MAINTENANCE MANUAL

ADW-E SERIES

CONTENTS

OCT 2002 REV 1

Specifications and Function Subject to Change without Notice

1. INTRODUCTION

The ADW-E series is designed and programmed according to the OIML R-76 Class III requirements.

This scale is 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.

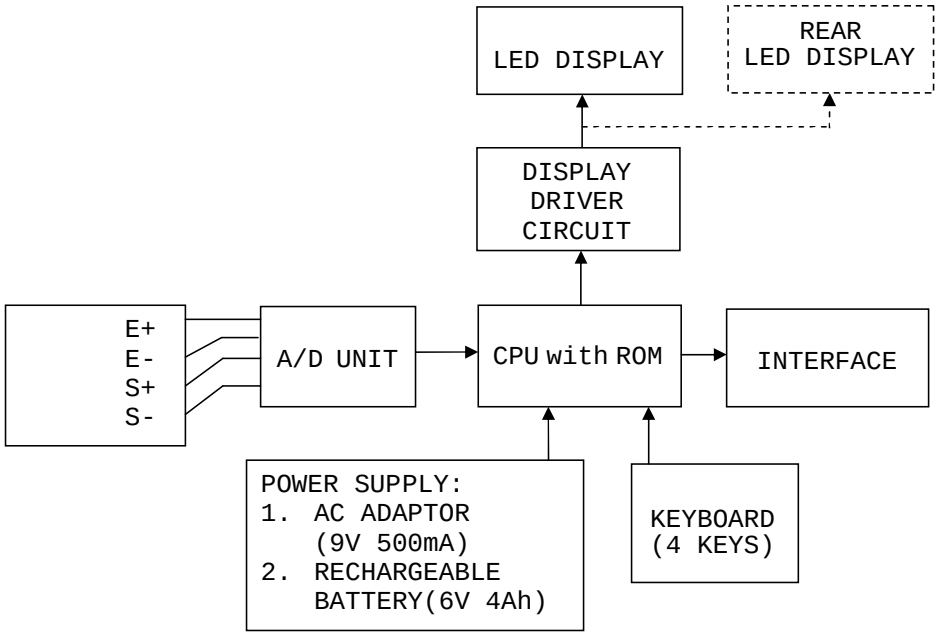
After servicing, it is necessary to go through all tests and procedures to ensure the scale meets all the meteorological and approval requirements.

Here are some features of the ADW-E series

1. Designed to meet OIML-R76 class III requirements.
2. Zero Indicator.
3. Net Indicator.
4. Negative Value Indicator.
5. Auto Tare Function.
6. Power on Zero Function.
7. Manual Zero Function.
8. Extended Display Function.
9. Auto Power Saving Function.
10. Metric/Avoirdupois Conversion Function.
11. Low battery warning signal.
12. Single points Calibration.
13. Mini jumper to prevent end-user calibration.
14. Optional EL backlights.
15. Optional RS232C interface.
16. Optional Rear Display
17. Built-in rechargeable battery operated.
18. Battery operating time: 200 hours plus after charged.

