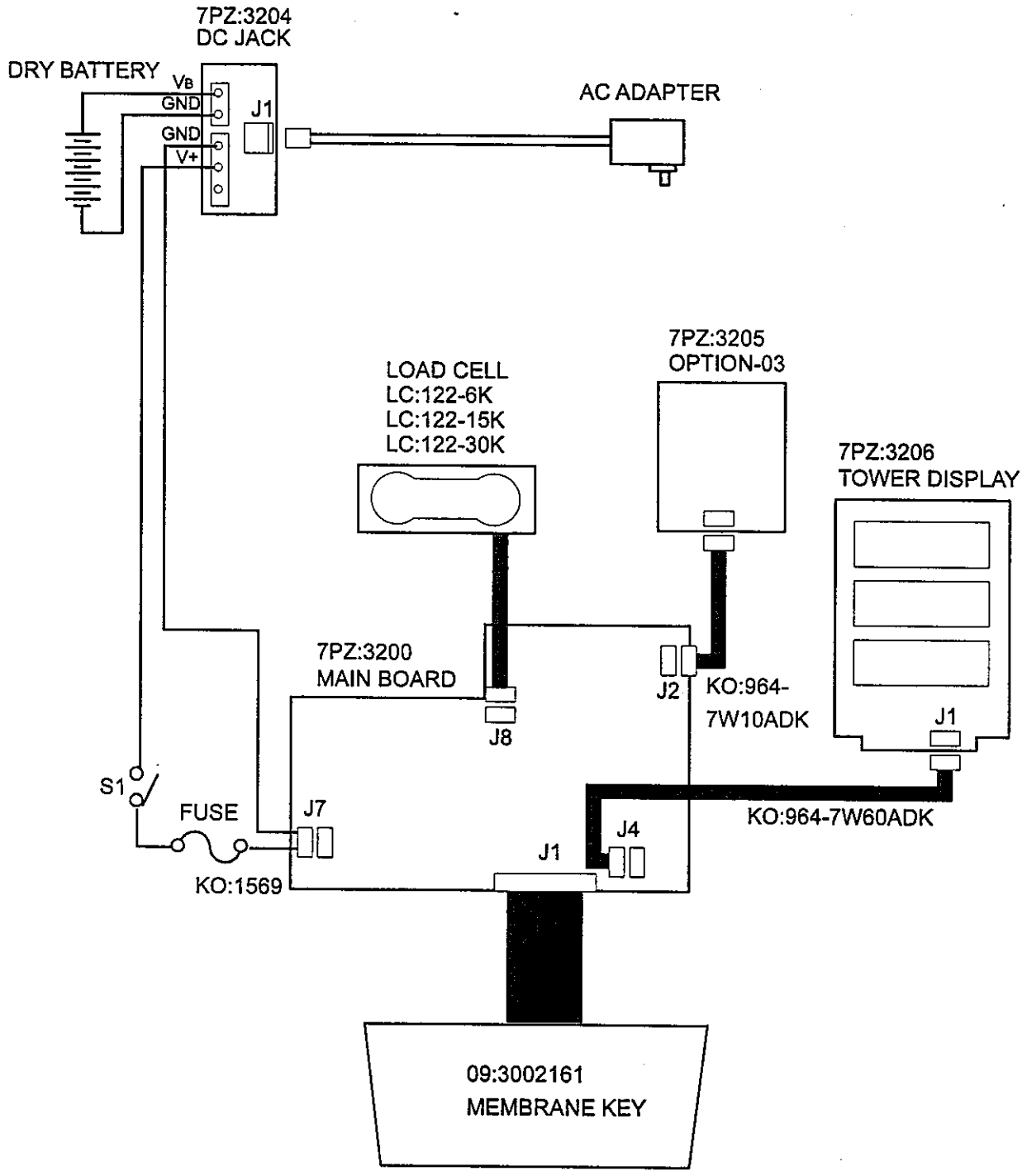
1. BLOCK DIAGRAM

1-1 SF-A Series

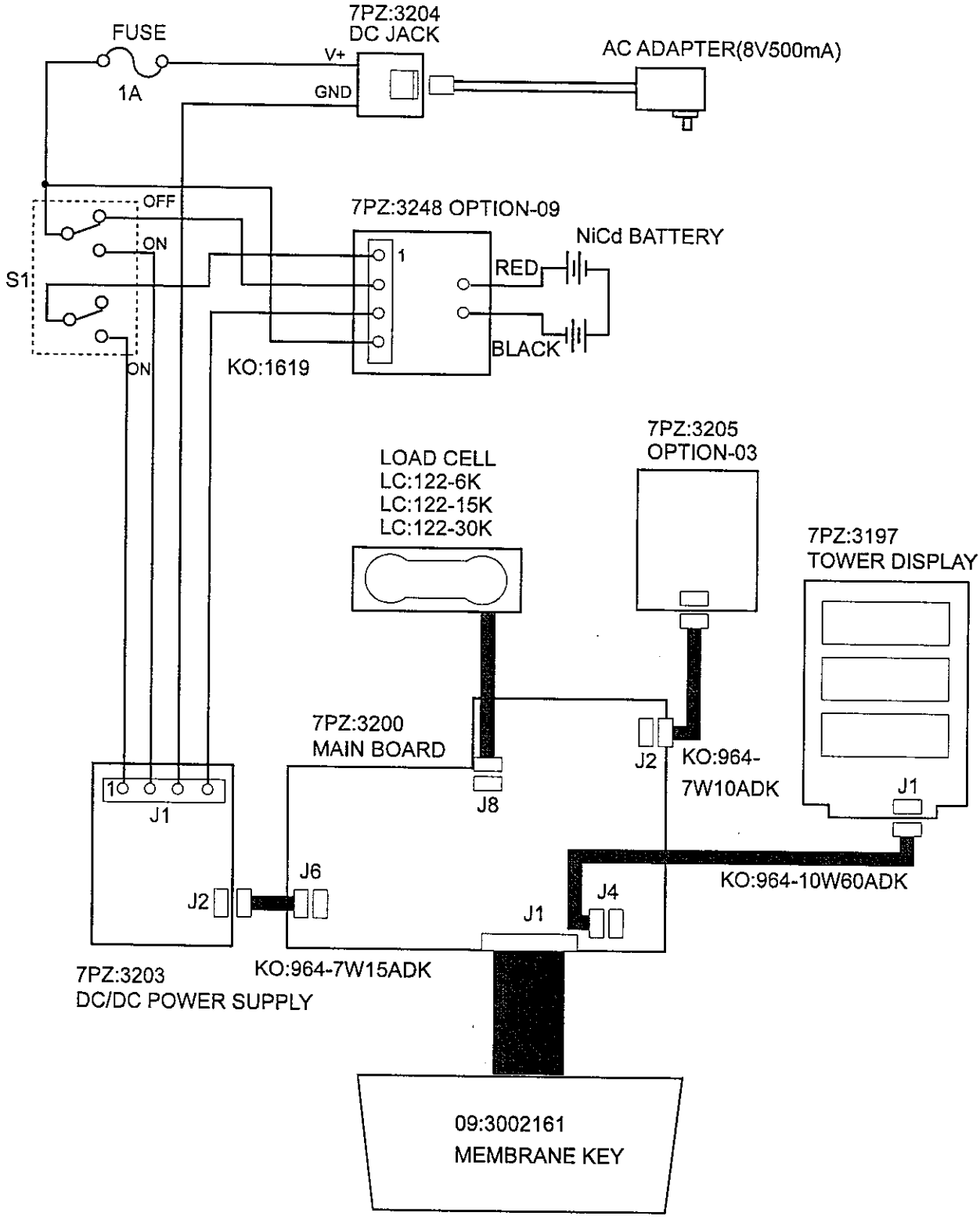
	AC CABLE		
AC INPUT	PC:3201B	PC:3201C	
AC100V	KO:1570	PC:1570A	JAPAN
AC120V	KO:1570	PC:1570A	USA
AC230V	KO:1571	PC:1571A	EU
AC220V	KO:1572	PC:1572A	KOREA

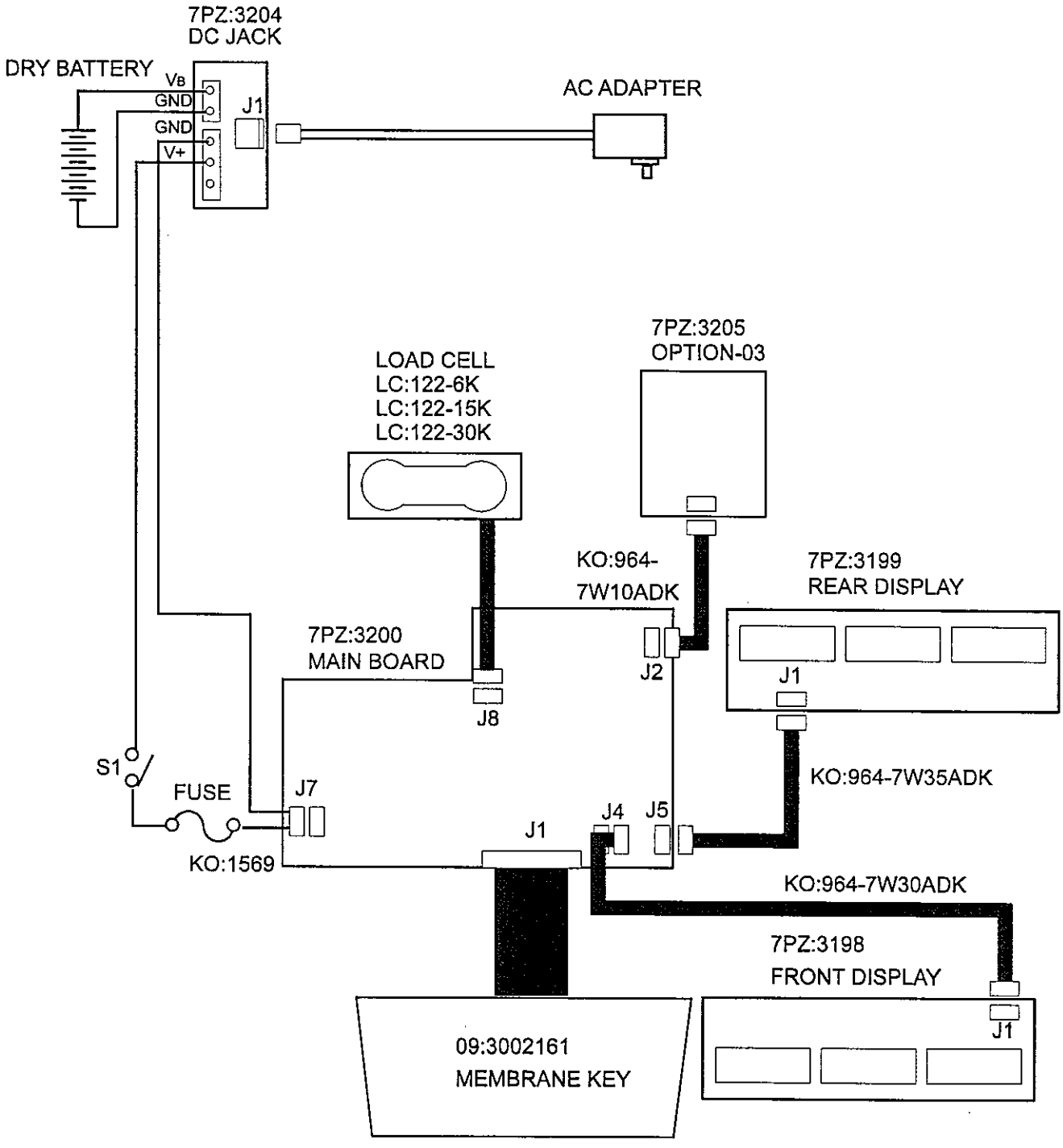


TF	PZ:3202(D3)	PZ:3199/A(VFD)
TF:452A	(DZ:05Z6.8)	PZ:3199(ED:FIP7G13)
TF:452B	(DZ:05Z5.6)	PZ:3199A(ED:SMO71MG)


7PZ:3204
DC JACK
DRY BATTERY
VB
GND
GND
V+
J1
AC ADAPTER
LOAD CELL
LC:122-6K
LC:122-15K
LC:122-30K
7PZ:3205
OPTION-03
7PZ:3206
TOWER DISPLAY
7PZ:3200
MAIN BOARD
J8
J2
KO:964-
7W10ADK
J1
S1
FUSE
J7
KO:1569
J1
J4
KO:964-7W60ADK
09:3002161
MEMBRANE KEY

1-3 SF-C Series




7PZ:3204
DC JACK
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GND
V+
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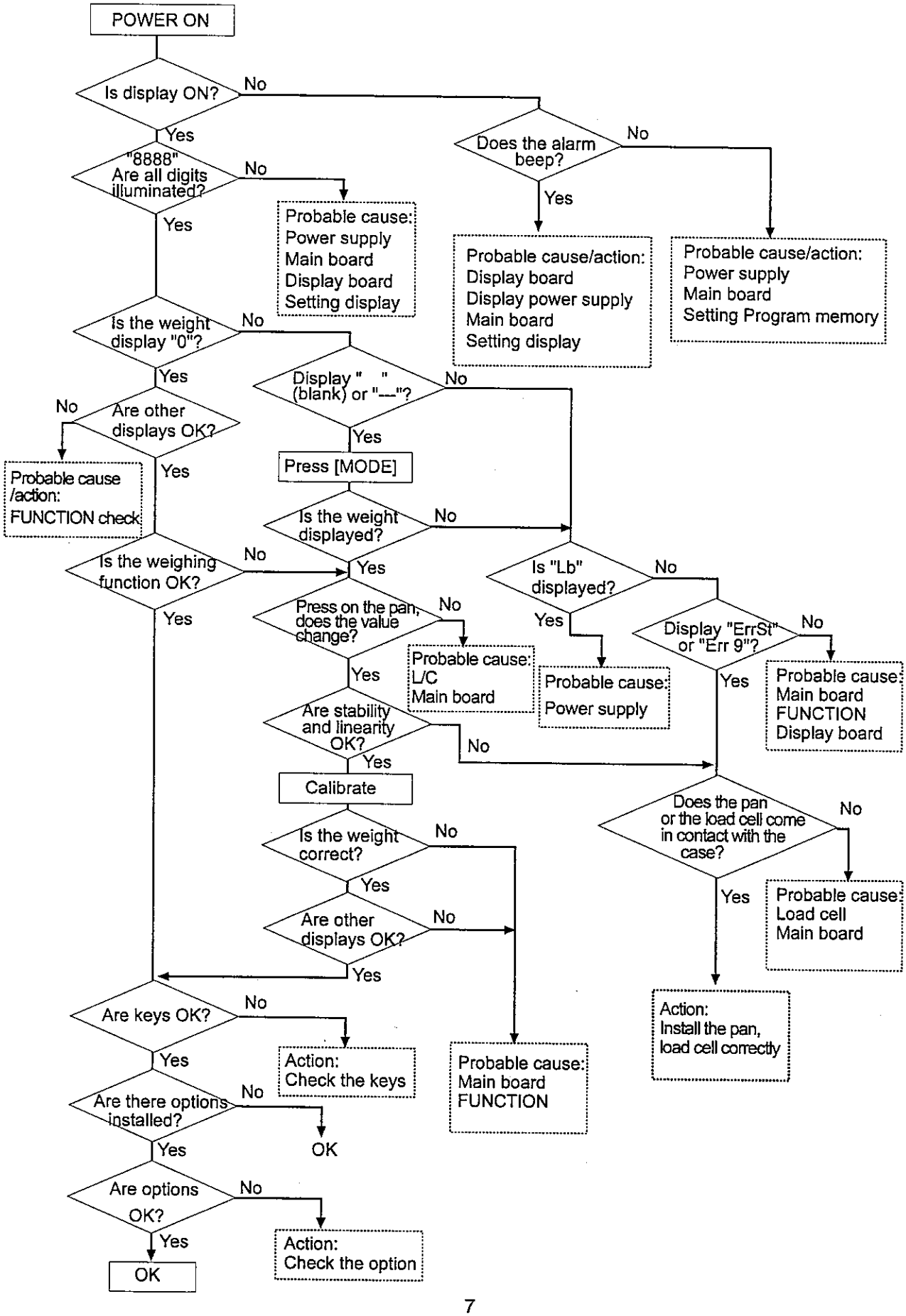
AC ADAPTER
LOAD CELL
LC:122-6K
LC:122-15K
LC:122-30K
7PZ:3205
OPTION-03
KO:964-
7W10ADK
7PZ:3199
REAR DISPLAY
7PZ:3200
MAIN BOARD
J2
J1
J8
S1
FUSE
J7
KO:964-7W35ADK
J4
J5
J1
KO:1569
KO:964-7W30ADK
7PZ:3198
FRONT DISPLAY
J1
09:3002161
MEMBRANE KEY

2. TROUBLESHOOTING

2-1 Flowchart



2-2 Items to be Checked

Problem	Remedy
Incorrect display	• Turn the power off and start again. • When "-----", " (blank)", or "Err St" is displayed: Confirm that the weighing pan is installed correctly, it is not in contact with anything, and nothing is placed on it. Then, press [MODE] several times. • When the weight value is a little different from the correct value or the scale starts with the "----- " display: Calibrate. • When "E" or "Err4" to "Err9" is displayed, or the weight value is greatly different from the correct value: Perform A/D check. If nothing wrong is found, compensate for temperature. • When part of the display is missing or is not clear: Check the display board and power supply. • When strange characters appear: Check the main board. Confirm the TYPE setting, then check the display in the check mode.
The keys do not function.	• Check the TYPE setting. • If any keys do not function, perform SW check by turning the power ON while holding down [CAL].
Memory data may have changed.	• Check the internal RAM, EEPROM. In the check mode, R/W check can be performed with the data stored in the EEPROM.
OP-03 SI/O communications do not function	• Check FORMAT, BAUD RATE and PARITY bit of the FUNCTION setting. • Perform SI/O check on the OP-03 board.
OP-09 battery does not function.	• When "Lb" is displayed: Check the main board to see if the battery voltage is 4.2V or higher. • When the battery charge is low: Charge the battery using the correct AC adapter (8 V 500 mA or higher). Connect the AC adapter (disconnect and connect it again if it was already connected), turn the power switch off and allow approximately 14 hours to fully charge the battery. • When the battery does not supply power: Check the 2A-slow blow fuse on the battery charge control board, and then check the battery board.
No display at all	• Check the fuse, supply voltage, battery, AC adapter, AC adapter jack and power switch. • Check that the EPROM, if used, is inserted in the IC socket correctly. • Check the power supply. When 5-V power is supplied, the alarm beeps when the power switch is turned on. • Check the main board, including the JP1 and JP2 settings. • Check the display board.

Note: For each board
Check the voltage and the signal waveform, when possible. During this test, turn the power switch on and off repeatedly. Do not keep the power switch turned on for long periods of time. Defective parts may become extremely hot.

2-3 Repair Notes

Power supply

- Wrap the cables with electrician's tape so that they will not come in contact with the load cell. If the cables come in contact with the load cell, it may cause a short circuit or incorrect weighing.
- (Only for SF-A) Note that the PZ:3201 J3 voltage setting is different from the VFD voltage.

Main board

- Insert the EPROM in the U2 IC socket carefully. Cut the jumper JP2 so that it is open.
- When U4, U5 or the EEPROM is replaced, initialize and save A/D OFFSET, change the weighing capacity as necessary and compensate for temperature. Set F-function and PLU DATA if necessary.
- When A/D parts are replaced, save the A/D OFFSET and compensate for temperature.
- To initialize A-function, C-function, F-function or PLU DATA while maintaining the calibration data: Set the scale in the "SEtinG" mode. While holding down [T6], press [CAL] to display "init A". Then, press [*]. The functions will be reset to the default values. Reset the AI-X weighing capacity setting to the previous value.
- To clear PLU DATA: Set the scale in the "SEtinG" mode. While holding down [T7], press [CAL] to display "init F". Then, press [*]. This operation will also initialize F-function. Reset it.
- When the main board is replaced: The maintenance board, 7PZ:3200 was initialized and the A/D OFFSET was saved before shipping. Set "A1" weighing capacity while checking JP1, JP2 and TYPE settings. Change the functions as necessary and compensate for temperature.

Display board

- The height to attach a part is limited. Attach parts at the same height as the original.
- (Only for SF-A) The power supply depends on the VFD version. Use the same VFD as the previous one.

3. REPLACING THE LOAD CELL

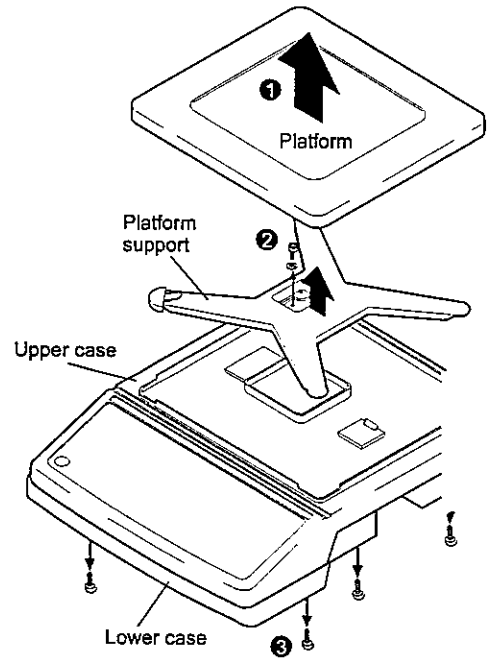
The following describes how to replace the load cell. This description can be also referred to when replacing boards and parts. About inter-board connection, refer to "1. BLOCK DIAGRAM".

3-1 Removing the Load Cell

(1) Remove the platform from the scale main unit.

(2) Remove the screw (2 pc) securing the platform support to remove it. Open the CAL key cover to remove the screw (1 pc) inside.

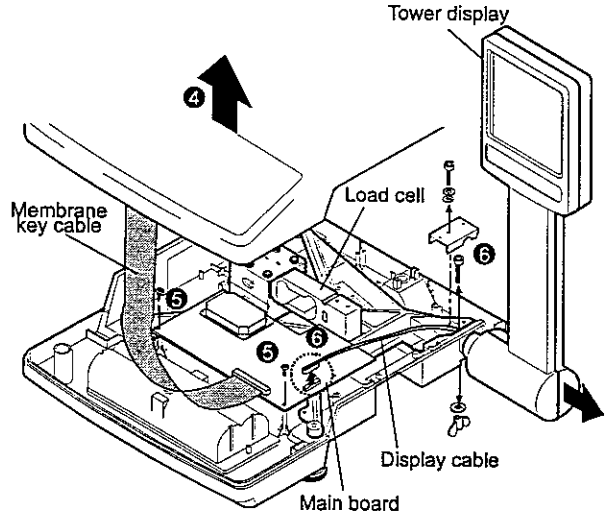
(3) Remove the screws (9 pcs for SF-A, SF-C; 8 for SF-B; 6 for SG-A.) from the bottom of the lower case. Remove the screws(1 pc) inside the battery compartment.



(4) Remove the upper case from the lower case. At this time, use much care not to pull the membrane key cable forcibly, and also the display cable for the SG-A.

(5) Remove the screws (4pcs) securing the main board.

(6) Remove the screws (2 pcs) securing the tower display and the display cable to remove the tower display. (Not applicable to the SG-A)

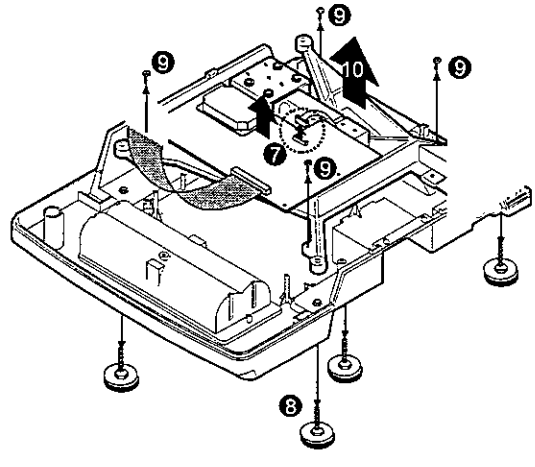


(7) Disconnect the load cell cable from the main board and remove the main board.

(8) Remove the leveling feet (4 pcs) from the lower case.

(9) Remove the screws (5 pcs) securing the base frame. Remove the grounding screw (1 pc) from the bottom of the lower case.

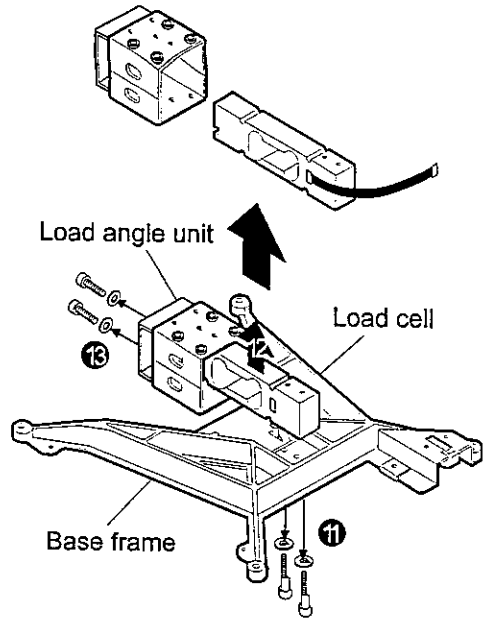
(10) Remove the base frame from the lower case.



(11) Remove the screws (2 pcs) from the bottom of the base frame.

(12) Remove the load cell from the base frame.

(13) Remove the screws (4 pcs) securing the load angle unit.



3-2 Attaching the Load Cell

(1) Refer to the table shown at the right to select the appropriate load cell for the scale model. Replace the load cell. Attach the load angle unit to the load cell using the screws (4 pcs). Allow an appropriate clearance between the load angle unit and base frame as shown below.

Weighing capacity	Clearance
6 kg	1.5 mm
15 kg	1.8 mm
30 kg	1.7 mm

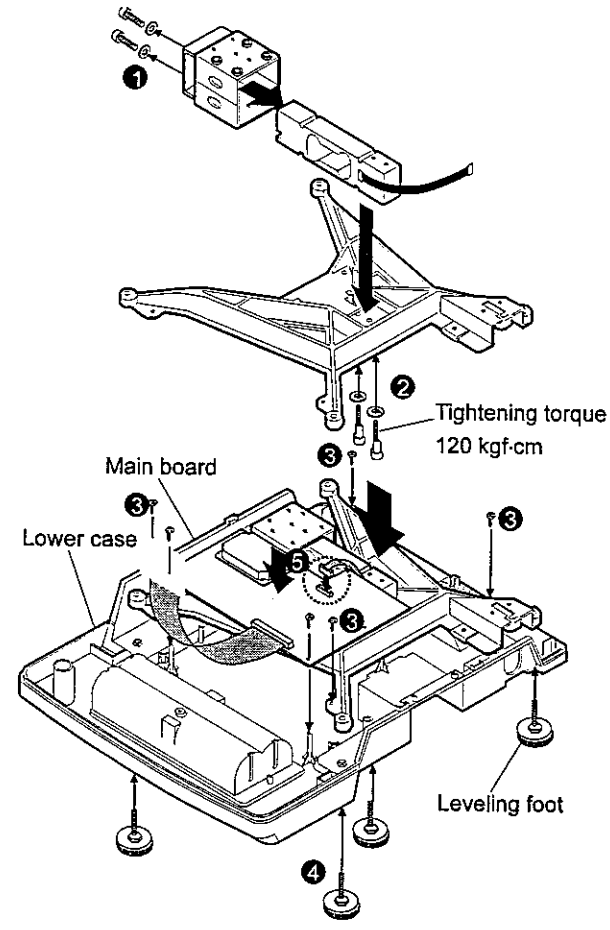
Model	LOAD CELL
SF-6KA/B,SG-6KA	LC:122-6K
SF-15KA/B,SG-15KA	LC:122-15K
SF-30KA/B,SG-30KA	LC:122-30K

(2) Attach the load cell to the base frame using the screws (2 pcs) with a tightening torque of 120 kgf•cm. Allow an appropriate clearance between the base frame and upper case by adjusting the adjust screws.

(3) Attach the base frame to the lower case using the screws (5 pcs). Fasten the grounding screw to the bottom of the lower case.

