

MAINTENANCE MANUAL

V-BM/V-FS/V-TM/V-PS SERIES

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October 2017

Specifications and Function Subject to Change without Notice

1. INTRODUCTION

The V-BM/V-FS/V-TM/V-PS series are designed and programmed according to the OIML R-76 Class III requirements.

These indicators are sealed to prevent unauthorized access to internal parts. Ender users should be advised not to undertake any trouble shooting except those listed on the operation manual.

This maintenance manual contains of certain information that may result in fraudulent use. Do not release any part of this manual to any end users or un-authorized persons.

The internal mini jumper should be so set to prevent un-authorized settings or alternations.

Should a load cell has been replaced, make sure that the protection devices are properly set.

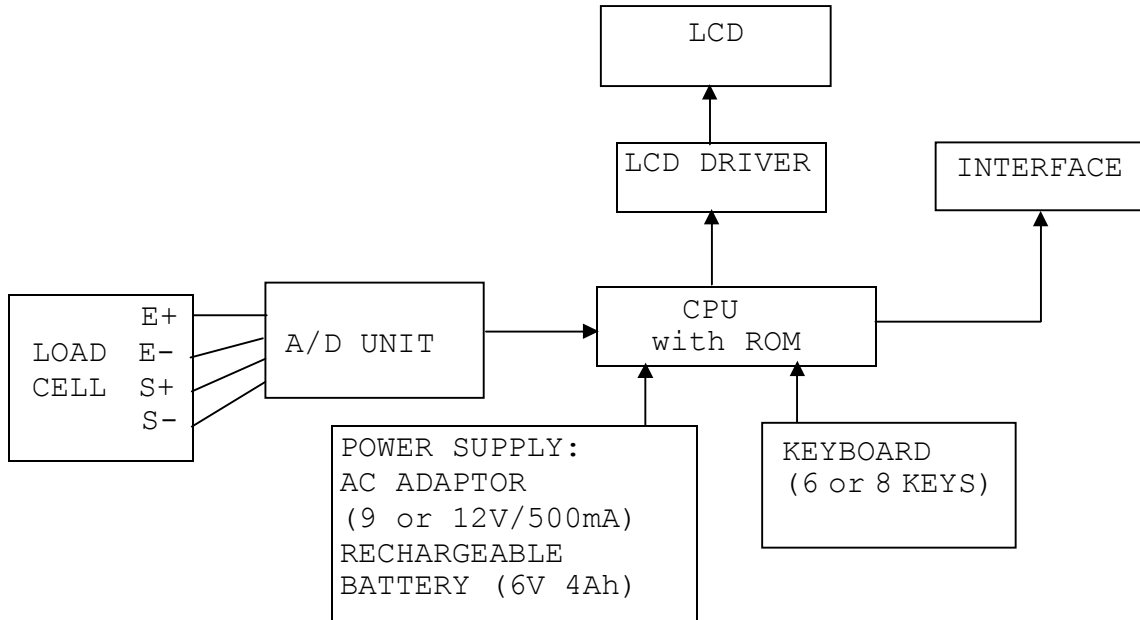
After servicing, it is necessary to go through all tests and procedures to ensure the indicator meets all the metrological and approval requirements.

Here are some features of the V-BM/V-FS/V-TM/V-PS series

1. Designed to meet OIML-R76 class III requirements.
2. Zero Indicator.
3. Tare Indicator.
4. Negative Value Indicator.
5. Auto Tare Function.
6. Power on Zero Function.
7. Manual Zero Function.
8. Animal Weighing Function.
9. Extended Display Function.
10. Auto Power Saving Function.
11. Metric/Avoirdupois Conversion Function.
12. Huge Size WTN LCD display, 5 ½ x 51mm.
13. Low battery warning signal.
14. 3 points Calibration.
15. Mini jumper to prevent end-user calibration.
16. Optional EL backlights.
17. Optional printer and RS232C interface.
18. Accumulation function available.
19. Built-in rechargeable battery operated.
20. Battery operating time: 200 hours plus after charged.

2. SPECIFICATION

2.1 SYSTEM BLOCK DIAGRAM



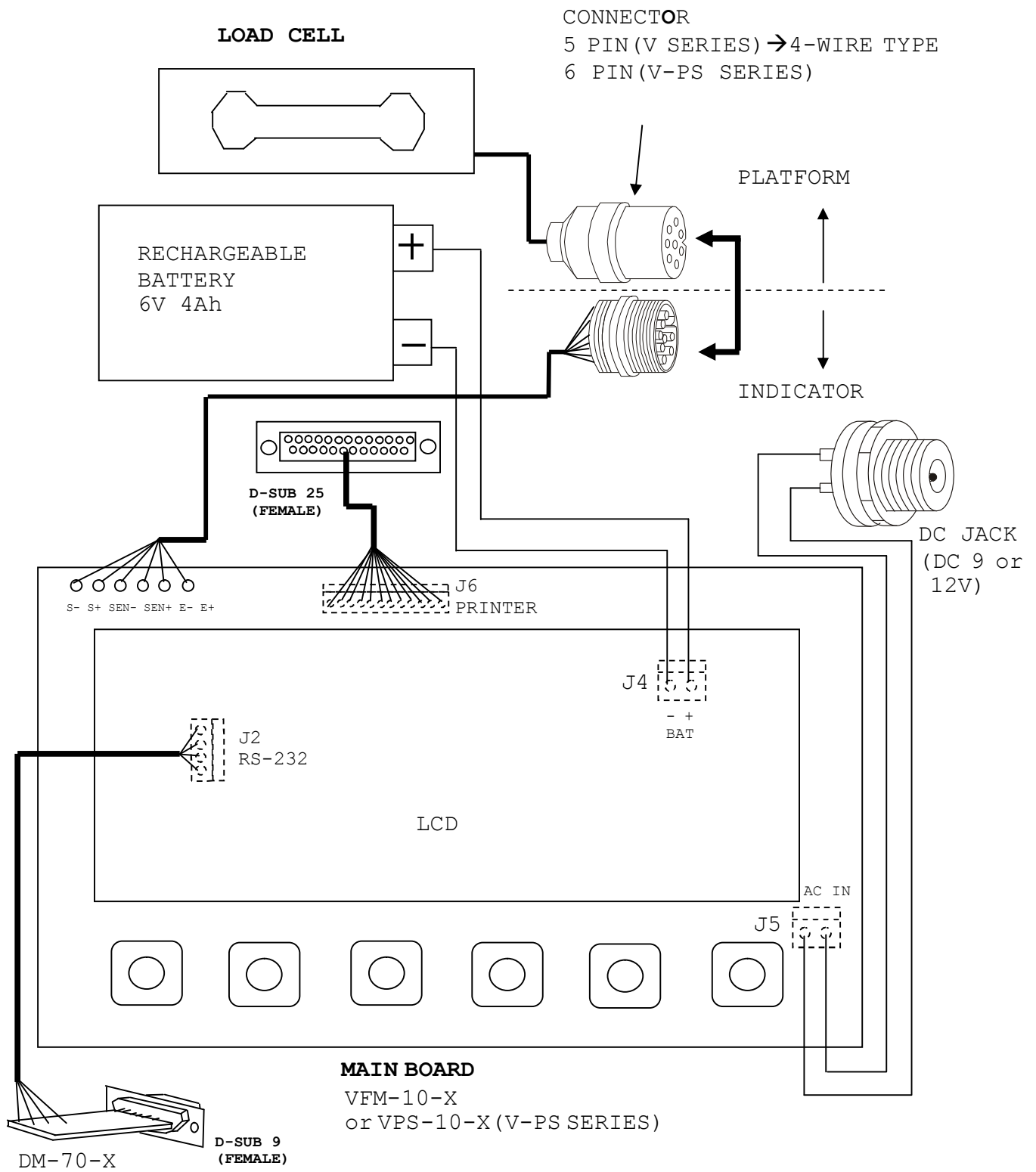
Description:

When a mass is placed on the platform, the load of the article is applied to the load cell inside it.

The resistance to the excitation current in the strain gauge will then change and the analog output signal varies.

It is amplified and digitized continuously by the A/D converter into a digital signal. Subsequently, the resulting count is processed and managed by the CPU. The CPU refers to the instructions from the keyboard, and then conveys the output data to LCD driver, which formats the data into readout on the display panels.

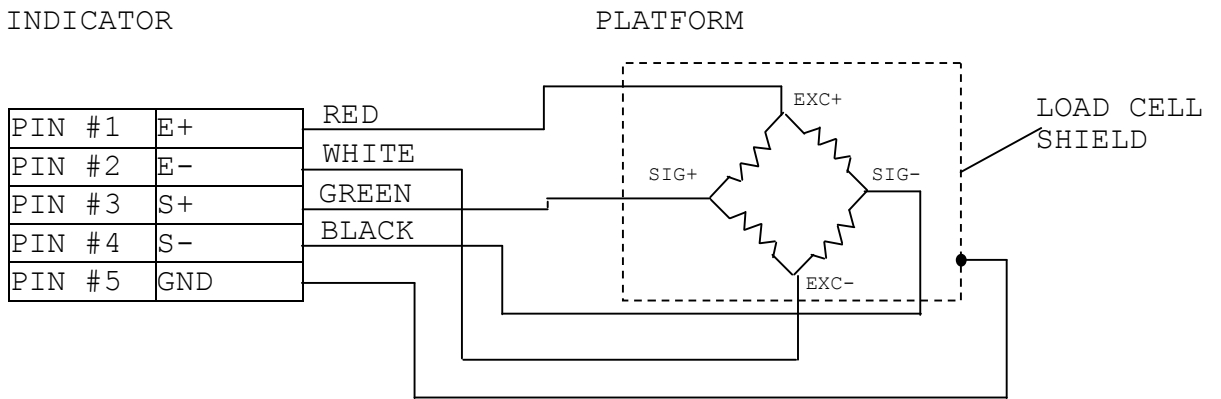
2.2 PHYSICAL LAYOUT OF ELECTRICAL CONNECTION



2.2.1 CONNECTION BETWEEN INDICATOR AND PLATFORM
(8 or 5 PINS ROUND CONNECTOR)

PIN ASSIGNMENT for V-BM/V-FS/V-TM/V-PS

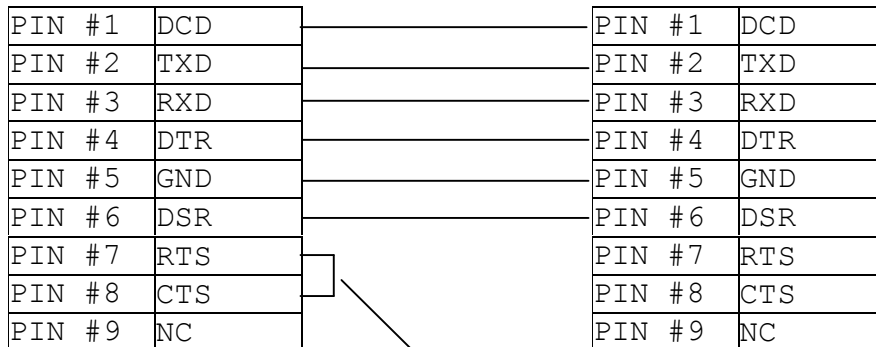
Note: If use 4-wire load cell, PIN#1 & pin#2, PIN#3 & PIN#4 should be shorted.



2.2.2 CONNECTION OF RS-232 BETWEEN INDICATOR AND PC (9PIN D-SUB)

PIN ASSIGNMENT

INDICATOR (9PIN D-SUB, FEMALE) PC (9PIN D-SUB, MALE)



** RTS & CTS has been shorted internally.

BAUD RATE: 4800, 9600 (DEFAULT), 19200, 38400

Protocol: N81 (DEFAULT), E71

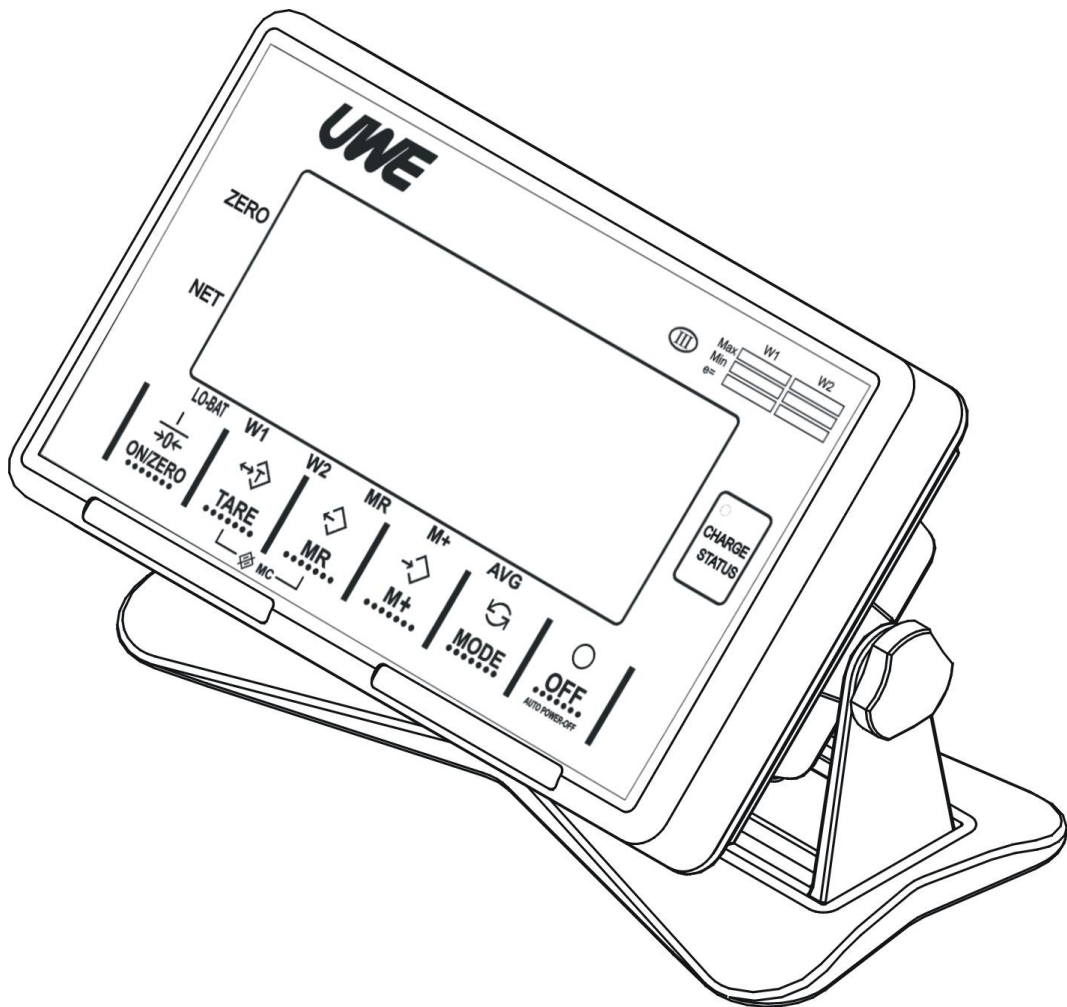
Code: ASCII

Data output: Continuous (DEFAULT), Auto Send (Output data once when stable, or Manual Send with M+ key (Press M+ to output a reading of individual transaction)).

2.3 GENERAL SPECIFICATION

2.3.1 Overall View

V-BM SERIES



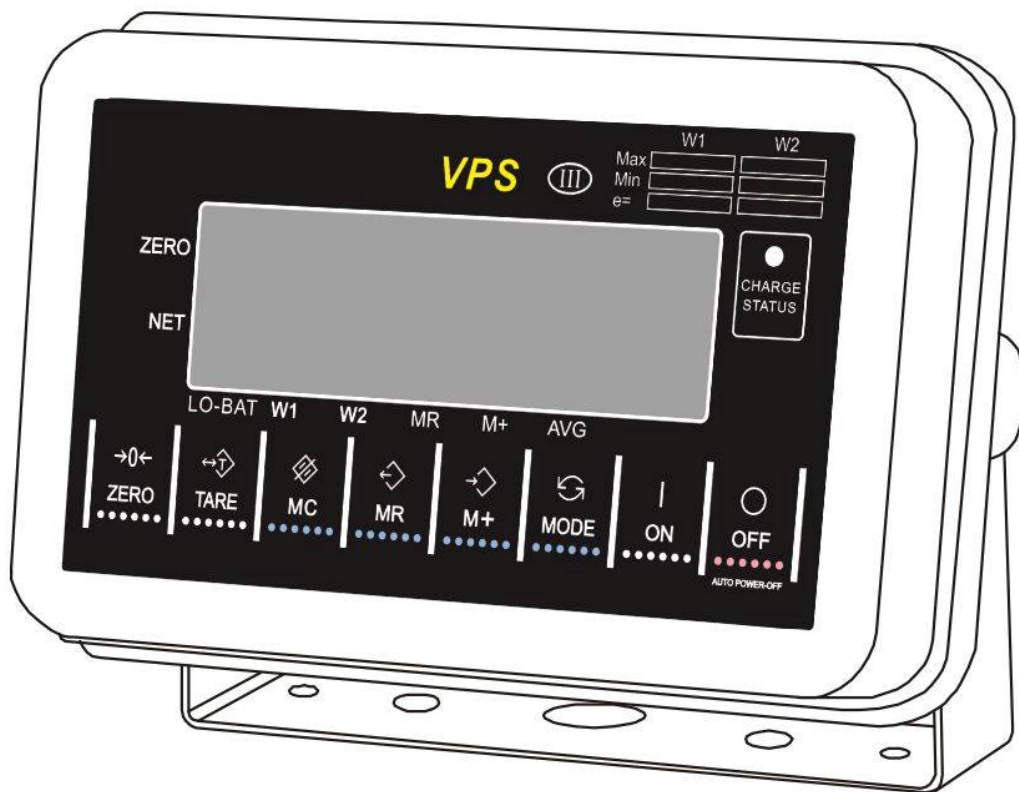
V-FS SERIES



V-TM SERIES



V-PS SERIES



2.3.2 Indicator Dimension:

V-BM	250 (W)	x	150 (H)	x	150 (D) mm
V-FS	260 (W)	x	190 (H)	x	130 (D) mm
V-TM	300 (W)	x	130 (H)	x	180 (D) mm
V-PS	215 (W)	x	150 (H)	x	90 (D) mm

2.3.3 Model Specifications

Model No.	Capacity / Division		Scale interval (n)	
	Dual interval	Dual range	OIML	Non-OIML
	(Max ₁) / (e ₁) (Max ₂) / (e ₂)	W1 (Max/e) W2 (Max/e)		
V-BM/V-FS/V-TM/V-PS INDICATOR	User Define		10,000	120,000
Class	III			
Software Number	CE030			
Maximum Tare Range	1/3 Max. - e (SUBTRACTIVE)			
Power on Zero Range	±2%, 5%, 10%, 15%, 20%, 30%, 40% Selectable			
Manual Zero Range	±2%			
Minimum Load	20e			
Operation Environment	-10°~40°C (14°~104°F), Non-condensed. R.H. ≤ 85%			
Power Consumption	0.1W 0.5W (when charged)			
Power Source	By Built-in Rechargeable Battery or Power Adaptor.			

2.3.4 Main Components Used

Microprocessors: SM89516

Crystal Oscillator: 18.432MHz

Display Device: WTN Liquid Crystal Display

2.3.5 Analog Specification

- Electronic, self-indicating device, with single [- or multi] - interval/range indication. The maximum number of verification scale intervals will be:
 $n \leq 10,000$ for class (III) instruments or
 $n \leq 1000$ for class (III) instruments.
- Power supply of 5 V DC;
- Minimum signal voltage per verification scale interval is 0.45 μ V;
- 24 bits serial digital output;
- Excitation power supply for the load cell is 5 V DC;
- A/D Conversion Speed: 10 times/second
- The analog data processing unit is built in a closed metal box.

2.3.6 Error Code and Description

P_OFF : Low battery warning when power on
Scale will shut off after this message appears

Error : Improper operation during calibration procedures
Case1: The linearity of internal A/D count for 2nd calibration weight is not within 100% \pm 2% of 1st calibration weight.
Case2: The linearity of internal A/D count for 3rd calibration weight is not within 100% \pm 2% of 2nd calibration weight.
Case3: The span value is not within the acceptable range ($1e \geq 12$ internal counts, span value of full capacity $< 1,000,000$ internal counts).
Case4: Calibration load should not be less than 1/100 of full capacity.

-----: Weighing exceeds -9e of zero point.

2.4 INTERNAL SETTINGS AND CALIBRATION METHODS

2.4.1 INTERNAL FUNCTION TABLE

Function	Symbol	Description
0	F0	Compulsory zero display(This function will not appear under OIML type)
1	F1	Span value reading
2	F2	Full display segment check
3	F3	Scale configuration
4	F4	Auto power off setting
5	F5	Select RS-232 baud rate & protocol
6	F6	Motion filter speed setting(0~7)
7	F7	RS-232 transmission mode
8	F8	Printer data format
9	F9	Auto tare setting
10	F10	Enable/disable absolute zero-point utilization
11	F11	Enable/disable accumulation when pressing M+
13	F13	Copies of UTP label printing (only available when choosing UTP in F.8)
14	F14	Enable/disable total printing when pressing MC (only available when choosing UTP in F8)
15	F15	UTP date/time setting (only available when choosing UTP in F.8)
19	F19	EC verification(For qualified personnel only)
20	F20	Gravity Compensation-place of calibration
21	F21	Gravity Compensation-place to be used

HOW TO ENTER THE REQUIRED FUNCTION MODE

- a. Turn scale off.
- b. Press and hold TARE, then turn scale on. Scale display F0
- c. Press TARE until the required function number appears.
- d. Press MODE
- e. Press MODE until the required setting appears.
- f. Press TARE to confirm.
- g. Repeat step c to f for other function setting, or
- h. Press ON/ZERO to save settings and return to normal operation.

F.0 COMPULSORY ZERO DISPLAY

A zero weight value will be displayed on the LCD if the load detected is within the below range.

Symbol	Zero Value Display Range
2Ero 0	Disable (Normal display)
2Ero 1	$\pm 1e_1$
2Ero 2	$\pm 1.5e_1$
2Ero 3	$\pm 2e_1$
2Ero 4	$\pm 2.5e_1$

F.1 SPAN VALUE READING

- Simply enter F1 to read the A/D counts.
- Press ZERO to clear the A/D counts, apply test mass onto platter, the span value of test mass will be displayed.

F.2 FULL DISPLAY SEGMENT CHECK

When function is entered, all segments will be displayed. Check and make sure that no segments are missed.

F.3 SCALE CONFIGURATION

The V-BM/V-FS/V-TM/V-PS indicators are designed to have no preset capacity and division, but for user to define. Depends on the requirement and the purpose of the indicators are operating under, the resolution can be set anywhere from 1/100 to 1/120,000.

When **oiml** mode is selected and application is legal for trade, the overall resolution will be limited to 1/10,000 with extended display for reference. When **norm** mode is selected and application is not legal for trade, the overall resolution can be set to a maximum of 1/120,000. The indicator also can be set to have dual intervals or dual range when parameter is input.

TO SET TYPE (Select between OIML and non-OIML application)

- Indicator is off
- Press and hold **TARE**, then press **ON/ZERO**
- Indicator displays **F1**
- Press **TARE** until indicator displays **F3**
- Press **MODE** to enter
- Indicator displays **TYPE**

- g. Press **M+** to select the operating type between **oiml** or **norm** for non-OIML
- h. Press **MODE** to confirm

TO SET WEIGHING UNIT

- a. After **TYPE** is selected, indicator will display **unit**
- b. Press **M+** to select the weighing units of kg, g, lb/kg, lb/g
 - To enable the avoirdupois units, press **MODE** when the lb/kg or lb/g sign appears.
 - To disable the avoirdupois units, press **MODE** when the kg or g sign appears.