2. SPECIFICATION

2.1 SYSTEM BLOCK DIAGRAM

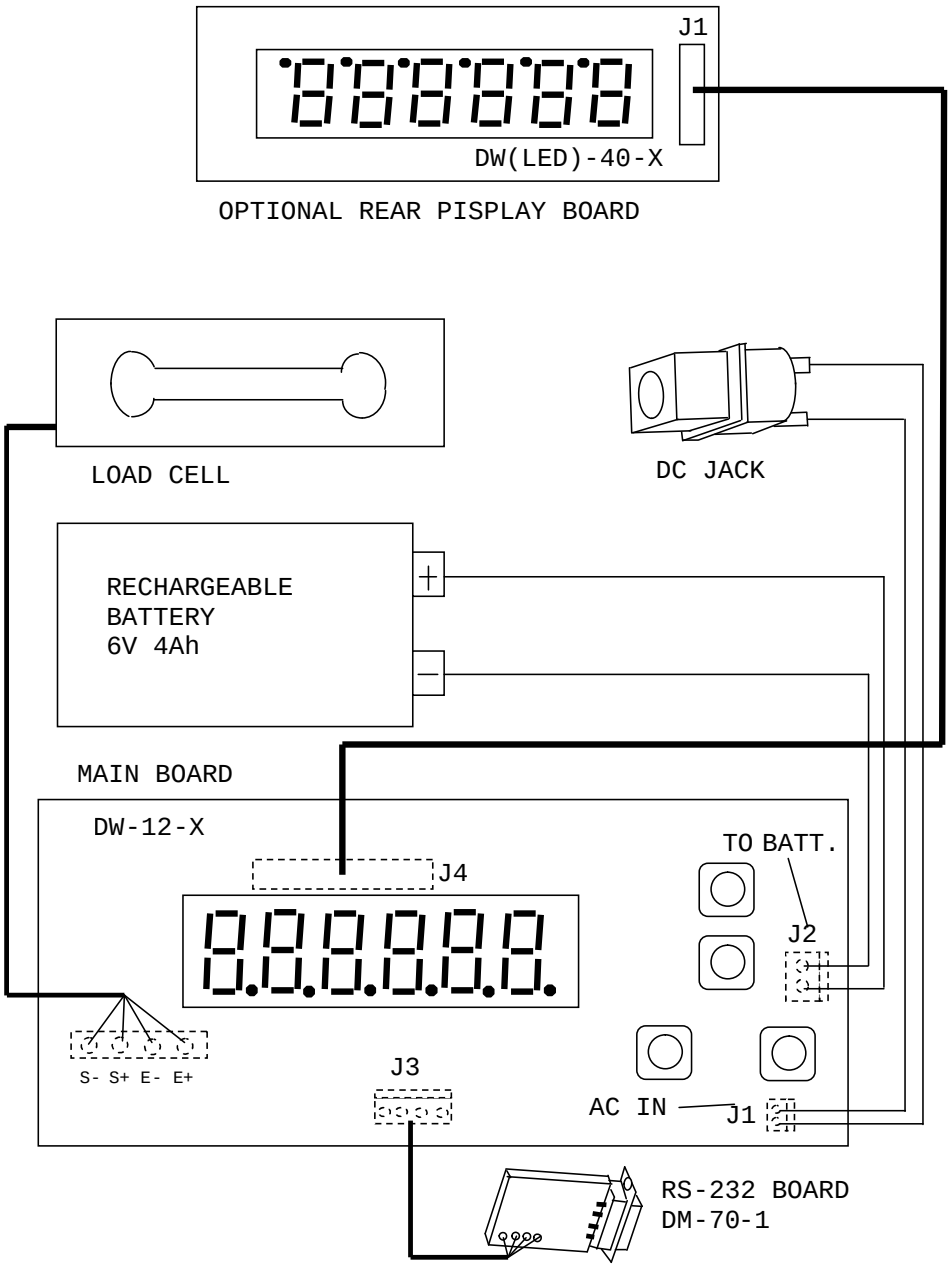


Description:
When a mass is placed on the platform, the load of the article is applied to the load cell inside it.

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

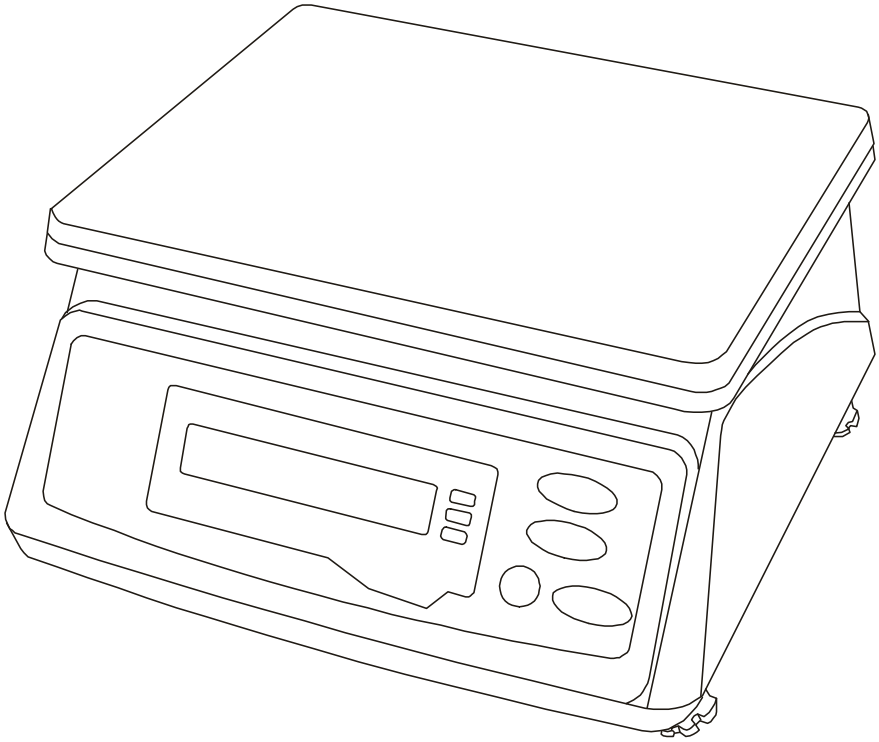
It is amplified and digitized continuously by the A/D converter into a digital signal. Subsequently, the resulting count is processed and managed by the CPU. The CPU refers to the instructions from the keyboard, and then conveys the output data to LED driver, which formats the data into readout on the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

2.2 PHYSICAL LAYOUT OF ELECTRICAL CONNECTION



2.3 GENERAL SPECIFICATION

2.3.1 Overall View



2.3.2 Dimension:

Platter size：250 x 215mm

Overall size：270(W) X 278(D) X 145(H) mm

2.3.3 Model Specifications

Model Number	Capacity (Max)	Division (e)
ADW-1500E	1500g	0.5g
ADW-3000E	3000g	1g
ADW-6000E	6000g	2g
ADW-15KE	15kg	0.005kg
ADW-30KE	30kg	0.01kg
Approval Class	III	
Maximum Tare Range	1/3 Max -1e	
Power on Zero Range	±10% Max	
Manual Zero Range	±2% Max	
Min. Load	20e	
Operation Environment	0°~40°C (32°~104°F), Non-condensed. R.H.≦ 85%	
Power Consumption	0.5W (when charged)	

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Deleted: Maximum Tare Ran ... [2]

Deleted: Power on Zero Ra ... [3]

Deleted: Manual Zero Rang ... [4]

2.3.4 Main Components Used

Microprocessors: SM8958
Crystal Oscillator: 11.0592MHz
Display Device: WTN Liquid Crystal Display
Load Cell Capacity: ADW-E-1500= 3kg
ADW-E-3000= 6kg
ADW-E-6000= 10kg
ADW-E-15K = 20kg
ADW-E-30K = 35kg

2.3.5 Analog Specification

- The maximum number of verification scale intervals will be:
  n ≤ 3000 for class (III) instruments
- Power supply of 5 V DC;
- 16 bits serial digital output;
- Excitation power supply for the load cell is 5 V DC;
- Input impedance of the load cell is 350 Ω;
- The analog data processing unit is built in a closed metal box.