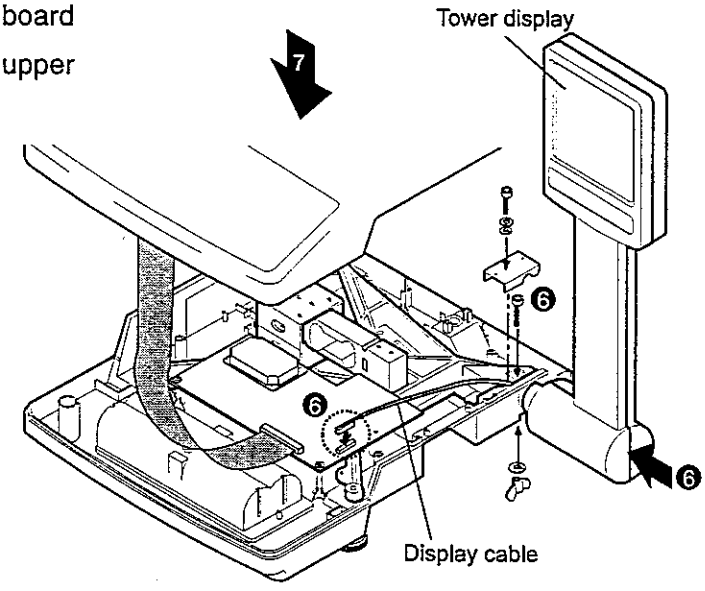
(4) Fasten the leveling feet (4 pcs) to the lower case.

(5) Connect the load cell cable to the main board connector. Attach the main board to the lower case using the screws (4 pcs).



(6) Attach the tower display into the lower case, then connect the display cable. Secure them with the screws (2 pcs). (Not applicable to the SG-A)

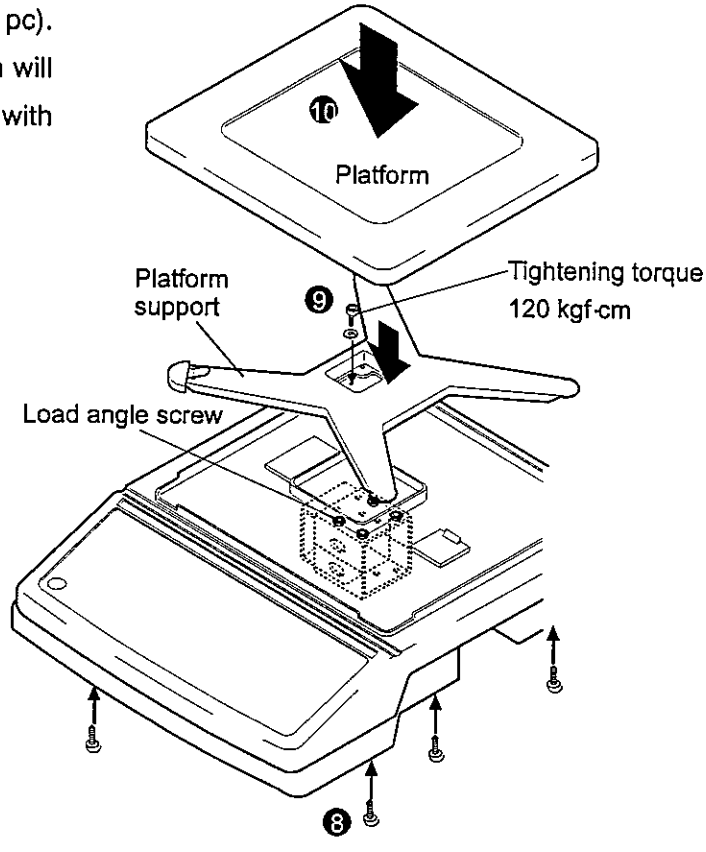
(7) Connect the membrane key cable to the main board and the display cable for the SG-A. Place the upper case on the lower case.



(8) Secure the upper case to the lower case using the screws (9 pcs for SF-A, SF-C; 8 for SF-B; 6 for SG-A.). Open the CAL key cover to replace the screw (1 pc) inside.

(9) Secure the platform support using the screw (2 pc). Adjust the load angle screws so that the platform will not come in contact with the case and be level with the top of the case.

(10) Place the platform on the platform support.



Now the assembling has been completed. Compensate for temperature.

4. CHECK MODE

4-1 Description of the Keys in the Check Mode

[ON/OFF] key	:Turns the display on and off.
[P0] to [P30]	:PLU keys
[T0] to [T9]	:Numeric keys
[C] key	:Cancels an operation or proceeds to the next step without any changes.
[CHANGE] key	:Selects an item when selection is available.
[*] key	:Saves, confirms or executes an operation.
[MEM] key	:Saves the functions.
[CAL] key	:Calibrates. Located on the main board.
" "	:Indicates something being displayed.
[Enter a numerical value]	:When the previous value is displayed and no change is required, press [C] to proceed to the next step. When changes are required, enter the value using the numeric keys and press [*]. "------" appears and the value will be written to the EEPROM.

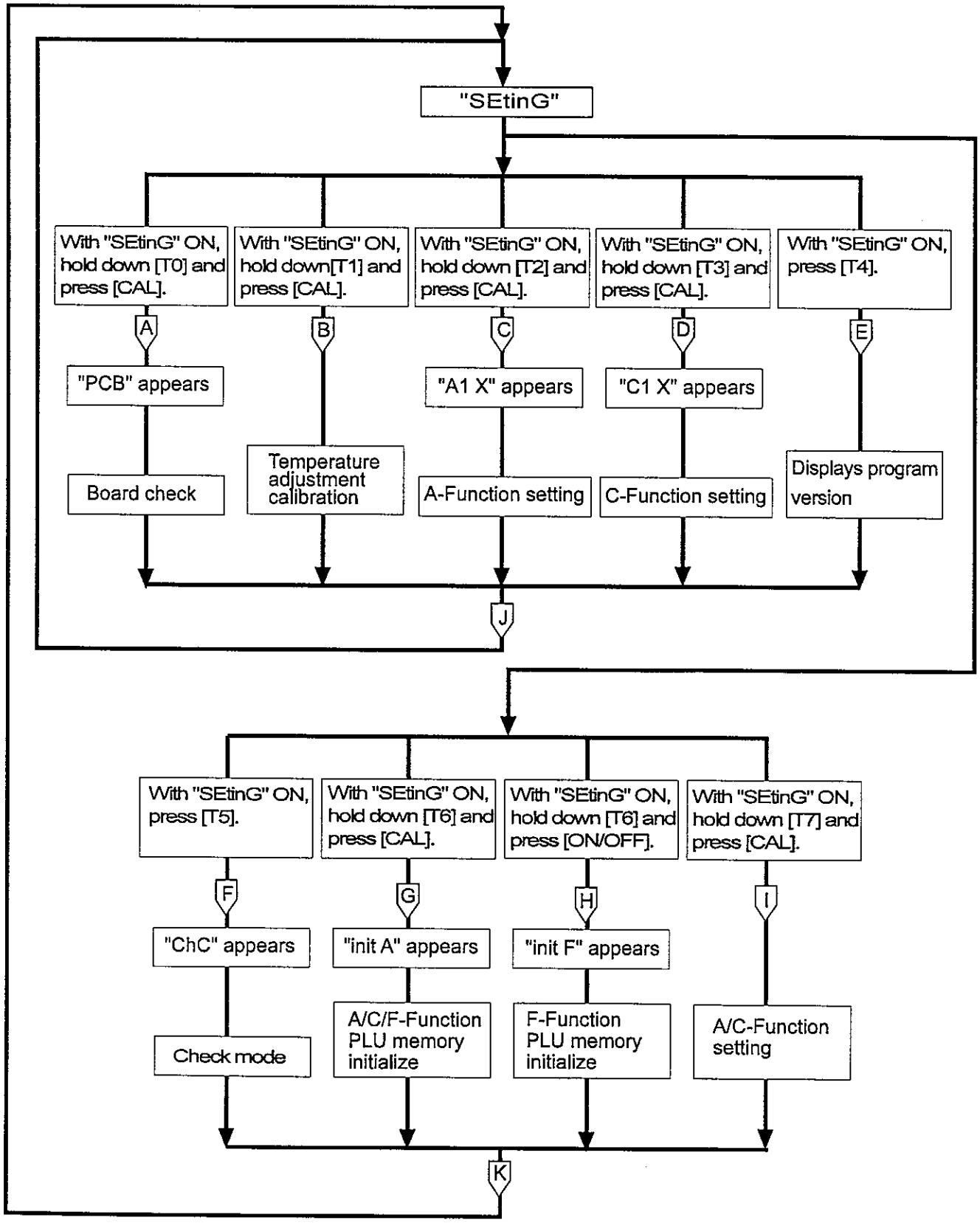
4-2 Entering the Check Mode

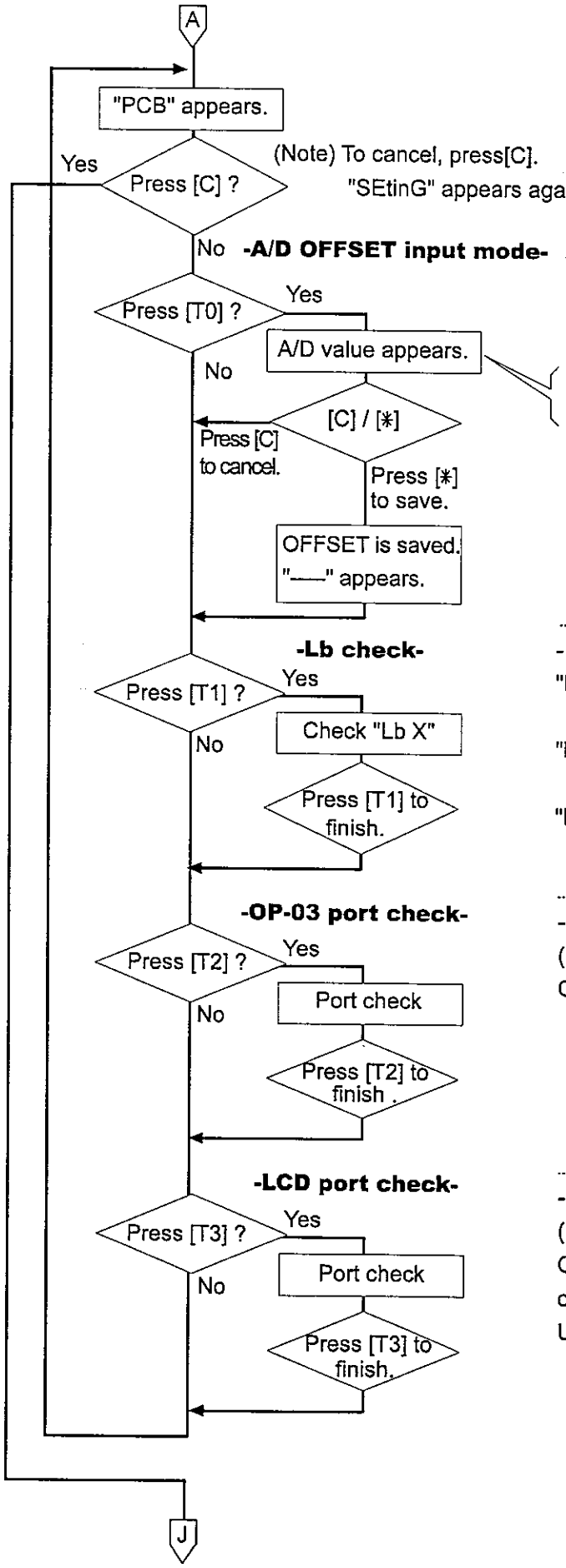
While holding down the [P10] and [ON/OFF] keys, turn the power switch on. Allow at least four seconds before releasing the keys.

While holding down the [P1] key, press the [ON/OFF] key. "SEtinG" appears and indicates that the scale is in the check mode.

4-3 Check Mode Flowchart

Refer to "4-2 Entering the Check Mode" to display "SetinG." For a detailed description on each setting, refer to the relevant page.





When the load cell, main board EEPROM or the A/D OP-AMP is replaced, connect the A/D OFFSET input device to J8.

" XXXX" Weight A/D OFFSET 35000±5000

" XXXX" Temperature A/D OFFSET 35000±2500

Note:Calibration and subsequent weighing will not be performed if OFFSET is entered without connecting the device.

- Low battery check mode -

"Lb 0" (Only for SF-C) Indicates that DC/DC input voltage is low.

"Lb 1" Indicates that +5V power supply input voltage decreases.

"Lb 2" (Only for SF-C) Indicates that the battery is used.

- OPTION input/output port check -

(Used when checking the board)

Output Lo level to J2 pin 1 to pin 5 in this order.

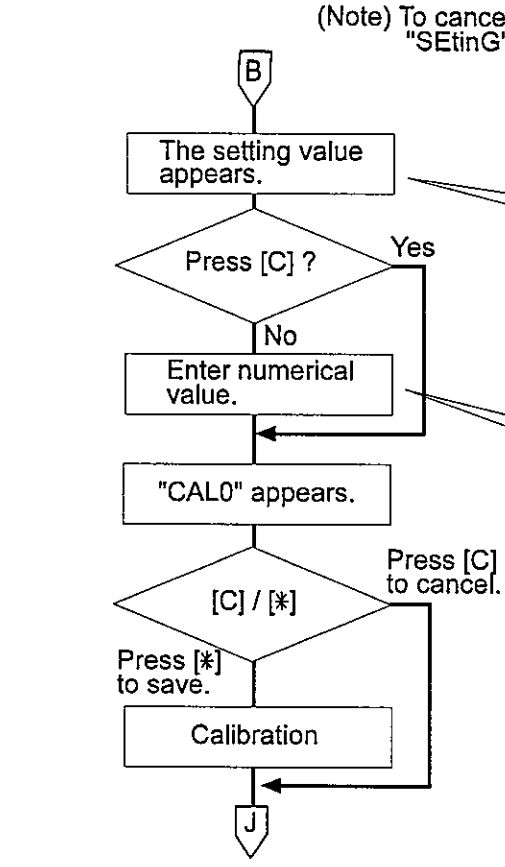
- LCD driver SI/O port check -

(Used when checking the board)

Output Lo level to J4 pin 5, J5 pins 4 and 5 in this order.

Used only for factory adjustment.

-Temperature compensation -



- Temperature compensation - (Adjusted at factory)

"tnP XX" Enter the current room temperature.

"G 9.798" Enter the local gravitational acceleration value.

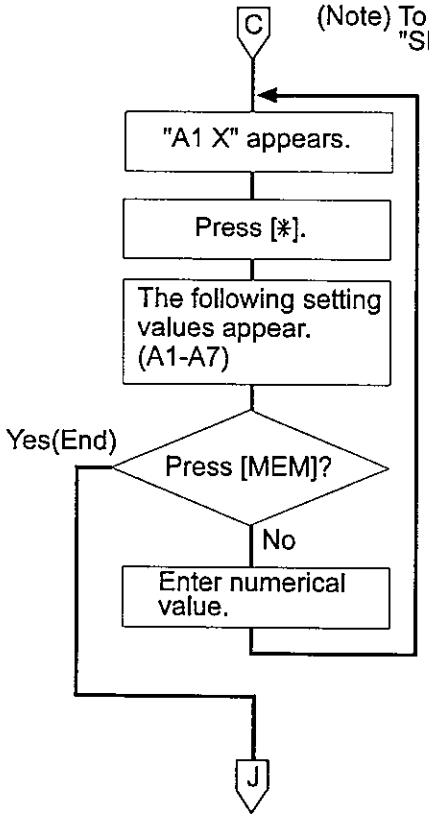
"ZC 0"
"LC 608"
"LC 4986"
} Do not change the temperature compensation factor (0.608, 4986) unless otherwise specified.

"CAL 0" Confirm that the stable indicator illuminates and press [*].

"CAL F" Place a calibration mass on the weighing pan, wait for the stable indicator to illuminate and press [*].

Note:The mass value can be changed from FULL, 2/3 to 1/3 by pressing [CHANGE].
When the load cell, main board, EEPROM or A/D OP-AMP is replaced, compensate for temperature.

-A-FUNCTION setting-



- A-function setting -

"A1 X" Enter the weighing capacity.

"X:0=6kg, 1=15kg, 2=30kg, 3=15lb, 4=30lb, 5=60lb

"A2 X" PRICE
"A3 X" UNIT PRICE
} Set the decimal point position.
X:0=None, 1=10^1, 2=10^2, 3=10^3, 4=10^4

"A4 X" Decimal point type X:0 [.], 1=[,]

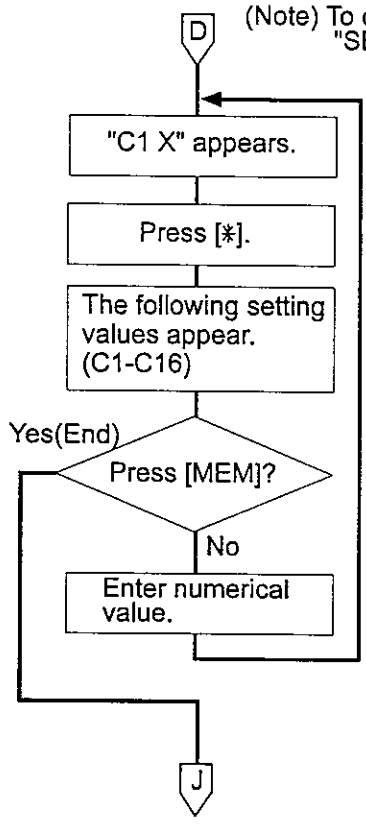
"A5 X" Range X:0=DUAL RANGE,1=SINGLE RANGE

"A6 X" Scale type X:0=Other than SF-C, 1=SF-C

"A7 X" Weight unit X:0=kg, 1=g

When the value is changed, press [*] and then press [MEM] to save the changes.

-C-FUNCTION setting-



- C-function setting -

"C1 X" Tare range X:0=weighing capacity,
1=2/3 of weighing capacity

"C2 X" Tare value reduction X:0=allowed, 1=prohibited

"C3 X" Preset tare (Digital tare) X:0=allowed, 1=prohibited

"C4 X" Tare compensation X:0=internal count, 1=displayed count

"C5 X" Price computation X:0=round down, 1=round off

"C6 X" Zero range X:0=2%, 1=5%, 2=20%

"C7 X" Zero range upon power-on X:0=10%, 1=50%

"C8 X" Unit price X:0=price per 100g, 1=price per 1 kg

"C9 X" (SI/O) Currency X:0=$(24H), 1=¥(5CH),
2=₩(57H), 3=British pound symbol(23H)

"C10 X" Zero tracking X:0=ON, 1=OFF

"C11 X" Motion detection condition
X:0=1d/1sec, 1=1d/0.5sec, 2=1d/0.25sec,3=0.5d/1sec,
4=0.5d/0.5sec, 5=0.5d/0.25sec

"C12 X" Zero key during tare operation
X:0=enabled (Clear tare), 1=enabled (Same tare),
2=disabled

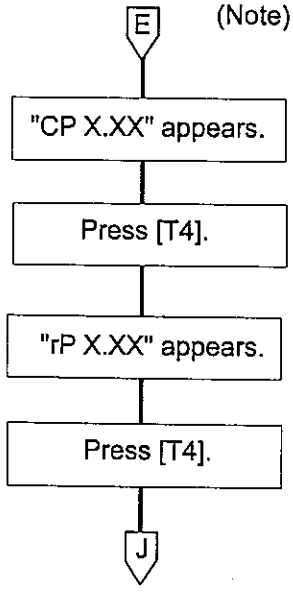
"C13 X" In the change display, clearing TOTAL using the MODE key
X:0=clear, 1=not to clear

"C14 X" During tare operation, displaying the zero point at GROSS ZERO
X:0=display, 1=not to display

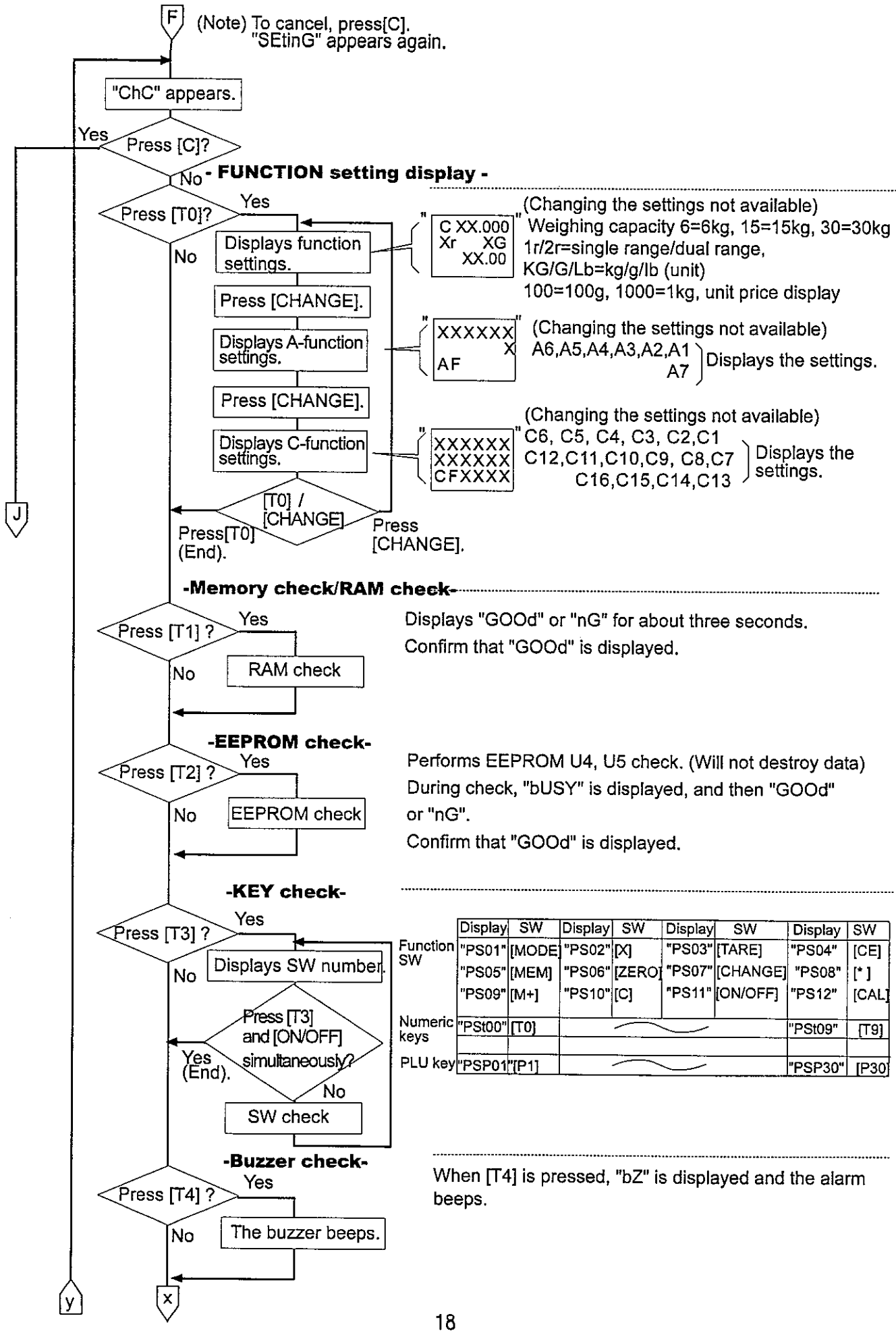
"C15 X" When the ON/OFF key is turned ON:
X:0=displays zero and the power is ON,
1=displays zero except the weight
2=shows the previous display

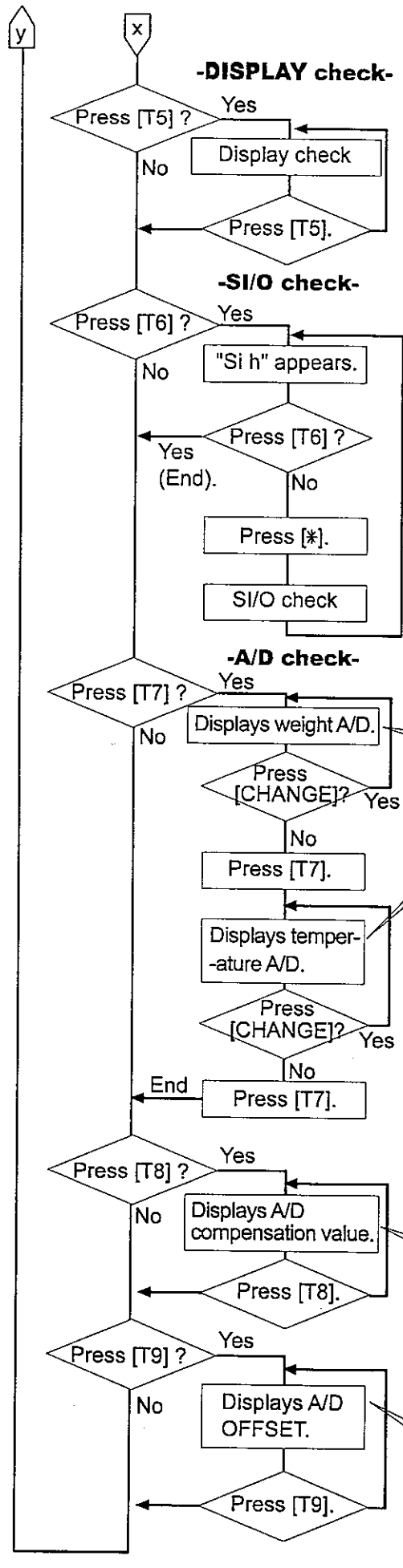
"C16 X" Totaling X:0=yes(TOTAL M+ valid), 1=no (EC,NTED)

- Program version display -



-CHECK MODE-


F
(Note) To cancel, press[C].
"SEtinG" appears again.
"ChC" appears.
Yes
Press [C]?
No
Press [T0]?
Yes
No
Displays function settings.
C XX.000
Xr XG
XX.00
(Changing the settings not available)
Weighing capacity 6=6kg, 15=15kg, 30=30kg
1r/2r=single range/dual range,
KG/G/Lb=kg/g/lb (unit)
100=100g, 1000=1kg, unit price display
Press [CHANGE].
Displays A-function settings.
XXXXXX
X
AF
(Changing the settings not available)
A6,A5,A4,A3,A2,A1
A7
Displays the settings.
Press [CHANGE].
Displays C-function settings.
XXXXXX
XXXXXX
CFXXXX
(Changing the settings not available)
C6, C5, C4, C3, C2,C1
C12,C11,C10,C9, C8,C7
C16,C15,C14,C13
Displays the settings.
[T0] / [CHANGE]
Press[T0] (End).
Press [CHANGE].
J
- FUNCTION setting display -
-Memory check/RAM check-
Press [T1] ?
Yes
No
RAM check
Displays "GOOd" or "nG" for about three seconds.
Confirm that "GOOd" is displayed.
-EEPROM check-
Press [T2] ?
Yes
No
EEPROM check
Performs EEPROM U4, U5 check. (Will not destroy data)
During check, "bUSY" is displayed, and then "GOOd" or "nG".
Confirm that "GOOd" is displayed.
-KEY check-
Press [T3] ?
Yes
No
Displays SW number.
Press [T3] and [ON/OFF] simultaneously?
Yes (End).
No
SW check
Function SW
Numeric keys
PLU key
Display SW Display SW Display SW Display SW
"PS01" [MODE] "PS02" [X] "PS03" [TARE] "PS04" [CE]
"PS05" [MEM] "PS06" [ZERO] "PS07" [CHANGE] "PS08" [*]
"PS09" [M+] "PS10" [C] "PS11" [ON/OFF] "PS12" [CAL]
"PSt00" [T0] "PSt09" [T9]
"PSP01" [P1] "PSP30" [P30]
-Buzzer check-
Press [T4] ?
Yes
No
The buzzer beeps.
When [T4] is pressed, "bZ" is displayed and the alarm beeps.
y
x



Pressing [T5] illuminates all the display symbols. Pressing [5] repeatedly changes the value displayed per digit, and finally returns to "chC" (End).

- OP-03 check mode -
Press [T6]. "Si h" appears.
Short pin 4 and pin 8 of PZ:3205 external connector J1. "Si L" appears. Check DTR and CTS/RTS.
Short pin 2 and pin 3 of J1 and press [*]. Receives TXD at RXD and displays "GOOd" or "nG". Verify that "GOOd" is displayed.
To end, press [T6] while "Si h" is displayed.

- A/D check mode -
Displays weight A/D raw count.
Pressing [CHANGE] displays the internal count. Press it again displays 1/10 internal count.

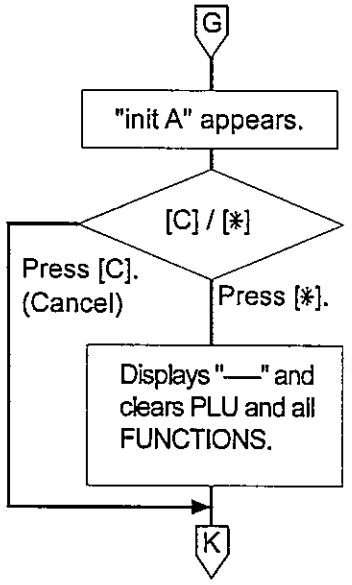
Displays temperature A/D.
Normally one sampling is performed every minute. To perform temperature A/D sampling manually, press [CHANGE].