TO SET DECIMAL POINT (For capacity and division readings)

- a. After **UNIT** is selected, indicator will display **dp**
- b. Press **M+** to select number of decimal place. It can be set from no decimal place up to 3 decimal place
- c. When selected, press **MODE** to confirm

TO SET RATED CAPACITY AND DIVISION

(For Single interval, it means $\text{Max} \times e$; for Dual Interval, it means $\text{Max}_2 \times e_2$)

- a. After decimal place is selected, indicator will display **CAP2**
- b. Press **M+** to enter and utilize **M+** to increase value, **MR** to move cursor to the next digit (**ON/ZERO** to move cursor backwards when the key is available)
- c. The division must be selected to complete the setup before proceed to the next selection
- d. Press **MODE** to confirm

TO SET POWER ON ZERO RANGE

- a. After capacity and division is set, indicator will display **CAP1?**
If dual interval/dual range does not require, press **MODE** to enter power on zero range setting.
- b. Indicator display **0Init**(Power on Zero Range), press **M+** until required setting appears.
In.=02%(±2% of full capacity) → In.=05% → In.=10% → In.=15% → In.=20% → In.=30% → In.=40% → In.=02%.....
- c. After power on zero range is selected, press **MODE** to confirm.
- d. During indicator displayed **CAP1?**, press **M+** to enter dual interval

/dual range setting if those functions are required.

TO SET DUAL INTERVAL (Max₁ x e₁) OR DUAL RANGE (W1 / W2)

- a. Press **M+** to select **Dual Interval** or **Dual Range**
- b. To enable dual interval, press **MODE** when the "Inter" sign appears.
- c. To enable dual range, press **MODE** when the "rAnge" sign appears.
- d. Utilize **M+** and **MR** keys to set the decimal point, capacity and division.
- e. After capacity and division is set, indicator will display **0Init.**
- f. Press **M+** to select power on zero range.
(In.=02%, 05%, 10%, 15%, 20%, 30%, 40%)
- g. Press **MODE** to confirm.
- h. When indicator display **F4**, press **MODE** to continue setup or **ON/ZERO** to quit

NOTE 1: You must reset capacity every time when you change the mode between OIML or NORMAL.

NOTE 2: Each range must not exceed 1/10,000 and 1/20,000 for overall capacity under OIML mode and 1/120,000 for NORMAL mode. For example, if **CAP2** sets as 2000kg (max2) x 0.2kg (e2), then **CAP1?** can set as 1000kg (max1) x 0.1kg (e1). So for OIML, max1/e1 & max2/e2 will not exceed 1/10,000 and max2/e1 will not exceed 1/20,000. For NORMAL, max2/e1 must not exceed 1/120,000.

NOTE 3: When setting up capacity, user must program all digits including division before press **MODE** to confirm.

F.4 AUTO POWER OFF SETTING

Two modes are available: (Default=4_OFF)

0_OFF = Auto Power Off function is disabled.

4_OFF = Scale will automatically be turned off after 4 minutes unused.

F.5 RS-232 BAUD RATE & PROTOCOL

- a. Press **M+** to select baud rate of **4800, 9600, 19200** and **38400**
- b. Press **MODE** to enter transmission protocol selection and press **M+** to select **P=n81** or **P=E71**
- c. Press **TARE** to save and return to other function

Note: The default value is:

Baud Rate :9600

DATA BIT :8
 PARITY BIT :N(NONE)
 STOP BIT :1
 CODE :ASCII

F.6 MOTION FILTER SPEED SETTING

Motion filter is used to give a more stable display when the working environment is affected by motion or airflow interference. Refer to the below table for motion filter speed setting

FiLt.X	Motion Filter Strength	Response Speed	Environment Interference Stability
0	NO	QUICK	BAD
1	WEAK		
2			
3	↑	↑	↑
4			
5	↓	↓	↓
6			
7	STRONG	SLOW	EXCELLENT

- a. Press **MODE** to select **FiLt.0** to **FiLt.7**
 - To disable the **MOTION FILTER FUNCTION** select "**FiLt.0**"
 - To employ the **MOTION FILTER FUNCTION** select "**FiLt.1**"~"**FiLt.7**"
- b. Press **TARE** to save and return to other function

F.7 RS-232 TRANSMISSION MODE

- a. Press **MODE** to select RS-232 transmission mode of **Conti**, **Auto**, **P_Out** or **OFF**.
 - When selects **Conti**, indicator will transmit data continuously when reading is stable
 - When selects **Auto**, indicator will transmit data once when reading is stable
 - When selects **P_out**, indicator will transmit data once when pressing **M+**
 - When selects **OFF**, indicator will not transmit data anymore.
- b. Press **TARE** to save and return to other function

F.8 PRINTER DATA FORMAT

- a. Press **MODE** to select printer data format of **Prnt.1**, **Prnt.2** or **utP**
 - When **Prnt.1** is selected, indicator will print single data

- when pressing **M+**
- When **Prnt.2** is selected, indicator will print data in a table format with number of entries and total weight
 - When **utP** is selected, indicator will print data to UTP printer by it's communication protocol.
- b. Press **TARE** to enter next setup for printout mode.
 - c. Press **MODE** to select printout mode of **Auto** or **nAuto** (non-auto)
 - When selects **Auto**, indicator will print data once when reading is stable
 - When selects **nAuto**, indicator will print data once when pressing **M+**
 - d. If choose **utP** in **step a**, there will have several printer data formats can be set.
 After pressing **TARE**, indicator displays previous setting (Prnt.1, Prnt.2 or Form0~Form9)
 Press **MODE** until the required setting appears.
 - When **Prnt.1** is selected, indicator will print data in a table format with number of entries and total weight
 - When **Prnt.2** is selected, indicator will print single data with simple format.
 - When **Form0~Form9** is selected, indicator will employ desired label format that has stored in UTP printer by it's communication protocol.
 Then press **MODE** to select **Auto** or **nAuto** as step c described.
 - e. Press **TARE** to save and return to other functions

F.9 AUTO TARE FUNCTION SETTING

- a. Press **MODE** to select **TroFF** or **Tr_on**
 - TroFF** will disable the auto tare off function
 - Tr_on** will enable the auto tare function and tare off the first weight that is placed on the scale
- b. Press **TARE** to save and return to other functions

F.10 ENABLE/DISABLE ABSOLUTE ZERO-POINT UTILIZATION

- a. Press **MODE** to select **AC_on** or **AC_oF**
 - AC_on** will enable absolute zero-point utilization (use original calibrated zero-point as power on zero-point)
 - AC_oF** will disable absolute zero-point utilization (indicator will be zeroed automatically while power on)
- b. Press **TARE** to save and return to other functions

F.11 ENABLE/DISABLE ACCUMULATION WHEN PRESSING M+

- a. Press **MODE** to select **Ad_on** or **Ad_oF**
 - Ad_on** will enable accumulation function when pressing **M+**
(Also prints data via RS-232 and printer)
 - Ad_oF** will disable accumulation function when pressing **M+**
(Press **M+** to print data only, **M+** & **MR** & **MC** will be no function)
- b. Press **TARE** to save and return to other functions

F.13 COPIES OF UTP LABEL PRINTING(only available when choosing UTP in **F8**)

- a. Press **MODE** to select copies of UTP printing(Copy1~copy9)
Copy X: quantity of copies
- b. Press **TARE** to save and return to other function.

F.14 ENABLE/DISABLE TOTAL PRINTING WHEN PRESSING MC(only available when choosing UTP in **F8**)

- a. Press **MODE** to select **tt_on** or **tt_oF**
 - tt_on** will enable total printing when pressing **MC**
(*F11 must set "Ad_on" in advance*)
 - tt_oF** will disable total printing when pressing **MC**
- b. Press **TARE** to save and return to other functions

F.15 UTP DATE/TIME SETTING(only available when choosing UTP in **F8**)

It must be a UTP printer installed and connected to scale Properly when trying to set up UTP's date/time data.

- a. Enter **F15**, press **MODE** to show present year data(year:y=xx, e.g. Year of 2008 → y=08).
- b. Enter correct year data by utilizing **MR**(move cursor) and **M+**(increase value) keys.
- c. Press **MODE** to save setting, then scale displays present month data(month:m=xx).
- d. Repeat **step b to c** for month(m=xx)/day(d=xx)/hour(H=xx)/minute(m=xx) data setting.

F.19 EC verification(For qualified personnel only)

This function can only be used under verification stage. When executing F19, the displayed scale interval(**d**) will be 1/10 Of verification scale interval(**e**). (eg. e=0.1g, d=0.01g)

F.20 GRAVITY COMPENSATION-PLACE OF CALIBRATION (C.G.)

This function stores the gravity value of where the scale is manufactured. indicator was calibrated according to the value stored.

- a. Press **MODE** to enter and utilize **M+** to increase value, **MR** to move

cursor to the next digit

b. Press and hold **MODE** to save or **TARE** to quit

Note: When the change is saved, indicator will enter calibration automatically to reflect the change in gravity. Please refer to next paragraph for how to calibrate the indicator

F.21 GRAVITY COMPENSATION-PLACE TO BE USED (U.G.)

This function stores the gravity value of where the indicator will be used. The value stored in F.21 will be used to compare with the value in F.20 to compensate the difference in gravity value.

a. Press **MODE** to enter and utilize **M+** to increase value, **MR** to move cursor to the next digit

b. Press and hold **MODE** to save and return to other functions

2.4.2 CALIBRATION METHODS

AUTO CALIBRATION

- a. Indicator is off and nothing is on the platform
- b. Press and hold **MODE**, then press **ON/ZERO**
- c. Indicator displays **CAL._1**
- d. Press **MODE** for **YES** and indicator will self calibrate zero point before proceed to the first point calibration
- e. Indicator will show "Load XXXX", for which XXXX is 1/3 of the full capacity. Load the weight according to the display
- f. After weight is placed, press **MODE** when display is flashing
- g. Indicator displays **CAL._2**
- h. Press **MODE** for **YES** or **ZERO** to exit
- i. Indicator will show "Load YYYY", for which YYYY is 2/3 of the full capacity. Load the mass according to the display
- j. After weight is placed, press **MODE** when display is flashing
- k. Indicator displays **CAL._3**
- l. Indicator will show "Load ZZZZ", for which ZZZZ is the full capacity. Load the mass according to the display
- m. After weight is placed, press **MODE** when display is flashing to complete the calibration procedures

ODD WEIGHT CALIBRATION

- a. Indicator is off and nothing is on the platform
- b. Press and hold **MODE**, then press **ON/ZERO**
- c. Indicator displays **CAL._1**
- d. Press **M+** and manually enter the weight that intends to calibrate by utilize **M+** to increase and **MR** to move cursor. The value entered will be considered as the first point calibration
- e. When the weight is set, press **MODE** to begin the calibration and indicator will self calibrate zero point before proceed to the first calibrate weight that was manually entered
- f. Load the mass according to the display
- g. Press **MODE** when display is flashing
- h. Indicator displays **CAL._2**
- i. Press **MODE** for **YES** or **ZERO** to exit
- j. Enter the weight that intends to calibrate by utilize **M+** to increase and **MR** to move cursor

Please note that the value for second point has to be higher than first point

- k. When the weight is set, press **MODE** to begin second point calibration
- l. Load the mass according to the display
- m. Press **MODE** when display is flashing
- n. Indicator displays **CAL._3**
- o. Repeat **step i to l** if third point calibration is required
- p. Press **MODE** when display is flashing to complete the calibration procedures

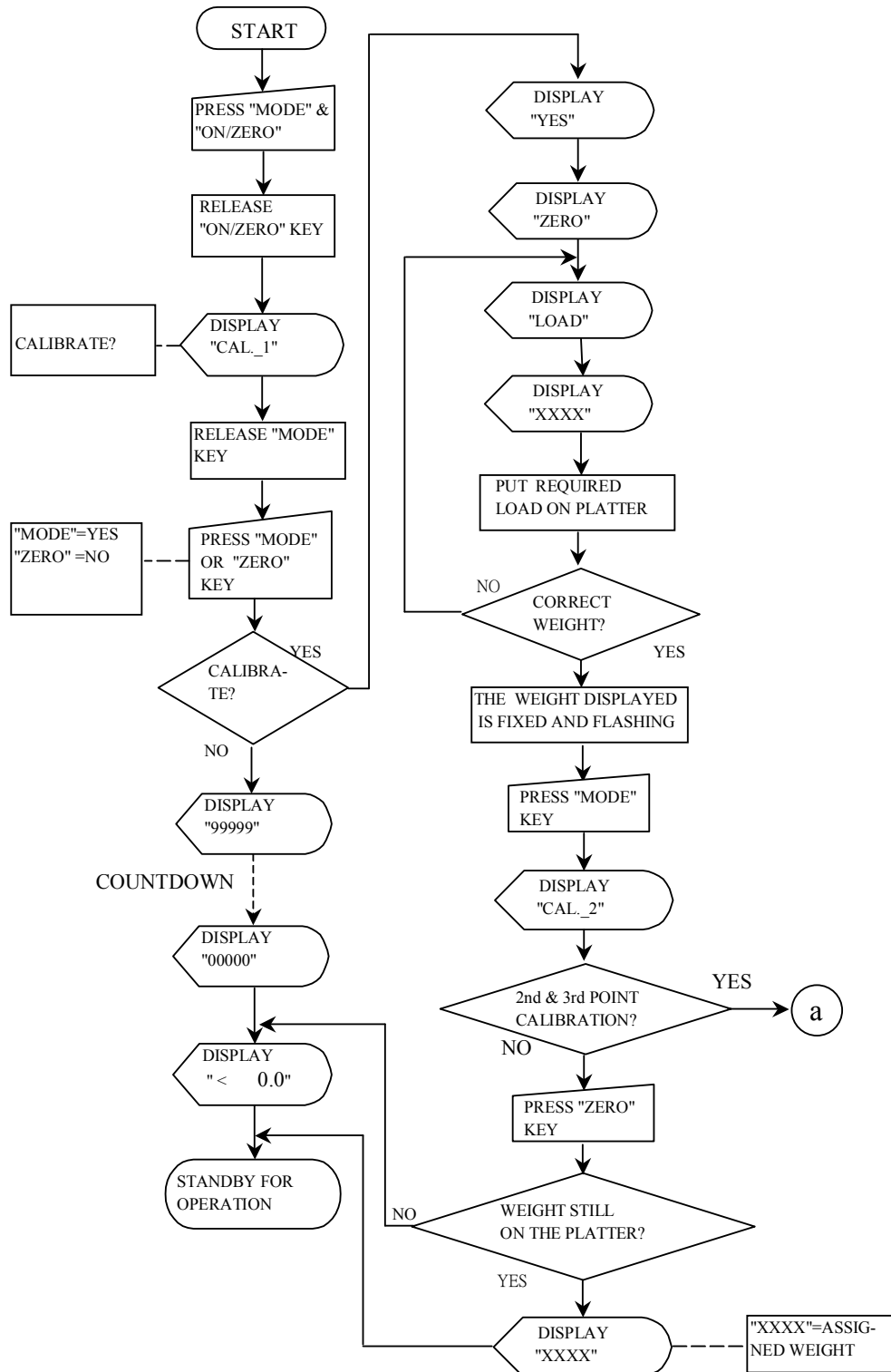
Note: When manually enter the weight for calibration, the first point must not be less than 1/100 of the full capacity. The second point must not be less than the first point. But it is highly recommend setting the second point at about 2/3 of the full capacity.

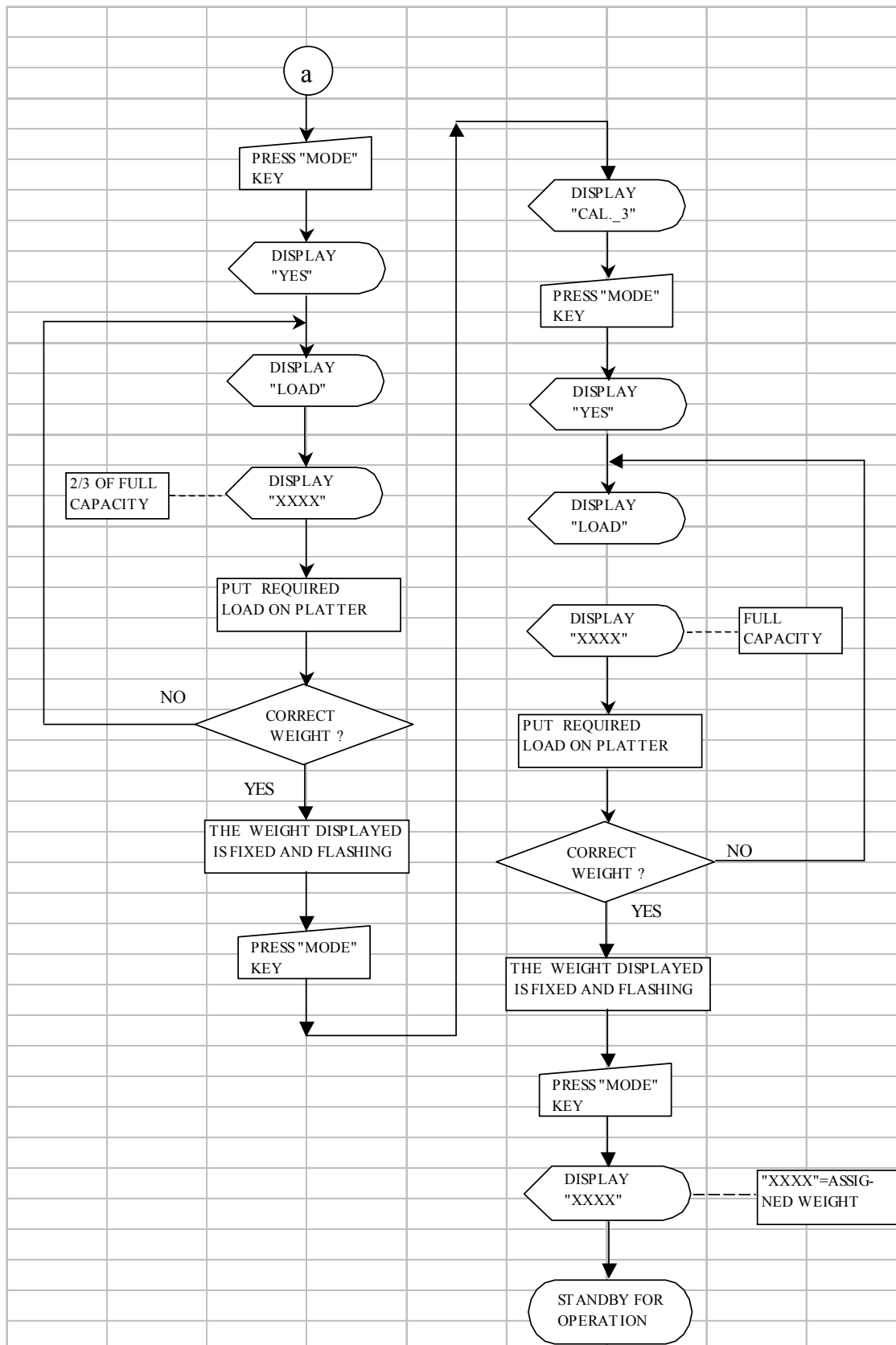
2.4.3 DISABLE CALIBRATION AND INTERNAL FUNCTIONS SETTING WITH JUMPER SW. (JP1)

The JP1 is used to control calibration and internal functions setting (F1 and F3). move this jumper to CAL-LOCK position to disable calibration and internal functions setting.