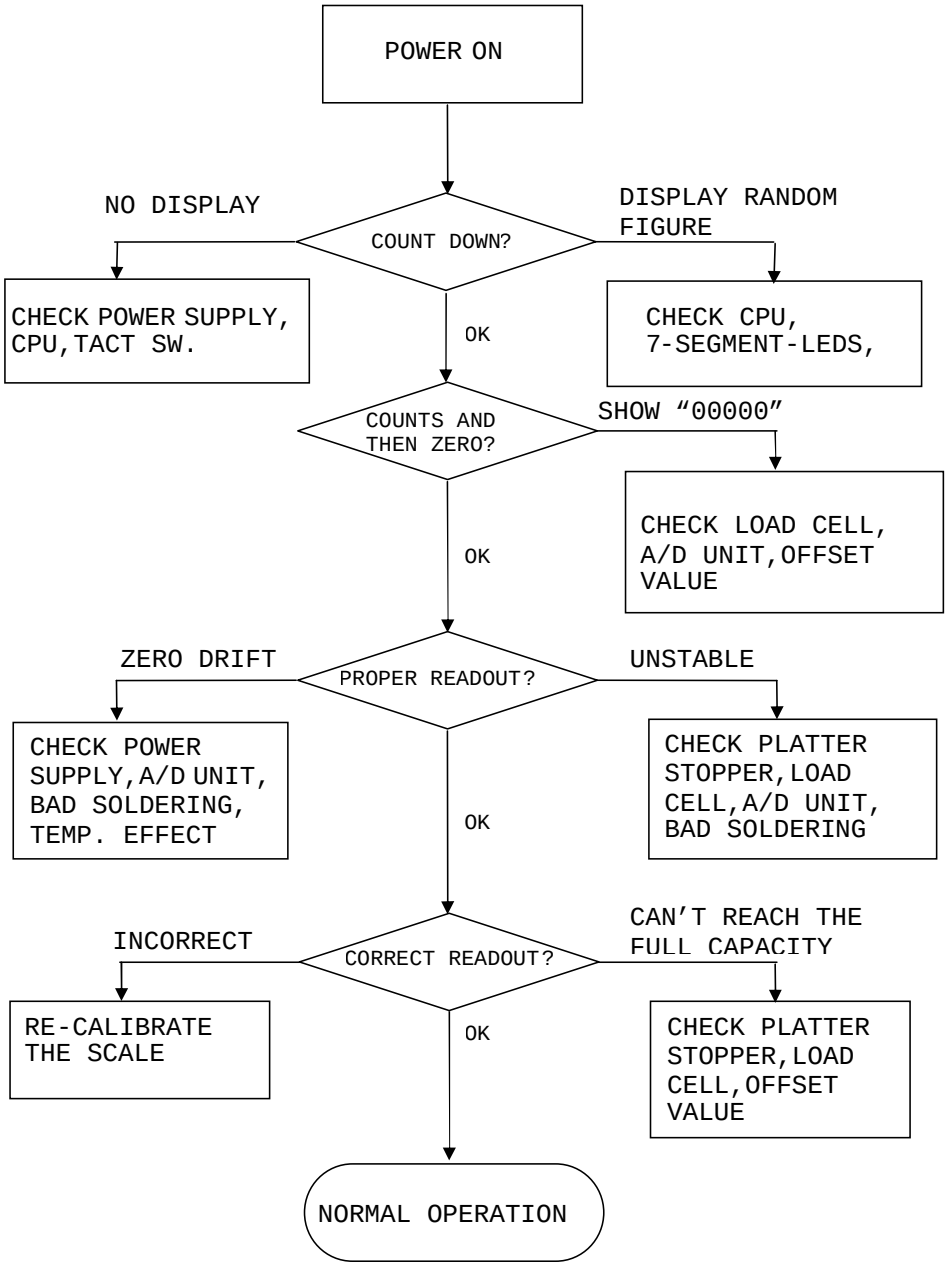
2.4 CALIBRATION METHODS

AUTO CALIBRATION

a. Turn scale off
b. Press and hold MODE, then press **ON/ZERO**
c. Scale display **CAL?**
d. Press **MODE** for **YES** and scale will self calibrate zero point
e. After zero point is calibrated, Scale will displays **"LOAD XXXX or YYYY".** For **"XXXX"** is about 1/3 of the full capacity and **"YYYY"** is 2/3 of the full capacity
f. Load the weight according to scale
g. Wait until the scale display **"donE"** and start counting down
h. Calibration is completed and scale will display the weight