Weight raw A/D count display: value without calibration or temperature compensation, Approx. 1/95000
Internal count display:
Weight displayed times 20, 1/60000 (SF6K, SF30K);
Weight displayed times 25, 1/75000 (SF15K).
Temperature A/D: approx. 70000±6000

Displays A/D compensation factor for CAL.
Each time [T8] is pressed, the display changes "ZC 0" to "LC 608" to "tC 4986" and finally to "ChC" (End).

Displays A/D default value saved at "PCb" [T0].
Weight A/D default value 35000±5000
Pressing [T9] again changes the display in the following order:
temperature A/D default value 35000±3000,
"tnP XX" (temperature at CAL) and "ChC" (End).

Except calibration
A/C/F-FUNCTION PLU memory
-Initialize-

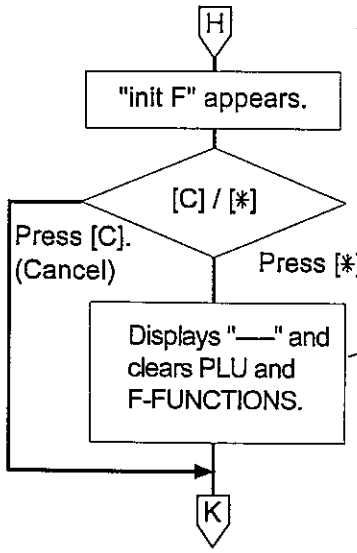


Initializes all functions and clears PLU MEMORY.

Initializes EEPROM function and PLU data.

Note: "init A" initializes A-function weighing capacity setting and scale type setting, but the calibration data remains. Reset the function to restore data.

F-FUNCTION and PLU memory
-Initialize-

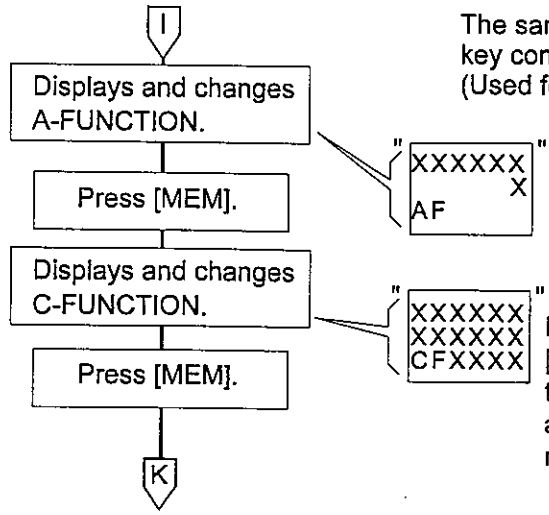


Initializes F-function and clears PLU MEMORY.

Initializes EEPROM F-function and PLU data.

Note: Clear PLU data in this mode so that A-function and C-function will not be changed.

-AC FUNCTION setting mode-



The same contents can be set simultaneously using the following key combination:[T2]+[CAL]=A-function, [T3]+[CAL]=C-function (Used for factory setting).

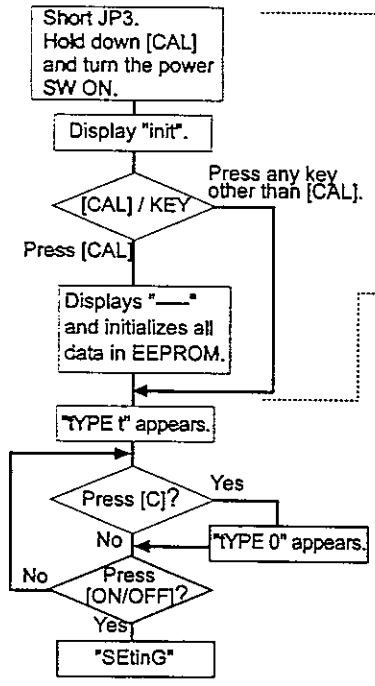
Displays the setting value. [MEM] to change the flashing digit to the left, [TARE] to move downward and numeric keys to change the numerical value.

Displays the setting value. [MEM] to change the flashing digit to the left, [TARE] to move downward and numeric keys to change the numerical value.

5. INTERNAL SETTING

5-1 Initializing, A/D OFFSET Input

If the EEPROM data is destroyed or when the EEPROM is replaced, perform "init" (initialization). This operation will initialize all the data including calibration data and function settings. To initialize function settings only or PLU data, perform "init A" or "init F".



- Initializing -

Short JP-3. While holding down [CAL], turn the power switch on. "init" appears. Pressing [CAL] displays "——" and initializes all the data in EEPROM. Pressing any key other than [CAL] will proceed to the scale type setting without initialization and "tYPE T" appears.

Note: After initialization, open JP-3.

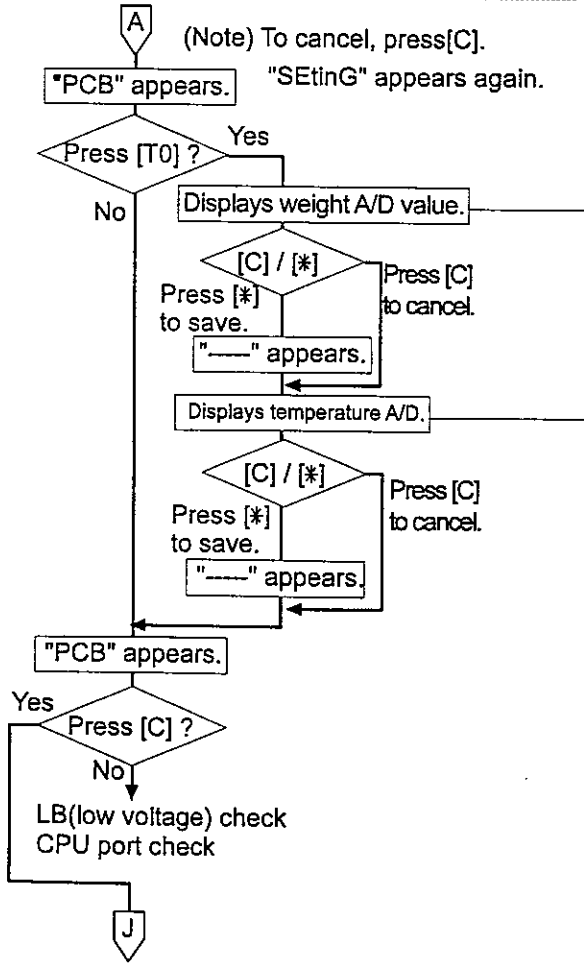
- Setting the scale type -

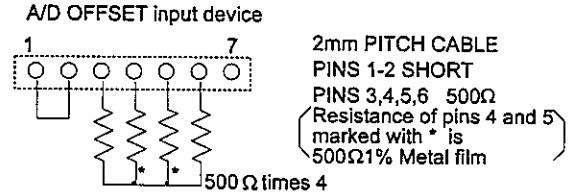
"tYPE T" is displayed. For SF-A, SF-B or SF-C, press [ON/OFF] to proceed to the next item. For SG-A, press [C] to display "tYPE 0".

Note: The wrong type setting may cause strange characters to appear or cause keys to function improperly.

- A/D OFFSET input mode -

Enters A/D OFFSET, sets A-function, C-function, F-function and performs temperature compensation. Before entering A/D OFFSET, connect the input device to the L/C connector and warm-up for ten minutes or more.





With "SEtinG" displayed, hold down [T10] and press [CAL] to display "PCB". Then, press [T0] to display weight A/D.

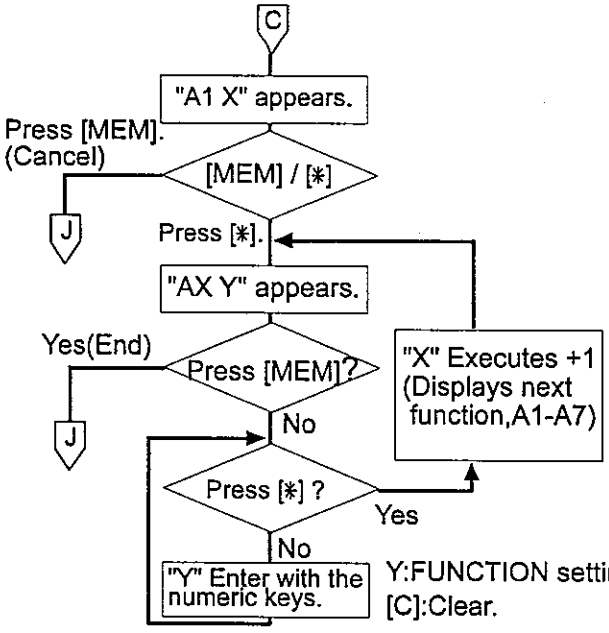
"XXXXX"=within 35000±5000
Confirm that the value is stable within the range and press [*] to save it. "——" and then temperature A/D appears.

"XXXXX"=within 35000±2500
Confirm that the value is stable within the range and press [*] to save it. "——" and then "PCB" appears.

Press [C] to display "SEtinG". Set the weighing capacity and perform temperature compensation.

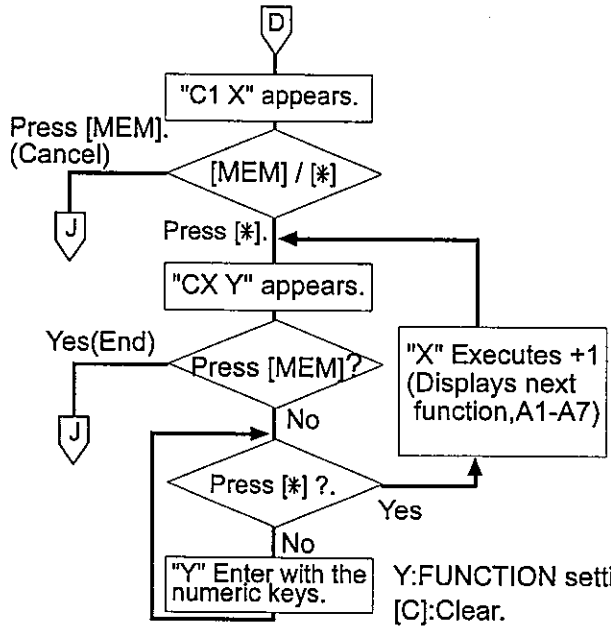
Note: Saving the OFFSET without using the input device may disable calibration function. If the wrong OFFSET is entered, temperature can not be compensated correctly.

5-2 Setting A-function and C-function



With "SEtinG" displayed, hold down [T2] and press [CAL] to display "A1". This indicates that the scale is in the A-function setting mode. Press [*] (To cancel the operation, press [MEM]), enter an appropriate numerical value and press [*]. Use the same procedure to set A2 to A7.
Finally press [MEM] to display "SEtinG" to complete the operation.

Y:FUNCTION setting values.
[C]:Clear.



With "SEtinG" displayed, hold down [T3] and press [CAL] to display "C1." This indicates that the scale is in the C-function setting mode. Press [*] (To cancel the operation, press [MEM]), enter an appropriate numerical value and press [*]. Use the same procedure to set C2 to C16.
Finally press [MEM] to display "SEtinG" to complete the operation.
Note: Before calibration, be sure to set the weighing capacity.

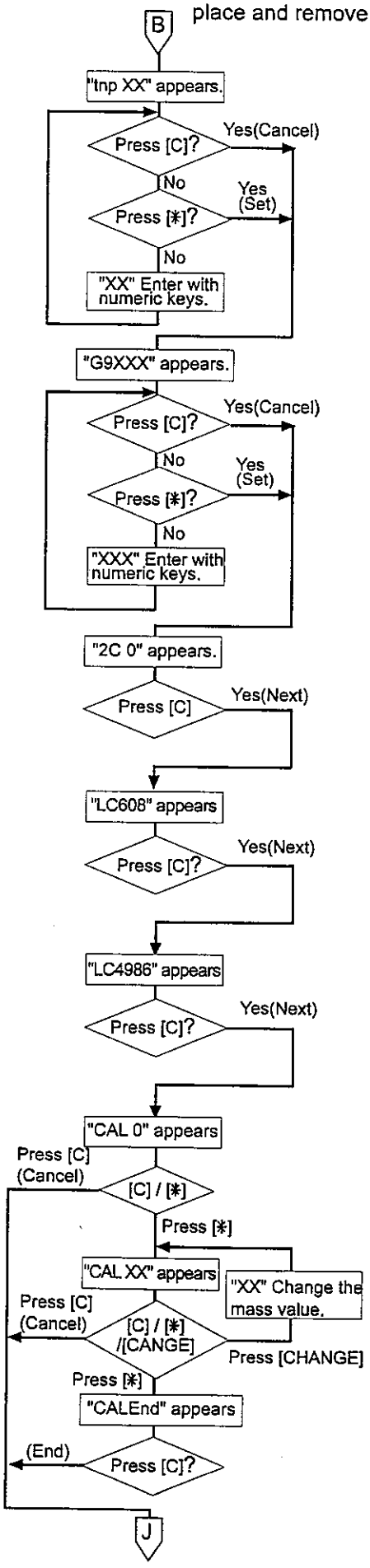
Y:FUNCTION setting values.
[C]:Clear.

- A-FUNCTION setting -	DEFAULT
A1 Weighing capacity 0:6kg, 1:15kg, 2:30kg, 3:15lb, 4:30lb, 5:60lb	0
A2 Price decimal point 0=None, 1=10^1, 2=10^2, 3=10^3, 4=10^4	2
A3 Unit price decimal point position Same as above	2
A4 Decimal point type 0=[.], 1=[,]	0
A5 Range 0=DUAL,1=SINGLE	1
A6 Scale type 0=other than SF-C, 1=SF-C	0
A7 Weight unit 0=kg, 1=g	0
- C-FUNCTION setting -	
C1 Tare range 0:weighing capacity 1:2/3, 2:1/2	0
C2 Tare value reduction 0:allowed, 1:prohibited	1
C3 Preset tare 0:allowed, 1:prohibited	1
C4 Tare computation 0:internal count, 1:displayed count	0
C5 Price computation 0:round down, 1:round off	1
C6 Zero range 0:2%, 1:5%, 2:20%	0

	DEFAULT
C7 POWER ON ZERO 0:10%, 1:50%	0
C8 Unit price 0:price per 100g (/0.1lb), 1:price per 1 kg (/1lb)	1
C9 (SI/O) currency 0:$(24H), 1:¥(5CH), 2:₩(57H), 3:British Pound(23H)	0
C10 Zero tracking 0:ON, 1:OFF	0
C11 Motion detecting condition 0:1d/1sec, 1:1d/0.5sec, 2:1d/0.25sec, 3:0.5d/1sec, 4:0.5d/0.5sec, 5:0.5d/0.25sec	2
C1 ZERO key during tare operation 0:enabled (clears tare), 1:enabled (same tare), 2:disabled	0
C13 In the change display, clearing TOTAL using the MODE key 0:clear, 1:not to clear	0
C14 During tare operation, displaying the zero point at GROSS ZERO 0:display, 1:not to display	0
C15 When the ON/OFF key is turned ON: 0:displays zero and the power is ON 1:displays zero except the weight 2:Shows the previous display	0
C16 Totaling 0:yes (TOTAL M+ valid), 1:no (conforming to EC, NTEP approval)	0

5-3 Temperature Compensation

Connect the load cell to the scale and display "SEtinG." Place it in a draft-free room with a stable temperature and warm-up for ten minutes or more. When the load cell is replaced, place and remove the calibration mass several times.



- Setting the temperature -

With "SEtinG" displayed, hold down [T1] and press [CAL] to display "tnP 25." Use the numeric keys to enter the room temperature. Press [*] to set the calibration temperature. "----" and then "G9.798" appears.

- Setting the gravitational acceleration -

"G9.798" is displayed. Use the numeric keys to enter the local value of gravitational acceleration and press [*]. When entering the value, ignore the decimal point. "----" and then "ZC 0" appears.

- Setting the temperature compensation factor -

After "ZC 0", the temperature compensation factor (i.e. "LC 608" and "tC 4986") appears. Do not change the value unless otherwise specified. Press [C] to proceed to the next item. If a change is required, follow the same procedure as the gravitational acceleration setting. Be sure to set the correct values, or the scale temperature characteristics will be wrong.

- Zero calibration -

When [C] is pressed in the previous step, "CAL 0" appears. Confirm that nothing is on the weighing pan and the weighing pan is not in contact with anything. Press [*] to perform zero calibration. "----" and then "CAL XX" appears.

- Span calibration -

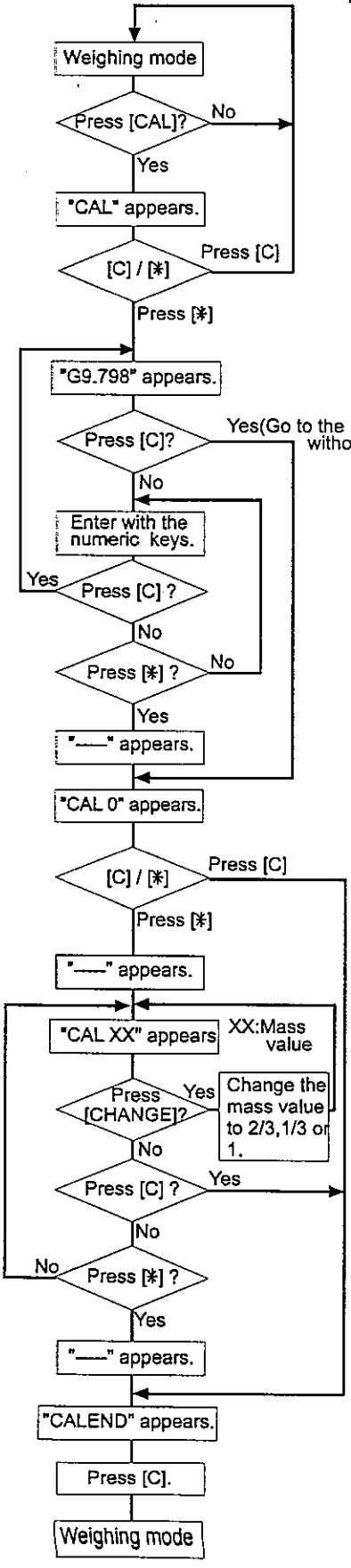
The calibration mass value, which is the weighing capacity value set in A1 function, appears in place of XX in "CAL XX". To change the value, press [CHANGE]. Available values are 1/1, 2/3 and 1/3 of the weighing capacity. Using a mass with the full scale value is recommended.

Place the mass on the weighing pan, wait for the stable indicator to illuminate and press [*] to perform span calibration. "----" and then "CAL End" appears. Press [C] to end the operation.

Check the linearity after calibration.

5-4 Calibration

Calibration to compensate for, gravitational acceleration, zero and span calibration error.
This calibration is to correct errors on a scale which was once calibrated. When the load cell, main board or A/D parts are replaced, temperature compensation is required. Before calibration, place the scale in a draft-free room with a stable temperature and warm it up for ten minutes or more.



Note: Turn the power switch on, set the scale in the normal weighing mode by pressing [MODE] when "-----" or " " (blank) appears. Warm the scale up for ten minutes or more. If "E" appears, check A/D to verify that the A/D value is within the correct range and perform temperature compensation.

- Setting gravitational acceleration -

In the weighing mode, press [CAL] to display "CAL". Press [*] to display the gravitational acceleration value such as "G 9798". Use the numeric keys to enter the local gravitational acceleration value and press [*]. When entering the value, ignore the decimal point. "——" and then "CAL 0" appears to indicate that the value has been set.

To complete the operation without calibration, press [C] twice to return the scale to the weighing mode.

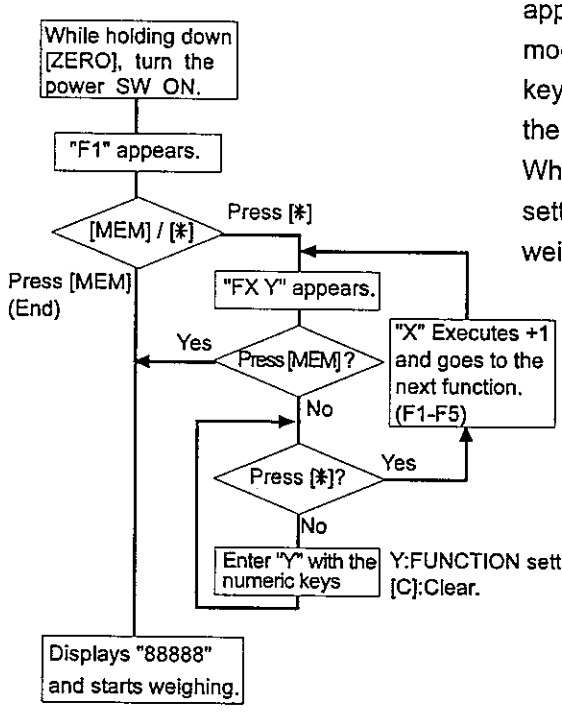
- Zero calibration -

With "CAL 0" displayed, confirm that nothing is on the weighing pan and the weighing pan is not in contact with anything. Wait for the stable indicator to appear and press [*]. "——" then "CAL XX" appears to indicate that zero calibration has been completed. To complete the operation without span calibration, press [C] twice to return the scale to the weighing mode.

- Span calibration -

The calibration mass value, which is the weighing capacity value set in A1 function, appears in place of XX in "CAL XX". To change the value, press [CHANGE]. Available values are 1/1, 2/3 and 1/3 of the weighing capacity. Using a mass with the full scale value is recommended.
Place the mass on the weighing pan, wait for the stable indicator to appear and press [*]. "-----" and then "CAL End" appears to indicate that span calibration has been completed. Press [C] to return the scale to the weighing mode.

5-5 USER FUNCTION Setting



While holding down [ZERO], turn the power switch on. "F1" appears to indicate that the scale is in the F-function setting mode. Press [*] to select the function number. Use the numeric keys to enter an appropriate value, and press [*] to proceed to the next function number.
When all the settings have been done, press [MEM] to save the settings. "88888" appears and the scale returns to the normal weighing mode.

F1:AUTO DISPLAY OFF DEFAULT
0:yes, 1:no 1
(If no key operation is performed for 5 minutes or more, or there is no change in weight, the display will be turned off automatically. The power is still on under this condition, thus no power saving is achieved.)

F2:Cancellation of unit price near zero 0
0:selectable with [CHANGE], 1:clear, 2:not to clear
With "F2 0", while the weight is displayed, press [CHANGE] to display "Ut C" (clear) and "UtnC" (not to clear) one after another to select either one.

F3:OP-03 output mode 5
0:Pressing [*] will output the price, weight and unit price (Format 1).
1:Pressing [*] will output the PLU number and price (Format 2).
2:Command mode:outputs the price, weight and unit price (Format 1).
3:Stream mode:outputs the price, weight and unit price (Format 1).
4:EC approval specifications printer output with delay time (Format 3).
5:EC approval specifications printer output (Format 3).

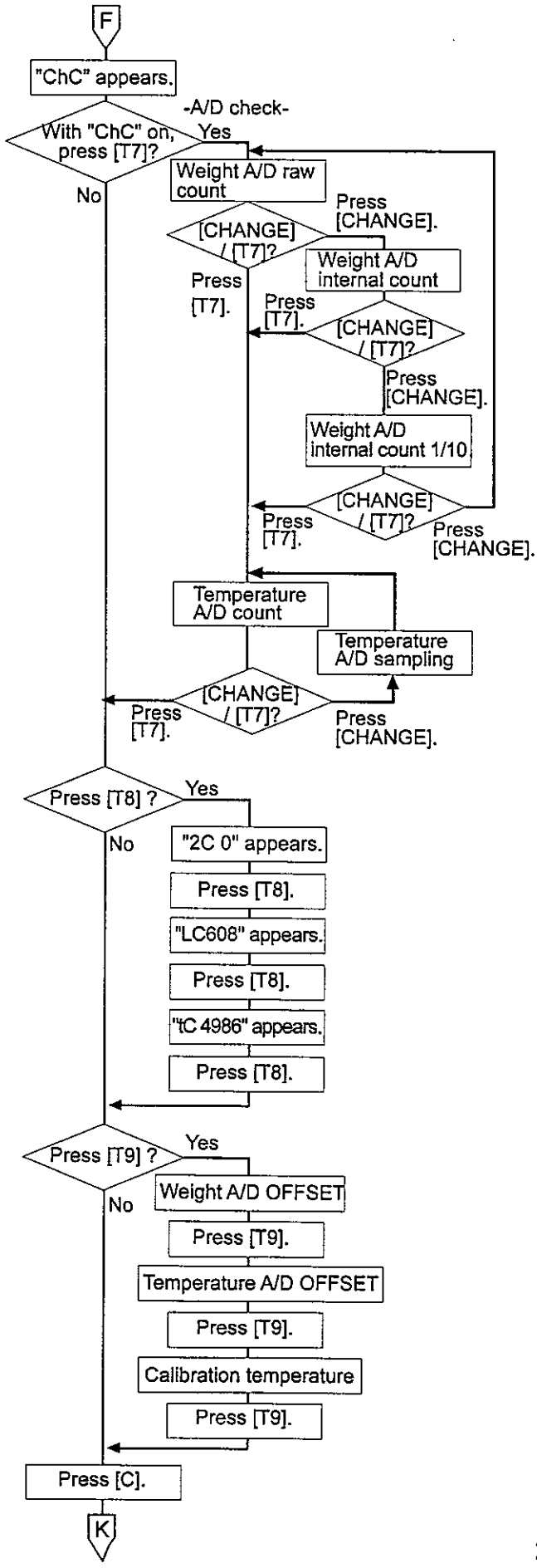
Note) When C16=0 is selected for C-function, only F3=4 or F3=5 is available.

F4:OP-03 Baud rate 2
0:600bps
1:1200bps
2:2400bps
3:4800bps
4:9600bps

F5:OP-03 Parity bit 0
0:7bits (EVEN)
1:8bits (NONE)

5-6 A/D Check

With "SEtinG" displayed, press [T5]. "ChC" appears. Then, press [T7] to enter the A/D check mode.



- Displaying weight A/D raw count -
Displays the raw value in the A/D converter counter. Because the value is raw, without any computation such as temperature compensation, it varies greatly depending on the environment.

A/D OFFSET count ≒35000±5000
(when the A/D offset device is connected)
Zero≒35000-170000
Span≒95000±20000

- Weight A/D internal count display -
Calibrates and corrects the raw count and displays the value as 20 times (1/60000) or 25 times (1/75000) of the weight displayed (1/3000).

Zero≒0±30000
Span≒60000±50 (SF-6K, SF-30K), ≒75000±62 (SF-15K)
Stability band (width) within±10

- Weight A/D internal count 1/10 display
Displays 1/10 of the internal count described above. (1/6000, 1/7500)

- Temperature A/D count display -
Displays temperature sensor A/D count. Normally, one sampling per minute. Presssing [CHANGE] performs another A/D.
Temperature A/D count≒69000±8000

- Temperature compensation factor display -
Displays the main compensation factors to be used for temperature compensation. No change is available.

Displays the value saved at A/D OFFSET input. If the value is not within the specified range, temperature may not be compensated correctly. If such a situation occurs, reenter A/D OFFSET and perform temperature compensation again.

6. CHECKING THE POWER SUPPLY

There are three types of power supplies, depending on the scale type.

6-1 SF-A AC Power Supply for the VFD

Note: Parts vary with the PCB version. So, use much care when replacing the PCB.

• Fuse :0.2 A slow blow type

• Power cable :Six cables are available, depending on the plug and the connector. When replacing the power cable, check the connector type on the PZ:3201 located in the scale case.

	Power cable(Depends on the connector in the scale)		Voltage setting
	For PC:3201B J1	For PC:3201C J1, J5	PZ:3201-J3 (TF:452 color code)
100V A PLUG	KO:1570	KO:1570A	J3-P1 (Brown)
120V A PLUG	KO:1570	KO:1570A	J3-P2 (Red)
230V C PLUG	KO:1571	KO:1571A	J3-P3 (Orange)
220V C (For Korea)	KO:1572	KO:1572A	J3-P3 (Orange)
230V BF PLUG		KO:1620A	J3-P3 (Orange)
230V S PLUG		KO:1621A	J3-P3 (Orange)

• Transformer :Two transformers are available, depending on the VFD board version.