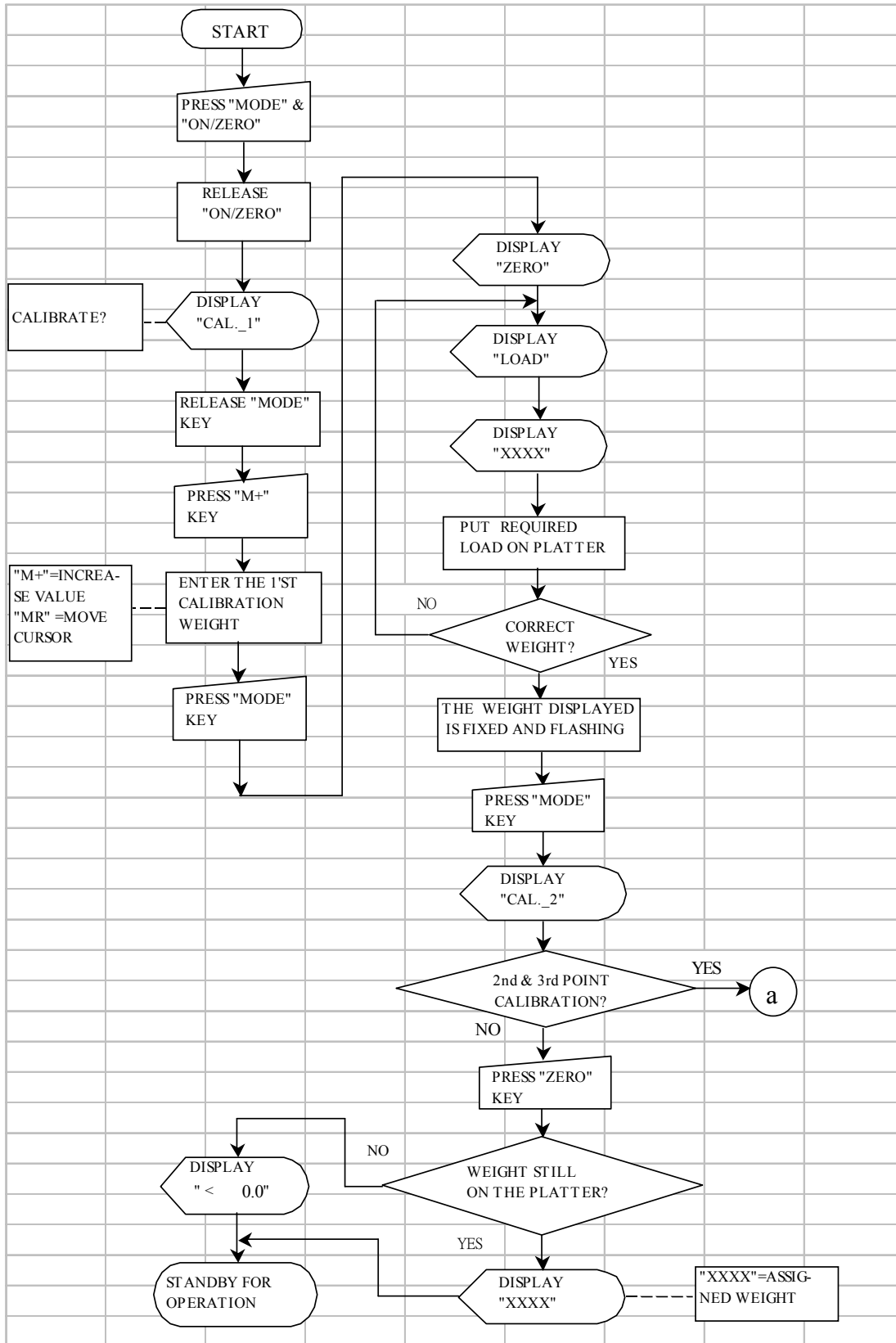
2.5 FLOW CHART

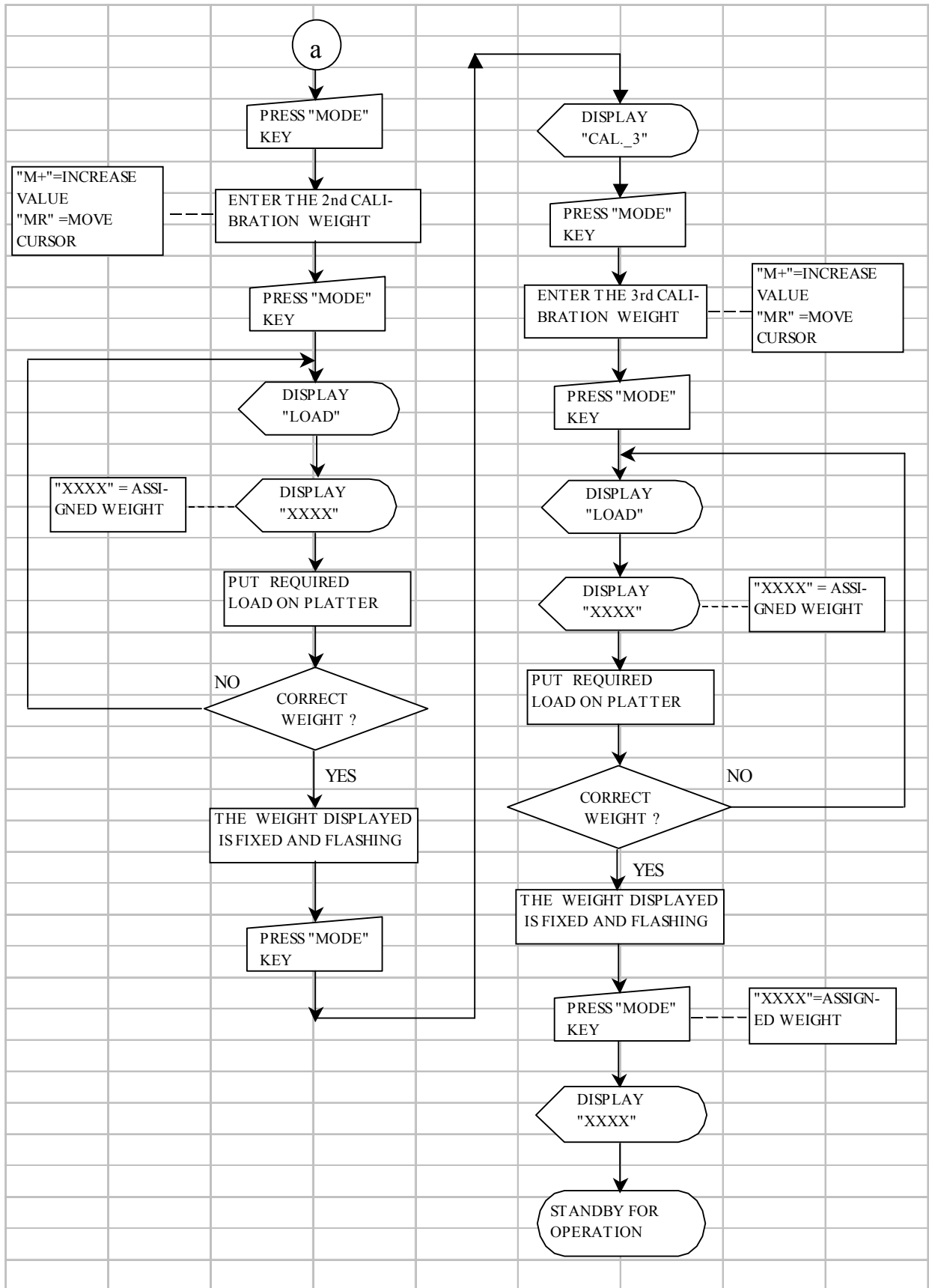
2.5.1 Auto Calibration



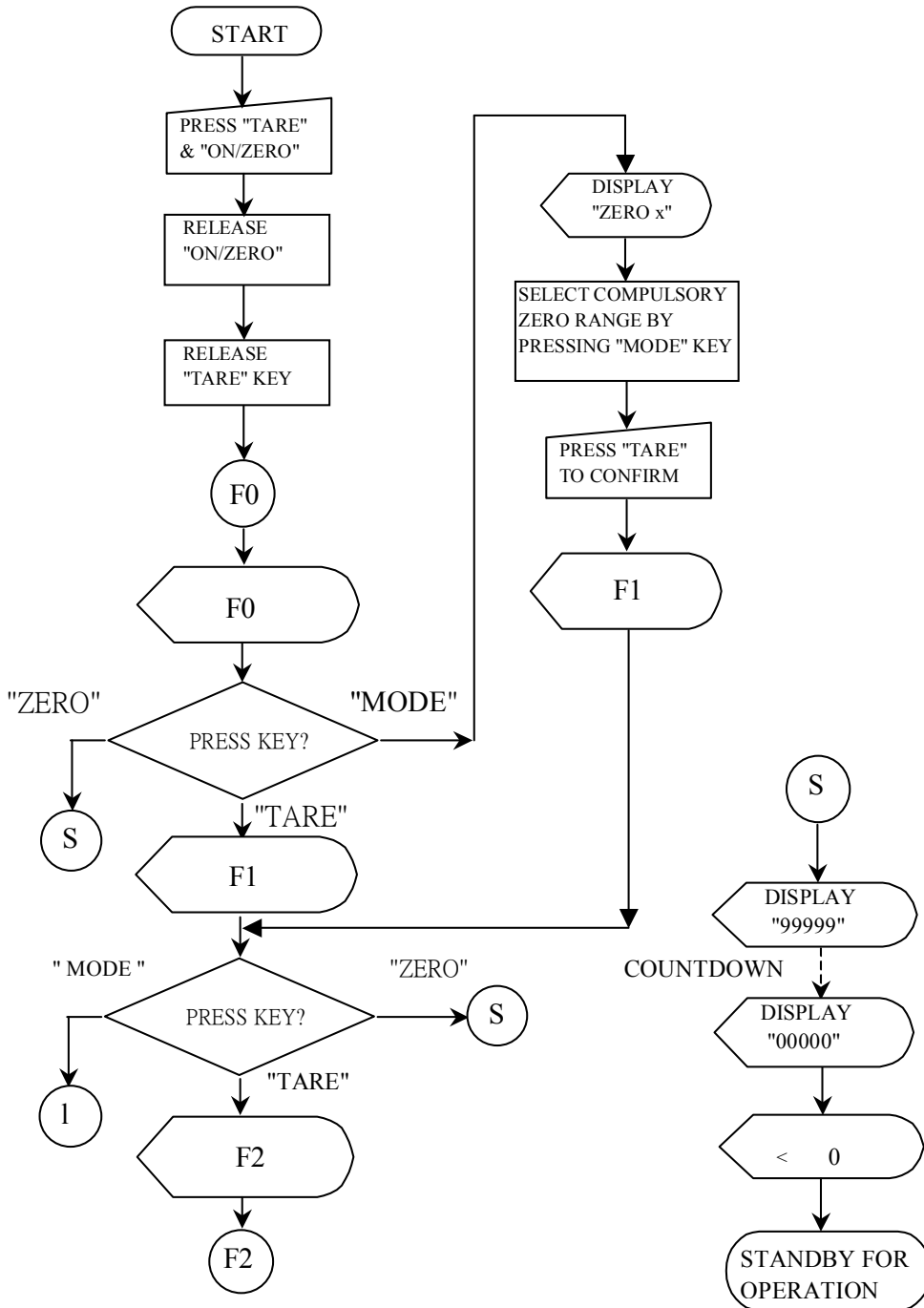


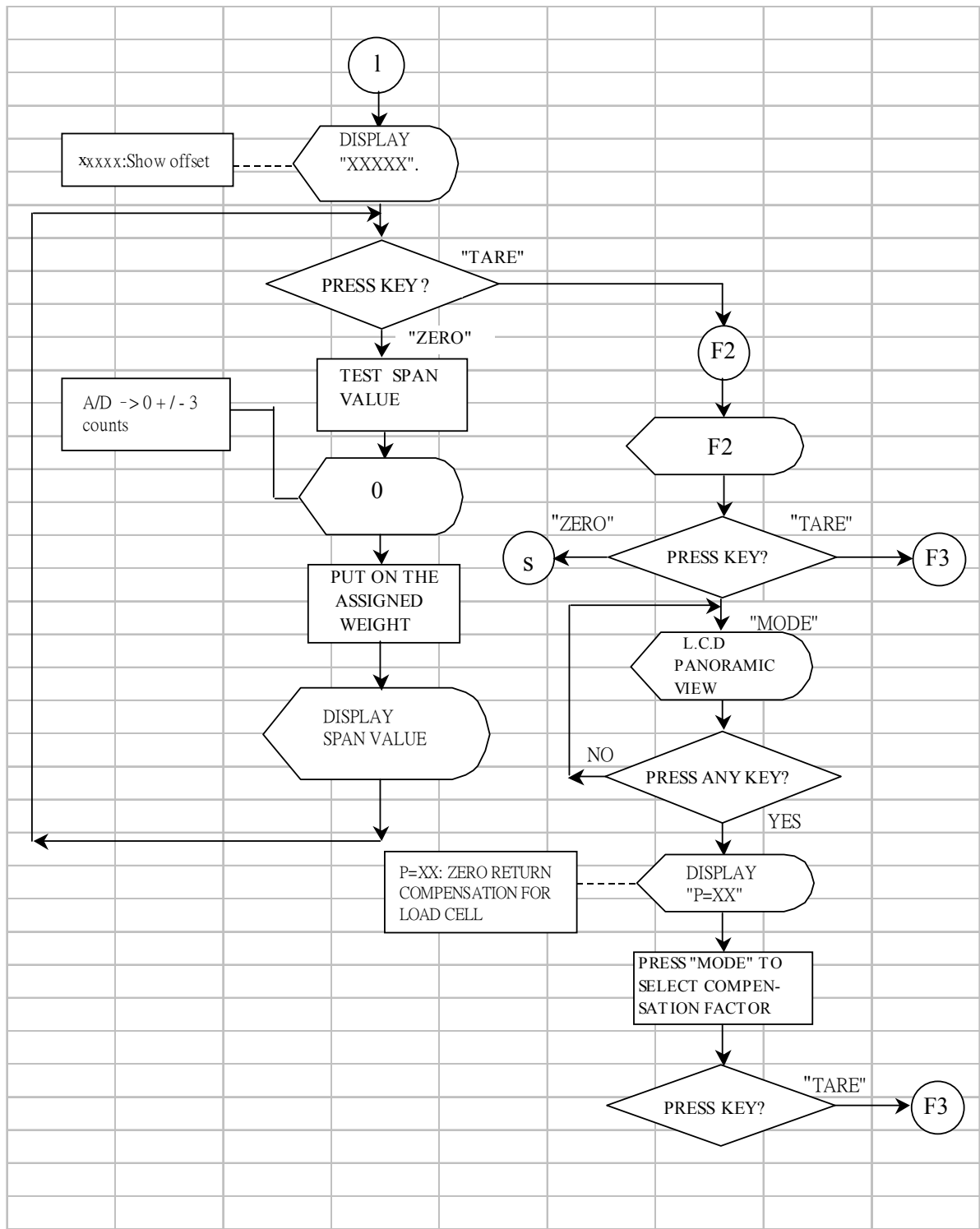
ODD WEIGHT CALIBRATION

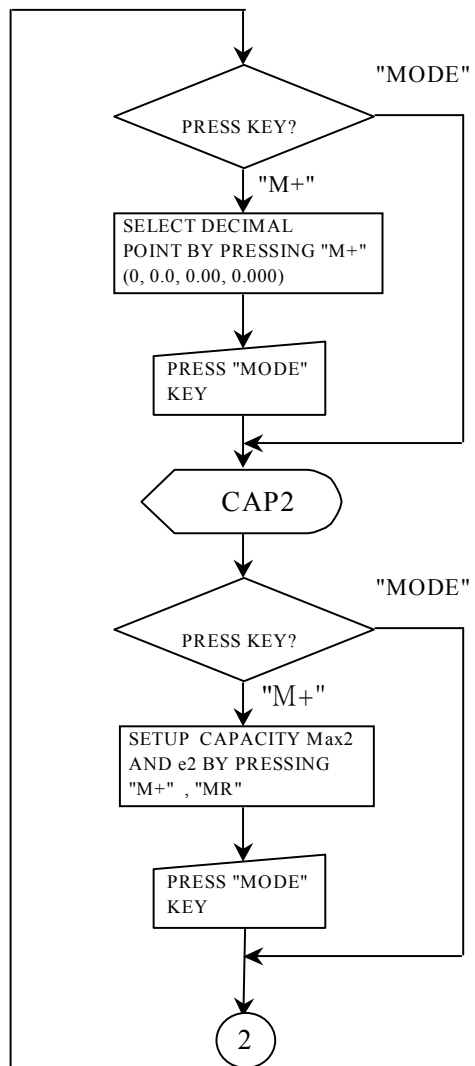
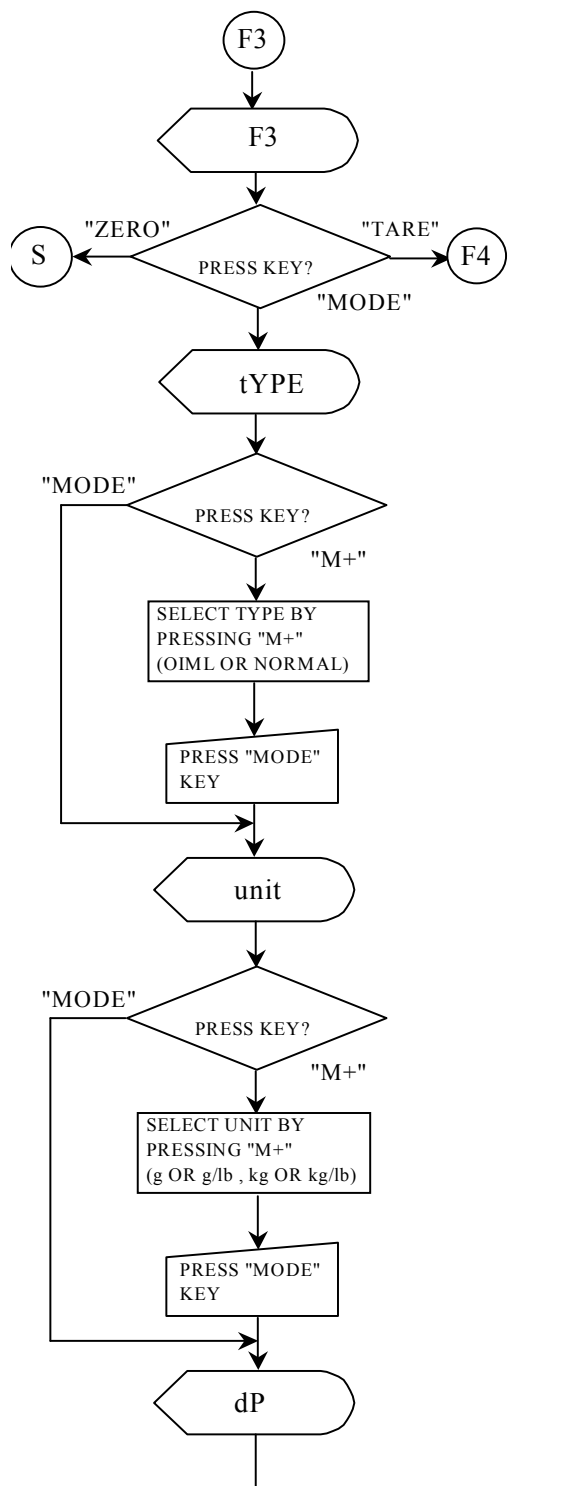


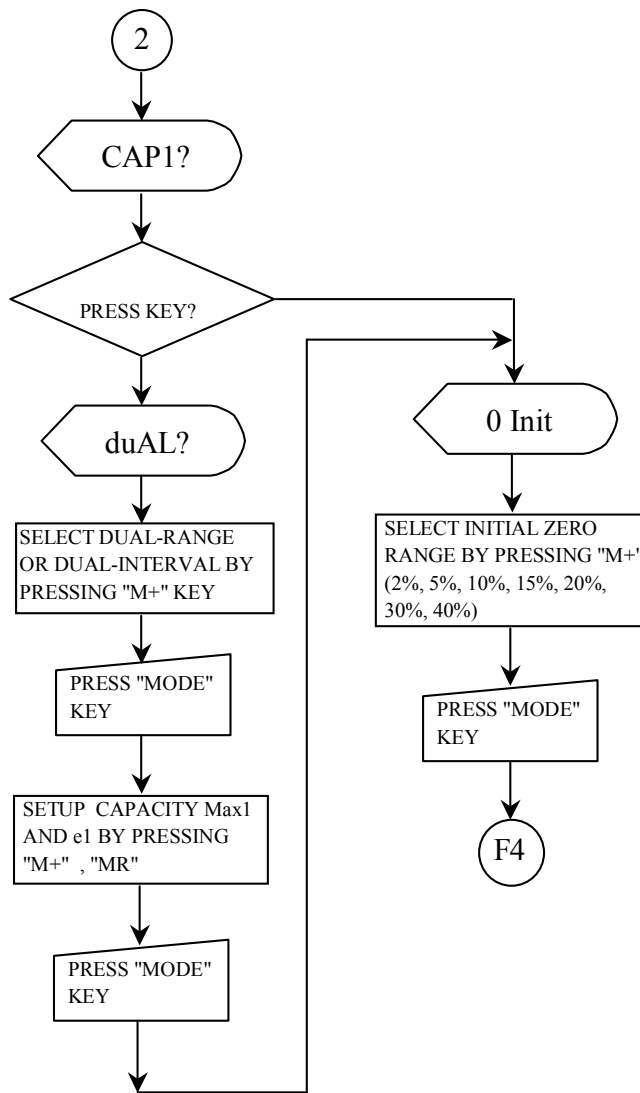


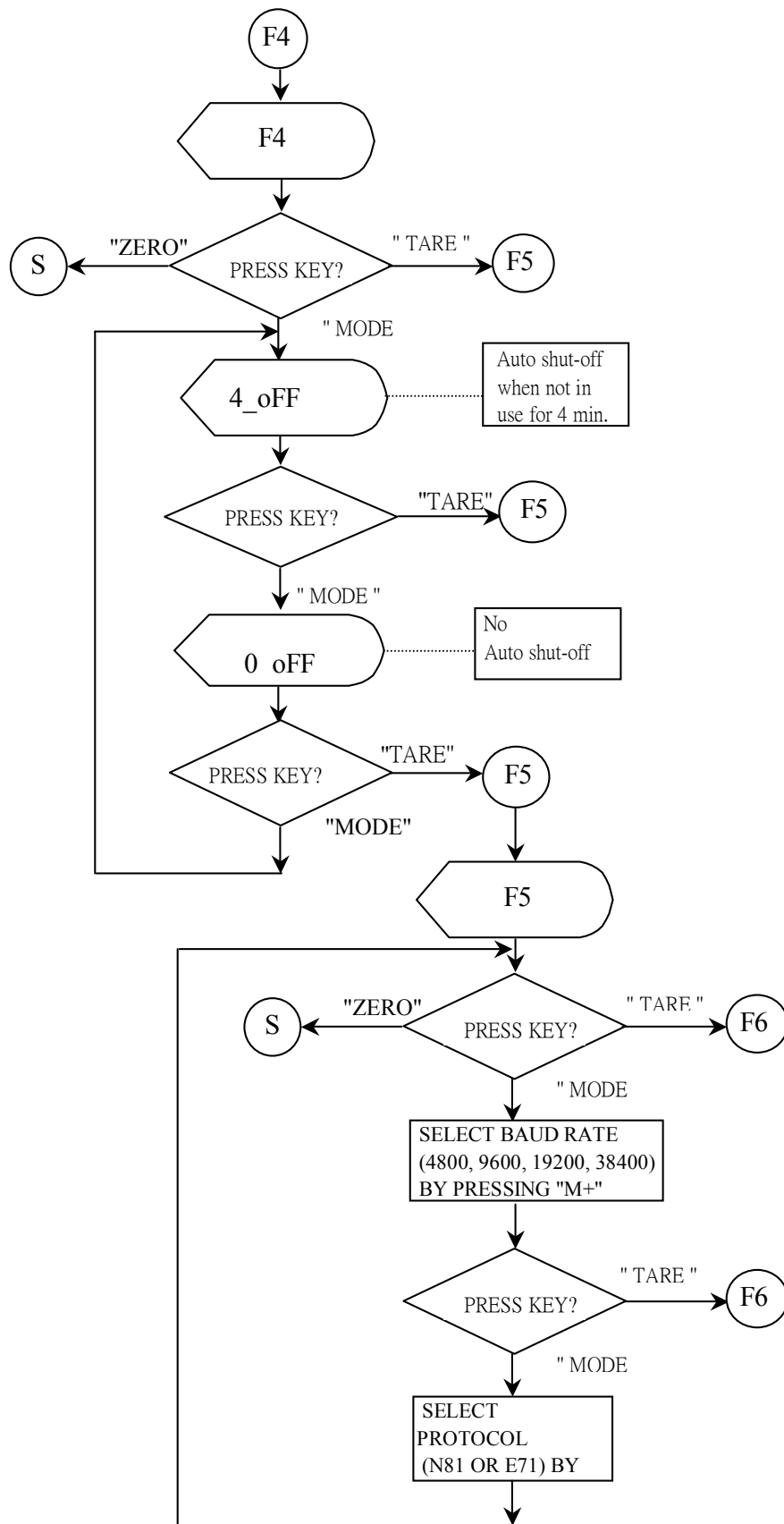
2.5.2 Function Test (for technicians only)