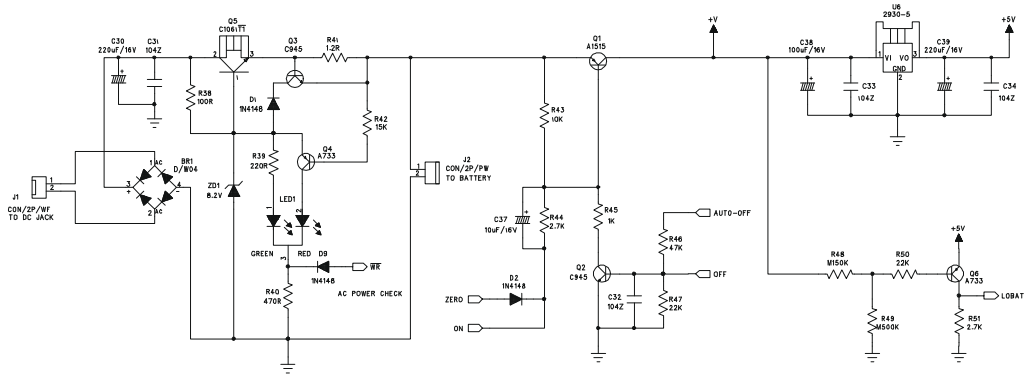
3. TROUBLE SHOOTING

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 (DW-12-X)
Q5 (C1061)
Q3 (C945)
R41(1.2R 1/2W)
ZD1(ZENER 8.2V)
DC JACK
BATTERY(6V 4Ah)
Q1 (A1515)
Q2 (C945)
Q6 (A733)
U6 (NS2950-5)



Description:
1) Power source: Rechargeable Battery 6V/4Ah or AC adaptor(9V, 500mA)

2) How Battery is charged completely?
The charging voltage is regulated by Q5 (C1061) and ZD1 (8.2V) for about 7 volts.
The charging current will go down automatically when voltage reached.
Q3 (C945) and R41 (1.2R, 1/2W) provide Over-Current protection.

3) +5V power drives digital circuit system.
U6 (NS2950-5) is a 5volts Voltage Regulator.

4) +5V power drives analog circuit system.
U4 (NS2950A) is a 5volts Voltage Regulator.

4) Auto-off:
If the scale is set with 4_oFF or even under LO-BAT situation, after fixed time interval, CPU will release a low potential signal to draw down Q2, then Q1 cuts off, the scale will be shut down immediately.

5) Low Power Detection:
The Q6(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 LED Display Checking

3.2.3.1 Check that every LED module is soldered properly onto the main board.

3.2.3.2 Check whether segment of LED module is ruined.

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.

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.

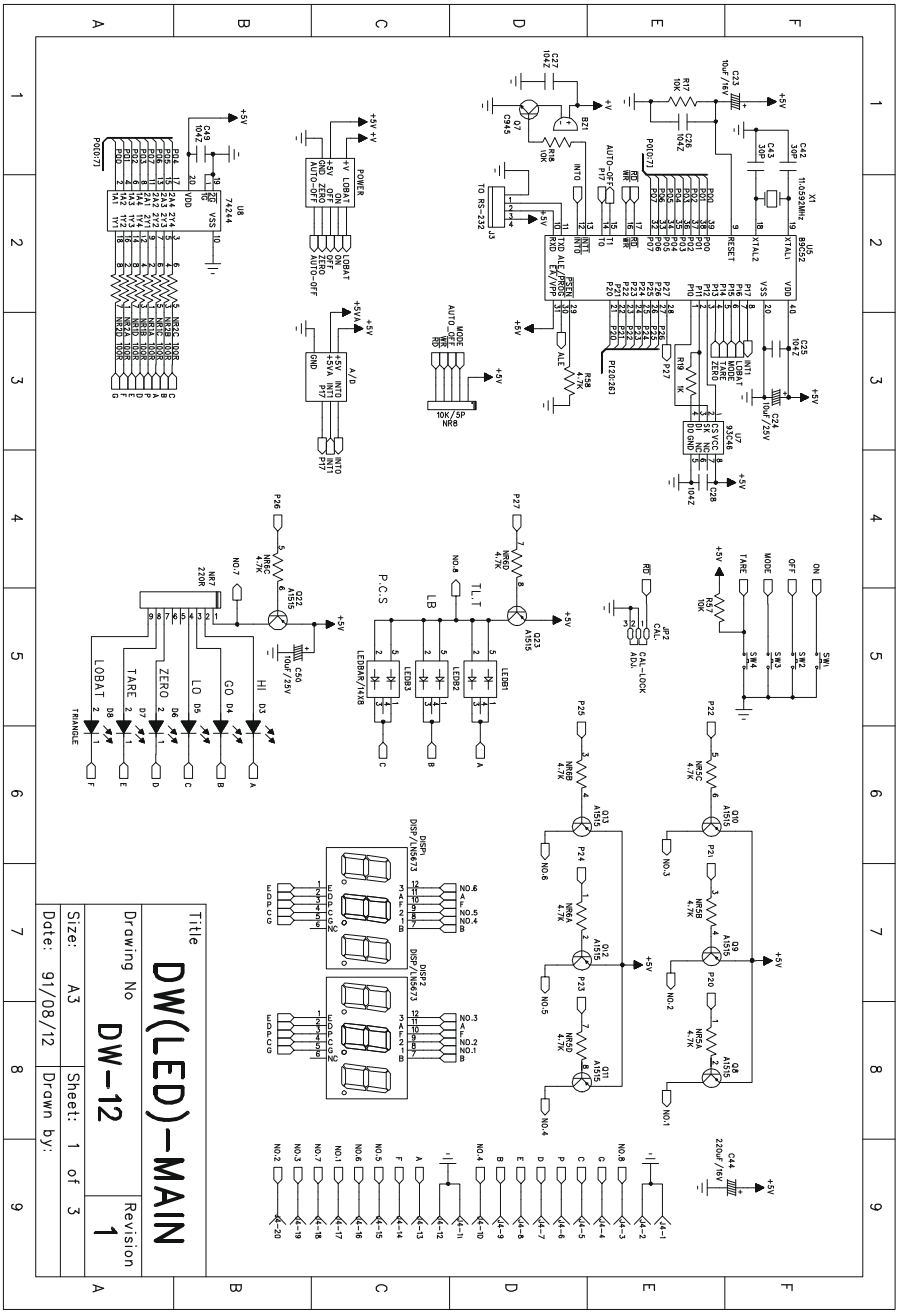
3.2.5.2 Check that the signal output of loadcell is normal.