Transformer	Display board PZ:3197/3197A-VFD
TF:452A	PZ:3197(PC:3197, ED:FIP7G13)
TF:452B	PZ:3197A(PC:3197A, ED:SMO71MG)

• Supply voltage : To change the supply voltage, replace the PZ:3201 J3 and switch the transformer tap. The earlier scales may contain PC:3201B, TF452A or PZ:3200C. This is mainly because the display is different and does not affect the scale operation.

		J6	TF452A used PC:3200C-J6 voltage	J6	TF452A used PC:3200D-J6 voltage	J6	TF452B used PC:3200C-J6 voltage
Lb0	Power supply input	1	8.5V ± 10%	1	8.5V ± 10%	1	9V ± 10%
V+	Power supply +5V	2	8.5V ± 10%	2	8.5V ± 10%	2	9V ± 10%
GND	GND	3	GND	3	GND	3	GND
Lb2	Power supply SENSE input	4	GND (Lb2 Not used)	4	4.6V ± 15%	4	4.8V ± 15%
eb/ec	VFD power supply	5	29V ± 15%	5	29V ± 15%	5	35V ± 15%
Ef		6	AC 4V ± 15%	6	AC 4V ± 15%	6	AC 3.6V ± 15%
Ef		7	–	7	–	7	–
Ecco			DC6.0V + 15% (To GND voltage)		DC6.0V + 15% (To GND voltage)		DC5.5V + 15% (To GND voltage)

6-2 SF-B, SG-A DC Power Supply for the LCD (An AC adapter or dry battery can be used.)

- Fuse : 0.2 A slow blow type
- AC adapter : 6 V 30 mA or greater (less than 15 V)
- Battery : When a battery is used, remove the AC adapter. SFC-09 can not be used.
- DC jack :PZ:3204 is the same as that of SF-C but the cable connection is different.

6-3 SF-C DC Power Supply for the VFD (AC adapter or SFC-09 (NiCd battery option) can be used.)

- Fuse :1A slow blow type
- AC adapter : With SFC-09 used, 8 V 500 mA or greater (less than 15 V)

  With no SFC-09 used, 5 V 600 mA or greater (less than 15 V)
- When SFC-09 is used, the power supply is automatically switched to the AC adapter or battery, whichever generates higher voltage, and is available continuously even at power failure.
- The scale can be operated with the SFC-09 for approximately eight hours. A dry battery can not be used.
- Only PZ: 3197A can be used for the VFD. PZ: 3197 can not be used.
- Low battery detection method is different from other scale types. Set the function A6=1.
- AC adapter input : 8-15 V Approx. 500 mA
- Battery input : 4.4-6 V Approx.500 mA
- Input voltage : 1.8-15 V AC adapter, 2. 4-6 V SFC-09, 3.4. GND
- Output voltage J2

1. 4-15V LBϕ:DC/DC input voltage SENSE LBϕ for 4 V or less
2. 7 V±15% V+:5 V power supply for LOGIC/ANALOG
3. GND
4. 0-8 V LB2:AC adapter voltage SENSE (AC adapter 4-8 V, Battery 0 V)
5. 35 V±10% eb/ec:VFD ANODE/GRID voltage

6,7 Approx. 6VAC (P-P) 70 KHz Ef:VFD FILAMENT voltage,
To GND 5.5 VDC±15%:VFD GRID CUT-OFF

Note) With 50/60 Hz power supply, AC voltage is about 3.6 V. With DC/DC power supply, the variation in the input voltage or output load changes the frequency. A normal DVM can not measure the voltage.

Refer to "11. OPTION 09 BATTERY OPTION" for the detail about SFC-09.

7. CHECKING MAIN BOARD PZ:3200

While the PZ:3200 is common for all scale types, PC:3200B or PC:3200C can not be used for the SF-C. For program memory, select CPU internal mask ROM and external EPROM at JP2. Select VFD or LCD at JP1. Select SF or SG in the type setting. Set the weighing capacity or other functions in the function setting.

7-1 Jumper Setting

JPI = Display selection jumper: Short = VFD / Open = LCD

JP2 = Program memory selection jumper: Short = CPU internal mask ROM / Open = External EPROM

JP3 = Factory adjusting jumper (EEPROM initialize): Short = Factory adjusting / Open = Normal use

See the description on initialization. Leave the JP3 open after adjustment.

7-2 Type Setting

While holding down [C], turn on the power switch to display "tyPE X". "t" is replaced with X for SF series; "o" for SG series. When the correct type is displayed, press [C] to complete the operation. If the type is not correct, press [ON/OFF], then [C] to display "t" or "o" in place of "X". Select the correct type and press [ON/OFF] to finish the operation.

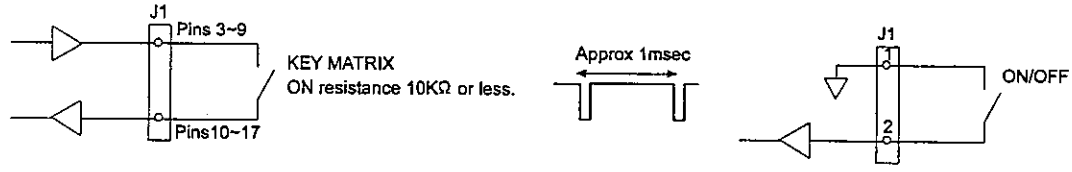
7-3 Function Setting: Refer to the description on the function setting.

Type setting example (If the setting is incorrect, the scale may not function properly.)

	JP1	TYPE setting	A-FUNCTION	JP2
SF-A	SHORT	"tYPE t"	A6=0 / Weighing capacity	
SF-B	OPEN	"tYPE t"	A6=0 \ A1=0 :6K	OPEN:External EPROM
SF-C	SHORT	"tYPE t"	A6=1 \ A1=1 :15K	SHORT:Internal MASK ROM
SG-A	OPEN	"tYPE 0"	A6=0 \ A1=2 :30K	

7-4 Connector

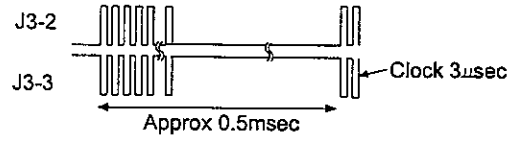
• J1: Membrane key Lock-in type key. Hold the levers on both sides to pull out the lock. To insert, push in the lock.



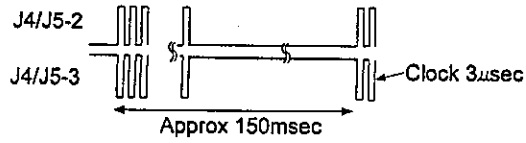
• J2: OPTION-03 RS-232C OPTION

Connected to PZ:3205.

• J3: VFD For SF-A or SF-C, outputs serial data to PZ:3197 and supplies power to the VFD.



• J4: LCD　　For SF-B or SG-A, outputs serial data to PZ:3198, PZ:3199, PZ:3206.



• J5: LCD　　For SG-A, connect to PZ:3199. (The same as J4. J4 and J5 are interchangeable.)

• J6: Power supply when VFD is used

For SF-A, connect to PZ:3202

For SF=C, connect to PZ:3203

• J7: Power supply when LCD is used

For SF-B or SG-A, connect to PZ:3204.

• J8: Load cell

Between pins 1-2	Temperature sensor terminal	Approx. 200Ω 0.1 V	pin 1 = approx.2.4 V
Between pins 3-6	Load cell excitation voltage terminal	Approx. 1 kΩ 5 V	pin 6 = GND
Between pins 4-5	Load cell output terminal	Approx. 1 kΩ 0 V	pin 4 = approx.2.5 V
Pin 7	Load cell element terminal	GND	

Note) Load cell output terminal, if not connected to PCB, is 0-10 mV, Span=approx. 5 mV.

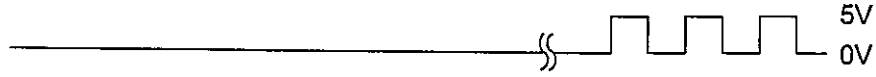
• Memory

U2　:EPROM　Switch the program memory between internal mask and external EPROM at JP2.

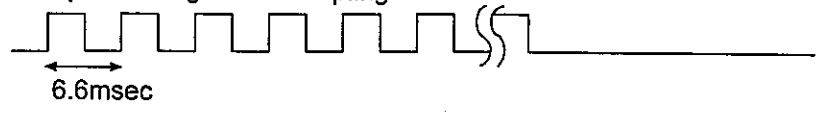
U4, U5 :EEPROM　Stores function, calibration and PLU data.

• A/D Dual integral method A/D

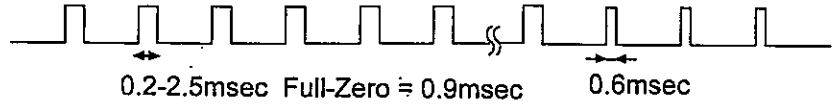
T1st　U7-pin 1 Temperature A/D sampling (Approx. every one minute)



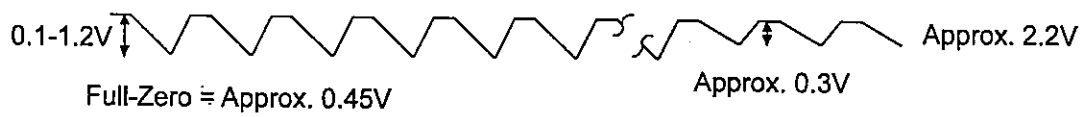
W1st　U7-pin 4 Weight A/D sampling



REF　U7-pin 10



Integral waveform C108



8. CHECKING SWITCHES

The key switch arrangement is different for the SF and SG. When the main board is replaced, set "tyPE t" for SF or "tyPE o" for SG in the type setting.

If two or more key switches are pressed at the same time, they will not function. Normally, switches are checked in "ChC" mode [T3]. If the switches do not function at all and the scale is not in the "SETinG" mode, check the SW port as follows:

8-1 Checking the SW Port

While holding down [CAL], turn on the power switch to display "P04.XX". Repeatedly pressing [CAL] displays CPU switch port numbers up to "P63 XX" one after the other. Check the switch matrix on COMMON using the lower three digits XXX.

(P04=pin 65, P05=pin 66, P06=pin 67, P63=pin 39, P62=pin 38, P61=pin 37, P60= pin 36 (CPU PIN No.)

SF-KEY		J1-17	J1-16	J1-15	J1-14	J1-13	J1-12	J1-11	J1-10
J1-9	DISPLAY KEY	P04.001 [X]	P04.002 [TARE]	P04.004 [MEM]	P04.008 [ZERO]	P04.016 [*]	P04.032 [M+]		
J1-8	DISPLAY KEY	P05.001 [T9]	P05.002 [MODE]	P05.004 [T6]	P05.008 [CE]	P05.016 [T3]	P05.032 [CANGE]	P05.064 [C]	
J1-7	DISPLAY KEY	P06.001 [T7]	P06.002 [T8]	P06.004 [T4]	P06.008 [T5]	P06.016 [T1]	P06.032 [T2]	P06.064 [T0]	
J1-3	DISPLAY KEY		P60.002 [P24]	P60.004 [P16]	P60.008 [P17]	P60.016 [P8]	P60.032 [T9]		P60.128 [P1]
J1-4	DISPLAY KEY	P61.001 [P25]	P61.002 [P26]	P61.004 [P18]	P61.008 [P19]	P61.016 [P10]	P61.032 [P11]	P61.064 [P2]	P61.128 [P3]
J1-5	DISPLAY KEY	P62.001 [P27]	P62.002 [P28]	P62.004 [P20]	P62.008 [P21]	P62.016 [P12]	P62.032 [P13]	P62.064 [P4]	P62.128 [P5]
J1-6	DISPLAY KEY	P63.001 [P29]	P63.002 [P30]	P63.004 [P22]	P63.008 [P23]	P63.016 [P14]	P63.032 [P15]	P63.064 [P6]	P63.128 [P7]

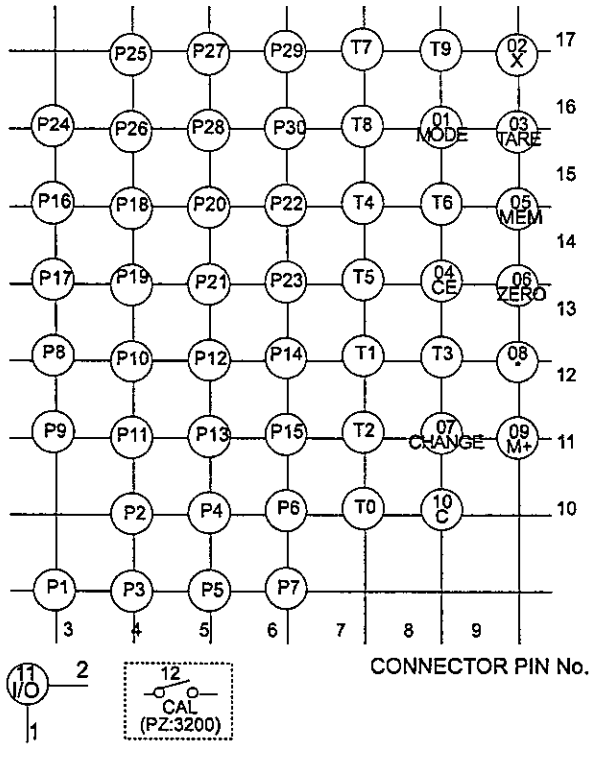
[ON/OFF] key is available as "▼" below "P."

SG-KEY		J1-17	J1-16	J1-15	J1-14	J1-13	J1-12	J1-11	J1-10
J1-9	DISPLAY KEY			P04.004 [X]	P04.008 [TARE]	P04.016 [MEM]	P04.032 [ZERO]	P04.064 [*]	P04.128 [M+]
J1-8	DISPLAY KEY			P05.004 [T0]	P05.008 [MODE]		P05.032 [CE]	P05.064 [C]	P05.128 [CHANGE]
J1-7	DISPLAY KEY			P06.004 [T8]	P06.008 [T9]	P06.016 [T5]	P06.032 [T6]	P06.064 [T2]	P06.128 [T3]
J1-3	DISPLAY KEY								
J1-4	DISPLAY KEY				P61.008 [P9]		P61.032 [P5]		P61.128 [P1]
J1-5	DISPLAY KEY			P62.004 [P10]	P62.008 [P11]	P62.016 [P6]	P62.032 [P7]	P62.064 [P2]	P62.128 [P3]
J1-6	DISPLAY KEY			P63.004 [P12]	P63.008 [T7]	P63.016 [P8]	P63.032 [T4]	P63.064 [P4]	P63.128 [T1]

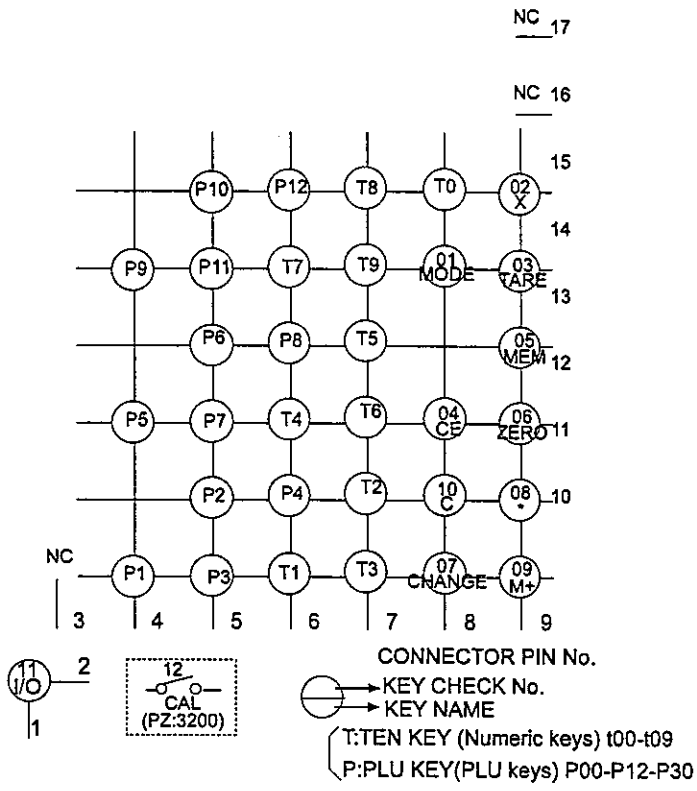
[ON/OFF] key is available as "▼" below "P."

8-2 Key Matrix

SF-A,B,C SERIES
MENBRANE KEY MATRIX



SG-A SERIES
MENBRANE KEY MATRIX



9. DISPLAYS

(PZ:3197, PZ:3197A, PZ:3198, PZ:3199, PZ:3206)

Two types of display, VFD and LCD are available. Further, there are two types of LCD, tower type and table top. Set the display board at common main board JP1 and in the type setting.

Model	Display board		Main board		
SF-A	PZ:3197/PZ:3197A	ED:FIP 7G13/ED:SMO71MG	J3	JP1 SHORT	"tYPE t"
SF-B	PZ:3206	ED:TTR1462+TTR1463	J4	OPEN	"tYPE t"
SF-C	PZ:3197A	ED:SMO71MG	J3	JP1 SHORT	"tYPE t"
SG-A	PZ:3198+PZ:3199	ED:TTR1462+TTR1463	J4+J5	OPEN	"tYPE 0"

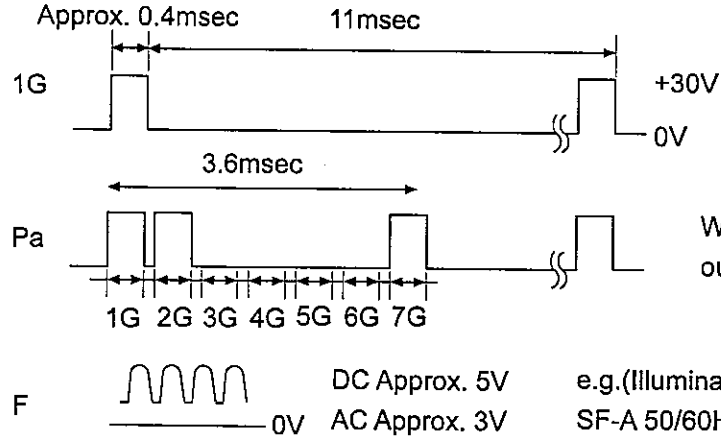
See "7. CHECKING MAIN BOARD PZ:3200" for JP1 and TYPE setting.

There are two types of VFD for the SF-A; ED:SM071MG PZ:3197A (new type), ED:FIP7G13 PZ:3197 (old type).The voltage and pins of the VFDs are different and are not interchangeable. When replacing the board, the transformer must be replaced, too. For details, refer to "6-1 SF-A power supply". For SF-C, only the new type VFD, ED:SM071MG PZ:3197A can be used.

There are two types of LCD; 6-digit LCD (ED:TTR1462) for displaying the weight and unit price, and 7-digit LCD (ED:TTR1463) for displaying the price. Either one can be selected from the two types in the parentheses for each display.

For SF-B, connect PZ:3206 to J4. For SG-A, connect front PZ:3198 and rear PZ:3199 to J4 and J5 respectively.

VFD

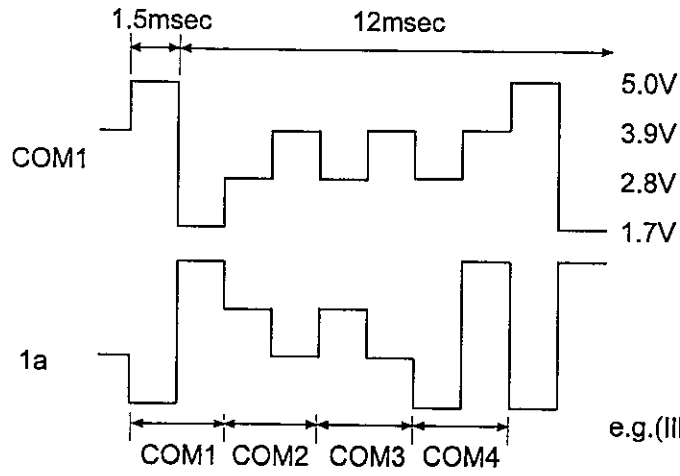


When SEG is illuminated, P waveform is output in synchronization with G waveform.

DC Approx. 5V
AC Approx. 3V

e.g.(Illuminates 1G X Pa, 2G X Pa, 7G X Pa)
SF-A 50/60Hz, SF-C Approx. 70KHz

LCD



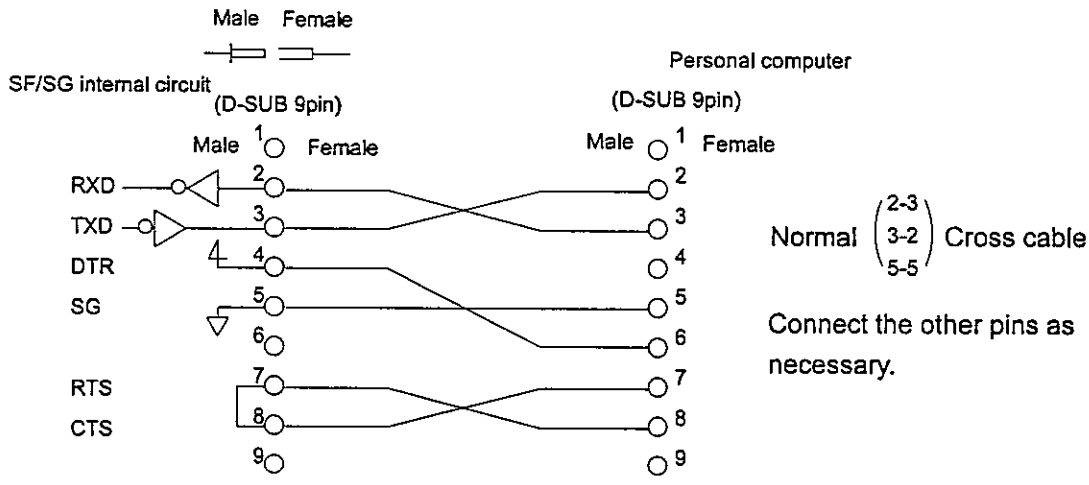
When SEG is illuminated, it outputs strong opposite phase amplitude in synchronization with COM signal.

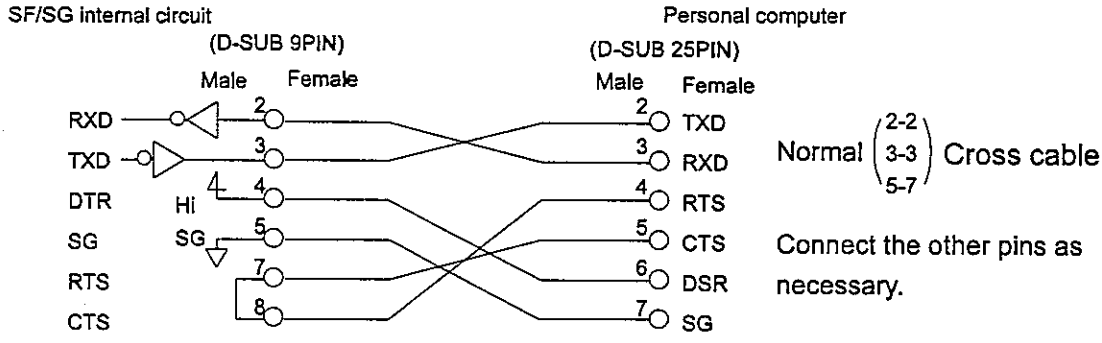
e.g.(Illuminates COM1 X 1a and COM4 X 1a)

fosc Approx. 70KHz

10. OPTION 03 (RS-232C OPTION)

Cable





Format (set in the function setting)

While holding down [ZERO], turn on the power switch to display "F1- ". Press [T3], then [*]. "F3-X" appears.

Select data output timing and format, and enter an appropriate value with the numeric keys.

0: Pressing [*] outputs data in format 1.
1: Pressing [*] outputs data in format 2.
2: Command mode communications
3: Stream mode output
4: Pressing the function key ([*], [M+] or [CE]) outputs data in format 3 with 1 line/1 sec delay.
5: Pressing the function key ([*], [M+] or [CE]) outputs data in format 3.

Note) When C16-0 is set for C-function, only 4 or 5 is available; C16-1, all modes (0-5) are available.

Baud rate

After changing the format, press [*] to display "F4-X". Enter the baud rate with the numeric keys.

0: 600 bps, 1: 1200 bps, 2: 2400 bps, 3:4800 bps, 4: 9600 bps

After setting the baud rate, press [*] to display "F5-X". Enter the parity bit with the numeric keys.

0:7 bits, EVEN, 1: 8 bits, NONE

After setting the parity bit, press [*] to display "F1-X". Press [MEM] to complete the operation.

11. OPTION 09 (BATTERY OPTION)

Battery	: 4400 mAH×4 with thermal protection	
Charger controller :	Charge input	8-15 V, Approx. 400 mA
	Charge output	6V, Approx. 440 mA 14 hours
	TRICKLE charge output	6 V 100mA or less
	DC/AC OSC	Approx. 70 KHz
	Timer power supply	8 V or greater
	Timer OSC	Approx. 4 KHz
	Timer duration	Approx. 14 hours
		Charge input Increments the count with 6 V or greater.
	Battery output	Approx. 5 V
	Fuse	1.5 A slow blow type

Note) Handle the battery carefully. Do not bang or drop it. Do not short the battery. Extremely great current will run in it.

The battery can be charged with the AC adapter while the scale power switch is turned off. After 14 hours of charging, it will continue to trickle charge.