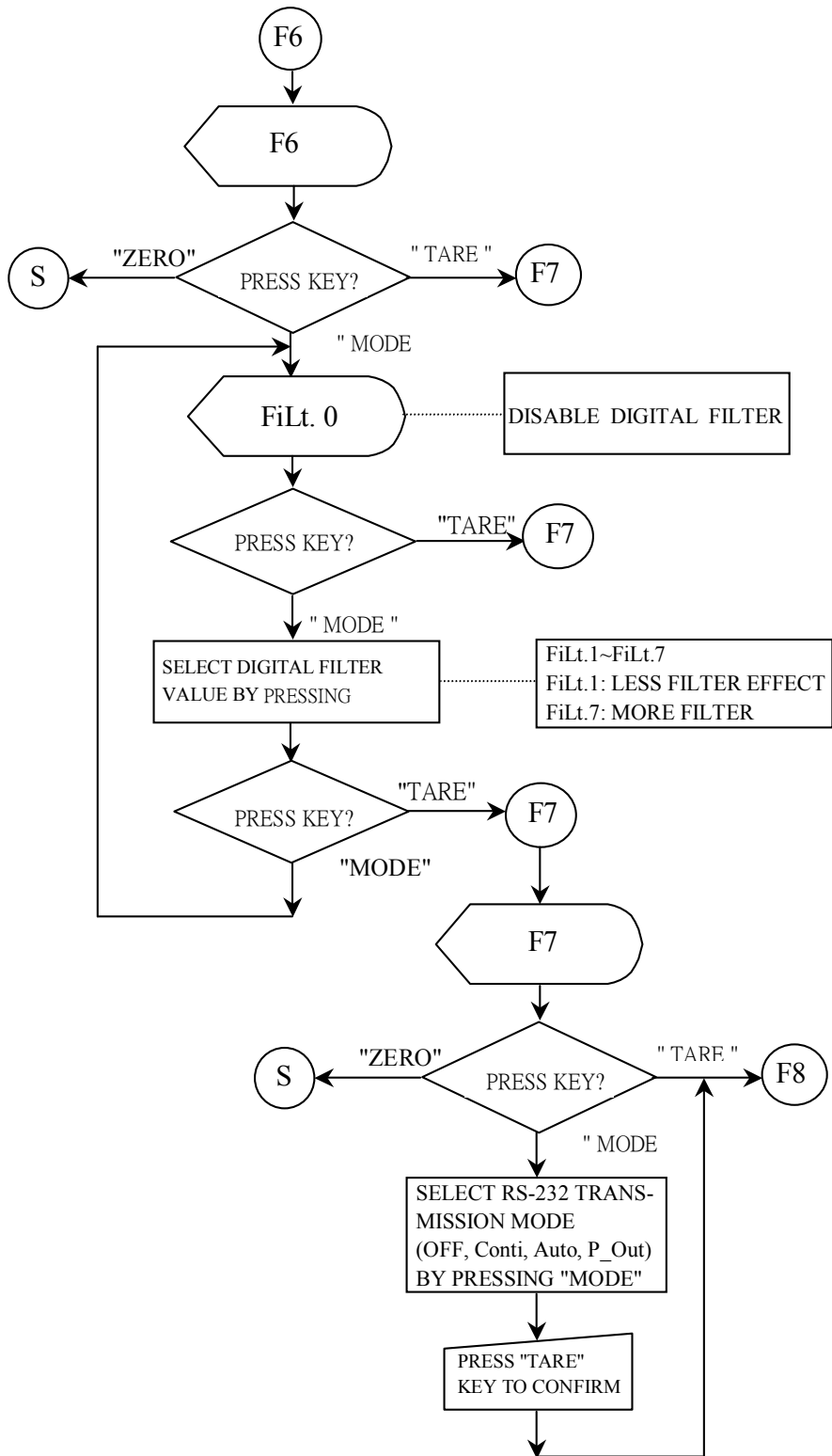


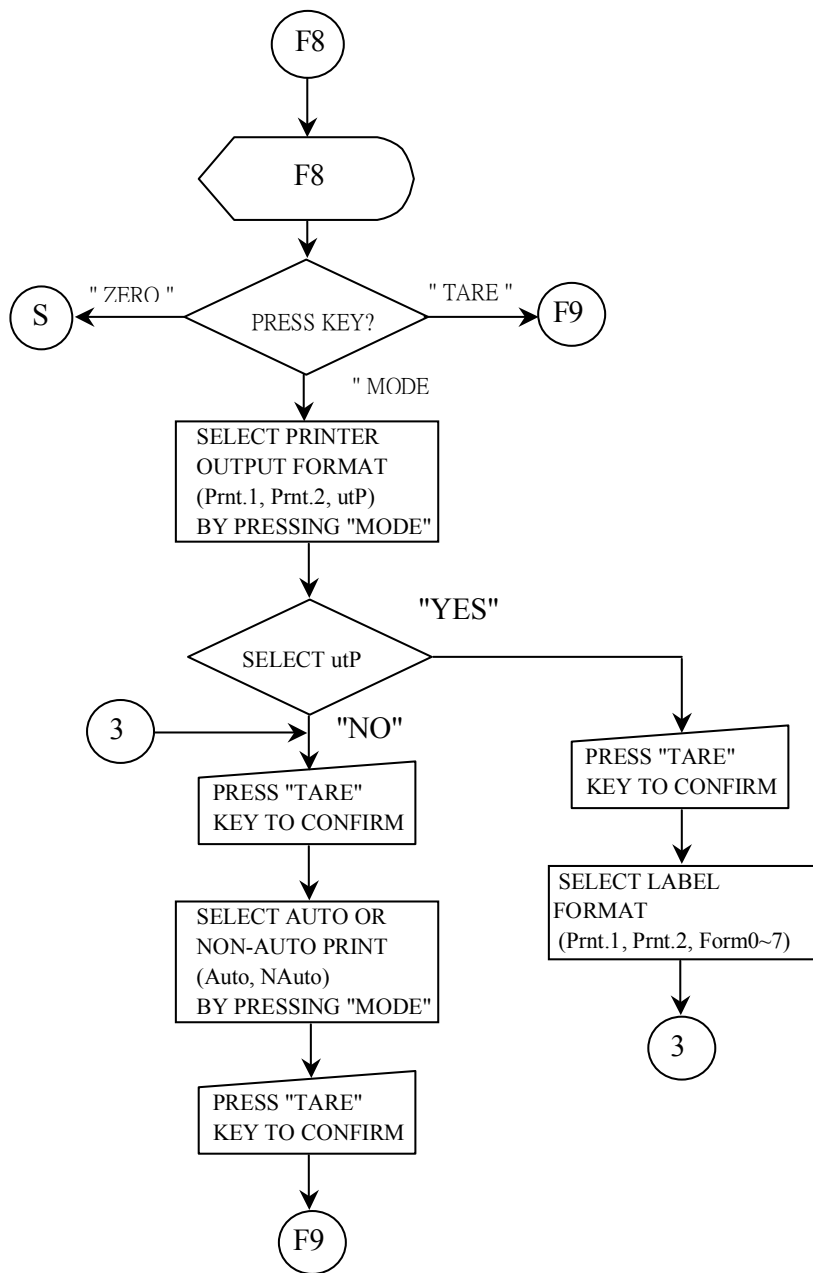


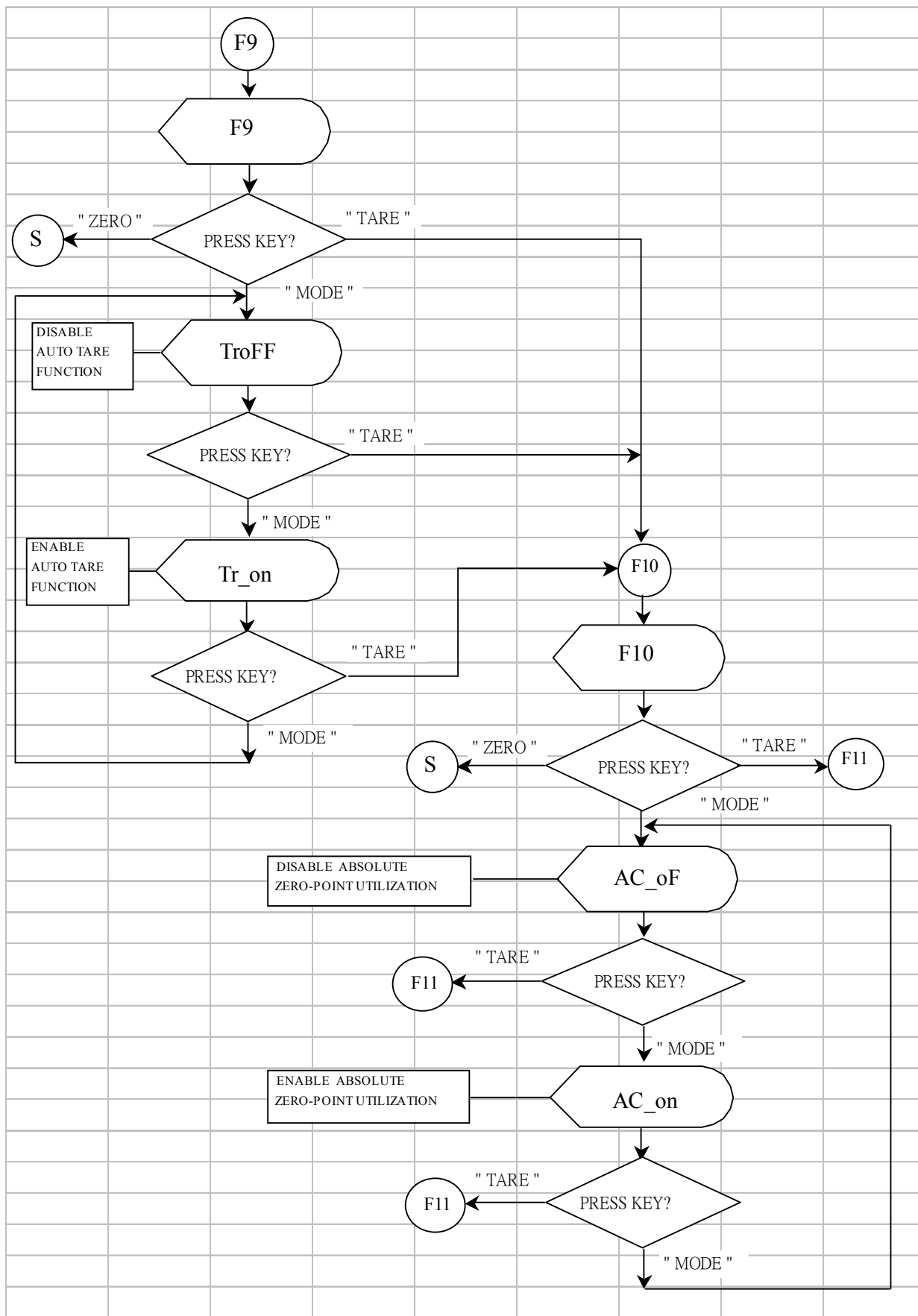


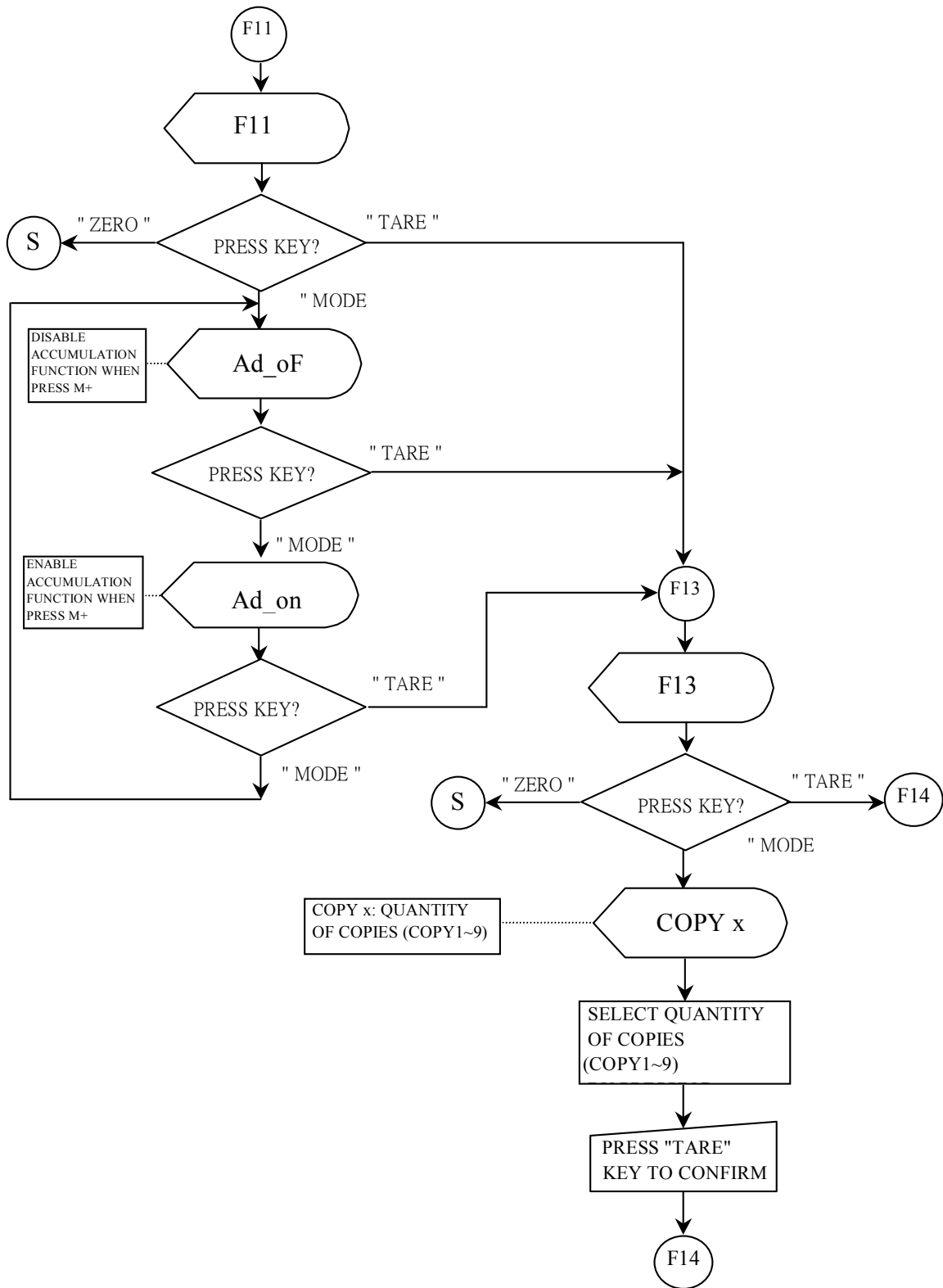


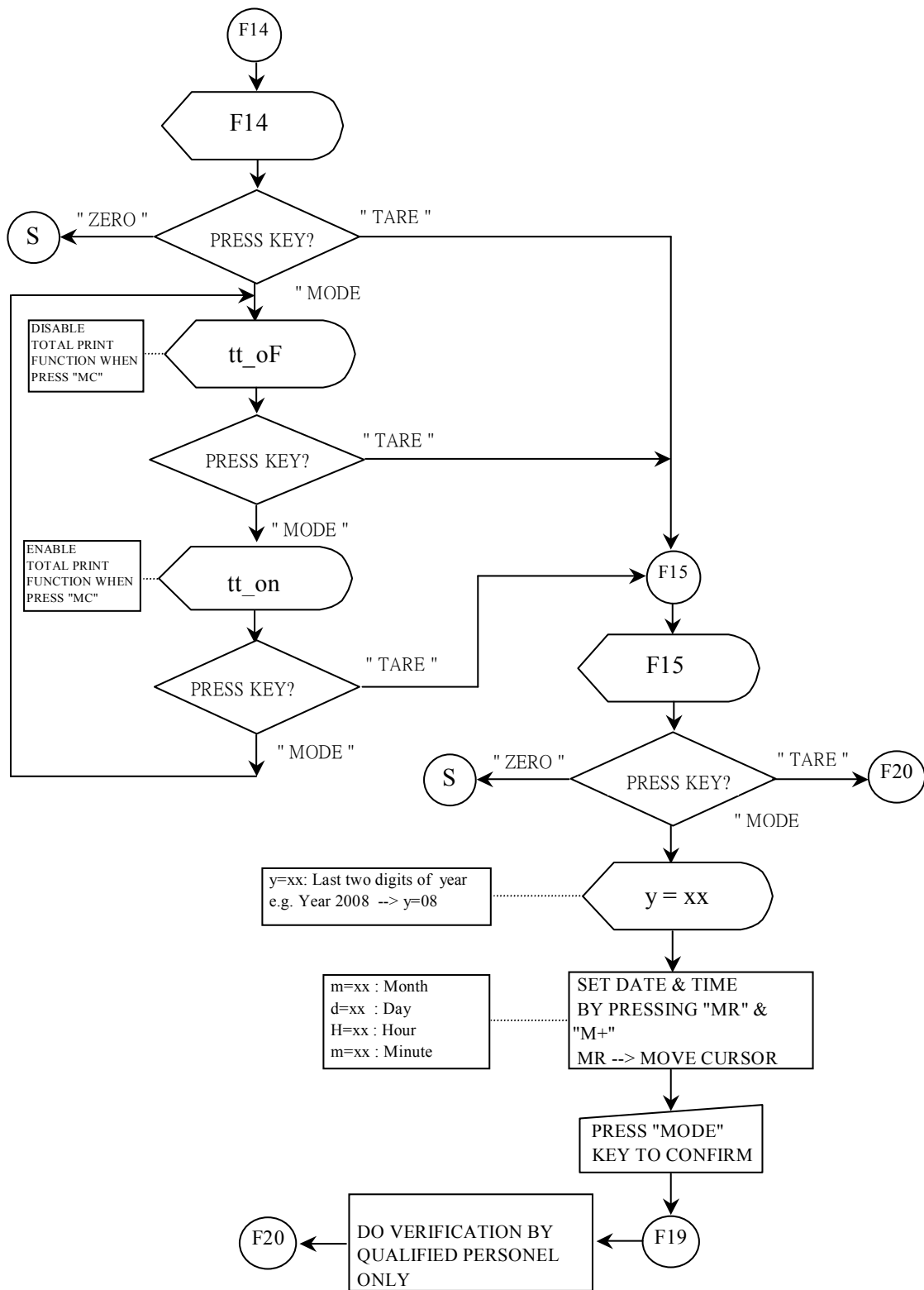


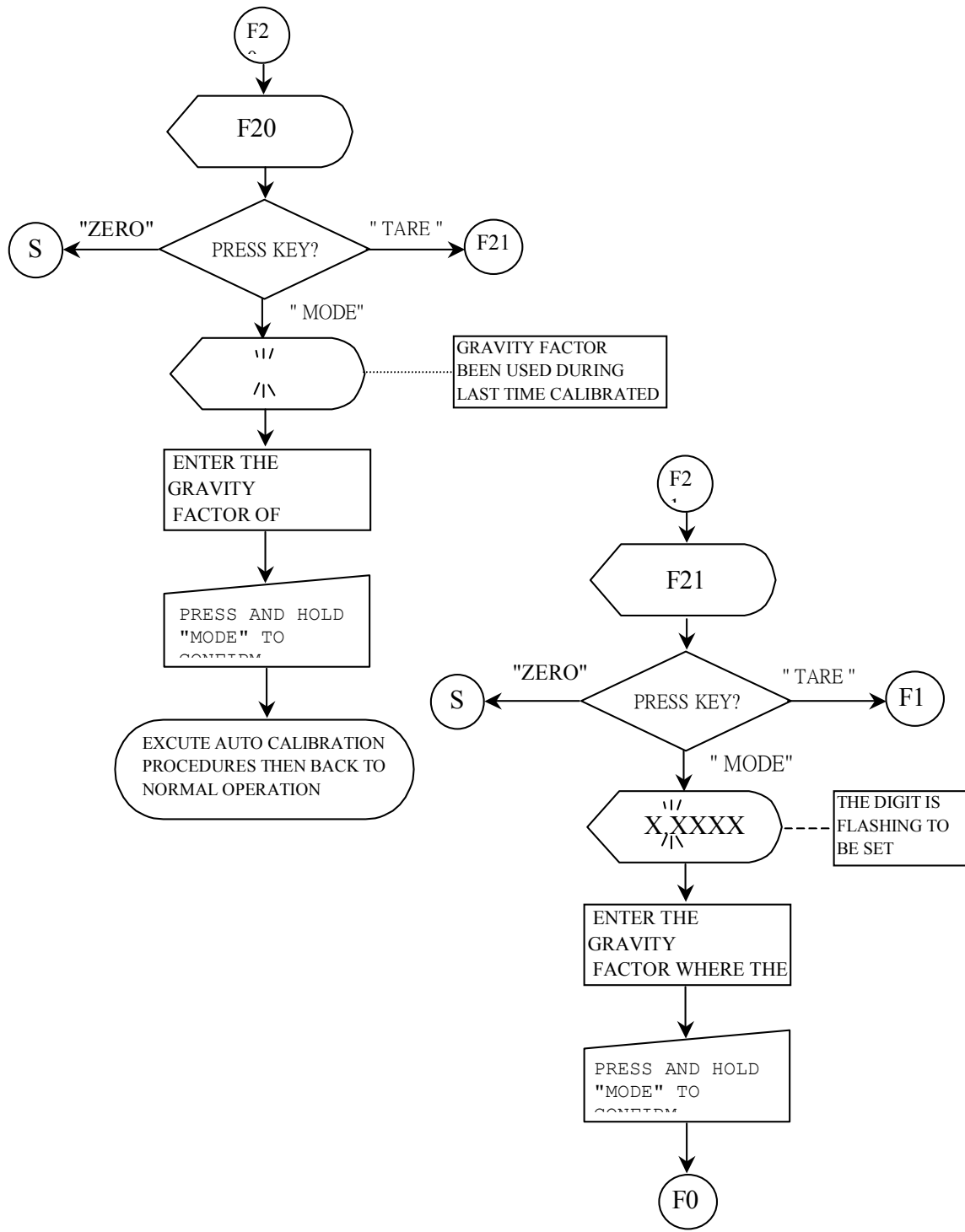






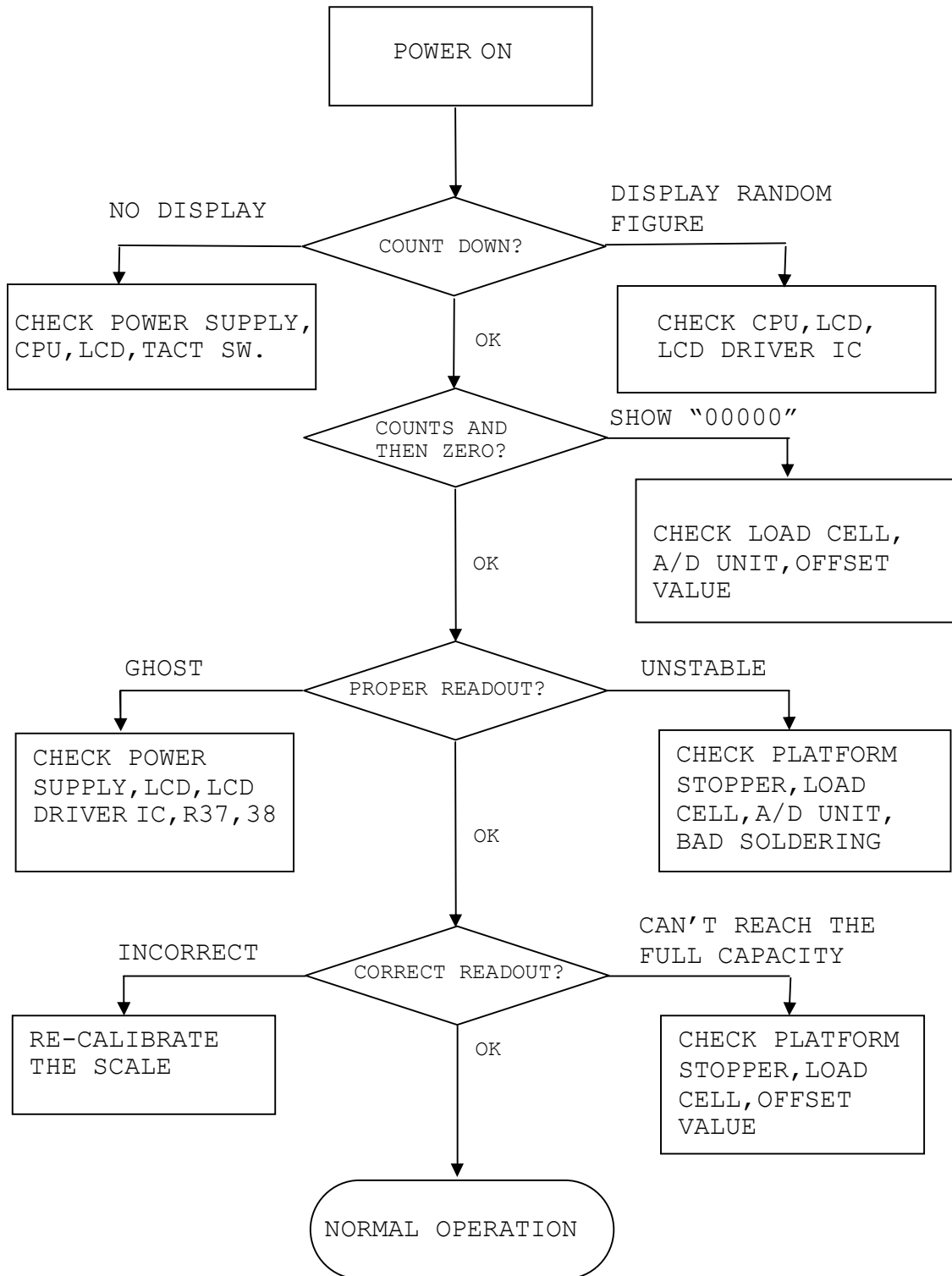






3. TROUBLE SHOOTING

3.1 TROUBLE SHOOTING LOOP

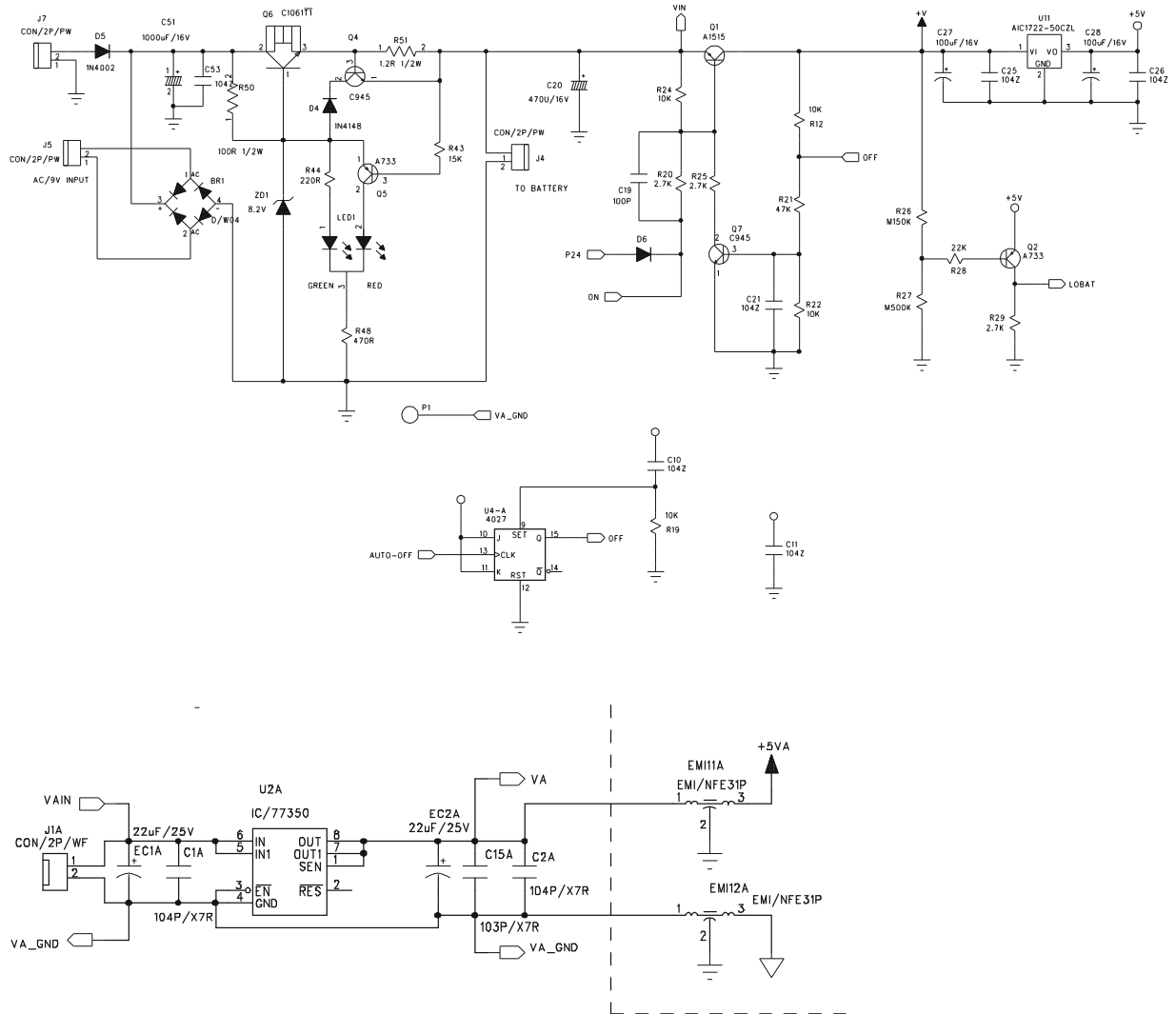


3.2 PARTS AND COMPONENTS TROUBLE SHOOTING

3.2.1 Power Supply Checking

3.2.1.1 Relevant parts:

- Main Board (VFM-10-X)
- Q1 (A1515)
- Q7 (C945)
- U4 (CD4027)
- U11(AIC 1722-5.0 or 1734-50CZL)
- Q6 (C1061)
- Q4 (C945)
- ZD1(ZENER 8.2V)
- R51(1.2R 1/2W)
- DC JACK
- BATTERY(6V 4Ah)
- Q2 (A733)



Description:

- 1) Power source: Rechargeable Battery 6V/4Ah or AC adaptor (9V, 500mA)
- 2) +5V power drives digital circuit system.
U11 (AIC 1722-5.0V or 1734-5.0V) is a 5volts Voltage Regulator.
- 3) +5V power drives analog circuit system.
U2A (TPS77350) is a 5volts Voltage Regulator.
- 4) Auto-off:
If the indicator is set with 4_off of power-saving function or under LO-BAT situation, after fixed time interval, CPU will release a low potential signal to draw Q7 off, then Q1 cuts off, indicator will be shut down immediately.
- 5) Low Power Detection:
The Q2 (A733) is designed to detect the power level. When battery power is less than 5.5V, the collector pole will become high potential, then CPU will instruct LCD display to show LO-BAT symbol.

3.2.1.2 Input voltage: 5.5V or higher

Check and recharge battery if voltage is less than 5.5V.

3.2.1.3 System voltage (Vcc): 5V +/- 10%