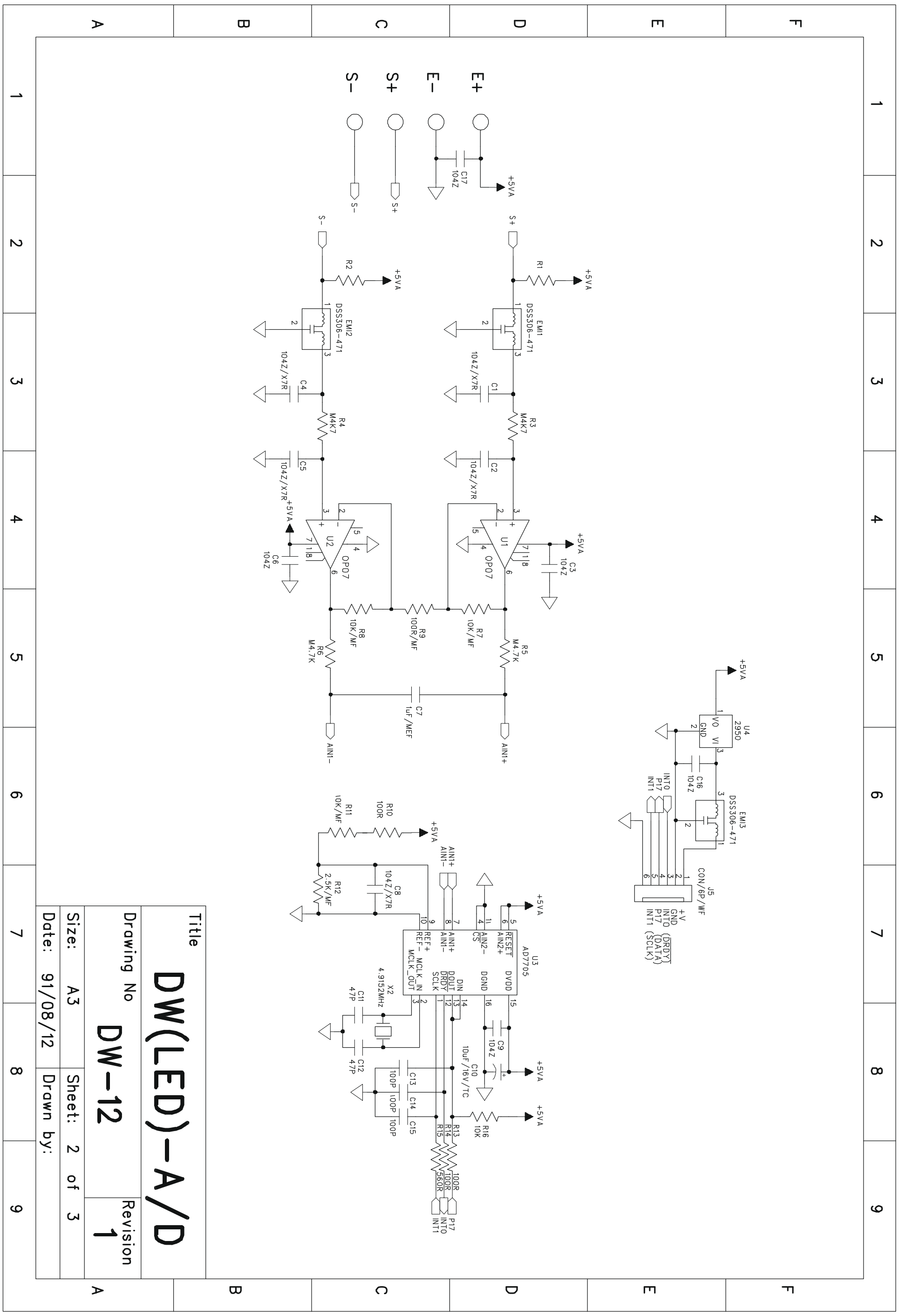
3.2.5.3 Check OP. Amplifiers & A/D Converter (AD7705).