SF-KA PARTS LIST

Symbol	Part No.	Part Name	Q'ty
1	07:1000046	Lower case	1
2	07:1000045-1	Upper case	1
3	07:1000047	Display column(front)	1
4	07:1000048	Display column(rear)	1
5	03:1000043	Platform support	1
6	03:1000044	Base frame	1
7	04:2000257	Platform	1
8	07:3002180	Battery cover	1
9	10:MR16	Level vial	1
10	10:7-032-001A	Leveling foot	4
11	FH:FH-B02-ADK	Fuse holder	1
11a	FS:EAWK200MAADK	Fuse	1
12	ST:SDDJDPST-ADK	Switch	1
13	06:A400-1003	Rubber packing	4
14	15:4005252	Earth spring	1
15	07:3002326	ROM cover	1
16-1	KO:1570A	Power Cable for Japan/USA	1
16-2	KO:1571A	Power Cable for EU	1
16-3	KO:1572A	Power Cable for KOREA	1
16-4	KO:1620A	Power Cable for UK	1
16-5	KO:1621A	Power Cable for Australia	1
17	09:3002161	Membrane key unit	1
17a	08:3002533	Key sheet	1
18	04:4005258	Shaft frame	1
19	7PZ:3197	Display board assembly	1
20	7PZ:3200	Main board assembly	1
21-1	LC:122-6K	Load cell for SF-6KA	1
21-2	LC:122-15K	Load cell for SF-15KA	1
21-3	LC:122-30K	Load cell for SF-30KA	1
22	04:3002186	Load angle	1
23	04:4005262	Spring holder(inner)	1
24-1	15:4005266	Spring plate(6k)	1
24-2	15:4005265	Spring plate(15k)	1
24-3	15:4005264	Spring plate(30k)	1
25	04:4005263	Spring holder(outer)	1
26-1	08:4005491	Rated label(A) 230V	1
26-2	08:4006180	Rated label(A) 120V	1
27	08:3002165	Filter(A,C)	2
28-1	08:3002305-1	Model No. label SF-6KA	2
28-2	08:3002305-2	Model No. label SF-15KA	2
28-3	08:3002305-3	Model No. label SF-30KA	2
29	04:4005253	Shaft holder	1
30	08:4004098	MFD by A&D	1
31	08:4003502	MADE IN KOREA	1
32	7PZ:3202	AC/DC power supply board assembly	1
33	TF:452A-ADK/TF:452B-ADK	Transformer	1
34	7PZ:3201	Noise filter board assembly	1
35	10:6NR-16	Cable cramp	1
36	04:4005693	Transformer holder	2
37	08:4005856	Spacer	1

SF-KA PARTS LIST

Symbol	Part No.	Part Name	Q'ty
	KO:964-10W60ADK	Cable(7PZ:3197 to 7PZ:3200)	1
	KO:964-7W15ADK	Cable(7PZ:3202 to 7PZ:3200)	1

SF-KB PARTS LIST

Symbol	Part No.	Part Name	Q'ty
1	07:1000046	Lower case	1
2	07:1000045-1	Upper case	1
3	07:1000047	Display column(front)	1
4	07:1000048	Display column(rear)	1
5	03:1000043	Platform support	1
6	03:1000044	Base frame	1
7	04:2000257	Platform	1
8	07:3002180	Battery cover	1
9	10:MR16	Level vial	1
10	10:7-032-001A	Leveling foot	4
11	FH:FH-B02-ADK	Fuse holder	1
11a	FS:EAWK200MAADK	Fuse	1
12	ST:SDDJDPST-ADK	Switch	1
13	06:A400-1003	Rubber packing	4
14	15:4005252	Earth spring	1
15	07:3002326	ROM cover	1
16	7PZ:3204	Jack board assembly	1
17	09:3002161	Membrane key unit	1
17a	08:3002533	Key sheet	1
18	04:4005258	Shaft frame	1
19	7PZ:3206	Display board assembly	1
20	7PZ:3200	Main board assembly	1
21-1	LC:122-6K	Load cell for SF-6KB	1
21-2	LC:122-15K	Load cell for SF-15KB	1
21-3	LC:122-30K	Load cell for SF-30KB	1
22	04:3002186	Load angle	1
23	04:4005262	Spring holder(inner)	1
24-1	15:4005266	Spring plate(6k)	1
24-2	15:4005265	Spring plate(15k)	1
24-3	15:4005264	Spring plate(30k)	1
25	04:4005263	Spring holder(outer)	1
26	08:4005535	Rated label(B)	1
27	08:3002166	Filter(B)	2
28-1	08:3002305-4	Model No. label SF-6KB	2
28-2	08:3002305-5	Model No. label SF-15KB	2
28-3	08:3002305-6	Model No. label SF-30KB	2
29	04:4005253	Shaft holder	1
30	08:4004098	MFD by A&D	1
31	08:4003502	MADE IN KOREA	1
32	15:4003493	Electrode(-)	1
33	15:4003492	Electrode(+)	1
34	15:4003494	Electrode(L)	1
35	08:4005856	Spacer	1
	KO:964-7W60ADK	Cable(7PZ:3206 to 7PZ:3200)	1
	KO:1569-ADK	Cable(7PZ:3204 to 7PZ:3200)	1

SF-KC PARTS LIST

Symbol	Part No.	Part Name	Q'ty
1	07:1000046	Lower case	1
2	07:1000045-1	Upper case	1
3	07:1000047	Display column(front)	1
4	07:1000048	Display column(rear)	1
5	03:1000043	Platform support	1
6	03:1000044	Base frame	1
7	04:2000257	Platform	1
8	07:3002180	Battery cover	1
9	10:MR16	Level vial	1
10	10:7-032-001A	Leveling foot	4
11	FH:FH-B02-ADK	Fuse holder	1
11a	FS:EAK1A-ADK	Fuse	1
12	ST:SDDJDPST-ADK	Switch	1
13	06:A400-1003	Rubber packing	4
14	15:4005252	Earth spring	1
15	07:3002326	ROM cover	1
16	7PZ:3204	Jack board assembly	1
17	09:3002161	Membrane key unit	1
17a	08:3002533	Key sheet	1
18	04:4005258	Shaft frame	1
19	7PZ:3197	Display board assembly	1
20	7PZ:3200	Main board assembly	1
21-1	LC:122-6K	Load cell for SF-6KC	1
21-2	LC:122-15K	Load cell for SF-15KC	1
21-3	LC:122-30K	Load cell for SF-30KC	1
22	04:3002186	Load angle	1
23	04:4005262	Spring holder(inner)	1
24-1	15:4005266	Spring plate(6k)	1
24-2	15:4005265	Spring plate(15k)	1
24-3	15:4005264	Spring plate(30k)	1
25	04:4005263	Spring holder(outer)	1
26	08:4006780	Rated label(C)	1
27	08:3002165	Filter(A,C)	2
28-1	08:3002305-7	Model No. label SF-6KC	2
28-2	08:3002305-8	Model No. label SF-15KC	2
28-3	08:3002305-9	Model No. label SF-30KC	2
29	04:4005253	Shaft holder	1
30	08:4004098	MFD by A&D	1
31	08:4003502	MADE IN KOREA	1
32	15:4003493	Electrode(-)	1
33	15:4003492	Electrode(+)	1
34	15:4003494	Electrode(L)	1
35	7PZ:3203	DC/DC power supply board assembly	1
36	08:4005856	Spacer	1
	KO:964-10W60ADK	Cable(7PZ:3197 to 7PZ:3200)	1
	KO:964-7W15ADK	Cable(7PZ:3202 to 7PZ:3200)	1
	KO:964-3S20ADK	Cable(7PZ:3204 to 7PZ:3203)	1

SG-KA PARTS LIST

Symbol	Part No.	Part Name	Q'ty
1	07:1000046	Lower case	1
2	07:1000045-2	Upper case	1
3	08:3002532	Rear sheet	1
4	07:3002170	LCD filter	1
5	03:1000043	Platform support	1
6	03:1000044	Base frame	1
7	04:2000257	Platform	1
8	07:3002180	Battery cover	1
9	10:MR16	Level vial	1
10	10:7-032-001A	Leveling foot	4
11	FH:FH-B02-ADK	Fuse holder	1
11a	FS:EAWK200MAADK	Fuse	1
12	ST:SDDJDPST-ADK	Switch	1
13	06:A400-1003	Rubber packing	4
14	15:4005252	Earth spring	1
15	07:3002326	ROM cover	1
16	7PZ:3204	Jack board assembly	1
17	09:3002162	Membrane key unit	1
17a	08:3002532	Key sheet	1
18	08:3002546	Unit label	1
19	7PZ:3198	Front display board assembly	1
20	7PZ:3200	Main board assembly	1
21-1	LC:122-6K	Load cell for SG-6KA	1
21-2	LC:122-15K	Load cell for SG-15KA	1
21-3	LC:122-30K	Load cell for SG-30KA	1
22	04:3002186	Load angle	1
23	04:4005262	Spring holder(inner)	1
24-1	15:4005266	Spring plate(6k)	1
24-2	15:4005265	Spring plate(15k)	1
24-3	15:4005264	Spring plate(30k)	1
25	04:4005263	Spring holder(outer)	1
26	08:4005535	Rated label(B)	1
27	7PZ:3199	Rear display board assembly	1
28-1	08:4005925-1	Model No. label SG-6KA	2
28-2	08:4005925-2	Model No. label SG-15KA	2
28-3	08:4005925-3	Model No. label SG-30KA	2
29	07:3002171	Side cover	1
30	08:4004098	MFD by A&D	1
31	08:4003502	MADE IN KOREA	1
32	15:4003493	Electrode(-)	1
33	15:4003492	Electrode(+)	1
34	15:4003494	Electrode(L)	1
35	08:4005856	Spacer	1
	KO:964-7W30ADK	Cable(7PZ:3198 to 7PZ:3200)	1
	KO:964-7W35ADK	Cable(7PZ:3199 to 7PZ:3200)	1
	KO:1569-ADK	Cable(7PZ:3204 to 7PZ:3200)	1
36	08:4006508	Under seal	1

7PZ:3197 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3197-ADK	Printed wiring board	1
C1,2	CK:SME50V1ADK	Chemical capacitor	2
C3,4	CC:0.01U-ADK	Ceramic capacitor	2
FIP1～6	ED:FIP7G13	Fluorescent display tube	6
IC1	UC:D16310GF	Driver IC	1
J1	JI:10P-S2L2-ADK	Connector	1
Q1～3	QT:KTC3198Y	Transistor	3
R1,3	RC:RD1/8S22KJ	Carbon resistor	2
R2	RC:RD1/8S2.7KJ	Carbon resistor	1
R4	RC:RD1/8S4.7KJ	Carbon resistor	1
R5,6	RC:RD1/8S56K	Carbon resistor	2
	06:4005275	Pillow	12

7PZ:3197A PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3197A-ADK	Printed wiring board	1
C1,2	CK:SME50V1ADK	Chemical capacitor	2
C3,4	CC:0.01U-ADK	Ceramic capacitor	2
FIP1～6	ED:SM071MG	Fluorescent display tube	6
IC1	UC:D16310GF	Driver IC	1
J1	JI:10P-S2L2-ADK	Connector	1
Q1～3	QT:KTC3198Y	Transistor	3
R1,3	RC:RD1/8S22KJ	Carbon resistor	2
R2	RC:RD1/8S2.7KJ	Carbon resistor	1
R4	RC:RD1/8S4.7KJ	Carbon resistor	1
R5,6	RC:RD1/8S56K	Carbon resistor	2
	06:4005275	Pillow	12

7PZ:3198 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3198C-ADK PC:3198C	Printed wiring board	1
C1	CC:0.1U25V-ADK	Ceramic capacitor	1
C2～4	CC:0.01U-ADK	Ceramic capacitor	3
J1	JI:7P-S2L2-ADK	Connector	1
LCD1,2	ED:TTR1462	Liquid crystal display	2
LCD3	ED:TTR1463	Liquid crystal display	1
R1	RC:RD1/8S270KJ	Carbon resistor	1
R2～4	RC:RD1/8S56KJ	Carbon resistor	3
R5～7	RC:RD1/8S5.6KJ	Carbon resistor	3
R8	RC:RD1/8S9.1KJ	Carbon resistor	1
U1	UC:D16430AGF	LCD Controller	1
	06:4005575	Pillow	3

7PZ:3199 PARTS LIST

Circuit Symbol	Part No	Part Name	Q'ty
	PC:3199C-ADK PC:3199C	Printed wiring board	1
C1	CC:0.1U25V-ADK	Ceramic capacitor	1
C2～4	CC:0.01U-ADK	Ceramic capacitor	3
J1	JI:7P-S2L2-ADK	Connector	1
LCD1,2	ED:TTR1462	Liquid crystal display	2
LCD3	ED:TTR1463	Liquid crystal display	1
R1	RC:RD1/8S270KJ	Carbon resistor	1
R2～4	RC:RD1/8S56KJ	Carbon resistor	3
R5～7	RC:RD1/8S5.6KJ	Carbon resistor	3
R8	RC:RD1/8S9.1KJ	Carbon resistor	1
U1	UC:D16430AGF	LCD Controller	1
	06:4005575	Pillow	6

7PZ:3200 LOGIC P/L

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3200D-ADK PC:3200D	Printed wiring board	1
BZ1	ET:WES20-15-ADK	Buzzer	1
C1, 19	CC:0.1U25V-ADK	Ceramic capacitor	2
C2	CK:SME35V100ADK	Chemical capacitor	1
C3, 11～15, 17, 18, 21, 23, 25	CC:0.01U-ADK	Ceramic capacitor	11
C4, 5	CT:489D105X0025	Tuntalum capacitor	2
C6	CK:SME16V47ADK	Chemical capacitor	1
C30～57	CC:100P-ADK	Ceramic capacitor	28
D1, 2	DI:1SS270-ADK	Diode	2
J1	JE:17FDZ-BT	Connector	1
J2, 4～6, 8	JI:7P-S2T2-ADK	Connector	5
J3	JI:10P-S2T2-ADK	Connector	1
J7	JI:3P-S2T2-ADK	Connector	1
L1～3	LL:LHL06-470ADK	Choke coil	3
R1	RC:RD1/8S100KJ	Carbon resistor	1
R5, 26	RC:RD1/8S1KJ	Carbon resistor	2
R6, 7, 23, 25, 61	RM:RN16TB30KFE	Metal film resistor	5
R8, 21, 22	RC:RD1/8S56KJ	Carbon resistor	3
R10, 24, 60	RM:RN16TB4.7KFC	Metal film resistor	3
R28～54	RC:RD1/8S100RJ	Carbon resistor	27
R105, 106, 124	RM:RN16TB120KFC	Metal film resistor	3
R109, 110, 112, 113	RM:RN16TB47KFC	Metal film resistor	4
R122	RM:RN16TB1 0 2 KFC	Metal film resistor	1
RN1, 2	RN:8-473JA-ADK	Resistor-network	2
S1	SK:ST1101B-ADK	Tact switch	1
U1	UC:D78054GC-471	Mask CPU	1
U2	UN:27C256-ADK	EPROM	1
(U2)	JS:10308-01-ADK	ROM Socket	1
U3	UC:HC573-ADK	Latch IC	1
U4, 5	UC:RP93C46-ADK	EEPROM	2
U7	UC:74HC02-ADK	IC	1
U8	UA:S-8054ALR	Reset IC	1
U9	UR:TA78DL05S	Regulator	1
X1	XT:KBR4.91MKSTF	Ceramic resonator	1
	04:4005254	Analog case (lower)	1
	04:4005255	Analog case (upper)	1

7PZ:3201 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3201C-ADK PC:3201C	Printed wiring board	1
C1,2	CC:0.001U2KVADK	Ceramic capacitor	2
C3	CP:P33510104ADK	Polyester capacitor	1
J1	JT:LW1143-03ADK	Connector	1
J3	KO:1618	Cable	1
NF1	LL:SU9V05020ADK	Choke coil	1
P1～3	JI:YFW-800-01	Faston pin	3

7PZ:3202 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3202-ADK	Printed wiring board	1
C1	CK:SME16V1MADK	Chemical capacitor	1
C2	CK:SME63V100ADK	Chemical capacitor	1
D1,2	DI:1B4B42-ADK	Bridge diode	2
D3	DZ:05Z6.8-ADK	Zener diode	1
J1	JT:LW0640-07ADK	Connector	1
J2	JI:7P-S2T2-ADK	Connector	1

7PZ:3202A PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3202A-ADK	Printed wiring board	1
C1	CK:SME16V1MADK	Chemical capacitor	1
C2	CK:SME63V100ADK	Chemical capacitor	1
D1.2	DI:1B4B42-ADK	Bridge diode	2
D3	DZ:05Z5.6-ADK	Zener diode	1
R2	RC:RD1/8S100RJ	Carbon resistor	1
R1	RM:RN16TB30KFE	Metalfilm resistor	1

7PZ:3203 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3203A-ADK	Printed wiring board	1
C1,3	CC:0.01V	Ceramic capacitor	2
C2	CK:SXE35VB100	Chemical capacitor	1
C4	CC:0.022V	Ceramic capacitor	1
C5	CC:0.001V	Ceramic capacitor	1
C6	CK:SXE10VB220	Chemical capacitor	1
C7	CK:SXE50VB47	Chemical capacitor	1
D1	DI:IN4001	Resistor	1
D3,4,8	DI:ISS133-ADK	Switching	4
D9	DZ:05Z4.7-ADK	Zener diode	1
D10	DZ:05Z30-ADK	Zener diode	2
D11	DZ:05Z5.6-ADK	Zener diode	2
J1	JI:4P-S2T2-ADK	Connector	1
J2	JI:7P-S2T2-ADK	Connector	1
L2	LL:LHL10-220ADK	Choke coil	1
Q1	QT:KTA1266Y	Transistor	1
Q3	QT:KTC3198Y	Transistor	1
R4	RC:RD1/8W15KJ	Carbon resistor	1
R2	RC:RD1/4W1KJ	Carbon resistor	1
R3	RC:RD1/8W82RJ	Carbon resistor	1
R5,7	RC:RD1/8W270RJ	Carbon resistor	1
R6,8,10,11	RC:RD1/8W100RJ	Carbon resistor	4
R9	RM:RN/8W30KD25	Metal film resistor	1
T1	TF:453A	DC/DC Transformer	1
	KO:964-7W15ADK	Cable	1
	KO:1619	Cable	1
	PZ:3203-P-SK		1

7PZ:3204 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3204A-ADK PC3204A	Printed wiring board	1
J1	JE:HS-302-ADK	Jack	1

5PM:SFC-09PARTS LIST

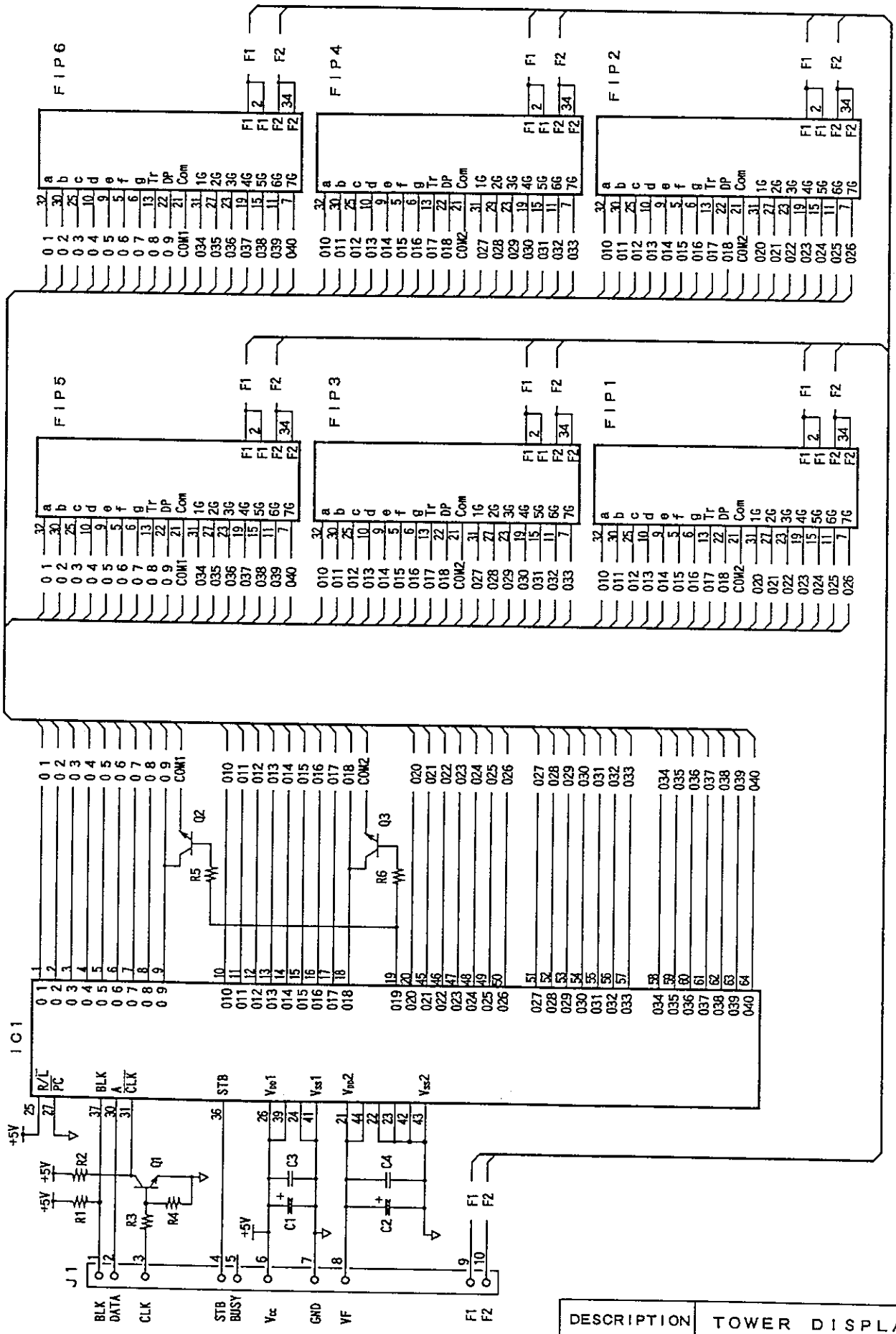
Circuit Symbol	Part No.	Part Name	Q'ty
	07:3003019	Battery case (upper)	1
	07:3003020	Battery case (lower)	1
	06:4006778	Sponge	4
	08:4006789	Battery label	1
	CV-150N	Convex	2

5PZ:3248 PARTS LIST

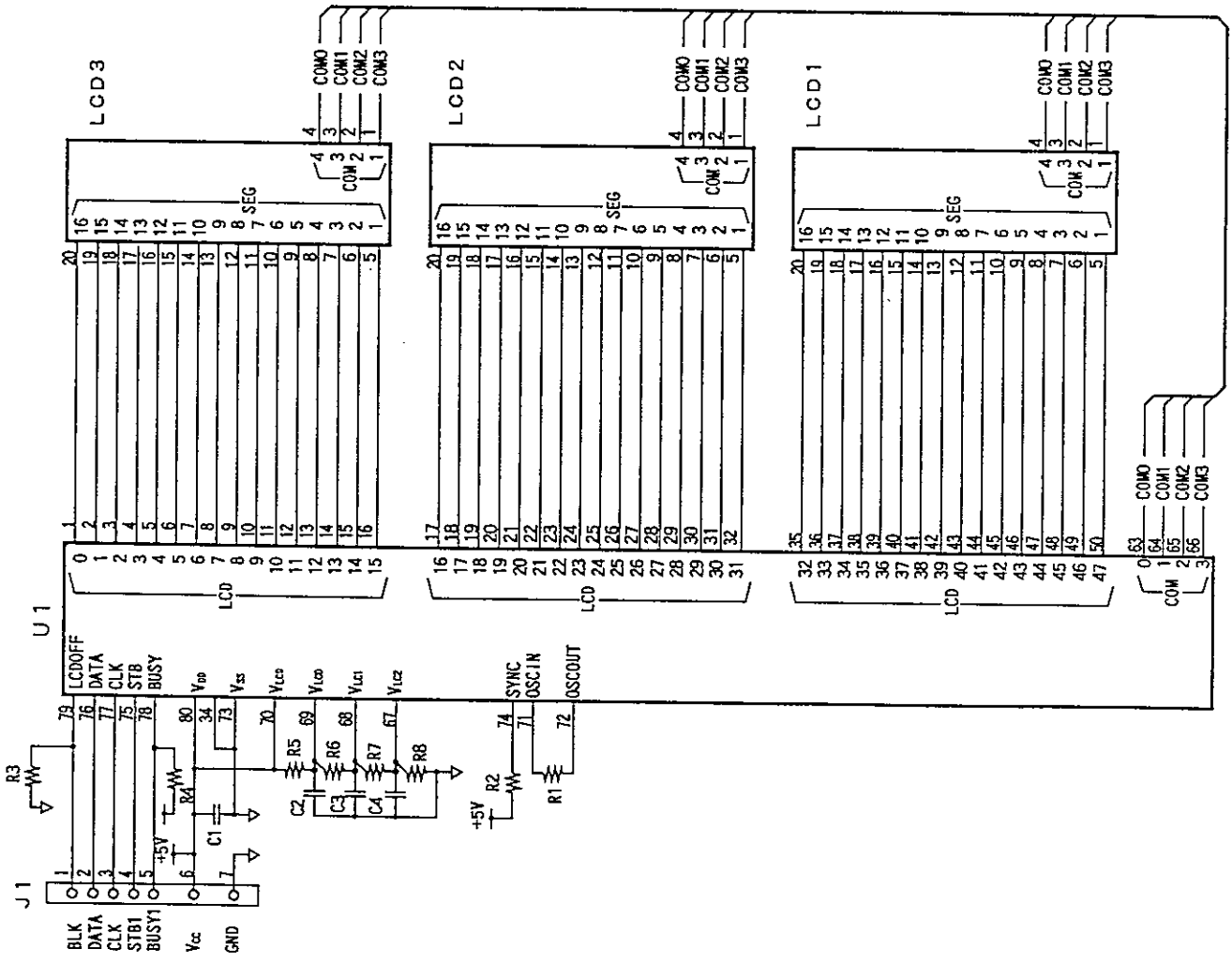
Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3248		1
IC2	UR:78L05	Regulator	1
IC1	UR:MC34063	Switching regulator	1
IC5,6	UC:74HC4060	Connector	2
IC4	UC:74HC400	Connector	1
Q2,3	QT:KTA1266Y	Transistor	2
Q4	QT:KTC3198Y	Transistor	1
DI	DI:IN4001	Diode	1
D3	DI:ISS133	Diode	1
L1	LL:LHL10NB331K	Choke coil	1
C4	CK:SXE35VB100	Chemical capacitor	1
C1	CK:SXE16VB470	Chemical capacitor	1
C6,9	CK:SME15VB22	Chemical capacitor	2
C7,2	CC:0.1V25V	Ceramic capacitor	2
C3,8,11,12	CC:0.01V	Ceramic capacitor	4
C5	CC:470P	Ceramic capacitor	1
C10	CM:V1H472	Polyester capacitor	1
R19	RM:RN/8W24KF	Metal film resistor	1
R6	RM:RN/8W12KF	Metal film resistor	1
R5	RM:RN/8W207KF	Metal film resistor	1
R1,2,8	RM:RN1/4W1RF	Metal film resistor	3
	RC:RD1/4W0.5RJ	Carbon resistor	1
R3	RC:RD1/2W330RJ	Carbon resistor	1
R4,9,11	RC:RD1/8W560RJ	Carbon resistor	3
R7	RC:RD1/8W3.9KJ	Carbon resistor	1
R10	RC:RD1/8W5.6KJ	Carbon resistor	1
R14,15	RC:RD1/8W22KJ	Carbon resistor	2
R13	RC:RD1/8W56KJ	Carbon resistor	1
R16,18	RC:RD1/8W100KJ	Carbon resistor	2
R12	RC:RD1/8W27KJ	Carbon resistor	1
R17	RC:RD1/8W10KJ	Carbon resistor	1
	J1:4P-52T2-ADK		1
	FS:EAWK2A-ADK	Fuse	1
FH1,2	FH:D504	Fuse holder	2
	EB:4P-440DE	Nicd battery	1
	PZ:3248-P-SK		1
IC3	VA:S-8054ALR	Reset IC	1
Q1	QT:A1244	Transistor	1
D1,2	DI:SB10-03A2	Diode	2

7PZ:3206 PARTS LIST

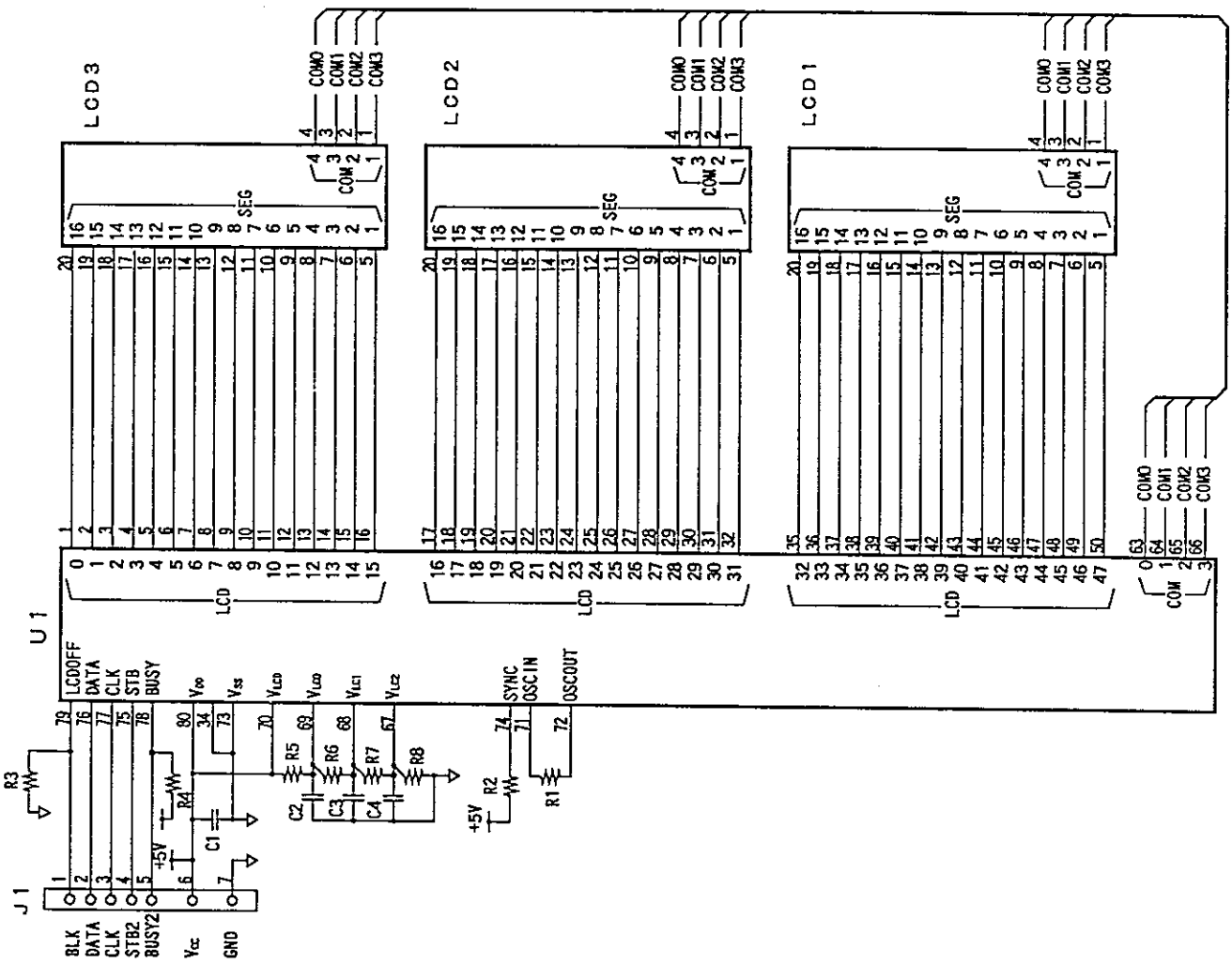
Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3206B-ADK PC:3206B	Printed wiring board	1
C1～3	CC:0.01U-ADK	Ceramic capacitor	3
C4	CC:0.1U25V-ADK	Ceramic capacitor	1
J1	JI:7P-S2L2-ADK	Connector	1
LCD1,2,5,6	ED:TTR1462	Liquid crystal display	4
LCD3,4	ED:TTR1463	Liquid crystal display	2
R1～3	RC:RD1/8S2.2KJ	Carbon resistor	3
R4	RC:RD1/8S3.3KJ	Carbon resistor	1
R5	RC:RD1/8S270KJ	Carbon resistor	1
R6～8	RC:RD1/8S56KJ	Carbon resistor	3
U1	UC:D16430AGF	LCD Controller	1
	06:4005273	Pillow	12