Check that the system voltage is within 5V +/- 10%

- a) less than 4.5V, the CPU may not work properly.
- b) more than 6V, ghost will appear on LCD.

3.2.2 Platform Stopper Checking

The platform device shall not touch anything around itself during operation. Check that the platform is not contacted with the upper (no load) and/or lower (with load) stopper.

3.2.3 LCD Display Checking

3.2.3.1 Check that it is soldered and connected properly between LCD and driver IC (PCF8576), driver IC (PCF8576) and CPU.

3.2.3.2 Check whether LCD is broken.

3.2.4 CPU Checking

3.2.4.1 Check that all pins are seated properly into the socket.

3.2.4.2 Check that the Crystal Oscillator works well.

3.2.4.3 Check the RESET is normally low.

3.2.5 A/D Unit Checking

3.2.5.1 Check that the +5V powers are correctly fed to the A/D unit.

3.2.5.2 Check that the signal output of loadcell is normal.

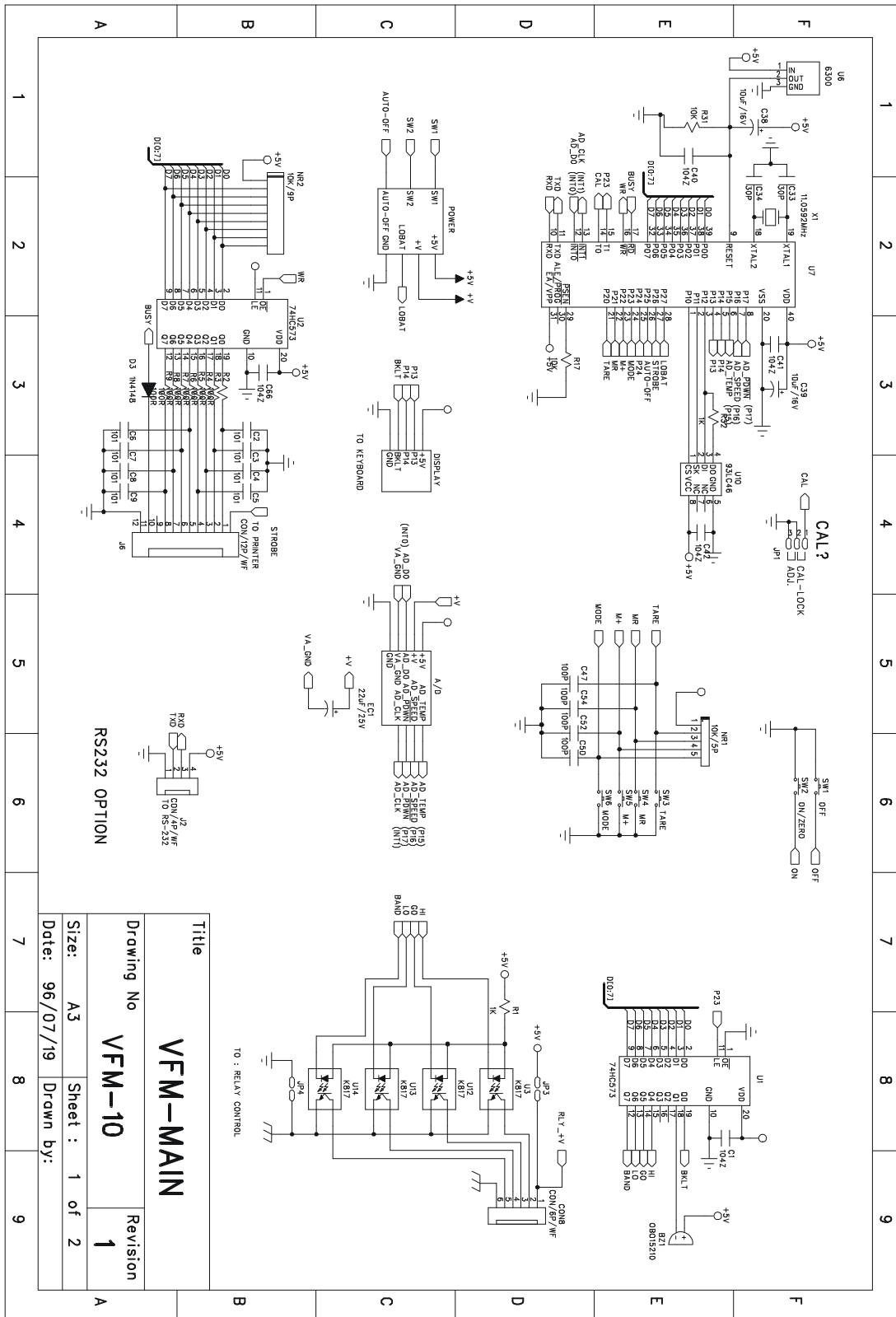
3.2.5.3 Check A/D Converter (ADS1232).

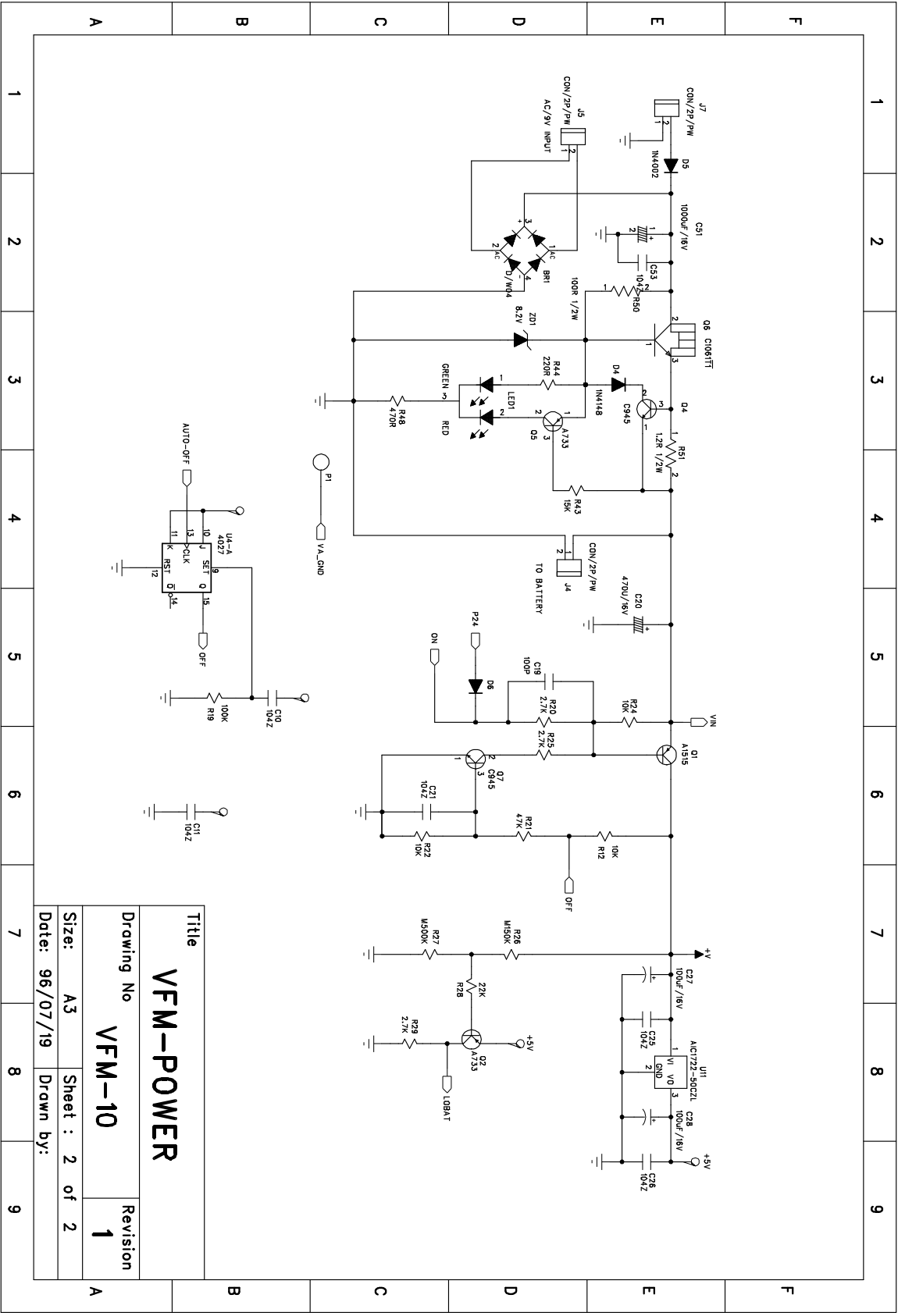
When no error is found with the above checking procedures, the trouble can be caused on the loadcell or the PCB itself. Replace a new one could be better to identify the defective.

In this way, the readout of weight would be varied because of the output voltage of loadcell and different span value, so re-calibration is required after this replacement.

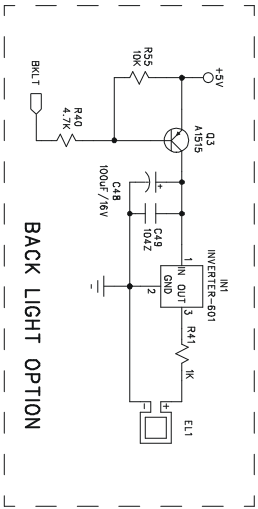
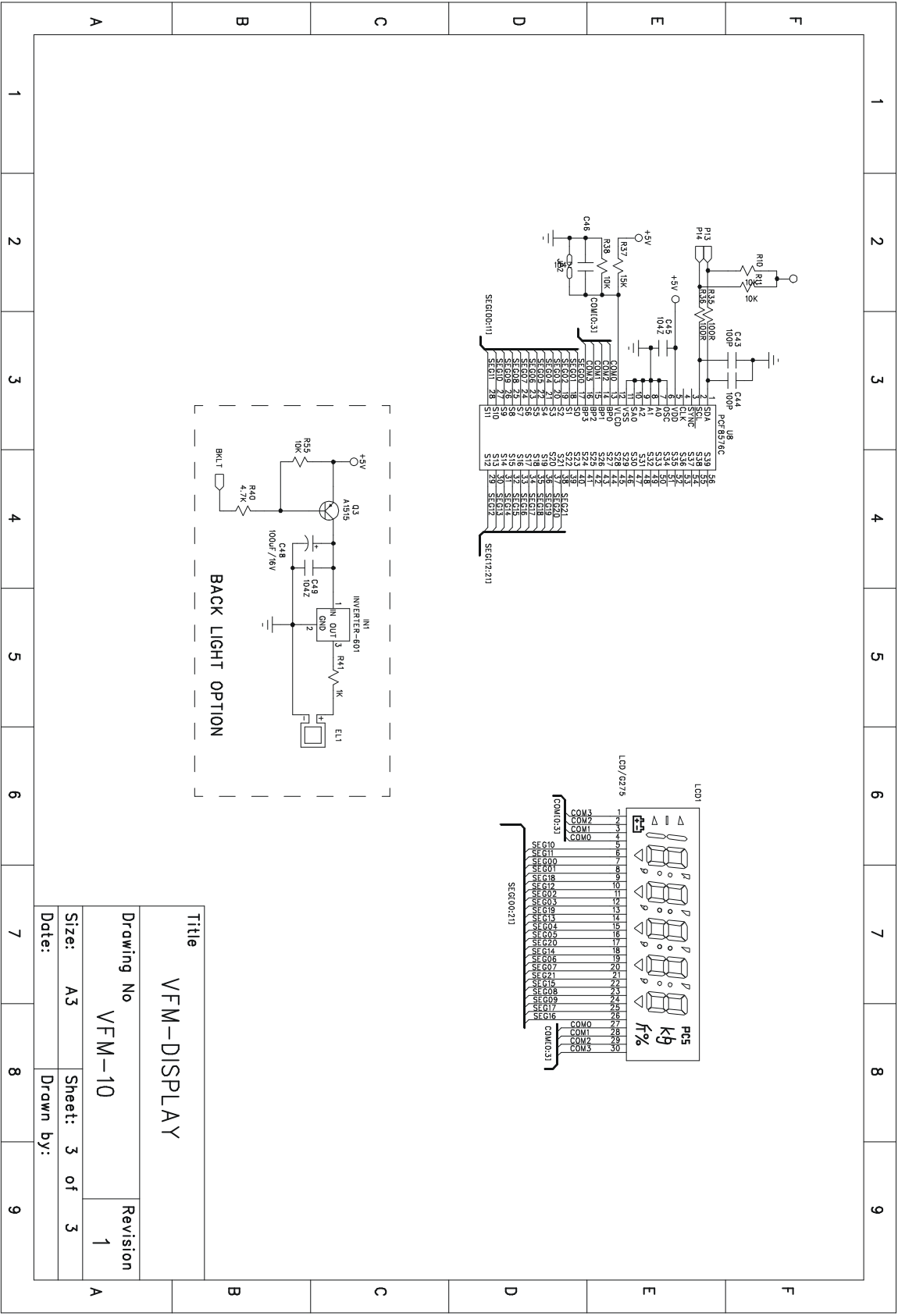
4. ELECTRICAL CIRCUITRY

4.1 SCHEMATICS

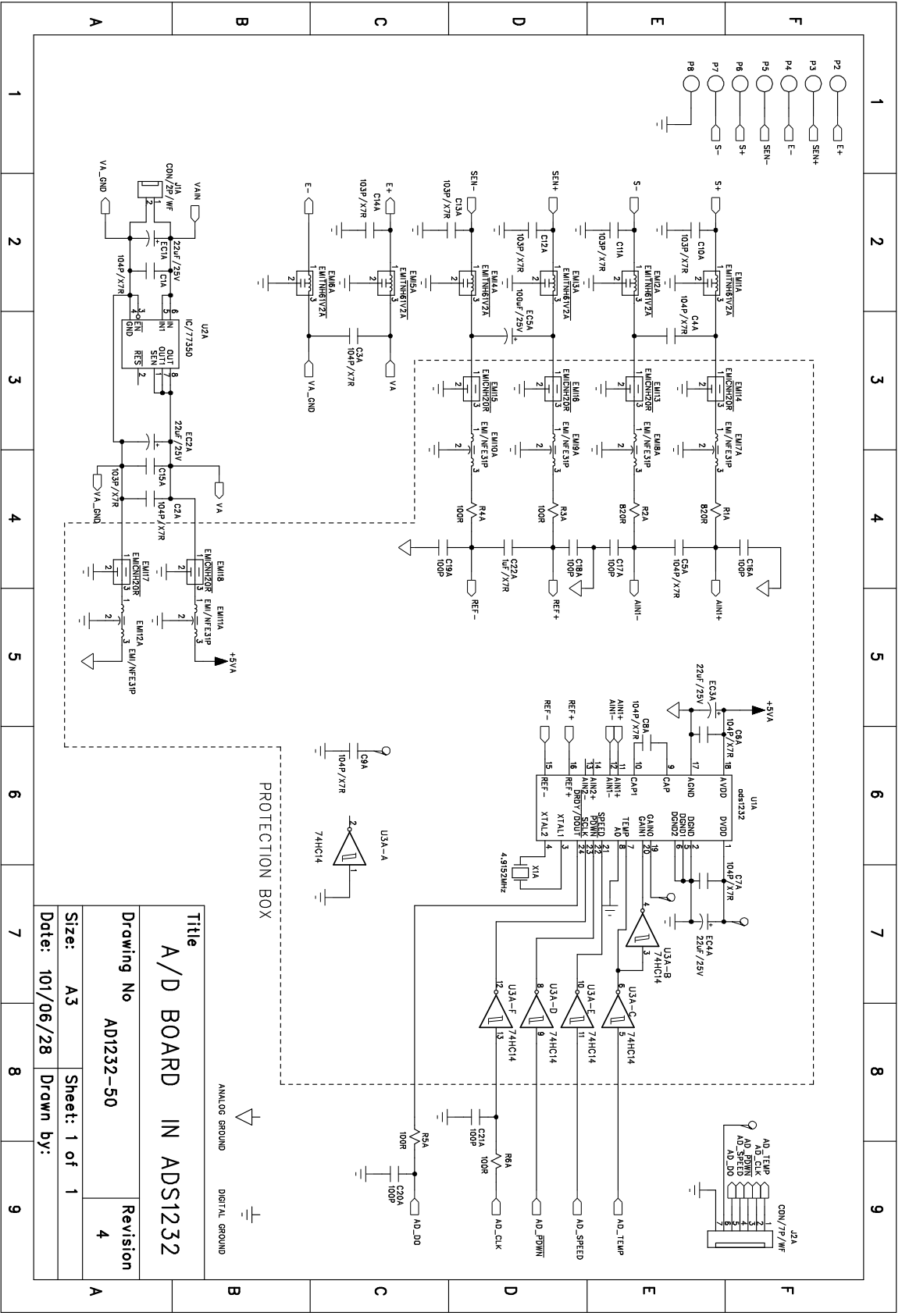




Title		VFM-POWER	
Drawing No		VFM-10	
Revision		1	
Size:	A3	Sheet :	2 of 2
Date:	96/07/19	Drawn by:	