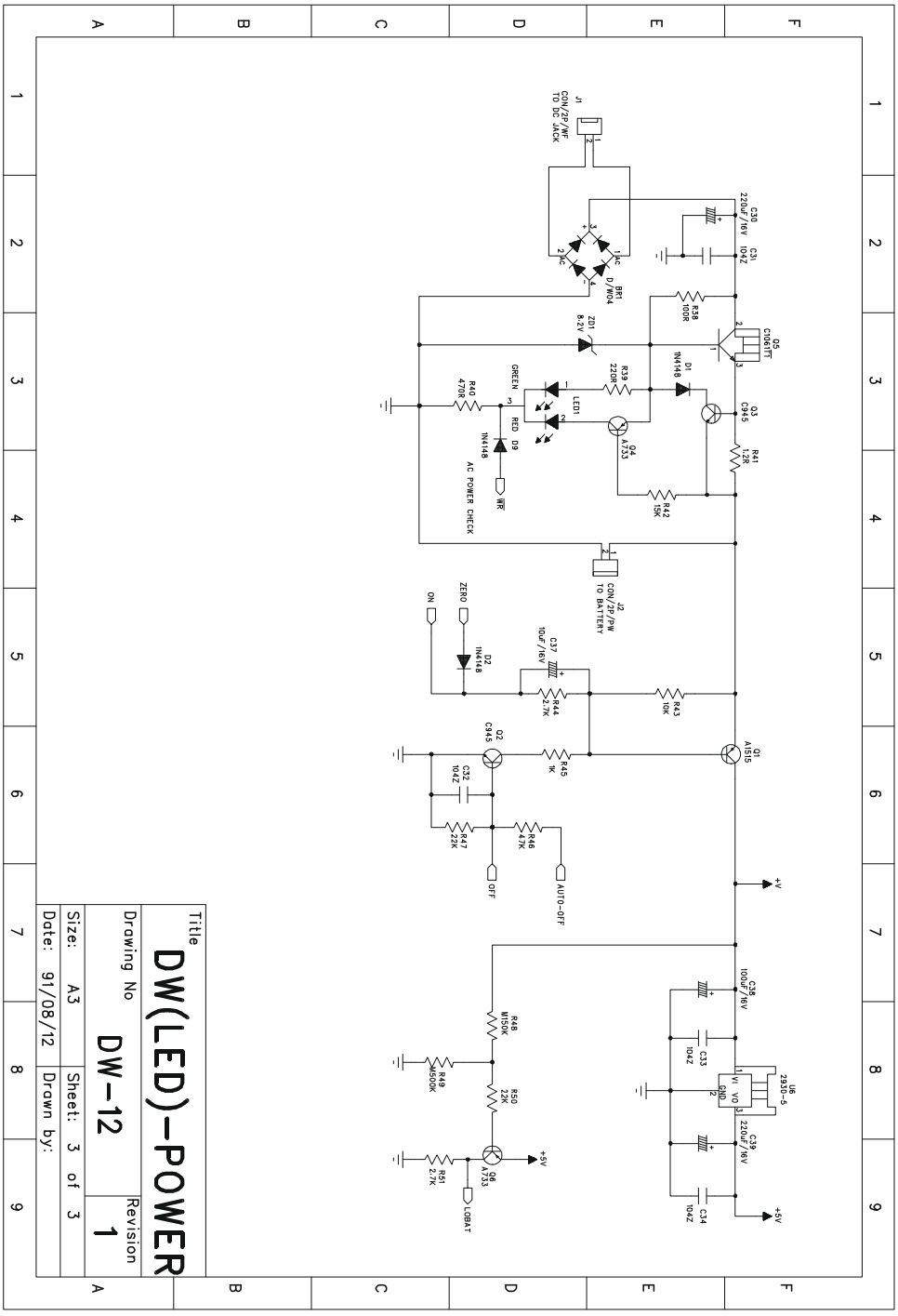
When no error is found with the above checking procedures, the trouble can be caused on the loadcell or the PCB itself. Replace a new one could be better to identify the defective.
In this way, the readout of weight would be varied because of the output voltage of loadcell and different span value, so re-calibration is required after this replacement.