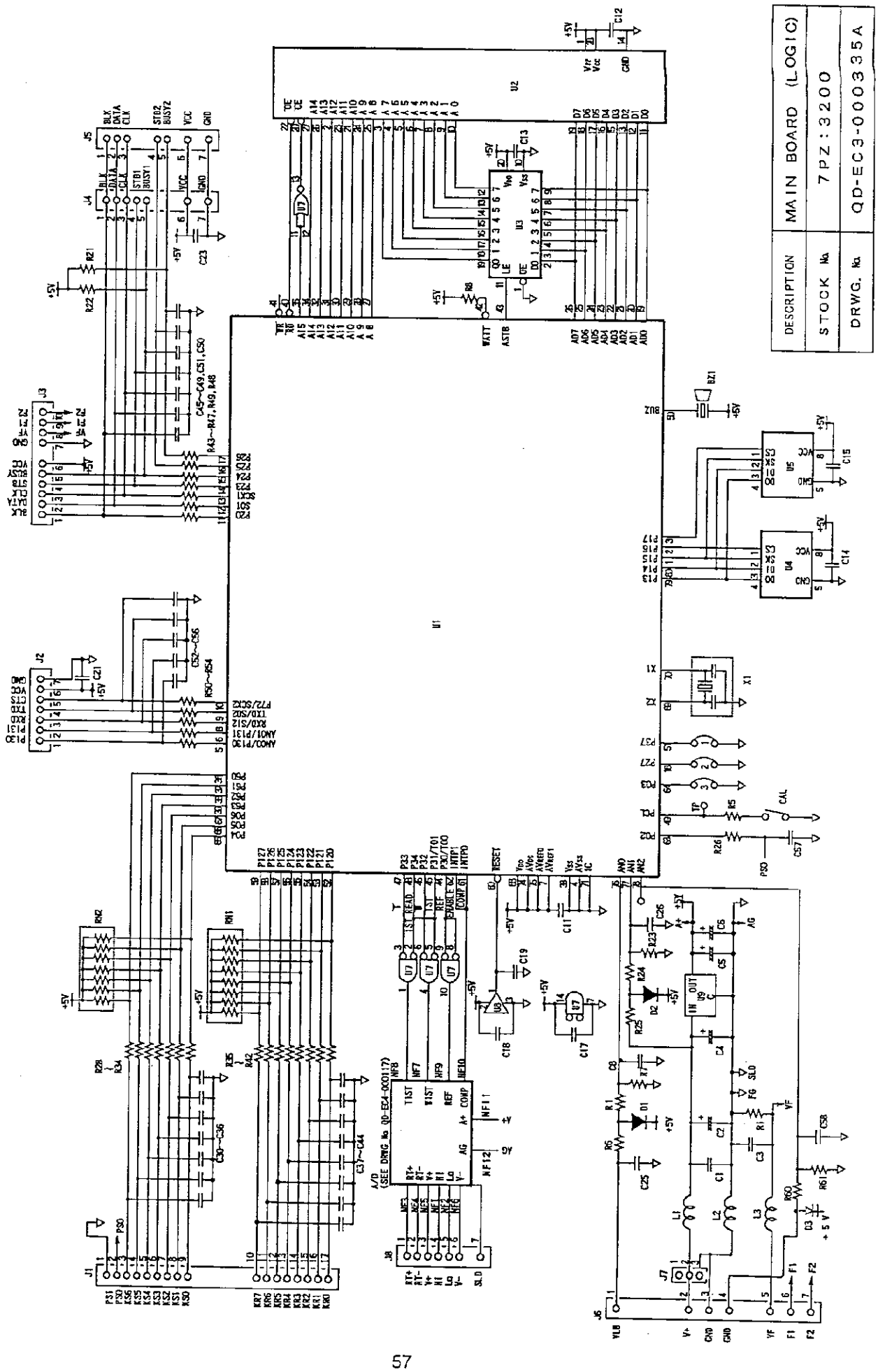
DESCRIPTION	TOWER DISPLAY
STOCK No.	7PZ:3197A
DRWG. No.	QD-EC4-000114A

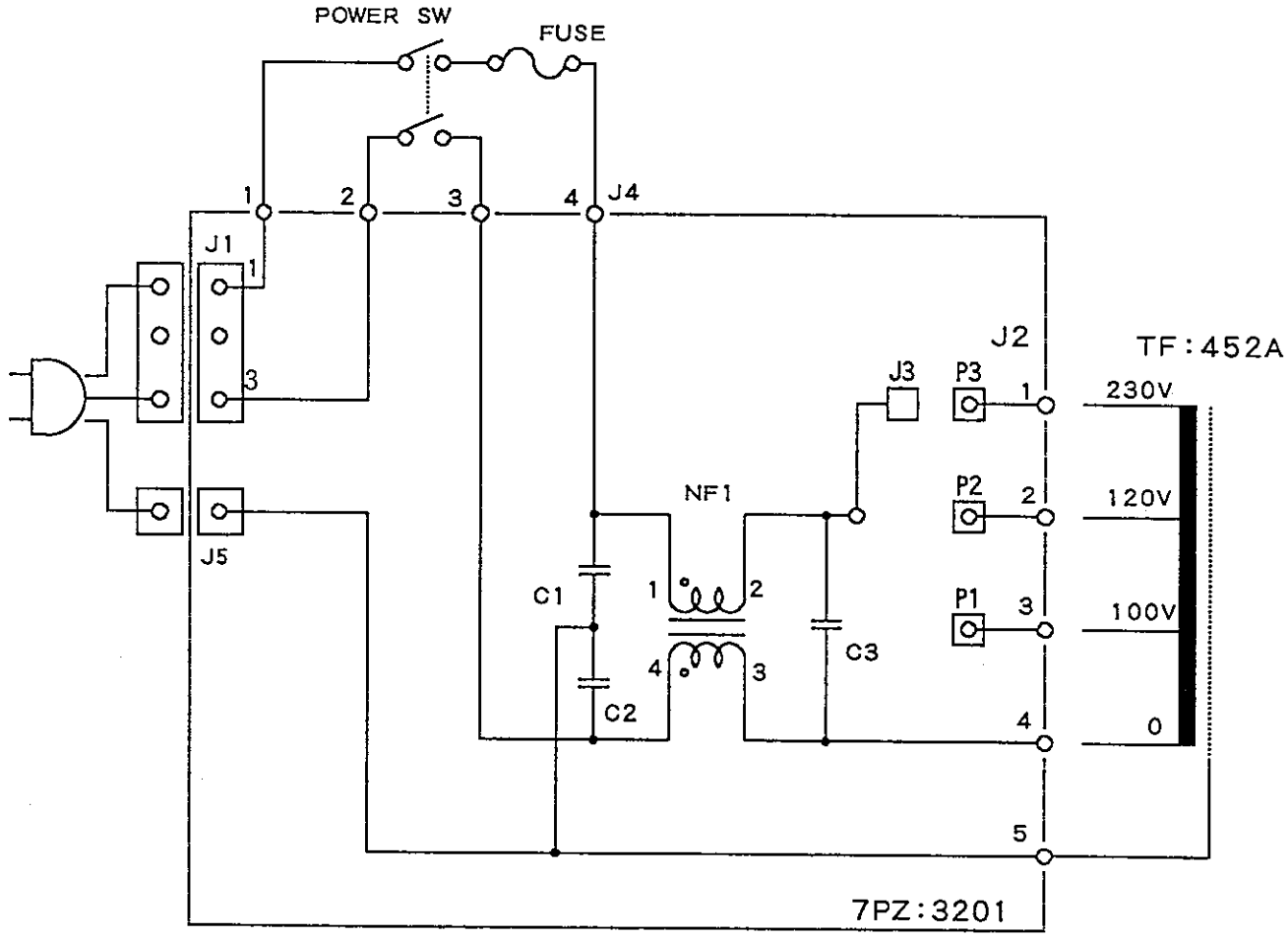


DESCRIPTION	FRONT DISPLAY
STOCK No.	7PZ:3198
DRWG. No.	QD-EC4-000115B

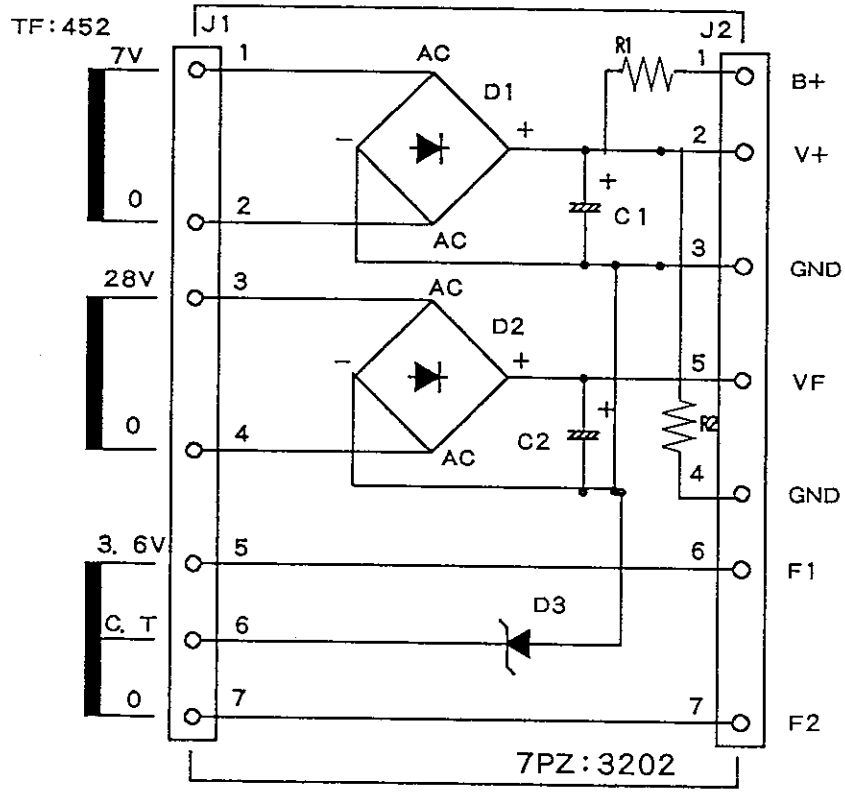


DESCRIPTION	REAR DISPLAY
STOCK No.	7PZ:3199
DRWG. No.	QD-EC4-000116B

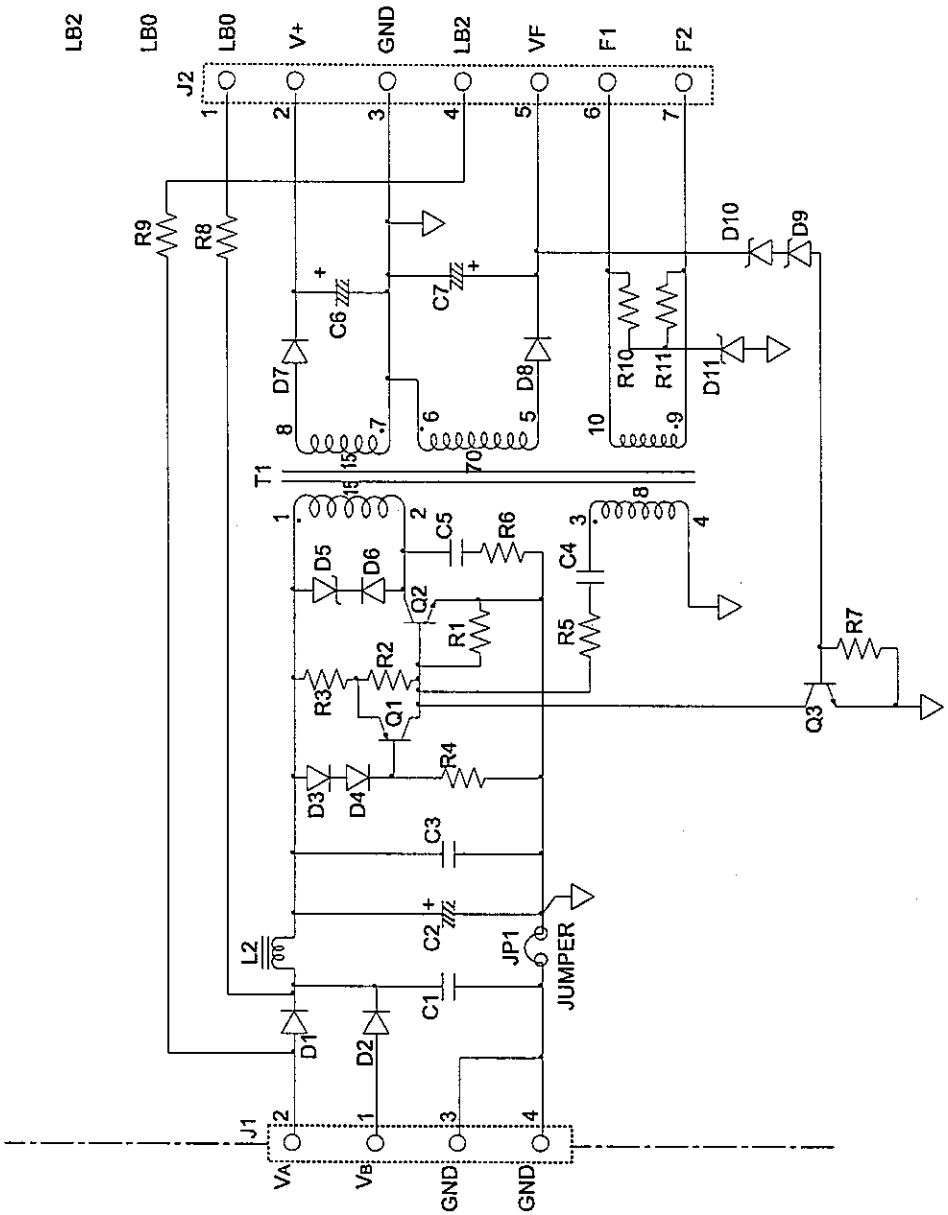

DESCRIPTION
MAIN BOARD (LOGIC)
STOCK No.
7PZ:3200
DRWG. No.
QD-EC3-000335A



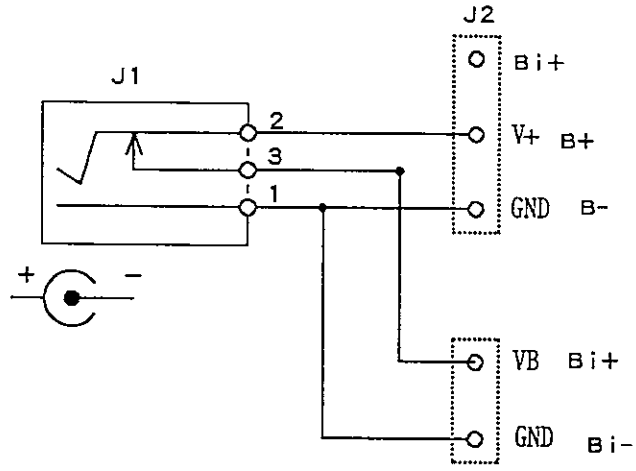
DESCRIPTION	AC LINE FILTER BOARD
STOCK No.	7PZ:3201
DRWG. No.	QD-EC4-000118B



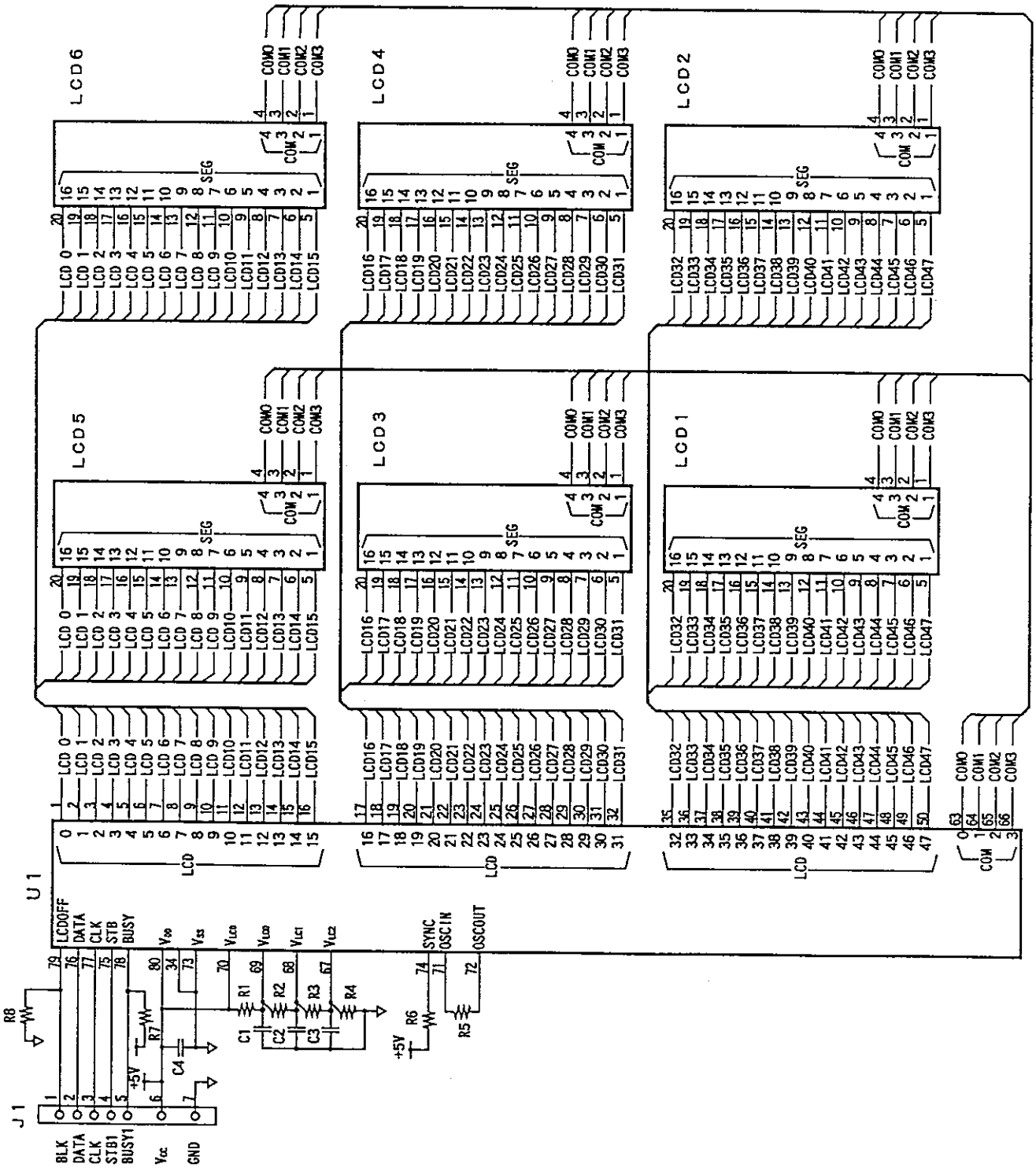
DESCRIPTION	AC POWER SUPPLY
STOCK No.	7PZ:3202
DRWG. No.	QD-EC4-000119



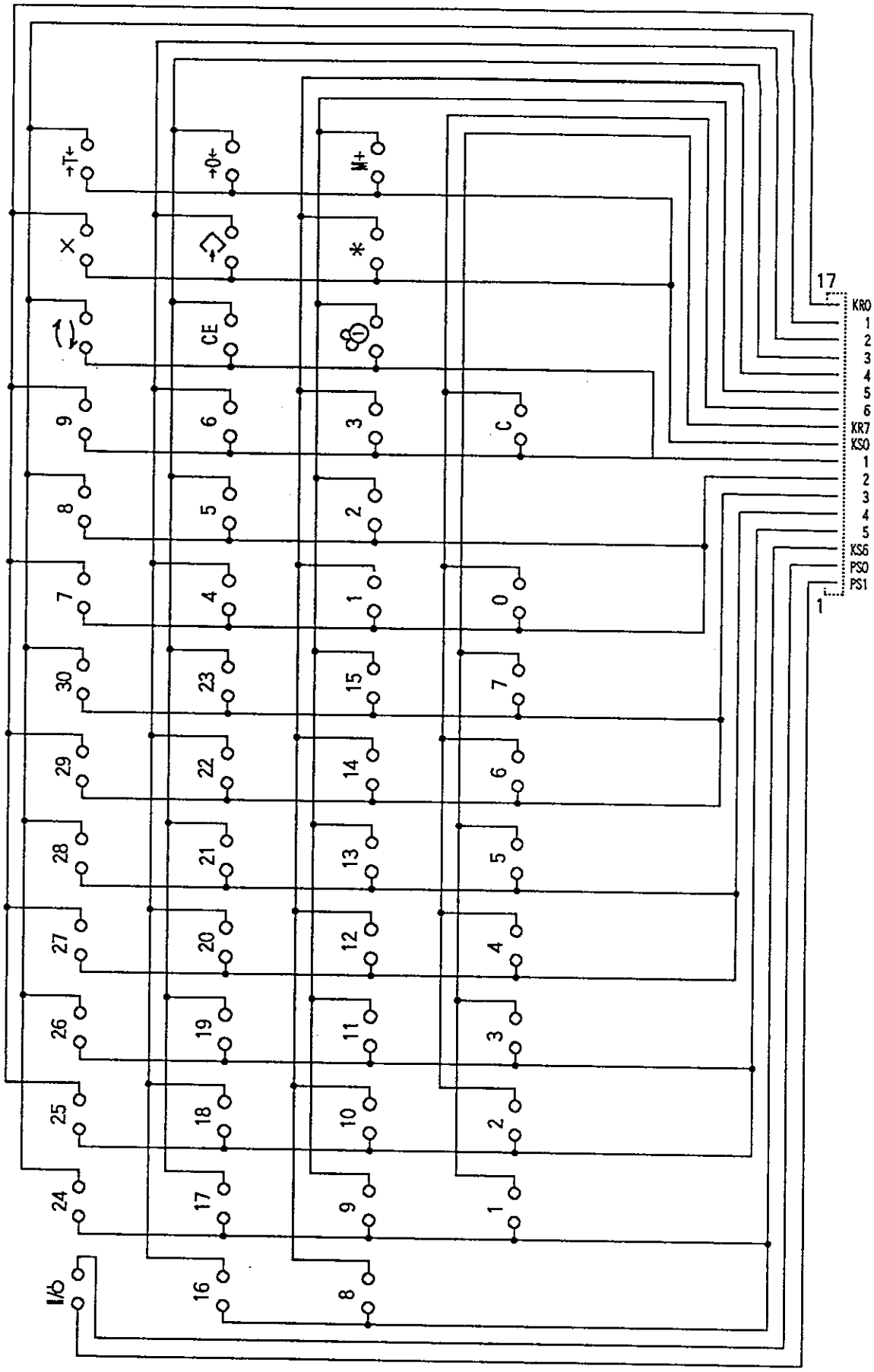
DESCRIPTION	DC/DC CONVERTER
STOCK No.	PZ:3203
DRWG. No.	QD-EC4-0001200



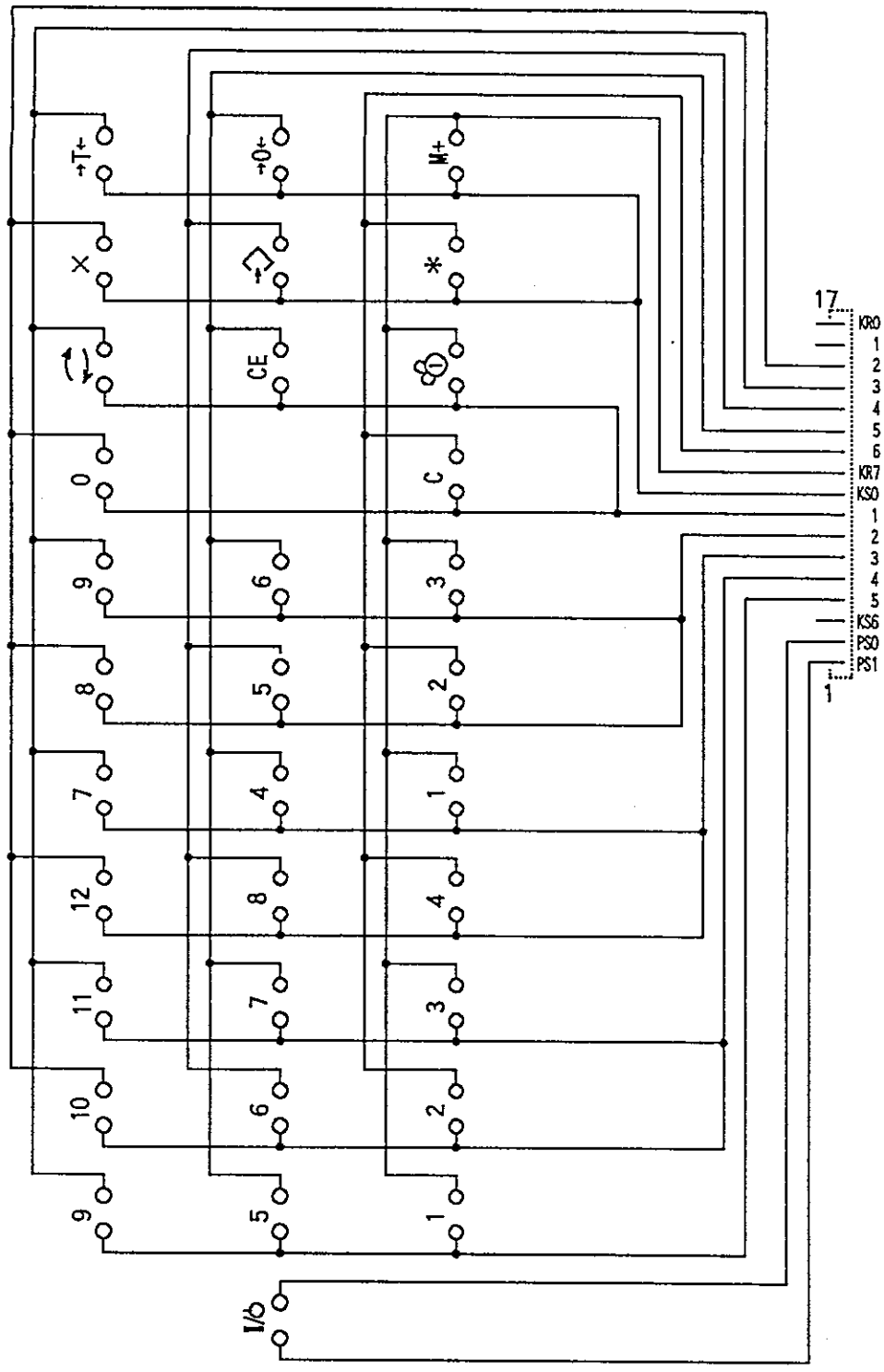
DESCRIPTION	DC JACK BOARD
STOCK No.	7PZ:3204
DRWG. No.	QD-EC4-000121