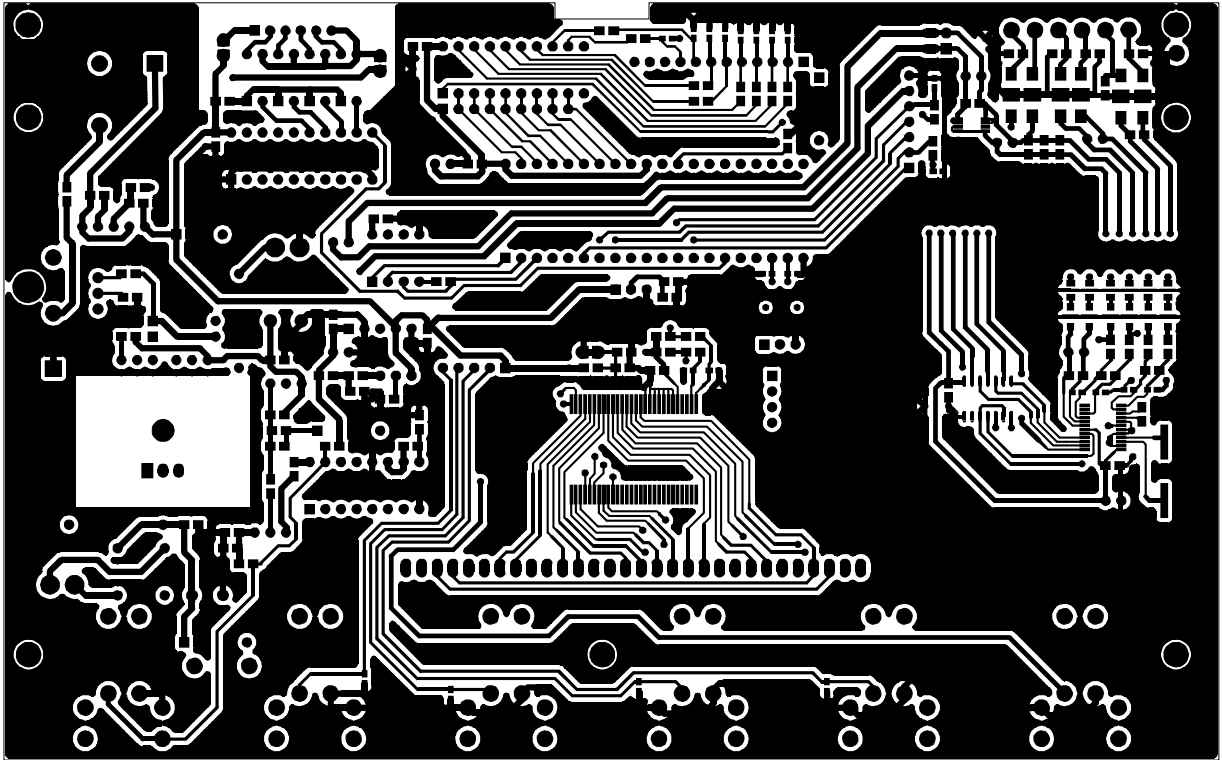


Title		VFM-DISPLAY	
Drawing No		VFM-10	
Size:	A3	Sheet:	3 of 3
Date:		Drawn by:	
Revision		1	

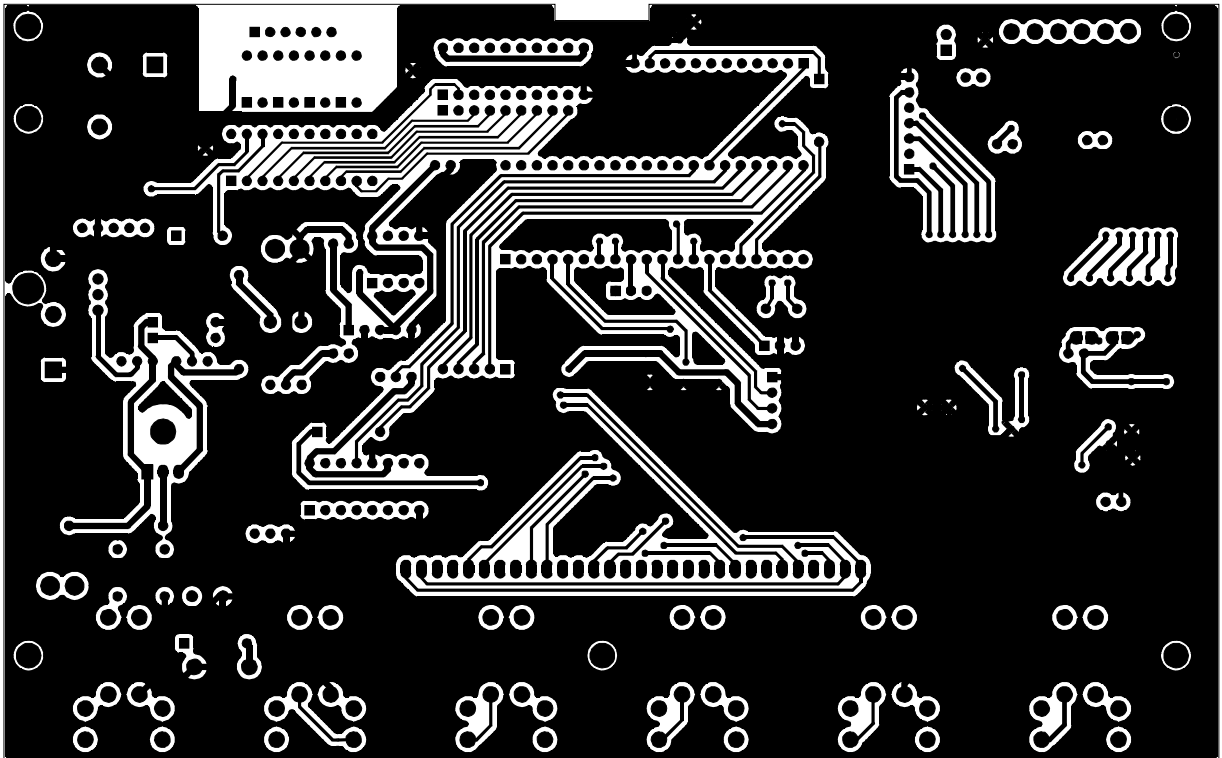


Title		A/D BOARD IN ADS1232	
Drawing No		AD1232-50	
Size:	A3	Sheet:	1 of 1
Date:	101/06/28	Drawn by:	
Revision		4	

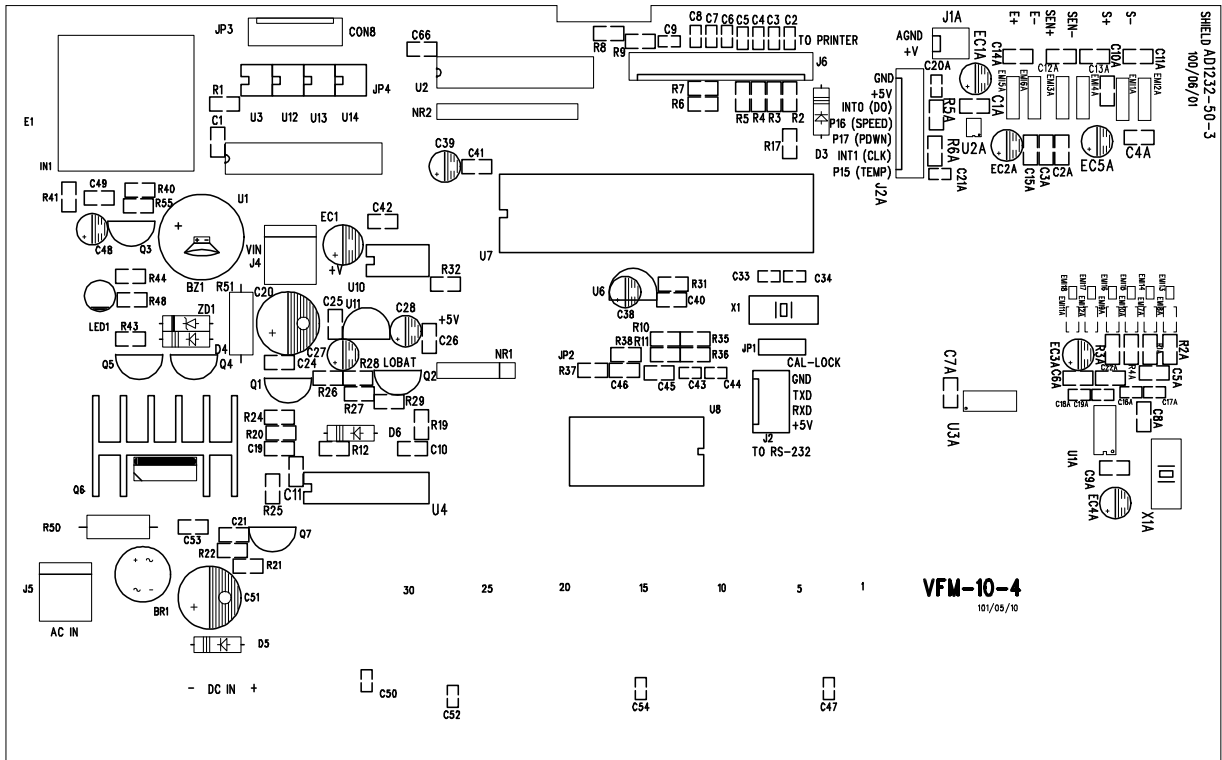
4.2 PCB LAYOUT



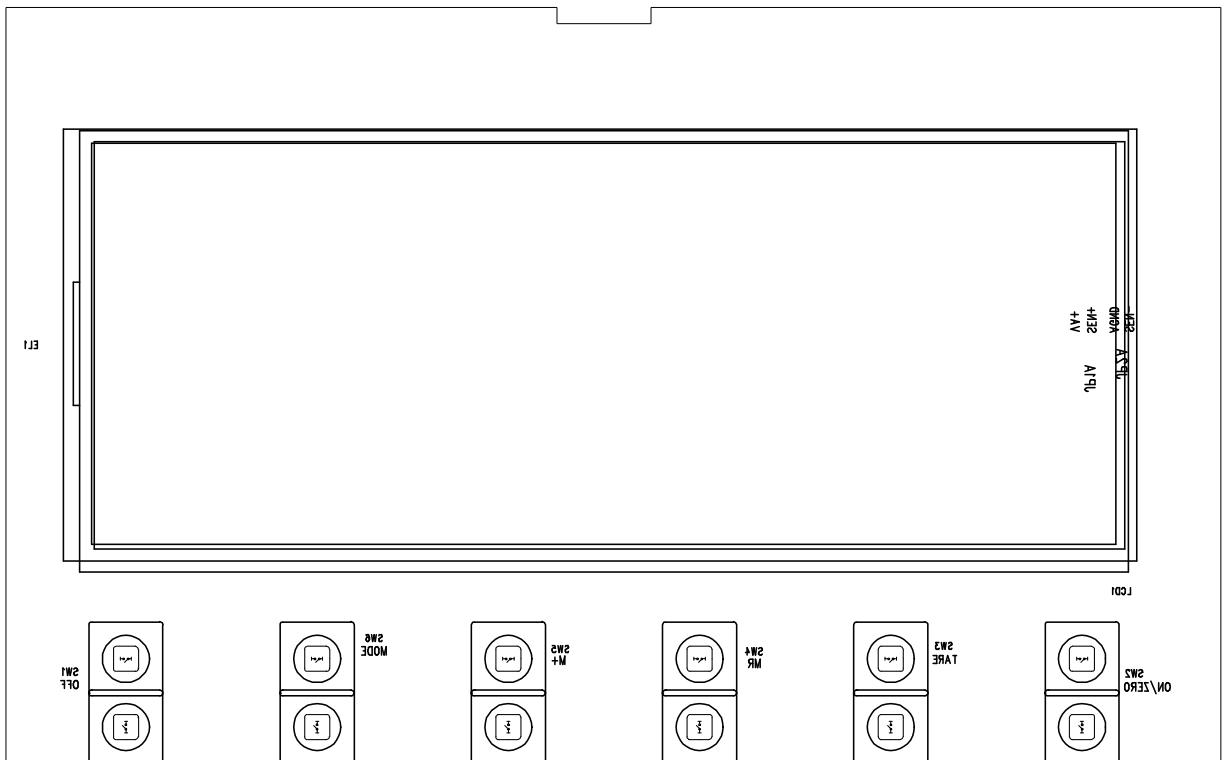
VFM-10-4 TOP LAYER



VFM-10-4 BOTTOM LAYER



VFM-10-4 TOP OVERLAY



VFM-10-4 BOTTOM OVERLAY

5. BILL OF MATERIAL

V-BM SERIES

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
A0905600800	CONNECTOR	8 PIN(PLT-168-R)	1	
A1007000001	FERRITE CORE	TR-16*9*28mm	1	LOAD CELL
A1007000004	FERRITE CORE	T-28.3*13.8*13.5mm	1	POWER INPUT
A1204070370	WIRE ARRAY	7PIN 37cm	1	
C1W10000000	PANEL PC (TRANSPARENT)	1706 SERIES,200*78*2mm	1	
G00010FW000	PLASTIC HOUSING (UNDER)	OFW SERIES	1	
G0001FM0200	PLASTIC HOUSING (UPPER)	FM SERIES, 6 HOLES	1	
C1VBM030000	OVERLAY PC	VBM SERIES	1	
E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD	1	
A1600060400	RECHARGEABLE BATTERY	6V 4Ah	1	
A1208020351	BATTERY WIRE ARRAY	2PIN 35cm,SINGLE HOUSING	1	
F0007NBS102	BATTERY CLAMP	NBS SERIES (ALUMINUM HOUSING)	1	
A60*****	ADAPTOR	***V/9V,500mA	1	
A0906000210	DC JACK	SCD-021 (BLACK)	1	
A1208020601	BATTERY WIRE ARRAY	2PIN 60cm,SINGLE HOUSING	1	
A0905600801	CONNECTOR	8 PIN(PLT-168-P)	1	
G0003PSP000	PLASTIC FIX PLATE	PSP/OFW SERIES, U SHAPE	1	
G0030000800	PLASTIC KNOB	M8*1.25P*15L	2	
G0005NBS000	RUBBER WASHER	ϕ 27*9*3mm	2	
F0007PSP001	STEEL FIX PLATE	PSP/OFW SEIES	1	TABLE STAND
G0004DW0002	RUBBER PAD	ϕ 15.3x3.5t	4	DW SERIES

VFM-10-X MAINBOARD

E0VFM000010	P.C.B.	VFM-10-X	1	
A0102000276	L.C.D.	UTN-G275JV-3W	1	LCD1
A0201089516	I.C.	SM89516AC25P	1	U7
A0202093662	I.C.	93LC66 OR 93C66PC27	1	U10
A0205040270	I.C.	4027	1	U4
A0204745732	I.C.	74HC573	1	U1
A0207017220	VOLTAGE REGULATOR I.C.	1734-50CZL	1	U11
A0208085760	I.C.	PCF8576CT	1	U8
A0300000040	I.C. SOCKET	40 PIN	1	U7

A0401007330	TRANSISTOR	A733	2	Q2,5
A0401009450	TRANSISTOR	2SC945	2	Q4,7
A0401010610	TRANSISTOR	H1061C OR D880	1	Q6
A0401015150	TRANSISTOR	A1515	2	Q1,3
A0501004002	DIODE	1N4002	1	D5
A0501004148	DIODE	1N4148	3	D3,4,6
A0502000001	BRIDGE RECTIFIER	W06(1A)	1	BR1
A0503020082	ZENER DIODE	1/2W 8V2(9A3)	1	ZD1
A0625050000	L.E.D.	GREEN/RED,ROUND 5mm	1	LED1
A0701106017	CAPACITOR (EC)	10uF/25V(SS TYPE)	2	C38,39
A0701107016	CAPACITOR (EC)	100uF/16V	3	C27,28,48
A0701108016	CAPACITOR (EC)	1000uF/16V	1	C51
A0701226017	CAPACITOR (EC)	22uF/16V (SS TYPE)	1	EC1
A0701477016	CAPACITOR (EC)	470uF/16V	1	C20
A0773104050	CAPACITOR (MLC),SMD0805	0.1uF/50V(104),X7R	15	C1,10-11,21,24-26, 40-42,45-46,49,53,66
A0774030051	CERAMIC CAPACITOR (CC),SMD0603	30pF/50V(30)	2	C33-34
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	15	C2-9,19,43-44,47, 50,52,54
A0814001503	METAL FILM RESISTOR (SMD,1%)	150KΩ (25PPM 0805)	1	R26
A0814005003	METAL FILM RESISTOR (SMD,1%)	500KΩ (25PPM 0805)	1	R27
A0805020120	CARBON FILM RESISTOR	1.2Ω 1/2W	1	R51
A0805021101	CARBON FILM RESISTOR	100Ω 1/2W	1	R50
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100Ω (0805)	10	R2-9,35,36
A0815001102	CARBON FILM RESISTOR (SMD,5%)	1KΩ (0805)	3	R1,32,41
A0815001103	CARBON FILM RESISTOR (SMD,5%)	10KΩ (0805)	9	R10-12,17,22,24, 31,38,55
A0815001104	CARBON FILM RESISTOR (SMD,5%)	100KΩ (0805)	1	R19
A0815001153	CARBON FILM RESISTOR (SMD,5%)	15KΩ (0805)	2	R37,43
A0815001221	CARBON FILM RESISTOR (SMD,5%)	220Ω (0805)	1	R44
A0815001223	CARBON FILM RESISTOR (SMD,5%)	22KΩ (0805)	1	R28
A0815001272	CARBON FILM RESISTOR (SMD,5%)	2.7KΩ (0805)	3	R20,25,29
A0815001471	CARBON FILM RESISTOR (SMD,5%)	470Ω (0805)	1	R48
A0815001472	CARBON FILM RESISTOR (SMD,5%)	4.7KΩ (0805)	1	R40
A0815001473	CARBON FILM RESISTOR (SMD,5%)	47KΩ (0805)	1	R21
A0802010305	RESISTOR NETWORK	10KΩ 5 PIN	1	NR1
A0802010309	RESISTOR NETWORK	10KΩ 9 PIN	1	NR2
A0902010020	CONNECTOR	2 PIN WAFER,PITCH=3.9mm	2	J4,5
A0907010030	CONNECTOR	1 * 3 PIN 180°	1	JP1

A0910111020	MINI JUMPER	PITCH 2.54	1	JP1
A1100318431	CRYSTAL	18.432MHZ/us	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A1306000003	TACT SW.	KPT-1104B	6	SW1-6
A5004000004	HEAT SINK	MB-217-22+PIN	1	Q6

A/D SECTION

A0203012320	I.C.	ADS1232IPWT (SMD)	1	U1A
A0204074145	I.C	74HC14	1	U3A
A0207773500	VOLTAGE REGULATOR I.C.	TPS77350GPK	1	U2A
A0701226017	CAPACITOR (EC)	22 μ F/16V (SS TYPE)	4	EC1A-4A
A0701107016	CAPACITOR (EC)	100 μ F/16V	1	EC5A
A0773103050	CAPACITOR (MLC),SMD0805	0.01 μ F/50V(103),X7R	6	C10A-15A
A0773104050	CAPACITOR (MLC),SMD0805	0.1 μ F/50V(104),X7R	9	C1A-9A
A0773105050	CAPACITOR (MLC),SMD0805	1 μ F/25V(105),X7R	1	C22A
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	6	C16A-21A
A0773105050	CAPACITOR (MLC),SMD0805	1 μ F/25V(105),X7R	1	C22A
A0814008200	METAL FILM RESISTOR (SMD,1%)	820 Ω (25PPM 0805)	2	R1A,2A
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100 Ω (0805)	4	R3A-6A
A1008000004	EMI FILTER	TNH61V2A102S10A-TM	6	EMI1A-6A
A1008000003	EMI FILTER	NFE31PT152Z1E9L	6	EMI7A-12A
A1008000005	FEED-THROUGH CAPACITOR, SMD	CNH20R105M-TM	6	EMI13-18
A1100249154	CRYSTAL	4.9152MHZ/SMD	1	X1A
F0015000012	PROTECTION BOX	7705-52-1 (UPPER)	1	
F0015000013	PROTECTION BOX	7705-52-1 (UNDER)	1	
Z0010000305	SCREW	M3*6	2	
C1000000002	PC PLATE (TRANSPARENT)	44*44mm	1	

BACK LIGHT OPTION

A1400000005	BACK LIGHT (EL)	168.0*68.0mm	1	EL1
A1401005120	BACK LIGHT INVERTER	5V TO 120V	1	IN1

PRINTER OPTION

A0204745732	I.C.	74HC573	1	U2
A0901010120	CONNECTOR	12 PIN WAFER	1	J6
A1250251220	WIRE ARRAY	D-SUB 25PIN+12PIN	1	
A1007000010	FERRITE CORE	23*10*32 (CLAMP TYPE)	1	

RS232 OPTION

A0901010040	CONNECTOR	4 PIN WAFER	1	J2
E1DM0100000	P.C.B. KIT	DM SERIES RS-232 (DM-70-1)	1	
A1202040401	WIRE ARRAY	4PIN 40cm,SINGLE HOUSING	1	
F0010005012	SCREW, D-SUB (INCLUDE NUT)	5*5L + #4-40UNC*1/2"L	2	
A1007000011	FERRITE CORE	19*6.5*32 (CLAMP TYPE)	1	

V-FS SERIES

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
A1007000001	FERRITE CORE	TR-16*9*28mm	1	LOAD CELL
A1007000004	FERRITE CORE	T-28.3*13.8*13.5mm	1	POWER INPUT
A0905600800	CONNECTOR	8 PIN(PLT-168-R)	1	
C0FS0000000	PANEL PC	226*128*9, 6 HOLES	1	
F0003FS0001	S/S TABLE STAND	FS SERIES, 23*10*11cm	1	
F0005FS0200	S/S HOUSING (UPPER)	FS SERIES	1	
F0005FS0211	S/S HOUSING (UNDER)	FS SERIES	1	
C1VFS030000	OVERLAY PC	VFS SERIES	1	
E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD	1	
A1600060400	RECHARGEABLE BATTERY	6V 4Ah	1	
A1208020351	BATTERY WIRE ARRAY	2PIN 35cm,SINGLE HOUSING	1	
F0013FS0000	BATTERY CLAMP	FS SERIES,132*15mm	1	
F0022000010	S/S ADJUSTABLE FEET	FS SERIES	2	
G0030FS0012	RUBBER FRAME	FS SERIES	1	
A60*****	ADAPTOR	***V/9V,500mA	1	
A0906000210	DC JACK	SCD-021 (BLACK)	1	
A1208020601	BATTERY WIRE ARRAY	2PIN 60cm,SINGLE HOUSING	1	
A0905600801	CONNECTOR	8 PIN(PLT-168-P)	1	
A1204070370	WIRE ARRAY	7PIN 37cm	1	
G0004FS0100	PLASTIC BUTTON	FS SERIES (GL-16)	4	
G0030FS0004	RUBBER PACKING	DC JACK	1	
G0030PS1000	RUBBER PACKING	PS SERIES, FOR S/S BOLT	6	

VFM-10-X MAINBOARD

E0VFM000010	P.C.B.	VFM-10-X	1	
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A0102000276	L.C.D.	UTN-G275JV-3W	1	LCD1
A0201089516	I.C.	SM89516AC25P	1	U7
A0202093662	I.C.	93LC66 OR 93C66PC27	1	U10
A0205040270	I.C.	4027	1	U4
A0204745732	I.C.	74HC573	1	U1
A0207017220	VOLTAGE REGULATOR I.C.	1734-50CZL	1	U11
A0208085760	I.C.	PCF8576CT	1	U8
A0300000040	I.C. SOCKET	40 PIN	1	U7
A0401007330	TRANSISTOR	A733	2	Q2,5
A0401009450	TRANSISTOR	2SC945	2	Q4,7
A0401010610	TRANSISTOR	H1061C OR D880	1	Q6
A0401015150	TRANSISTOR	A1515	2	Q1,3
A0501004002	DIODE	1N4002	1	D5
A0501004148	DIODE	1N4148	3	D3,4,6
A0502000001	BRIDGE RECTIFIER	W06(1A)	1	BR1
A0503020082	ZENER DIODE	1/2W 8V2(9A3)	1	ZD1
A0625050000	L.E.D.	GREEN/RED,ROUND 5mm	1	LED1
A0701106017	CAPACITOR (EC)	10uF/25V(SS TYPE)	2	C38,39
A0701107016	CAPACITOR (EC)	100uF/16V	3	C27,28,48
A0701108016	CAPACITOR (EC)	1000uF/16V	1	C51
A0701226017	CAPACITOR (EC)	22uF/16V (SS TYPE)	1	EC1
A0701477016	CAPACITOR (EC)	470uF/16V	1	C20
A0773104050	CAPACITOR (MLC),SMD0805	0.1uF/50V(104),X7R	15	C1,10-11,21,24-26, 40-42,45-46,49,53,66
A0774030051	CERAMIC CAPACITOR (CC),SMD0603	30pF/50V(30)	2	C33-34
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	15	C2-9,19,43-44,47, 50,52,54
A0814001503	METAL FILM RESISTOR (SMD,1%)	150KΩ (25PPM 0805)	1	R26
A0814005003	METAL FILM RESISTOR (SMD,1%)	500KΩ (25PPM 0805)	1	R27
A0805020120	CARBON FILM RESISTOR	1.2Ω 1/2W	1	R51
A0805021101	CARBON FILM RESISTOR	100Ω 1/2W	1	R50
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100Ω (0805)	10	R2-9,35,36
A0815001102	CARBON FILM RESISTOR (SMD,5%)	1KΩ (0805)	3	R1,32,41
A0815001103	CARBON FILM RESISTOR (SMD,5%)	10KΩ (0805)	9	R10-12,17,22,24, 31,38,55
A0815001104	CARBON FILM RESISTOR (SMD,5%)	100KΩ (0805)	1	R19
A0815001153	CARBON FILM RESISTOR (SMD,5%)	15KΩ (0805)	2	R37,43
A0815001221	CARBON FILM RESISTOR (SMD,5%)	220Ω (0805)	1	R44
A0815001223	CARBON FILM RESISTOR (SMD,5%)	22KΩ (0805)	1	R28