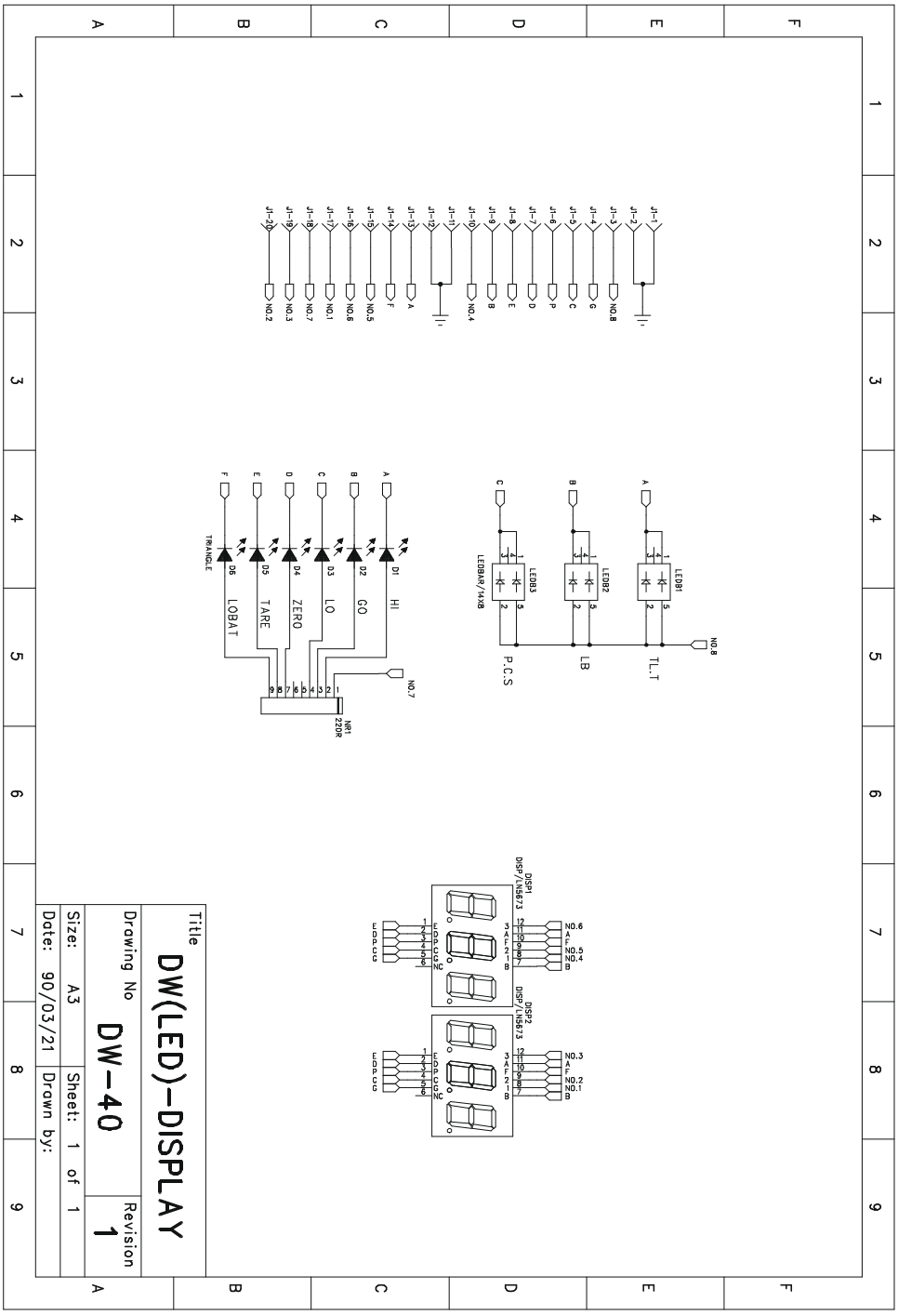
4. ELECTRICAL CIRCUITRY

4.1 SCHEMATICS

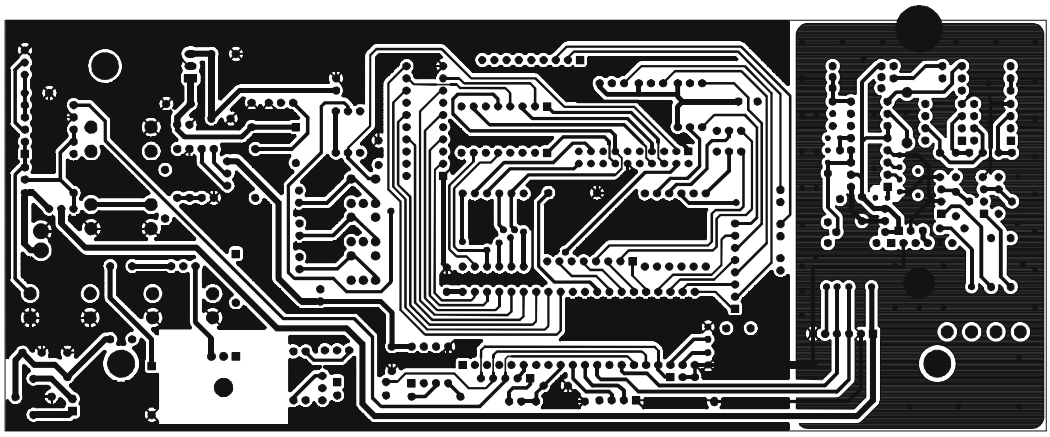



Title
DW(LED)-A/D
Drawing No
DW-12
Revision
1
Size: A3
Sheet: 2 of 3
Date: 91/08/12
Drawn by:
E+
E-
S+
S-

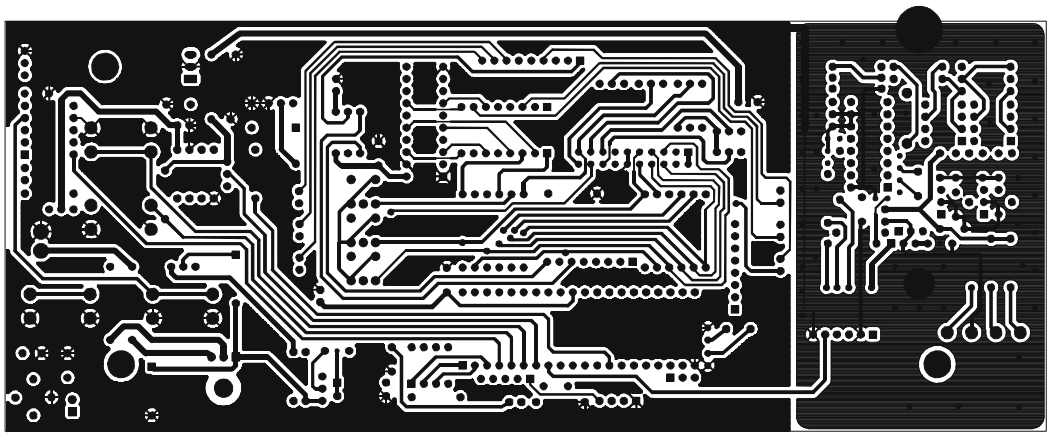

DW(LED)-POWER
DW-12
1
Size: A3
Sheet: 3 of 3
Date: 91/08/12
Drawn by:
J1
CON/2P/WF
TO DC JACK
BR1
D/BR04
C30
220uF/16V
C31
104Z
R38
100R
ZD1
8.2V
Q5
C945TT
D1
1N4148
R39
220R
LED1
GREEN
RED
R40
470R
D9
1N4148
AC POWER CHECK
Q3
C945
Q4
A733
R41
1.2R
R42
15K
J2
CON/2P/WF
TO BATTERY
ZERO
ON
D2
1N4148
C37
10uF/16V
R44
2.7K
R43
10K
Q2
C945
R45
1K
C32
104Z
R47
22K
R46
4.7K
OFF
AUTO-OFF
Q1
A1515
+4V
C38
100uF/16V
C33
104Z
U6
2930-5
VI
VO
GND
C39
220uF/16V
C34
104Z
+5V
R48
MT50K
R49
M500K
R50
22K
Q6
A733
R51
2.7K
LOBAT
+5V