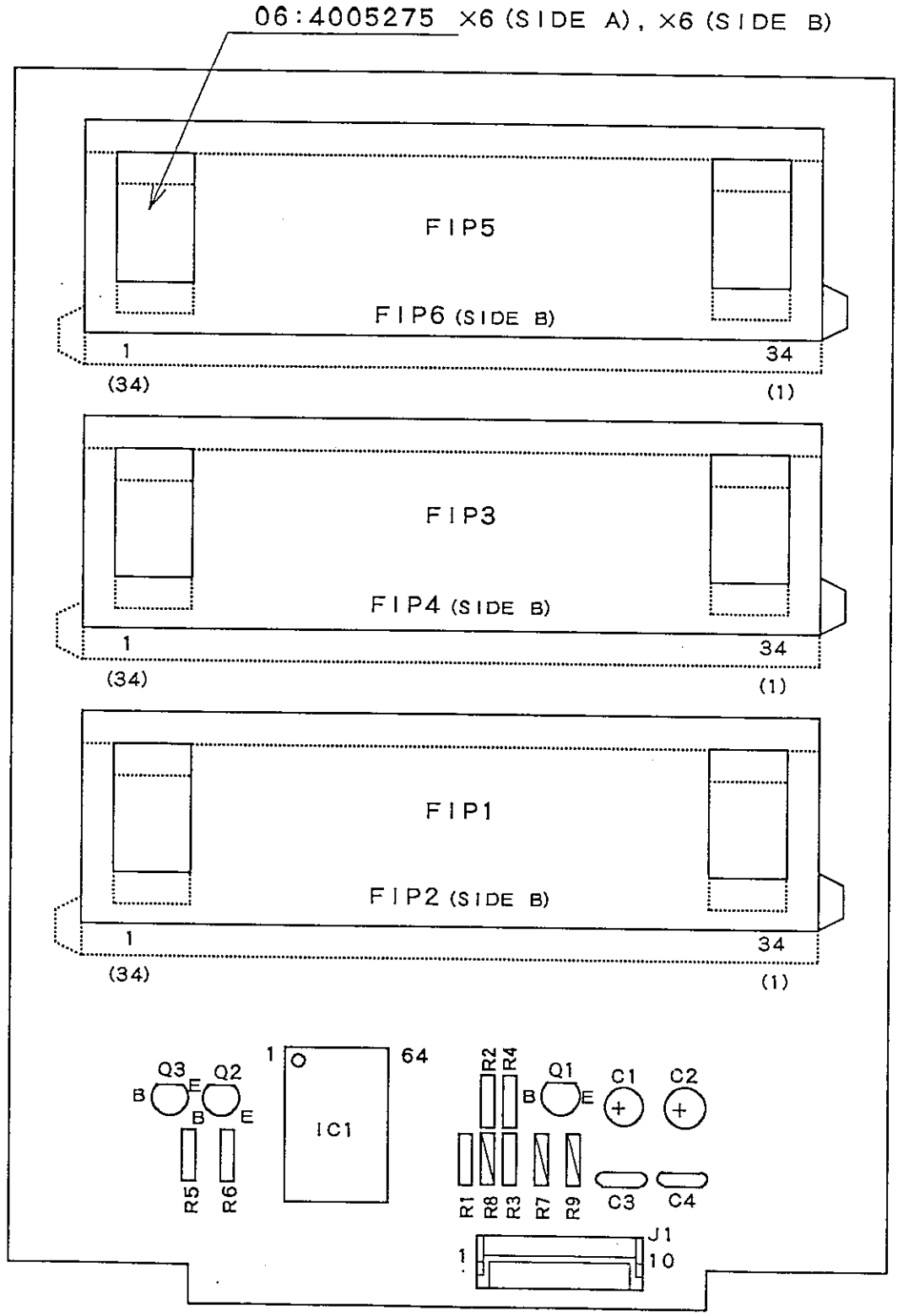
DESCRIPTION	TOWER DISPLAY
STOCK No.	7PZ:3206
DRWG. No.	QD-EC4-000123



DESCRIPTION	MEMBRANE 51KEYS
STOCK No.	09:3002161
DRWG. No.	QD-EC4-000132

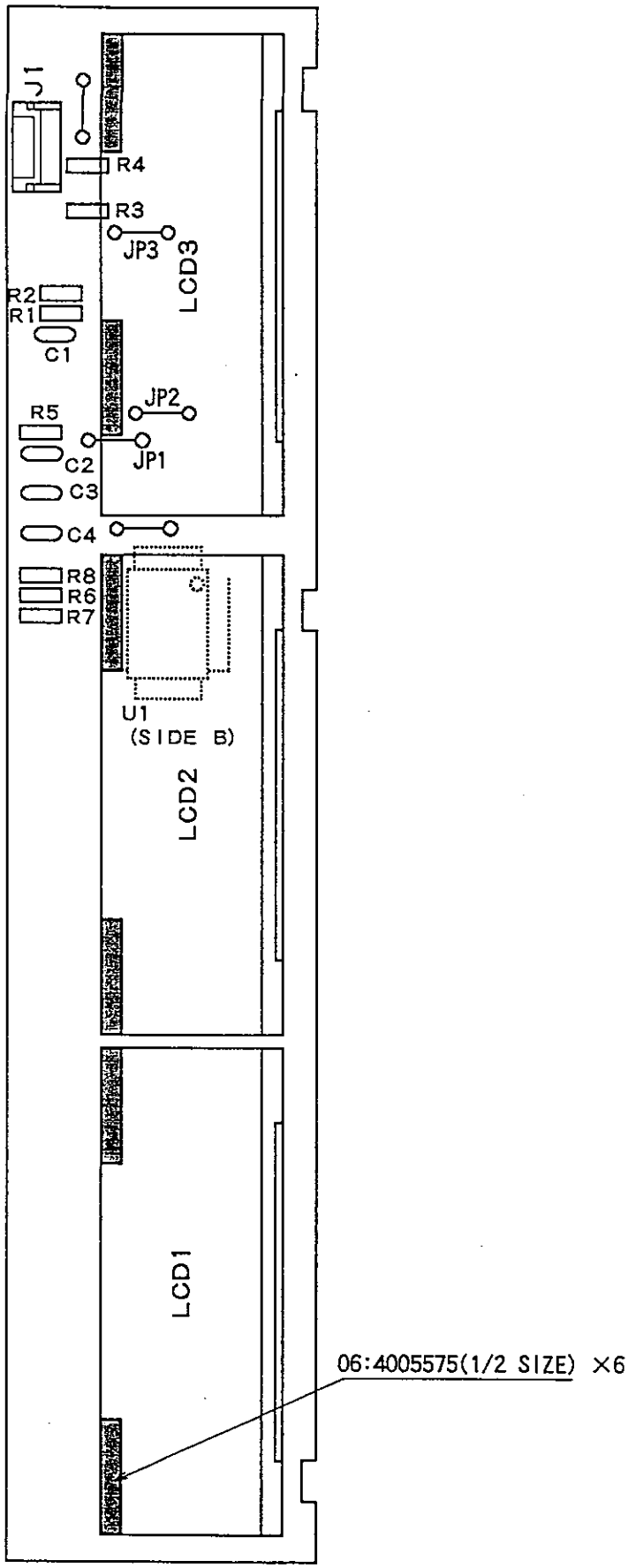


DESCRIPTION	MEMBRANE 33KEYS
STOCK No.	09:3002162
DRWG. No.	QD-EC4-000133



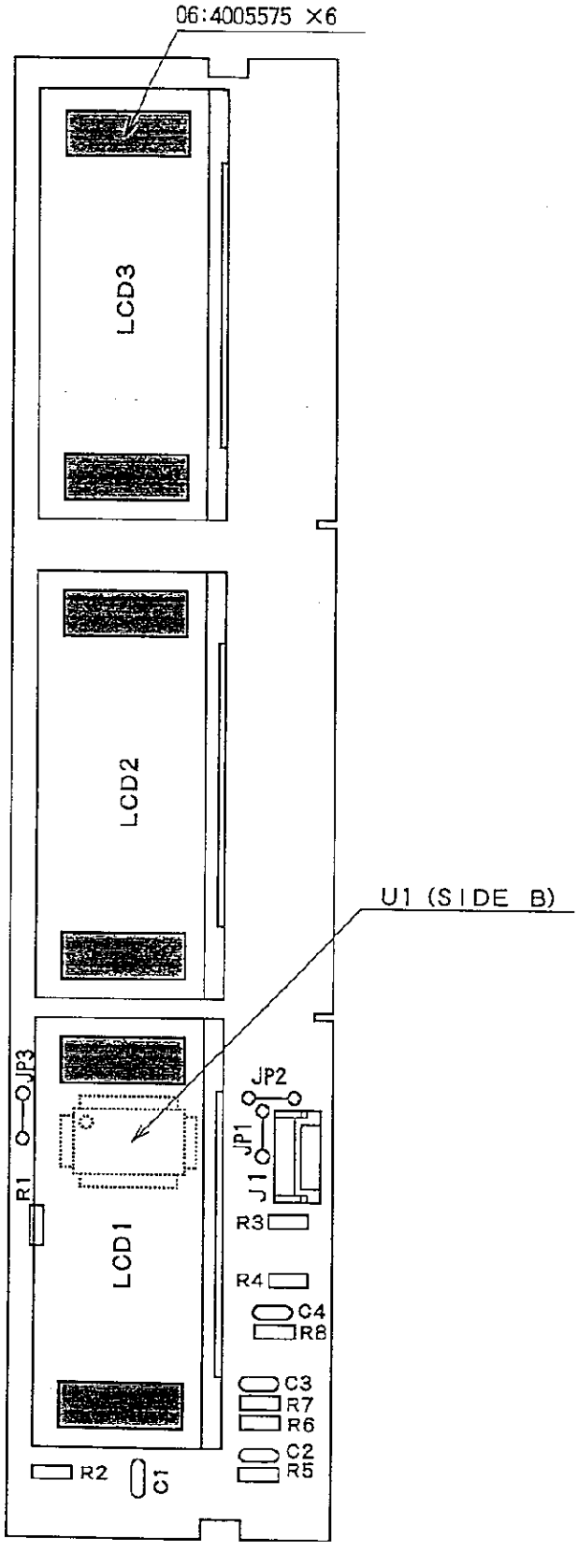
PC:3197

DESCRIPTION	TOWER DISPLAY
STOCK No.	7PZ:3197
DRWG. No.	QD-KZ3-000290A



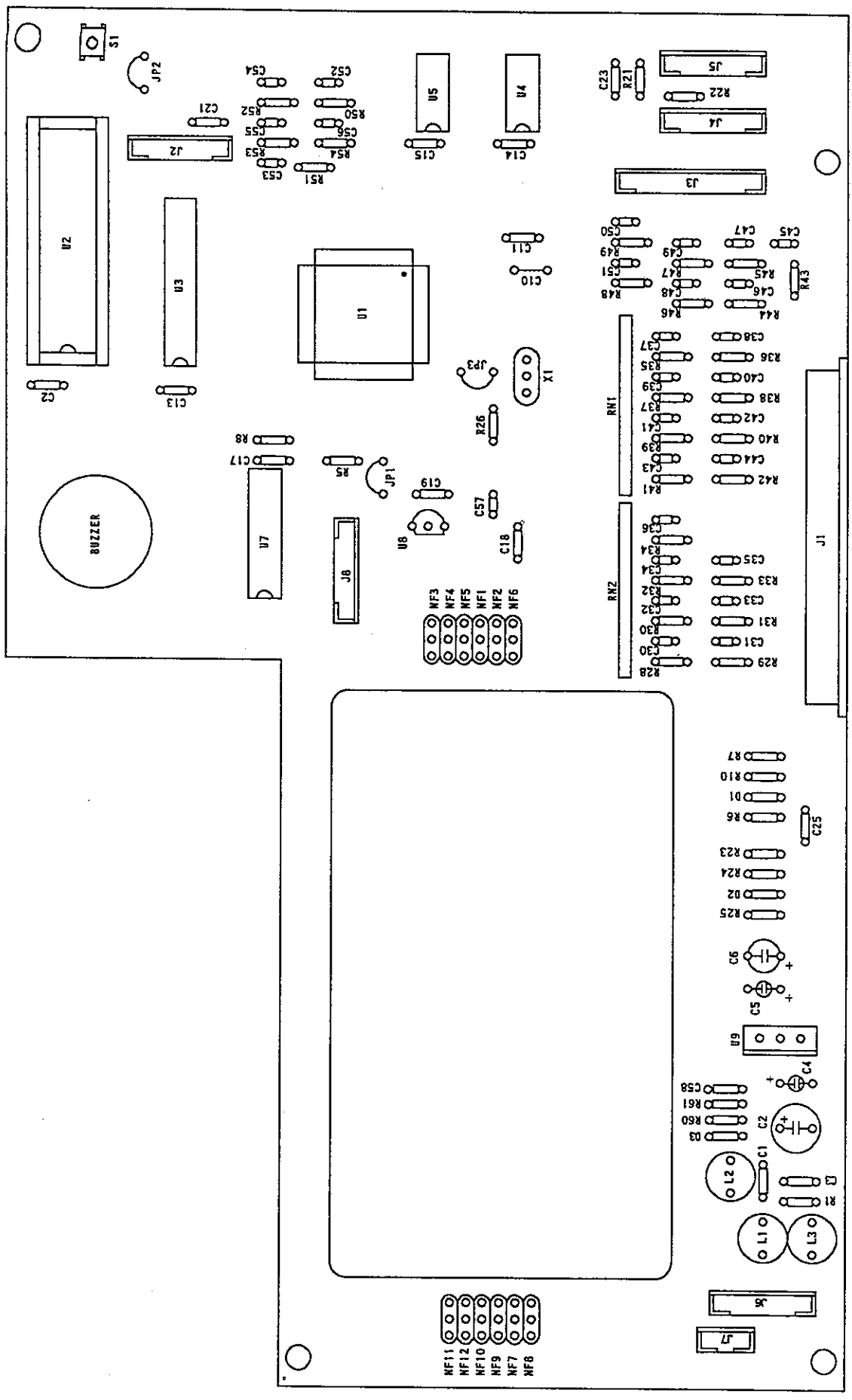
PC:3198B

DESCRIPTION	FRONT DISPLAY
STOCK No.	7PZ:3198
DRWG. No.	QD-KZ4-000099B



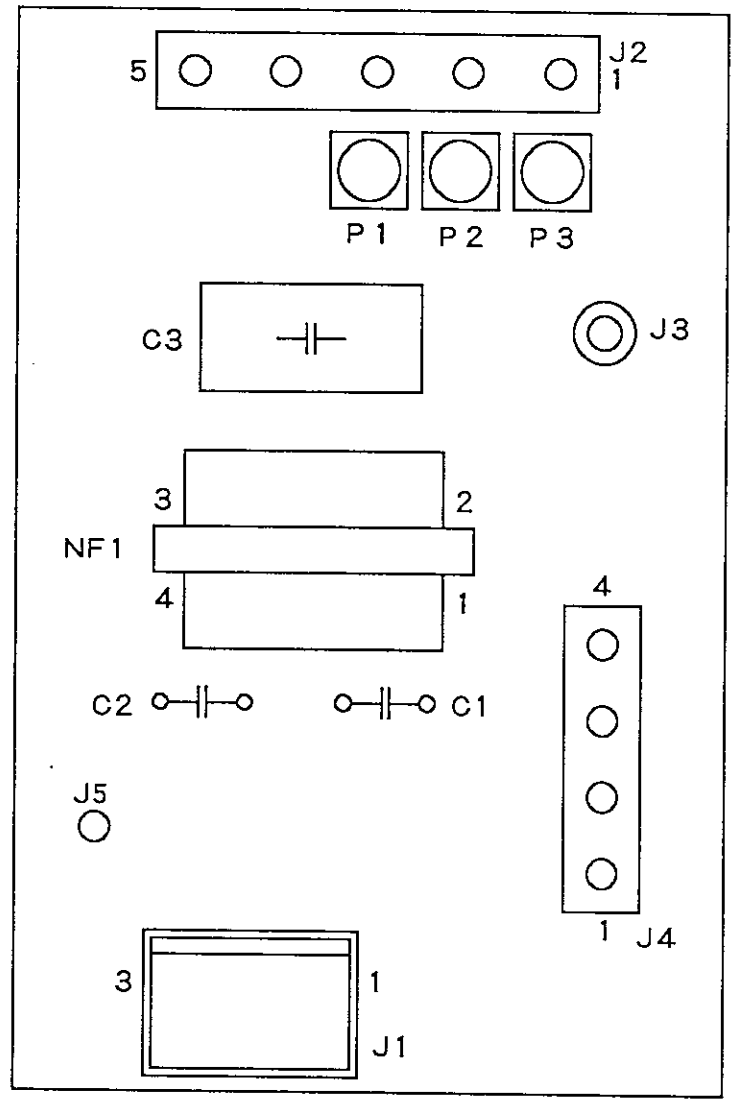
PC:3199B

DESCRIPTION	REAR DISPLAY
STOCK No.	7PZ:3199
DRWG. No.	QD-KZ4-000100B



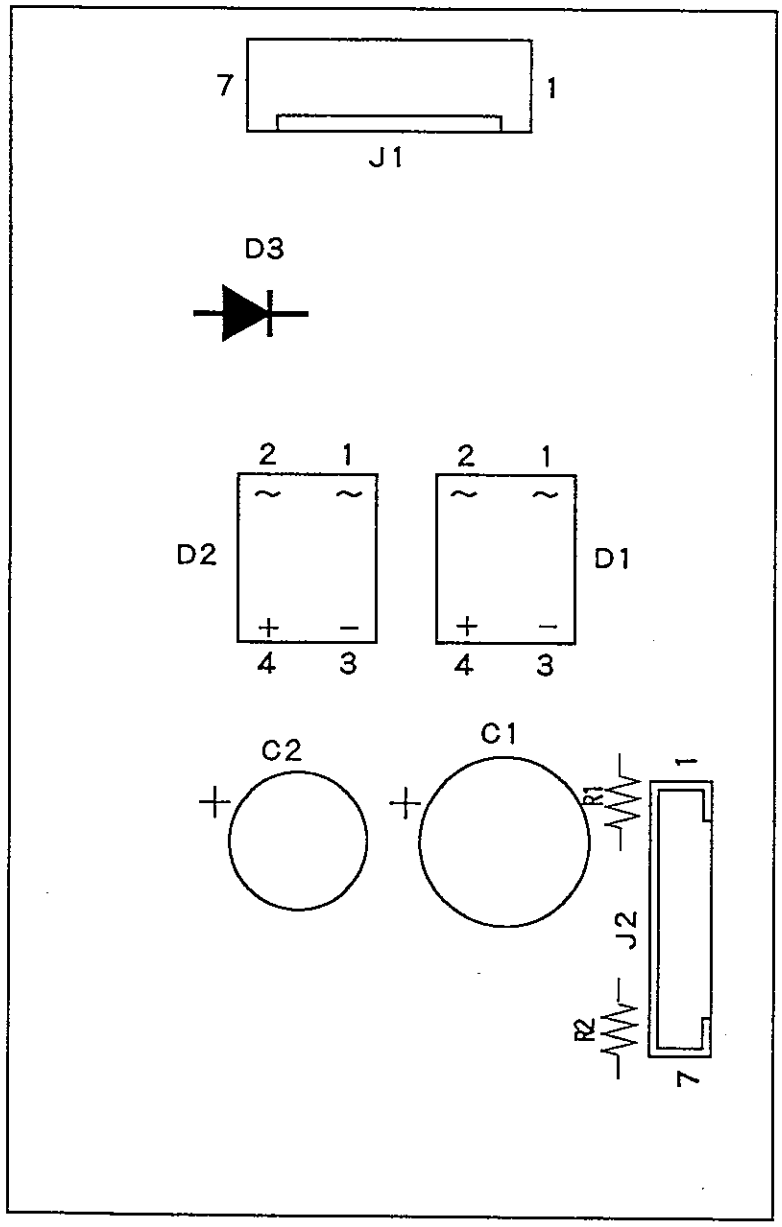
DESCRIPTION	MAIN BOARD
STOCK No.	7PZ:3200
DRWG. No.	QD-KZ3-000291

PC:3200C



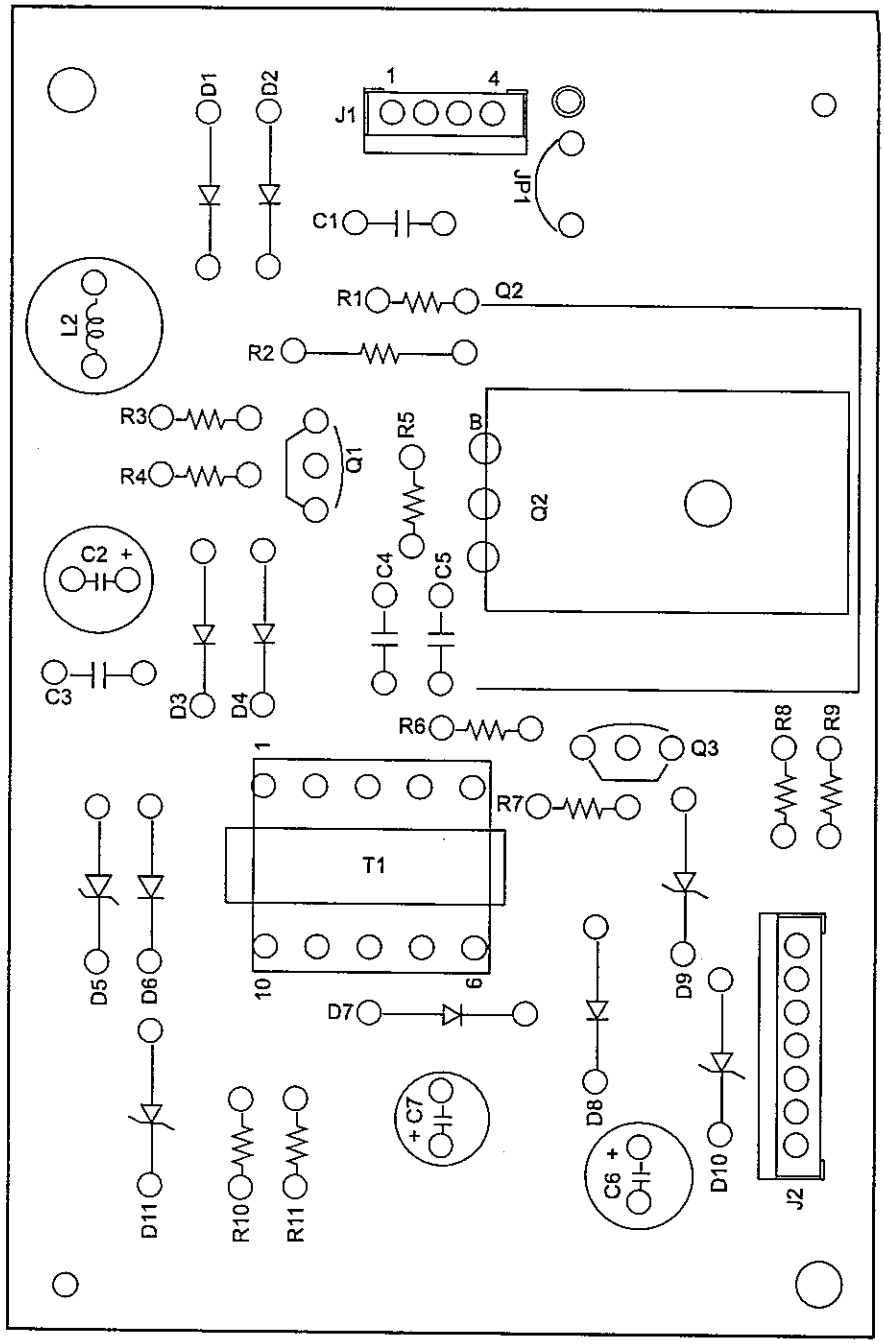
PC:3201B

DESCRIPTION	AC LINE FILTER BOARD
STOCK No.	7PZ:3201
DRWG. No.	QD-KZ4-000101B

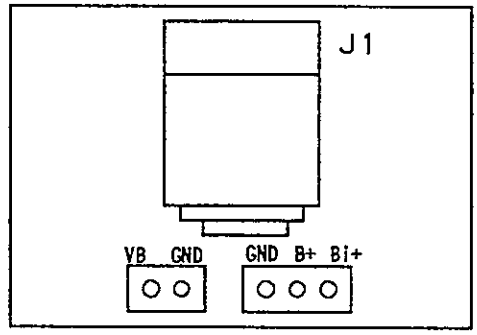


PC:3202

DESCRIPTION	AC POWER SUPPLY
STOCK No.	7PZ:3202
DRWG. No.	QD-KZ4-000102

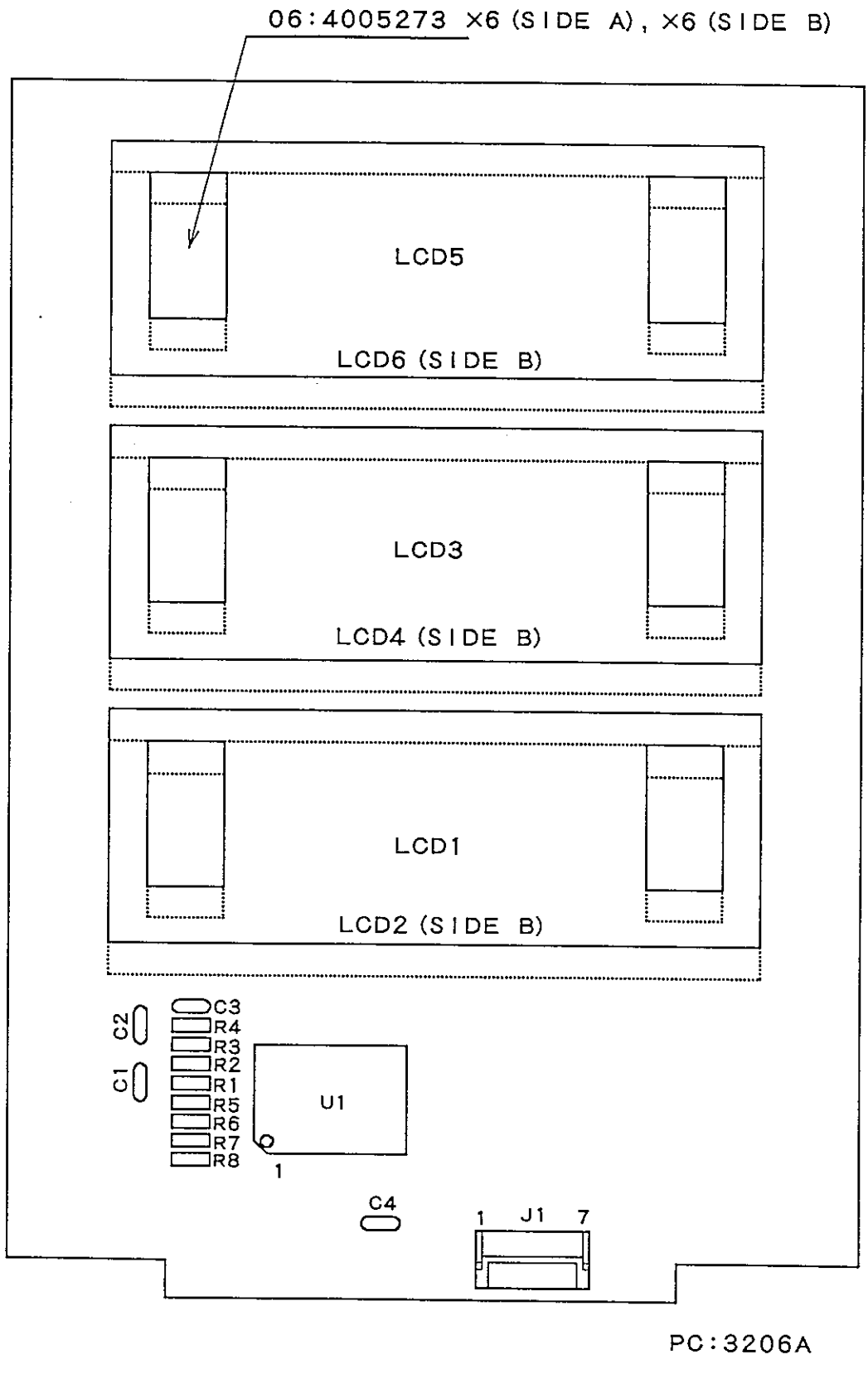


DESCRIPTION	DC/DC CONVERTER
STOCK No.	PZ:3203
DRWG. No.	QD-KZ4-000139B



PC:3204

DESCRIPTION	DC JACK BOARD
STOCK No.	7PZ:3204
DRWG. No.	QD-KZ4-000103

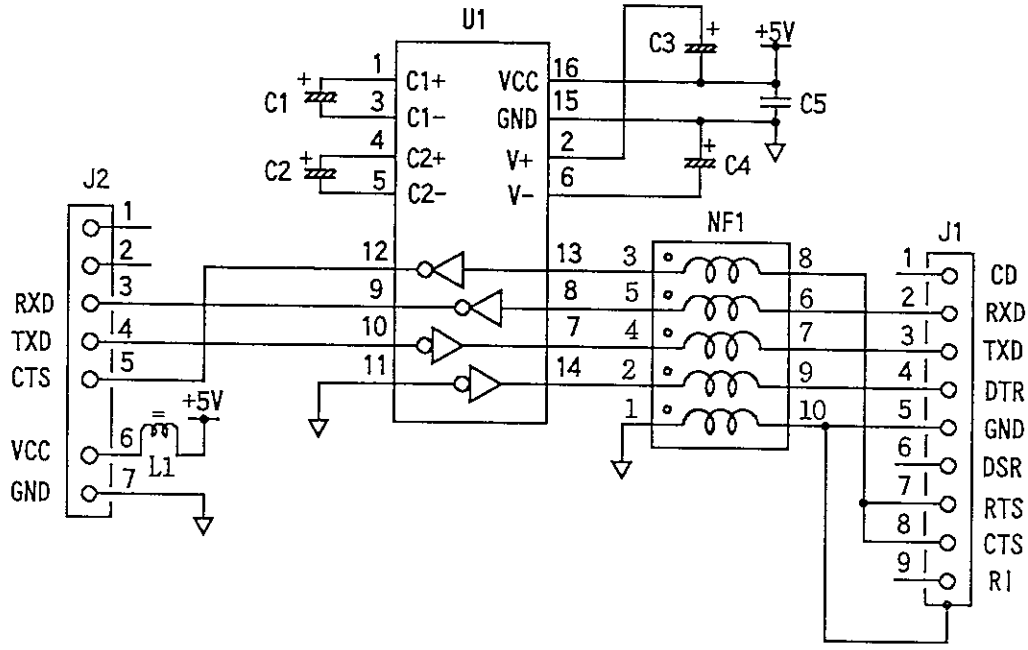


PC:3206A

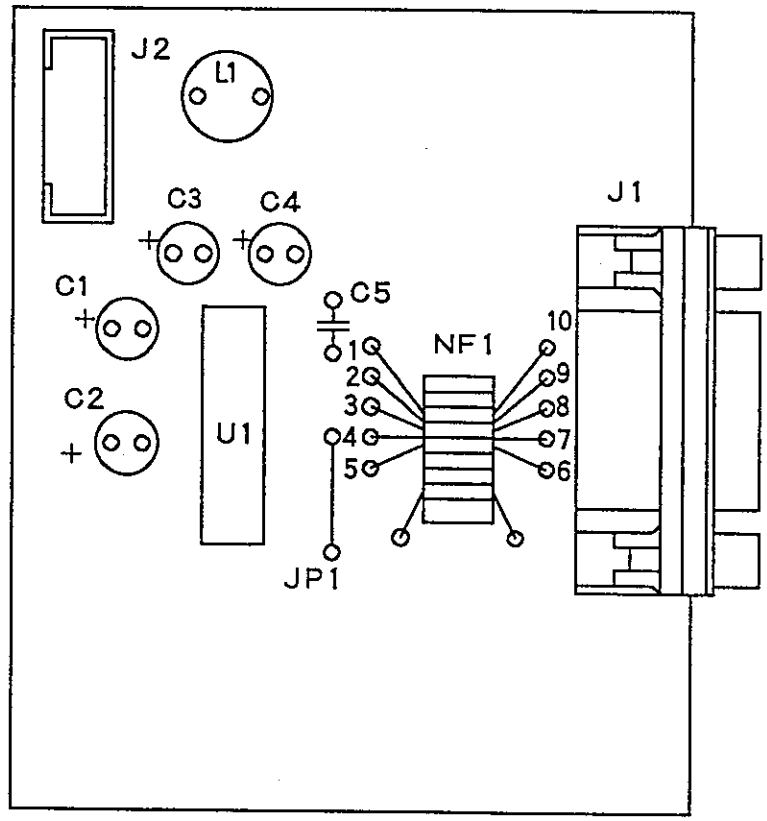
DESCRIPTION	TOWER DISPLAY
STOCK No.	7PZ:3206
DRWG. No.	QD-KZ4-000105A