A0815001272	CARBON FILM RESISTOR (SMD,5%)	2.7K Ω (0805)	3	R20,25,29
A0815001471	CARBON FILM RESISTOR (SMD,5%)	470 Ω (0805)	1	R48
A0815001472	CARBON FILM RESISTOR (SMD,5%)	4.7K Ω (0805)	1	R40
A0815001473	CARBON FILM RESISTOR (SMD,5%)	47K Ω (0805)	1	R21
A0802010305	RESISTOR NETWORK	10K Ω 5 PIN	1	NR1
A0802010309	RESISTOR NETWORK	10K Ω 9 PIN	1	NR2
A0902010020	CONNECTOR	2 PIN WAFER, PITCH=3.9mm	2	J4,5
A0907010030	CONNECTOR	1 * 3 PIN 180°	1	JP1
A0910111020	MINI JUMPER	PITCH 2.54	1	JP1
A1100318431	CRYSTAL	18.432MHZ/us	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A1306000003	TACT SW.	KPT-1104B	6	SW1-6
A5004000004	HEAT SINK	MB-217-22+PIN	1	Q6

A/D SECTION

A0203012320	I.C.	ADS1232IPWT (SMD)	1	U1A
A0204074145	I.C	74HC14	1	U3A
A0207773500	VOLTAGE REGULATOR I.C.	TPS77350GPK	1	U2A
A0701226017	CAPACITOR (EC)	22 μ F/16V (SS TYPE)	4	EC1A-4A
A0701107016	CAPACITOR (EC)	100 μ F/16V	1	EC5A
A0773103050	CAPACITOR (MLC),SMD0805	0.01 μ F/50V(103),X7R	6	C10A-15A
A0773104050	CAPACITOR (MLC),SMD0805	0.1 μ F/50V(104),X7R	9	C1A-9A
A0773105050	CAPACITOR (MLC),SMD0805	1 μ F/25V(105),X7R	1	C22A
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	6	C16A-21A
A0773105050	CAPACITOR (MLC),SMD0805	1 μ F/25V(105),X7R	1	C22A
A0814008200	METAL FILM RESISTOR (SMD,1%)	820 Ω (25PPM 0805)	2	R1A,2A
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100 Ω (0805)	4	R3A-6A
A1008000004	EMI FILTER	TNH61V2A102S10A-TM	6	EMI1A-6A
A1008000003	EMI FILTER	NFE31PT152Z1E9L	6	EMI7A-12A
A1008000005	FEED-THROUGH CAPACITOR, SMD	CNH20R105M-TM	6	EMI13-18
A1100249154	CRYSTAL	4.9152MHZ/SMD	1	X1A
F0015000012	PROTECTION BOX	7705-52-1 (UPPER)	1	
F0015000013	PROTECTION BOX	7705-52-1 (UNDER)	1	
Z0010000305	SCREW	M3*6	2	
C1000000002	PC PLATE (TRANSPARENT)	44*44mm	1	

BACK LIGHT OPTION

A1400000005	BACK LIGHT (EL)	168.0*68.0mm	1	EL1
A1401005120	BACK LIGHT INVERTER	5V TO 120V	1	IN1

RS232 OPTION

A0901010040	CONNECTOR	4 PIN WAFER	1	J2
E1PS0100000	P.C.B. KIT	PS-70-X RS-232 BOARD	1	
A1202040401	WIRE ARRAY	4PIN 40cm,SINGLE HOUSING	1	
A0950000012	WATER-PROOF CONNECTOR	LTW-6MP-C, MALE	1	
A1007000011	FERRITE CORE	19*6.5*32 (CLAMP TYPE)	1	
A0904120090	CONNECTOR	D-SUB 09F SOLDER	1	
A0904120091	D-SUB HOOD	9 PIN	1	
A0950000011	CABLE + WATER-PROOF CONNECTOR	6PIN 100cm(LTW-6FM-90)	1	

V-TM SERIES

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
A0905600800	CONNECTOR	8 PIN (PLT-168-R)	1	
A0905600801	CONNECTOR	8 PIN (PLT-168-P)	1	
A1007000001	FERRITE CORE	TR-16*9*28mm	1	LOAD CELL
A1007000004	FERRITE CORE	T-28.3*13.8*13.5mm	1	POWER INPUT
A1204070370	WIRE ARRAY	7PIN 37cm	1	
C1W10000000	PANEL PC (TRANSPARENT)	1706 SERIES,200*78*2mm	1	
G0001T00000	PLASTIC HOUSING (UNDER)	T SERIES	1	
G0001T00200	PLASTIC HOUSING (UPPER)	T SERIES	1	
C1VTM030000	OVERLAY PC	VTM SERIES	1	
E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD	1	
A1600060400	RECHARGEABLE BATTERY	6V 4Ah	1	
A1208020351	BATTERY WIRE ARRAY	2PIN 35cm,SINGLE HOUSING	1	
A1208020601	BATTERY WIRE ARRAY	2PIN 60cm,SINGLE HOUSING	1	
F0007NBS102	BATTERY CLAMP	NBS SERIES (ALUMINUM HOUSING)	1	
A60*****	ADAPTOR	***V/9V, 500mA	1	
A0906000210	DC JACK	SCD-021 (BLACK)	1	
G0004DW0002	RUBBER PAD	φ15.3×3.5t	4	DW SERIES

VFM-10-X MAINBOARD

E0VFM000010	P.C.B.	VFM-10-X	1	
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A0102000276	L.C.D.	UTN-G275JV-3W	1	LCD1
A0201089516	I.C.	SM89516AC25P	1	U7
A0202093662	I.C.	93LC66 OR 93C66PC27	1	U10
A0205040270	I.C.	4027	1	U4
A0204745732	I.C.	74HC573	1	U1
A0207017220	VOLTAGE REGULATOR I.C.	1734-50CZL	1	U11
A0208085760	I.C.	PCF8576CT	1	U8
A0300000040	I.C. SOCKET	40 PIN	1	U7
A0401007330	TRANSISTOR	A733	2	Q2,5
A0401009450	TRANSISTOR	2SC945	2	Q4,7
A0401010610	TRANSISTOR	H1061C OR D880	1	Q6
A0401015150	TRANSISTOR	A1515	2	Q1,3
A0501004002	DIODE	1N4002	1	D5
A0501004148	DIODE	1N4148	3	D3,4,6
A0502000001	BRIDGE RECTIFIER	W06(1A)	1	BR1
A0503020082	ZENER DIODE	1/2W 8V2(9A3)	1	ZD1
A0625050000	L.E.D.	GREEN/RED,ROUND 5mm	1	LED1
A0701106017	CAPACITOR (EC)	10uF/25V(SS TYPE)	2	C38,39
A0701107016	CAPACITOR (EC)	100uF/16V	3	C27,28,48
A0701108016	CAPACITOR (EC)	1000uF/16V	1	C51
A0701226017	CAPACITOR (EC)	22uF/16V (SS TYPE)	1	EC1
A0701477016	CAPACITOR (EC)	470uF/16V	1	C20
A0773104050	CAPACITOR (MLC),SMD0805	0.1uF/50V(104),X7R	15	C1,10-11,21,24-26, 40-42,45-46,49,53,66
A0774030051	CERAMIC CAPACITOR (CC),SMD0603	30pF/50V(30)	2	C33-34
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	15	C2-9,19,43-44,47, 50,52,54
A0814001503	METAL FILM RESISTOR (SMD,1%)	150KΩ (25PPM 0805)	1	R26
A0814005003	METAL FILM RESISTOR (SMD,1%)	500KΩ (25PPM 0805)	1	R27
A0805020120	CARBON FILM RESISTOR	1.2Ω 1/2W	1	R51
A0805021101	CARBON FILM RESISTOR	100Ω 1/2W	1	R50
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100Ω (0805)	10	R2-9,35,36
A0815001102	CARBON FILM RESISTOR (SMD,5%)	1KΩ (0805)	3	R1,32,41
A0815001103	CARBON FILM RESISTOR (SMD,5%)	10KΩ (0805)	9	R10-12,17,22,24, 31,38,55
A0815001104	CARBON FILM RESISTOR (SMD,5%)	100KΩ (0805)	1	R19
A0815001153	CARBON FILM RESISTOR (SMD,5%)	15KΩ (0805)	2	R37,43
A0815001221	CARBON FILM RESISTOR (SMD,5%)	220Ω (0805)	1	R44
A0815001223	CARBON FILM RESISTOR (SMD,5%)	22KΩ (0805)	1	R28

A0815001272	CARBON FILM RESISTOR (SMD,5%)	2.7K Ω (0805)	3	R20,25,29
A0815001471	CARBON FILM RESISTOR (SMD,5%)	470 Ω (0805)	1	R48
A0815001472	CARBON FILM RESISTOR (SMD,5%)	4.7K Ω (0805)	1	R40
A0815001473	CARBON FILM RESISTOR (SMD,5%)	47K Ω (0805)	1	R21
A0802010305	RESISTOR NETWORK	10K Ω 5 PIN	1	NR1
A0802010309	RESISTOR NETWORK	10K Ω 9 PIN	1	NR2
A0902010020	CONNECTOR	2 PIN WAFER, PITCH=3.9mm	2	J4,5
A0907010030	CONNECTOR	1 * 3 PIN 180 $^{\circ}$	1	JP1
A0910111020	MINI JUMPER	PITCH 2.54	1	JP1
A1100318431	CRYSTAL	18.432MHZ/us	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A1306000003	TACT SW.	KPT-1104B	6	SW1-6
A5004000004	HEAT SINK	MB-217-22+PIN	1	Q6

A/D SECTION

A0203012320	I.C.	ADS1232IPWT (SMD)	1	U1A
A0204074145	I.C.	74HC14	1	U3A
A0207773500	VOLTAGE REGULATOR I.C.	TPS77350GPK	1	U2A
A0701226017	CAPACITOR (EC)	22 μ F/16V (SS TYPE)	4	EC1A-4A
A0701107016	CAPACITOR (EC)	100 μ F/16V	1	EC5A
A0773103050	CAPACITOR (MLC),SMD0805	0.01 μ F/50V(103),X7R	6	C10A-15A
A0773104050	CAPACITOR (MLC),SMD0805	0.1 μ F/50V(104),X7R	9	C1A-9A
A0773105050	CAPACITOR (MLC),SMD0805	1 μ F/25V(105),X7R	1	C22A
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	6	C16A-21A
A0773105050	CAPACITOR (MLC),SMD0805	1 μ F/25V(105),X7R	1	C22A
A0814008200	METAL FILM RESISTOR (SMD,1%)	820 Ω (25PPM 0805)	2	R1A,2A
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100 Ω (0805)	4	R3A-6A
A1008000004	EMI FILTER	TNH61V2A102S10A-TM	6	EMI1A-6A
A1008000003	EMI FILTER	NFE31PT152Z1E9L	6	EMI7A-12A
A1008000005	FEED-THROUGH CAPACITOR, SMD	CNH20R105M-TM	6	EMI13-18
A1100249154	CRYSTAL	4.9152MHZ/SMD	1	X1A
F0015000012	PROTECTION BOX	7705-52-1 (UPPER)	1	
F0015000013	PROTECTION BOX	7705-52-1 (UNDER)	1	
Z0010000305	SCREW	M3*6	2	
C1000000002	PC PLATE (TRANSPARENT)	44*44mm	1	

BACK LIGHT OPTION

A1400000005	BACK LIGHT (EL)	168.0*68.0mm	1	EL1
A1401005120	BACK LIGHT INVERTER	5V TO 120V	1	IN1

PRINTER OPTION

A0204745732	I.C.	74HC573	1	U2
A0901010120	CONNECTOR	12 PIN WAFER	1	J6
A1250251220	WIRE ARRAY	D-SUB 25PIN+12PIN	1	
A1007000010	FERRITE CORE	23*10*32 (CLAMP TYPE)	1	

RS232 OPTION

A0901010040	CONNECTOR	4 PIN WAFER	1	J2
E1DM0100000	P.C.B. KIT	DM SERIES RS-232 (DM-70-1)	1	
A1202040401	WIRE ARRAY	4PIN 40cm,SINGLE HOUSING	1	
F0010005012	SCREW, D-SUB (INCLUDE NUT)	5*5L + #4-40UNC*1/2"L	2	
A1007000011	FERRITE CORE	19*6.5*32 (CLAMP TYPE)	1	

V-PS SERIES

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
A1007000001	FERRITE CORE	TR-16*9*28mm	1	LOAD CELL
A1007000004	FERRITE CORE	T-28.3*13.8*13.5mm	1	POWER INPUT
A0905600800	CONNECTOR	8 PIN (PLT-168-R)	1	
C0FS0000000	PANEL PC	226*128*9, 6 HOLES	1	
F0003FS0001	S/S TABLE STAND	FS SERIES, 23*10*11cm	1	
F0005FS0200	S/S HOUSING (UPPER)	FS SERIES	1	
F0005FS0211	S/S HOUSING (UNDER)	FS SERIES	1	
C1VFS030000	OVERLAY PC	VFS SERIES	1	
E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD	1	
A1600060400	RECHARGEABLE BATTERY	6V 4Ah	1	
A1208020351	BATTERY WIRE ARRAY	2PIN 35cm,SINGLE HOUSING	1	
F0013FS0000	BATTERY CLAMP	FS SERIES,132*15mm	1	
F0022000010	S/S ADJUSTABLE FEET	FS SERIES	2	
G0030FS0012	RUBBER FRAME	FS SERIES	1	
A60*****	ADAPTOR	***V/9V,500mA	1	
A0906000210	DC JACK	SCD-021 (BLACK)	1	
A1208020601	BATTERY WIRE ARRAY	2PIN 60cm,SINGLE HOUSING	1	

A0905600801	CONNECTOR	8 PIN(PLT-168-P)	1	
A1204070370	WIRE ARRAY	7PIN 37cm	1	
G0004FS0100	PLASTIC BUTTON	FS SERIES(GL-16)	4	
G0030FS0004	RUBBER PACKING	DC JACK	1	
G0030PS1000	RUBBER PACKING	PS SERIES, FOR S/S BOLT	6	

VPS-10-X MAINBOARD

E0VPS000010	P.C.B.	VPS-10-X	1	
A0102000276	L.C.D.	UTN-G275JV-3W	1	LCD1
A0201089516	I.C.	SM89516AC25P	1	U7
A0202093662	I.C.	93LC66 OR 93C66PC27	1	U10
A0205040270	I.C.	4027	1	U4
A0204745732	I.C.	74HC573	1	U1
A0207017220	VOLTAGE REGULATOR I.C.	1734-50CZL	1	U11
A0208085760	I.C.	PCF8576CT	1	U8
A0300000040	I.C. SOCKET	40 PIN	1	U7
A0401007330	TRANSISTOR	A733	2	Q2,5
A0401009450	TRANSISTOR	2SC945	2	Q4,7
A0401010610	TRANSISTOR	H1061C OR D880	1	Q6
A0401015150	TRANSISTOR	A1515	2	Q1,3
A0501004002	DIODE	1N4002	1	D5
A0501004148	DIODE	1N4148	3	D3,4,6
A0502000001	BRIDGE RECTIFIER	W06(1A)	1	BR1
A0503020082	ZENER DIODE	1/2W 8V2(9A3)	1	ZD1
A0625050000	L.E.D.	GREEN/RED,ROUND 5mm	1	LED1
A0701106017	CAPACITOR (EC)	10uF/25V(SS TYPE)	2	C38,39
A0701107016	CAPACITOR (EC)	100uF/16V	3	C27,28,48
A0701108016	CAPACITOR (EC)	1000uF/16V	1	C51
A0701226017	CAPACITOR (EC)	22uF/16V (SS TYPE)	1	EC1
A0701477016	CAPACITOR (EC)	470uF/16V	1	C20
A0773104050	CAPACITOR (MLC),SMD0805	0.1uF/50V(104),X7R	15	C1,10-11,21,24-26, 40-42,45-46,49,53,66
A0774030051	CERAMIC CAPACITOR (CC),SMD0603	30pF/50V(30)	2	C33-34
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	15	C2-9,19,43-44,47, 50,52,54
A0814001503	METAL FILM RESISTOR (SMD,1%)	150KΩ (25PPM 0805)	1	R26
A0814005003	METAL FILM RESISTOR (SMD,1%)	500KΩ (25PPM 0805)	1	R27
A0805020120	CARBON FILM RESISTOR	1.2Ω 1/2W	1	R51

A0805021101	CARBON FILM RESISTOR	100Ω 1/2W	1	R50
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100Ω (0805)	10	R2-9,35,36
A0815001102	CARBON FILM RESISTOR (SMD,5%)	1KΩ (0805)	3	R1,32,41
A0815001103	CARBON FILM RESISTOR (SMD,5%)	10KΩ (0805)	9	R10-12,17,22,24, 31,38,55
A0815001104	CARBON FILM RESISTOR (SMD,5%)	100KΩ (0805)	1	R19
A0815001153	CARBON FILM RESISTOR (SMD,5%)	15KΩ (0805)	2	R37,43
A0815001221	CARBON FILM RESISTOR (SMD,5%)	220Ω (0805)	1	R44
A0815001223	CARBON FILM RESISTOR (SMD,5%)	22KΩ (0805)	1	R28
A0815001272	CARBON FILM RESISTOR (SMD,5%)	2.7KΩ (0805)	3	R20,25,29
A0815001471	CARBON FILM RESISTOR (SMD,5%)	470Ω (0805)	1	R48
A0815001472	CARBON FILM RESISTOR (SMD,5%)	4.7KΩ (0805)	1	R40
A0815001473	CARBON FILM RESISTOR (SMD,5%)	47KΩ (0805)	1	R21
A0802010305	RESISTOR NETWORK	10KΩ 5 PIN	1	NR1
A0802010309	RESISTOR NETWORK	10KΩ 9 PIN	1	NR2
A0902010020	CONNECTOR	2 PIN WAFER, PITCH=3.9mm	2	J4,5
A0907010030	CONNECTOR	1 * 3 PIN 180°	1	JP1
A0910111020	MINI JUMPER	PITCH 2.54	1	JP1
A1100318431	CRYSTAL	18.432MHZ/us	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A1306000003	TACT SW.	KPT-1104B	6	SW1-6
A5004000004	HEAT SINK	MB-217-22+PIN	1	Q6

A/D SECTION

A0203012320	I.C.	ADS1232IPWT (SMD)	1	U1A
A0204074145	I.C	74HC14	1	U3A
A0207773500	VOLTAGE REGULATOR I.C.	TPS77350GPK	1	U2A
A0701226017	CAPACITOR (EC)	22μF/16V (SS TYPE)	4	EC1A-4A
A0701107016	CAPACITOR (EC)	100uF/16V	1	EC5A
A0773103050	CAPACITOR (MLC),SMD0805	0.01μF/50V(103),X7R	6	C10A-15A
A0773104050	CAPACITOR (MLC),SMD0805	0.1μF/50V(104),X7R	9	C1A-9A
A0773105050	CAPACITOR (MLC),SMD0805	1μF/25V(105),X7R	1	C22A
A0774101051	CERAMIC CAPACITOR (CC),SMD0603	100pF/50V(101)	6	C16A-21A
A0773105050	CAPACITOR (MLC),SMD0805	1μF/25V(105),X7R	1	C22A
A0814008200	METAL FILM RESISTOR (SMD,1%)	820Ω (25PPM 0805)	2	R1A,2A
A0815001101	CARBON FILM RESISTOR (SMD,5%)	100Ω (0805)	4	R3A-6A
A1008000004	EMI FILTER	TNH61V2A102S10A-TM	6	EMI1A-6A
A1008000003	EMI FILTER	NFE31PT152Z1E9L	6	EMI7A-12A

A1008000005	FEED-THROUGH CAPACITOR, SMD	CNH20R105M-TM	6	EMI13-18
A1100249154	CRYSTAL	4.9152MHZ/SMD	1	X1A
F0015000012	PROTECTION BOX	7705-52-1 (UPPER)	1	
F0015000013	PROTECTION BOX	7705-52-1 (UNDER)	1	
Z0010000305	SCREW	M3*6	2	
C1000000002	PC PLATE (TRANSPARENT)	44*44mm	1	

BACK LIGHT OPTION

A1400000005	BACK LIGHT(EL)	168.0*68.0mm	1	EL1
A1401005120	BACK LIGHT INVERTER	5V TO 120V	1	IN1

RS232 OPTION

A0901010040	CONNECTOR	4 PIN WAFER	1	J2
E1PS0100000	P.C.B. KIT	PS-70-X RS-232 BOARD	1	
A1202040401	WIRE ARRAY	4PIN 40cm,SINGLE HOUSING	1	
A0950000012	WATER-PROOF CONNECTOR	LTW-6MP-C, MALE	1	
A1007000011	FERRITE CORE	19*6.5*32 (CLAMP TYPE)	1	
A0904120090	CONNECTOR	D-SUB 09F SOLDER	1	
A0904120091	D-SUB HOOD	9 PIN	1	
A0950000011	CABLE + WATER-PROOF CONNECTOR	6PIN 100cm(LTW-6FM-90)	1	

6. APPENDIX

V-BM SERIES

VBM SERIES EXPLOSION DIAGRAM

APPROVED NO.:

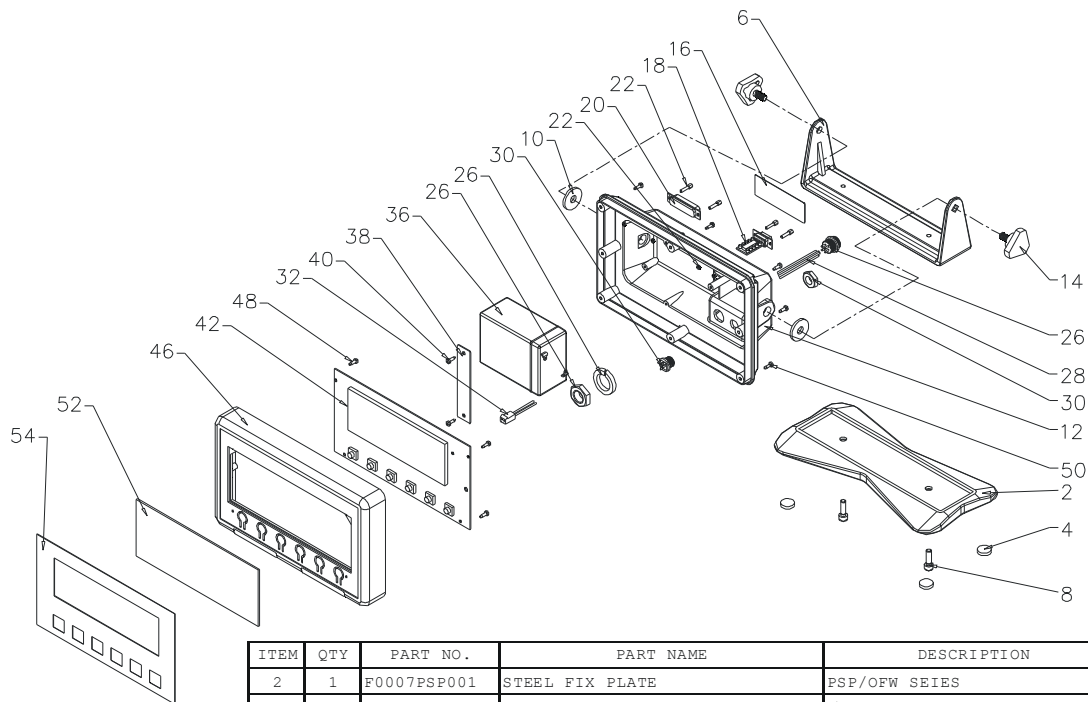
REV.

DRAWING NO.: VBM0-E-01-A

1

DWG.
NAME

VBM SERIES
EXPLOSION DIAGRAM



ITEM	QTY	PART NO.	PART NAME	DESCRIPTION
2	1	F0007PSP001	STEEL FIX PLATE	PSP/OFW SEIES
4	4	G0004DW0002	RUBBER PAD	φ16×3.5t, AR-167
6	1	G0003PSP000	PLASTIC FIX PLATE	PSP/OFW SERIES, U SHAPE
8	2	Z0014100620	S/S SCREW	M6*1P*20L
10	2	G0005NBS000	RUBBER WASHER	φ 27*9*3mm
12	1	G0001OFW000	PLASTIC HOUSING (UNDER)	OFW SERIES
14	2	G0030000800	ADJUSTABLE FEET	M8*1.25P*15L
16	1	D0BS0500001	NAME PLATE	
18	1	A0904120090	RS-232 INTERFACE	D-SUB 9
20	1	A0904120251	PRINTER INTERFACE	D-SUB 25
22	4	F0010005012	SCREW, D-SUB (INCLUDE NUT)	5*5L + #4-40UNC*1/2"L
26	1	A0905600800	CONNECTOR	PLT-168-R
28	1	A1204070250	WIRE ARRAY	7PIN 25cm
30	1	A0906000210	D.C. JACK	SCD-021 (BLACK)
32	1	A1208020351	BATTERY WIRE ARRAY	2PIN 35cm, SINGLE HOUSING
36	1	A1600060400	RECHARGEABLE BATTERY	6V 4Ah
38	1	F0007NBS102	BATTERY CLAMP	NBS SERIES (ALUMINUM HOUSING)
40	2	Z0010001308	ROUND HEAD SCREW	TAPPED, φ 3*8L
42	1	E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD
46	1	G0001FM0200	PLASTIC HOUSING (UPPER)	FM SERIES, 6 HOLES
48	7	Z0010001305	ROUND HEAD SCREW	TAPPED, φ 3*5L
50	6	Z0010001312	ROUND HEAD SCREW	TAPPED, φ 3*12L
52	1	C1W10000000	PANEL PC (TRANSPARENT)	1706 SERIES, 200*78*2mm
54	1	C1VBM030000	OVERLAY PC	VBM SERIES

V-FS SERIES

VFS SERIES EXPLOSION DIAGRAM

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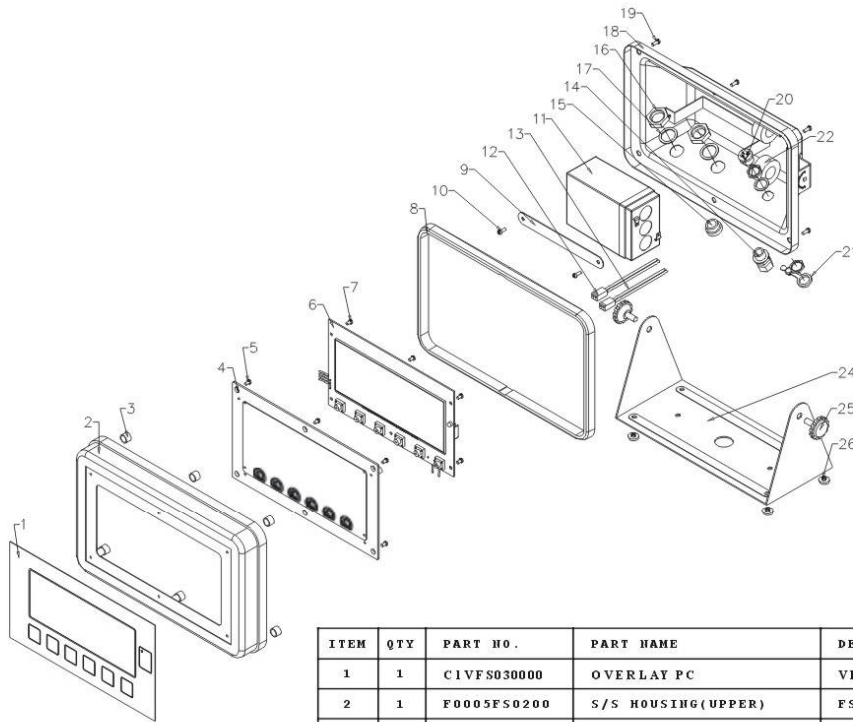
REV.

DRAWING NO.: VFS0-E-01-A

1

DWG.
NAME

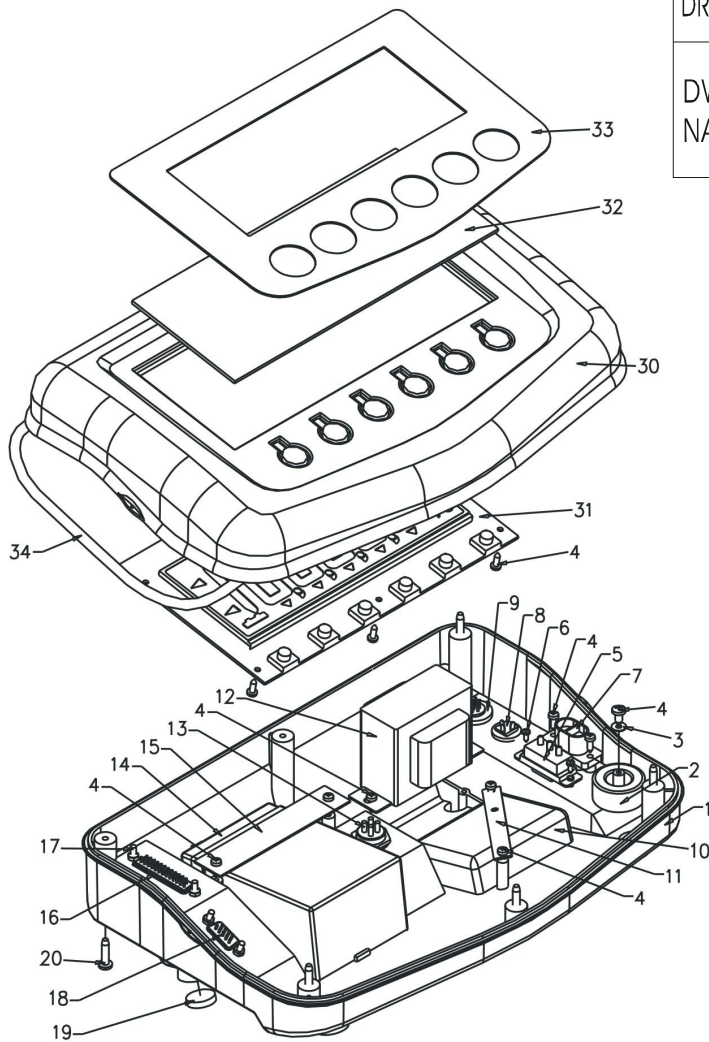
VFS SERIES
EXPLOSION DIAGRAM



ITEM	QTY	PART NO.	PART NAME	DESCRIPTION
1	1	C1VFS030000	OVERLAY PC	VFS SERIES
2	1	F0005FS0200	S/S HOUSING(UPPER)	FS SERIES
3	6	G0030PS1000	RUBBER CAP	FS SERIES
4	1	COFS0000000	PANEL PC (TRANSPARENT)	226*128.6.6 HOLES
6	1	E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD
8	1	G0030FS0010	RUBBER FRAME	FS SERIES
9	1	F0013FS0000	BATTERY CLAMP	FS SERIES,132*15mm
11	1	A1600060400	RECHARGEABLE BATTERY	GP4-6 6V 4AH
12	1	A1208020351	BATTERY WIRE ARRAY	2PIN 35cm,SINGLE HOUSING
13	1	A1208020601	BATTERY WIRE ARRAY	2PIN 60cm,SINGLE HOUSING
14	1	A0905600800	CONNECTOR	8 PIN(PLT-168-R)
15	1	A5001000512	PLASTIC CAP	PG-9(?16)
16	1	A5001000513	PLASTIC NUT	PG-9(?16)
17	1	A5001000514	SEALING RUBBER	§ 16*?24*1t
18	1	F0005FS0211	S/S HOUSING(UHDER)	FS SERIES
20	1	A0906000210	D.C. JACK	SCD-021 (BLACK)
21	1	G0030FS0000	RUBBER PLUG	FS SERIES(FOR DC JACK)
22	2	A1007000004	FERRITE CORE	T-28.3*13.8*13.5mm
24	1	F0003FS0001	S/S TABLE STAND	FS SERIES, 23*10*11cm
25	2	F0022000010	S/S ADJUSTABLE FEET	FS SERIES
26	4	G0004FS0100	PLASTIC BUTTON	FS SERIES(6L-16)

V-TM SERIES

VTM SERIES EXPLOSION DIAGRAM



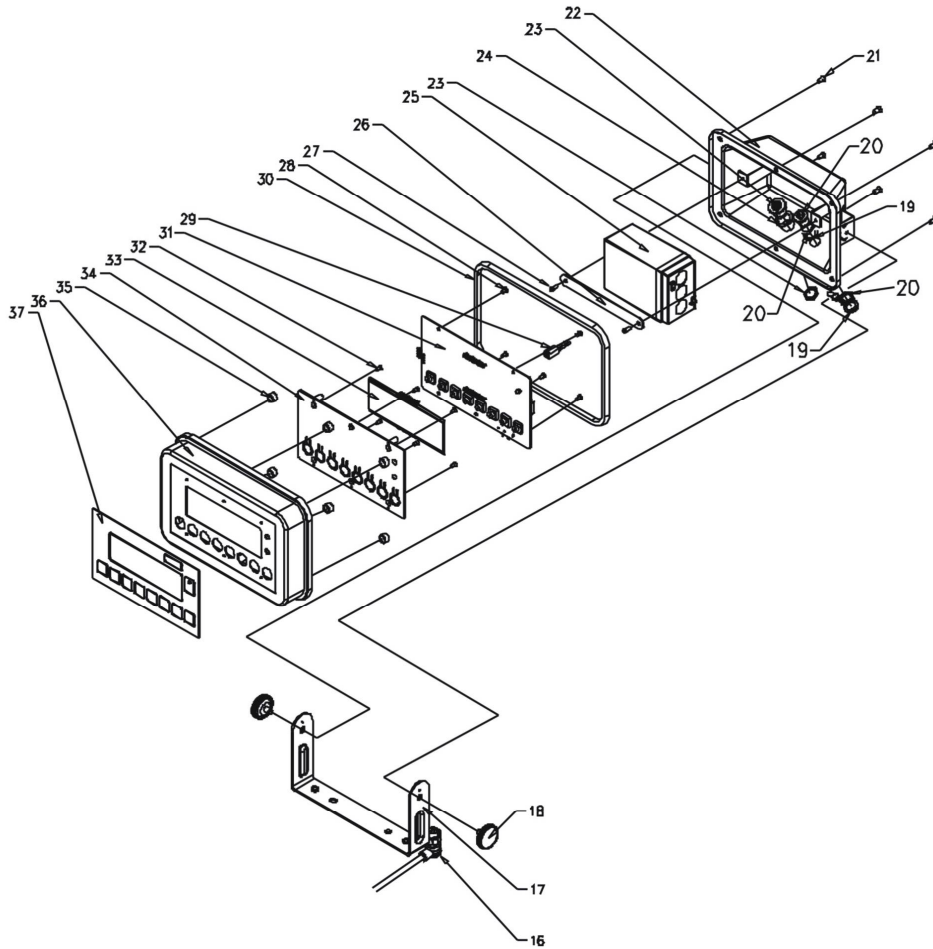
APPROVED NO.:	REV.
DRAWING NO.: VTM0-E-01-A	1
DWG. NAME	VTM SERIES EXPLOSION DIAGRAM

ITEM	QTY	PART NO.	PART NAME	DESCRIPTION
1	1	G0001T00000	PLASTIC HOUSING (UNDER)	T SERIES
2	1	A1007000004	FERRITE CORE	T-28.3*13.8*13.5mm
8	1	A0906000210	DC JACK	SCD-021 (BLACK)
13	1	A0905600800	CONNECTOR	8 PIN (PLT-168-R)
14	1	A1600060400	RECHARGEABLE BATTERY	6V 4Ah
15	1	F0007NBS102	BATTERY CLAMP	NBS SERIES (ALUMINUM HOUSING)
16	1	A1250251220	WIRE ARRAY	D-SUB 25PIN+12PIN
18	1	E1DM0100000	P.C.B. KIT	DM SERIES RS-232 (DM-70-1)
19	4	G0004DW0002	RUBBER PAD	φ 15.3x3.5t
30	1	G0001T00200	PLASTIC HOUSING (UPPER)	T SERIES
31	1	E1VFM000010	P.C.B. KIT	VFM-10-X MAINBOARD
32	1	C1W10000000	PANEL PC (TRANSPARENT)	1706 SERIES, 200*78*2mm
33	1	C1VTM030000	OVERLAY PC	VTM SERIES

V-PS SERIES

VPS SERIES EXPLOSION DIAGRAM

APPROVED NO.		REV.
DRAWING NO.: VPS0-E-01-A		1
DWG. NAME	VPS SERIES EXPLOSION DIAGRAM	

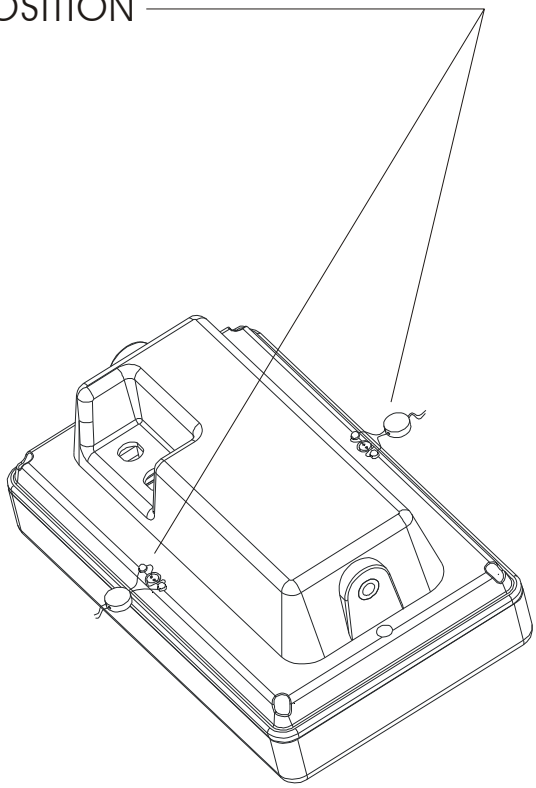


ITEM	PART NO.	PART NAME	DESCRIPTION	QTY
16	A0950000011	CONNECTOR	6 PIN 100cm(LTW-6FM-90)	1
17	F0003PS0000	S/S PLATE	PS SERIES, U SHAPE	1
18	F0022000010	S/S ADJUSTABLE FEET	FS SERIES	2
19	G0030FS0000	RUBBER PLUG	FS SERIES (DC JACK)	1
20	A0906000210	D.C. JACK	SCD-021 (BLACK)	1
21	Z0015100406	SCREW	M4x0.7Px6L	6
22	F0005PS1100	S/S HOUSING	PS SERIES(UNDER)	1
23	A0950000010	CONNECTOR	LTW-6MS-C	1
25	A1600060400	RECHARGEABLE BATTERY	GP4-6 6V 4AH	1
26	F0013FS0000	BATTERY CLAMP	FS SERIES, 132*15mm	1
27	Z0010000308	SCREW	M3x0.5Px8L	2
28	Z0010001305	SCREW	TAPED ϕ 3x5L	5
29	A1208020351	BATTERY WIRE ARRAY	2PIN 35cm(SINGLE HOUSING)	1
30	G0030PS1010	RUBBER FRAME	PS SERIES	1
31	E1PSXXXXXXX	P.C.B. KIT	PS-10-X	1
32	Z0010000306	SCREW	M3x0.5Px5L	6
33	A0102000289	L.C.D.	UTN-G289JV-W	1
34	C1PS1000000	PANEL PC	PS SERIES(TRANSPARENT)	1
35	G0030PS1000	RUBBER SEALING	PS SERIES	6
36	F0005PS1000	S/S HOUSING	PS SERIES(UPPER)	1
37	C1PS1XXXXXX	OVERLAY PC	PS	1

APPROVED NO.	REV.
DRAWING NO.: VBM-M-01-A	1
DWG. NAME	VBM SERIES SEALING DIAGRAM

VBM SERIES SEALING DIAGRAM

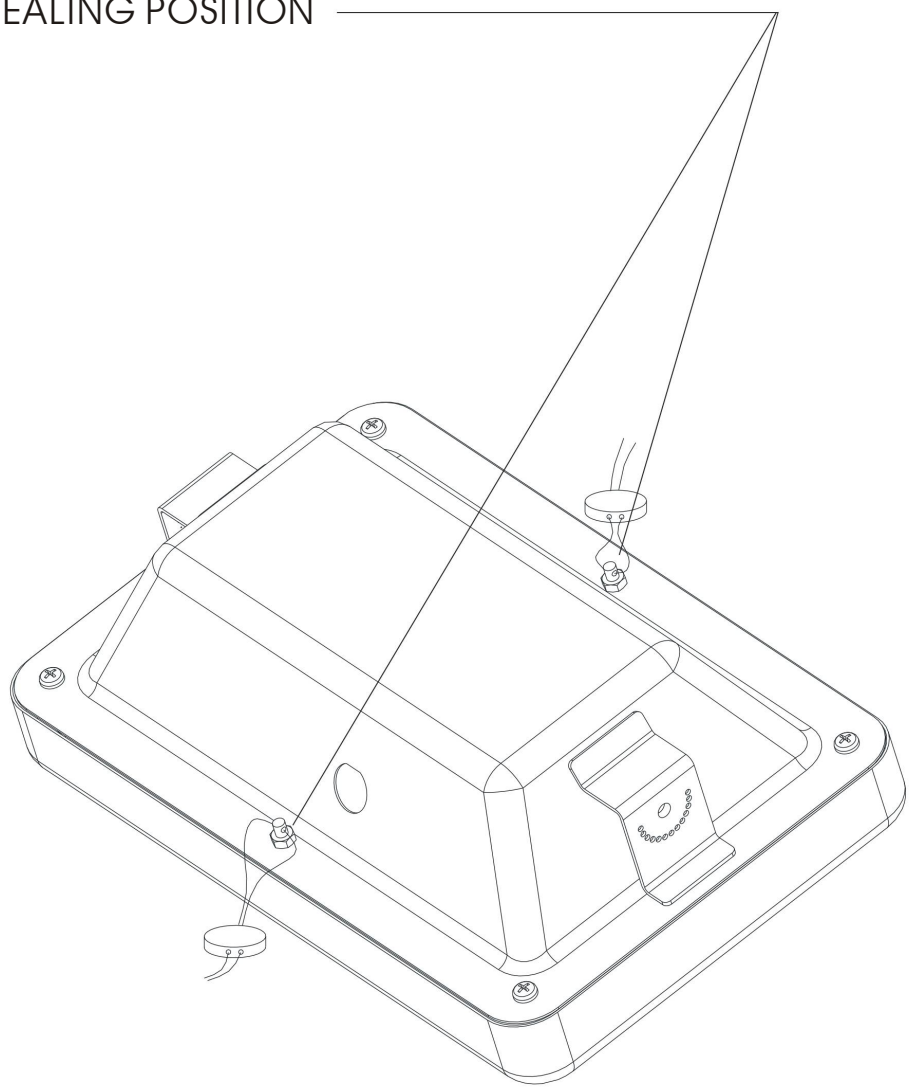
SEALING POSITION



APPROVED NO.		REV.
DRAWING NO.: VFS-M-01-A		1
DWG. NAME	VFS SERIES SEALING DIAGRAM	

VFS SERIES SEALING DIAGRAM

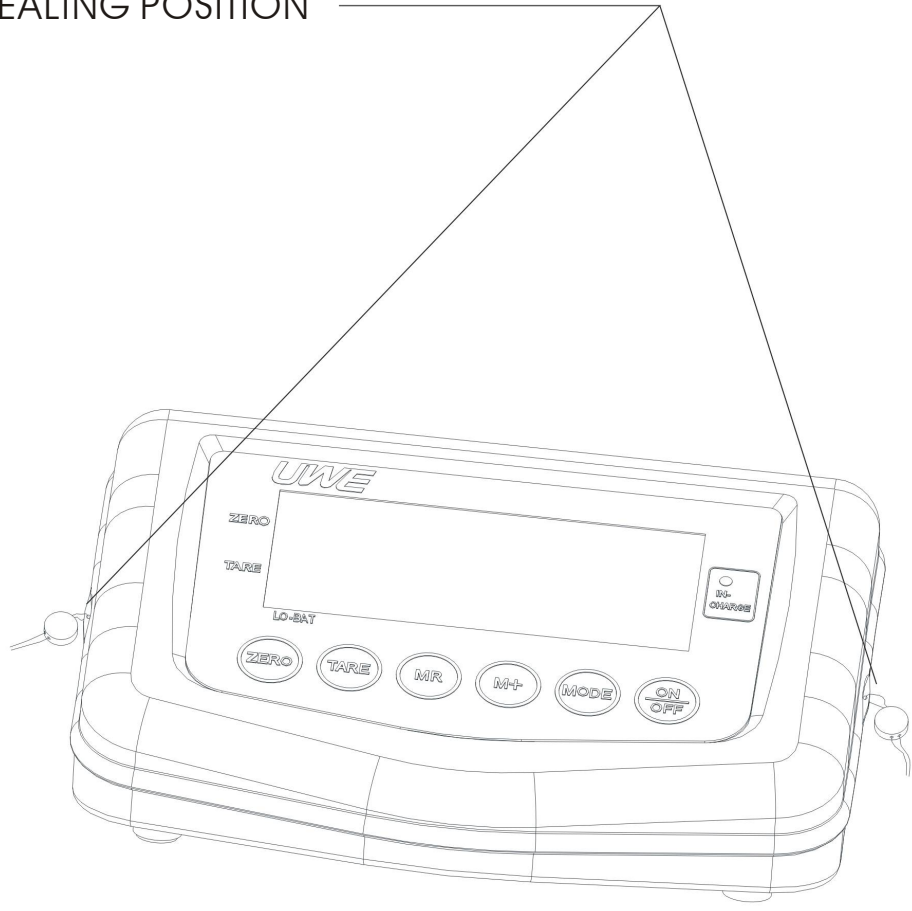
SEALING POSITION



APPROVED NO.	REV.
DRAWING NO.: VTM-M-01-A	1
DWG. NAME	VTM SERIES SEALING DIAGRAM

VTM SERIES SEALING DIAGRAM

SEALING POSITION



APPROVED NO.	REV.
DRAWING NO.: VPS0-M-01-A	1
DWG. NAME	VPS SERIES SEALING DIAGRAM

VPS SERIES SEALING DIAGRAM
SEALING POSITION