7PZ:3205 PARTS LIST

Circuit Symbol	Part No.	Part Name	Q'ty
	PC:3205A-ADK	Printed wiring board	1
C1～4	CK:SME25VB10ADK	Chemical capacitor	4
C5	CC:0.1U25V-ADK	Ceramic capacitor	1
J1	JA:RDED-9P-ADK	Connector	1
J2	JI:7P-S2T2-ADK	Connector	1
NF1	LR:BFR120507N2NA	Ferrite core	1
U1	UC:MAX232-ADK	RS-232C Controller	1
	01:4005914	Option panel	1

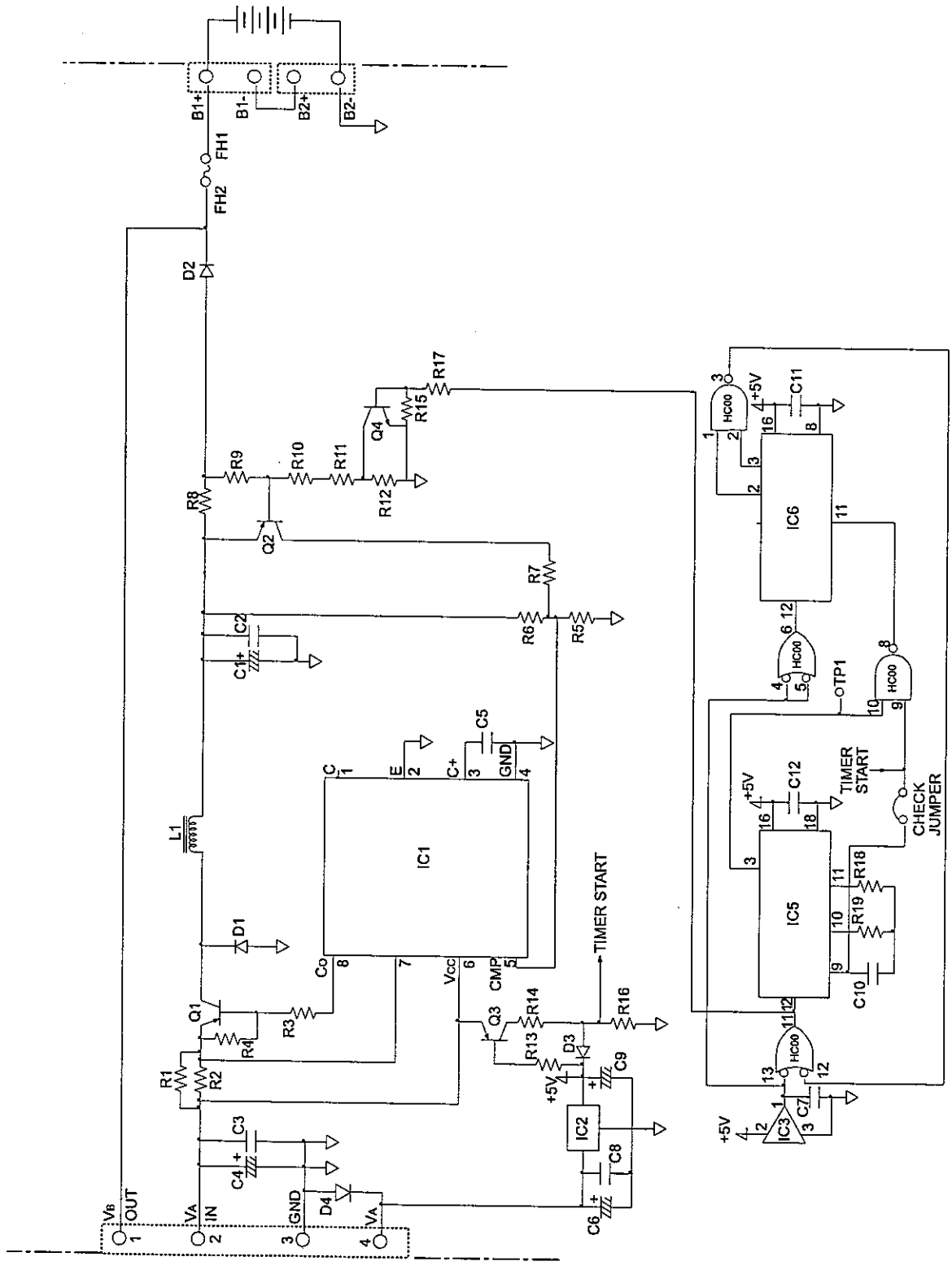


DESCRIPTION	RS232C INTERFACE
STOCK No.	7PZ:3205
DRWG. No.	QD-EC4-000122

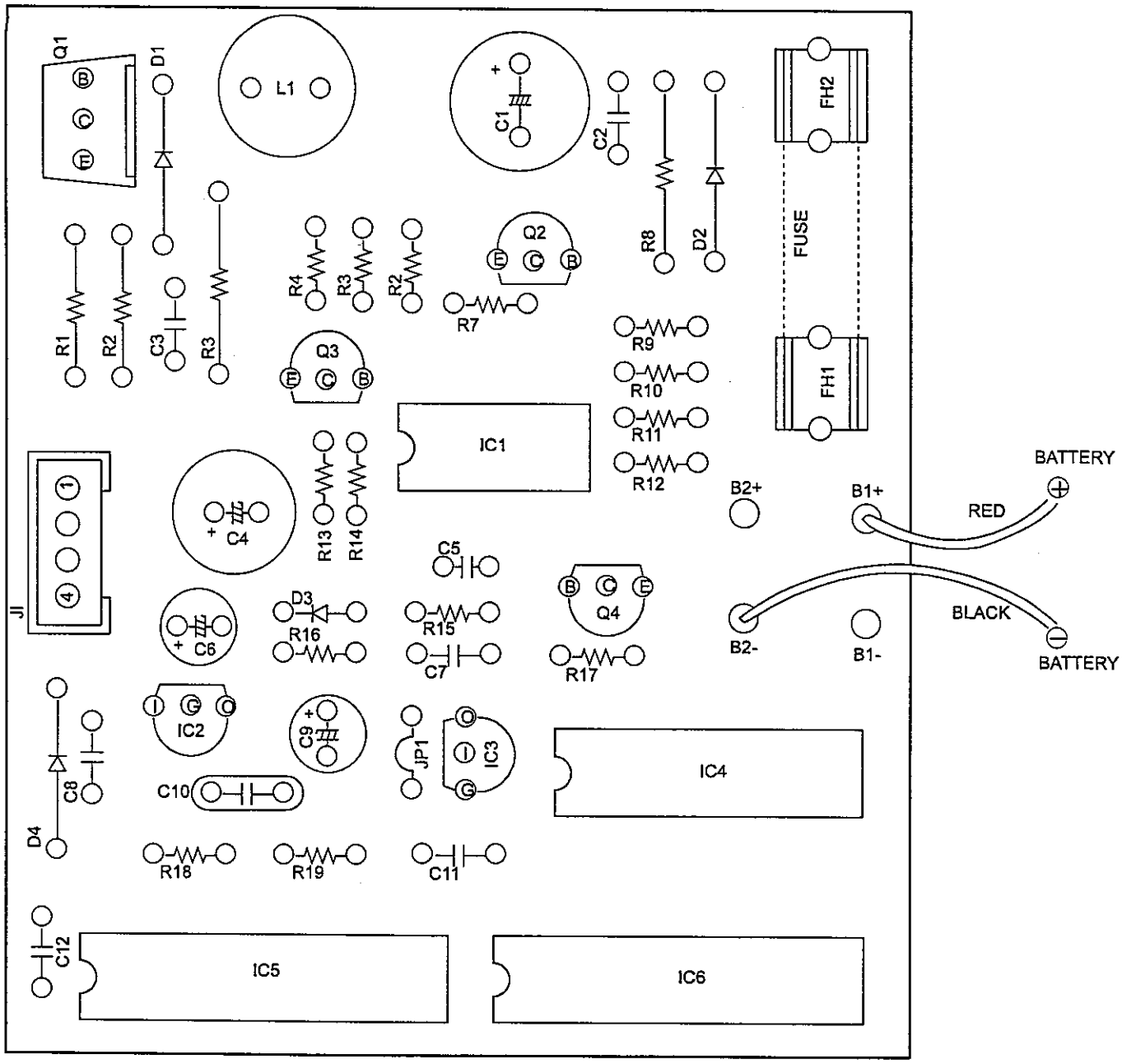


PC:3205A

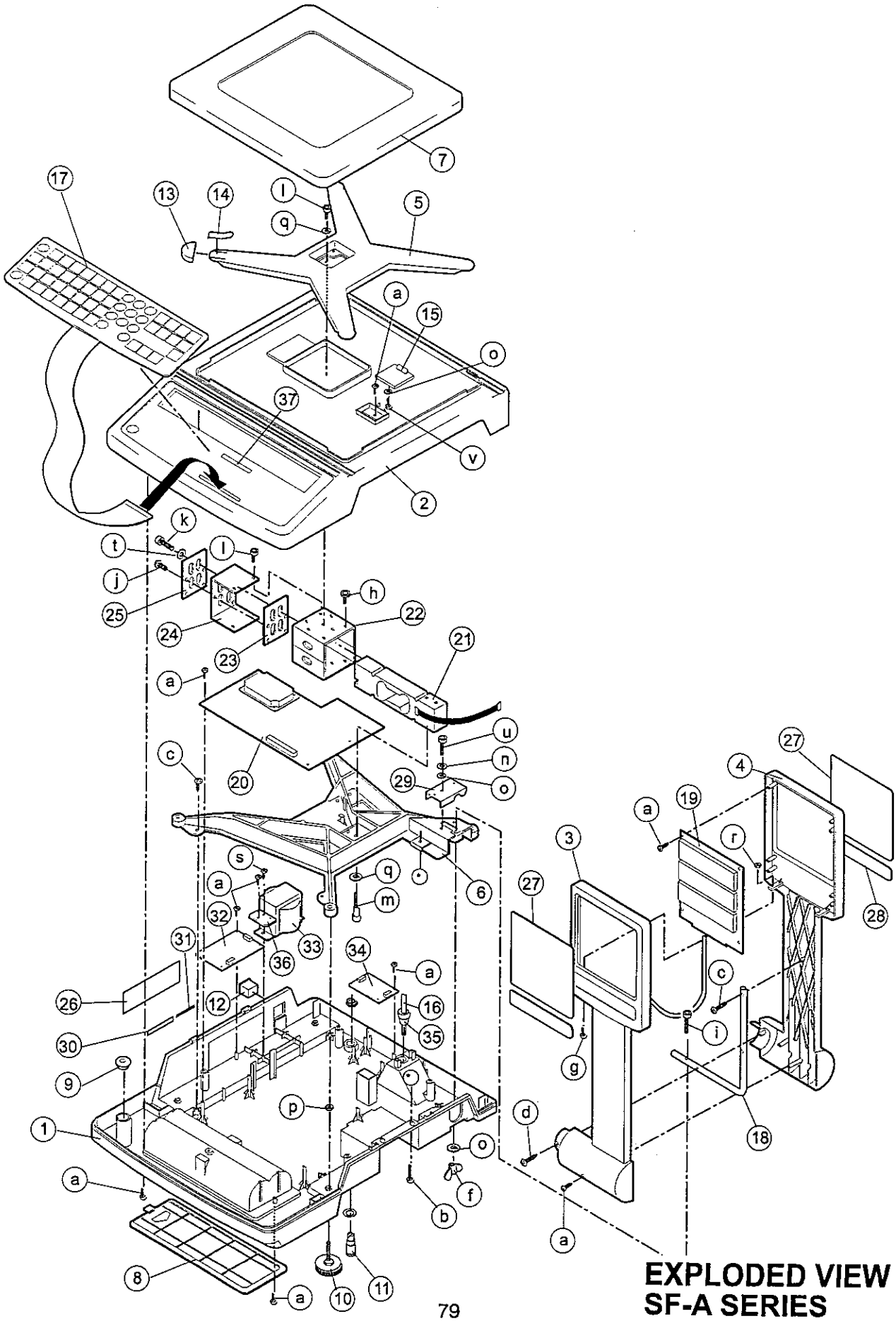
DESCRIPTION	RS232C INTERFACE
STOCK No.	7PZ:3205
DRWG. No.	QD-KZ4-000104



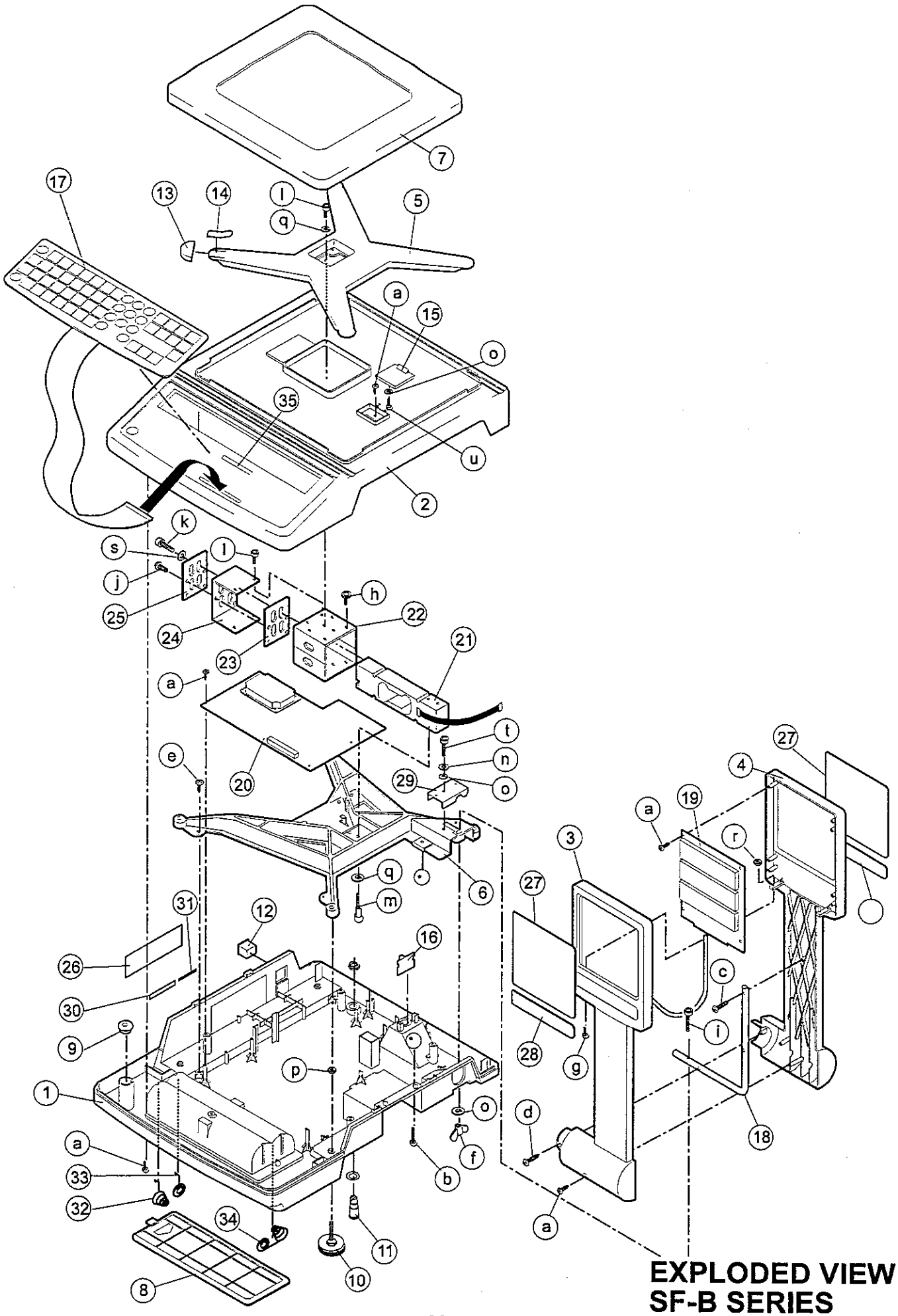
DESCRIPTION	SF-C Nicd BATTERY OPTION
STOCK No.	PZ:3248
DRWG. No.	QD-EC4-000175A



DESCRIPTION	SF-C Nicd BATTERY OPTION
STOCK No.	PZ:3248
DRWG. No.	QD-KZ4-000140A



EXPLODED VIEW
SF-A SERIES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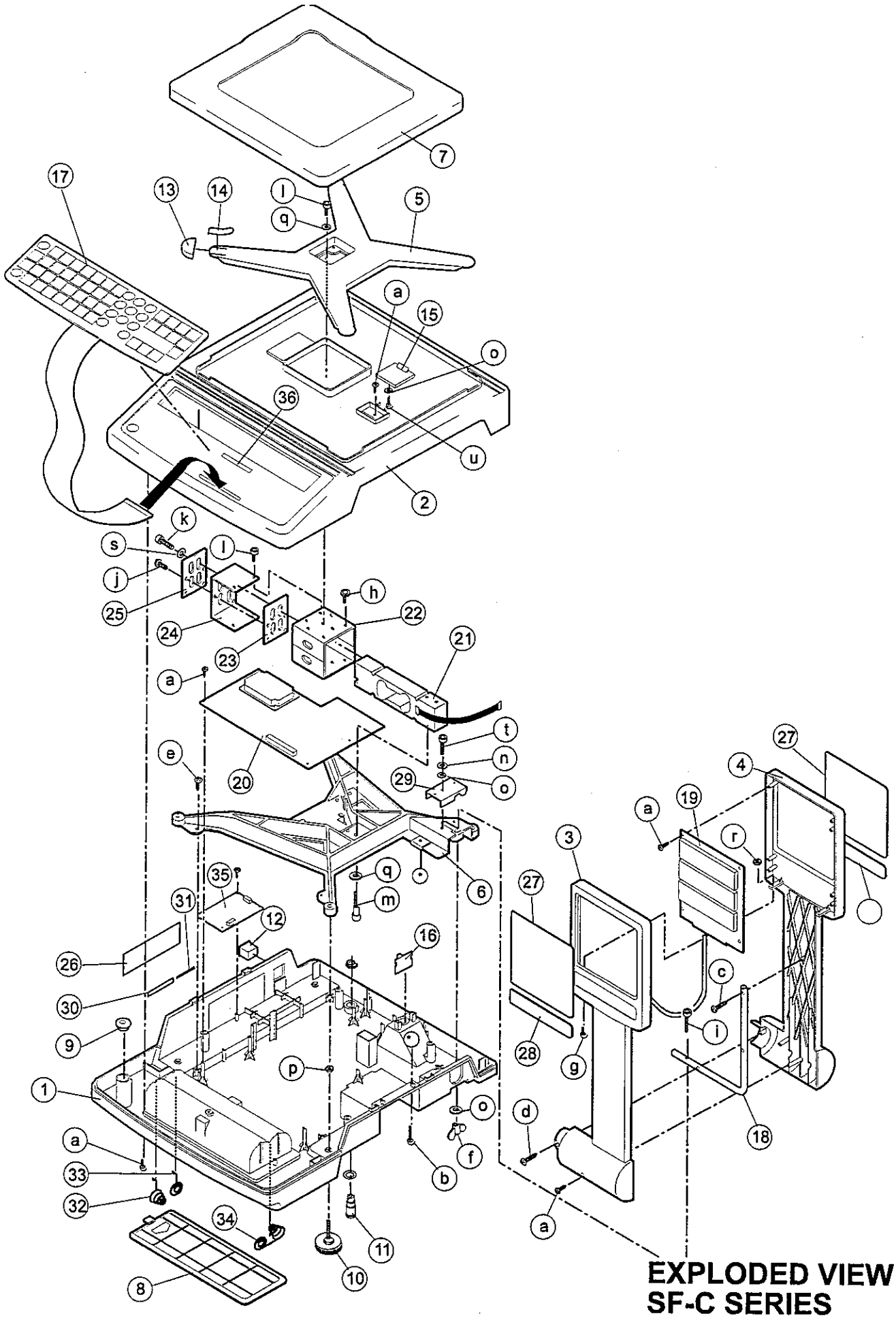
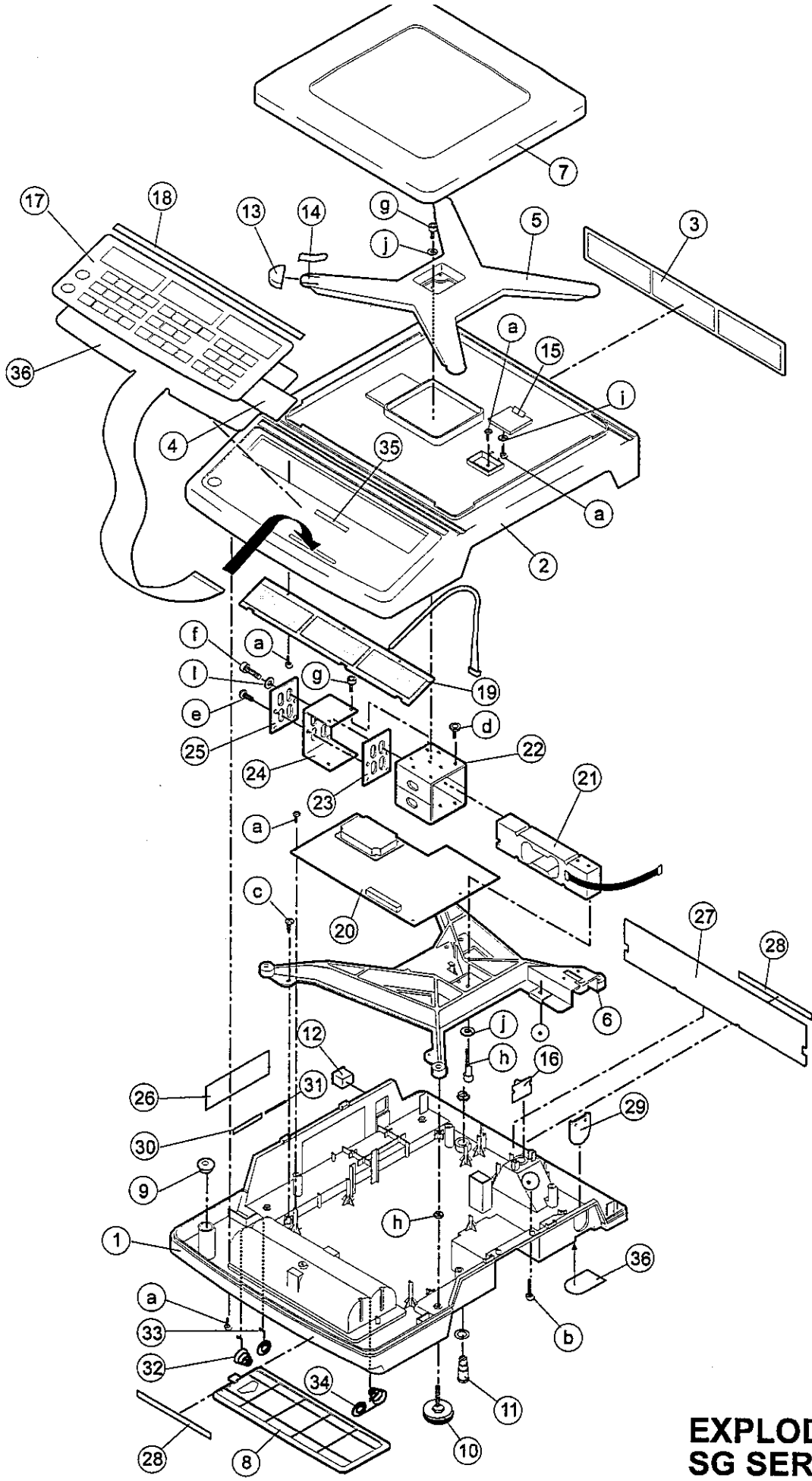


EXPLODED VIEW
SF-C SERIES



EXPLODED VIEW
SG SERIES

A&D Company, Limited
3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170 JAPAN
Telephone: [81] (3) 5391-6132 Fax: [81] (3) 5391-6148

A&D ENGINEERING, INC.
1555 McCandless Drive, Milpitas, CA. 95035 U.S.A.
Telephone: [1] (408) 263-5333 Fax: [1] (408)263-0119

A&D INSTRUMENTS LTD.
Abingdon Science Park, Abingdon, Oxford OX14 3YS ENGLAND
Telephone: [44] (1235) 550420 Fax: [44] (1235) 550485

<German Sales Office>
Genfer Strasse 6, Niedereschbach 60437 Frankfurt Main 50 GERMANY
Telephone: [49] (69) 507-1017 Fax:[49] (69) 507-2054

A&D MERCURY PTY. LTD.
32 Dew Street, Thebarton, South Australia 5031 AUSTRALIA
Telephone: [61] (8) 352-3033 Fax: [61] (8) 352-7409

A&D KOREA Limited
8th Floor, Manhattan Bldg. 36-2 Yoido-dong, Youngdeungpo-ku, Seoul, KOREA
Telephone: [82] (2) 780-4101 Fax: [82] (2) 782-4280