Title
DW(LED)-DISPLAY
Drawing No
DW-40
Revision
1
Size: A3
Sheet: 1 of 1
Date: 90/03/21
Drawn by:
TRIANGLE
LOBAT
TARE
ZERO
LO
GO
HI
LEDBAR/4X10
P.C.S
LB
TL.T
220R

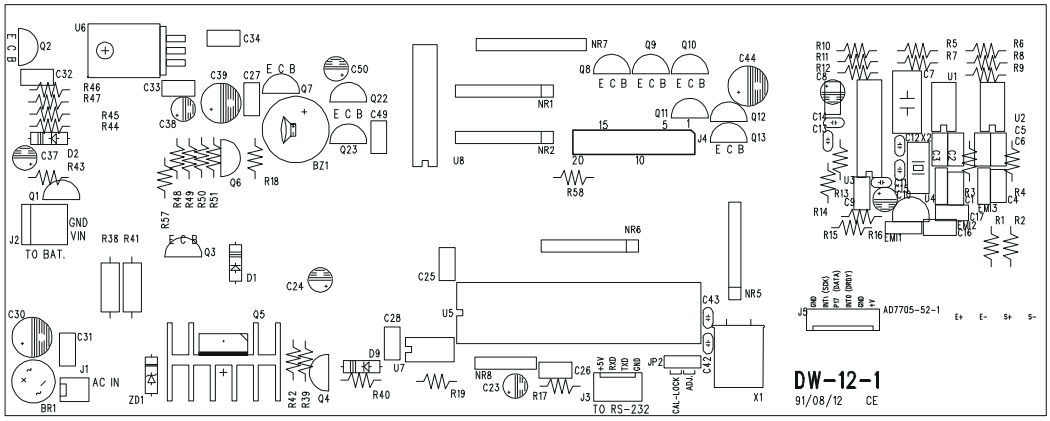
4.2 PCB LAYOUT



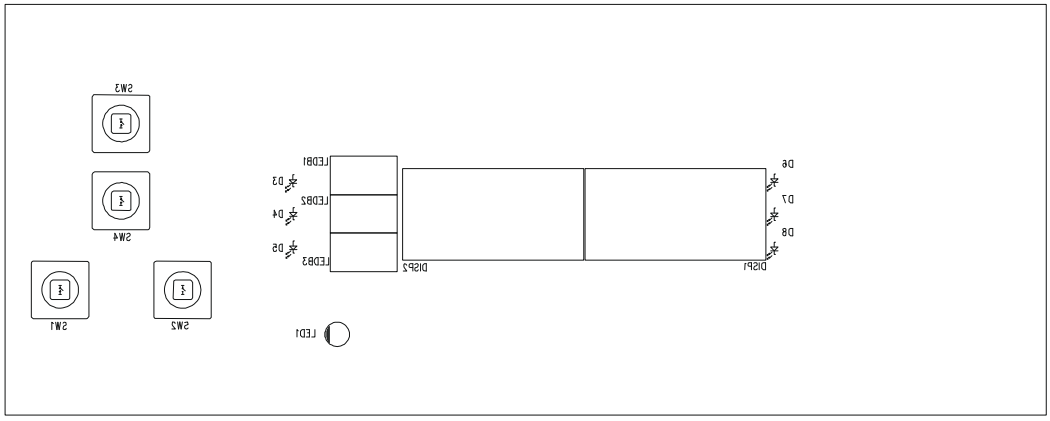
MAINBOARD(ADW-E) DW-12-1 TOP LAYER



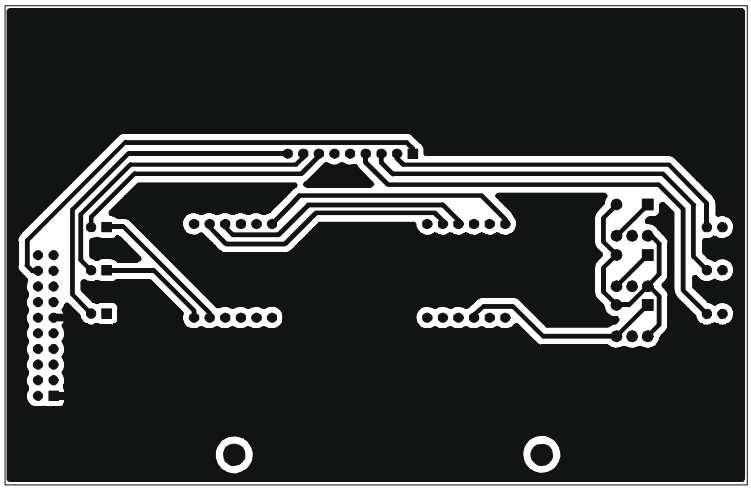
MAINBOARD(ADW-E) DW-12-1 BOTTOM LAYER



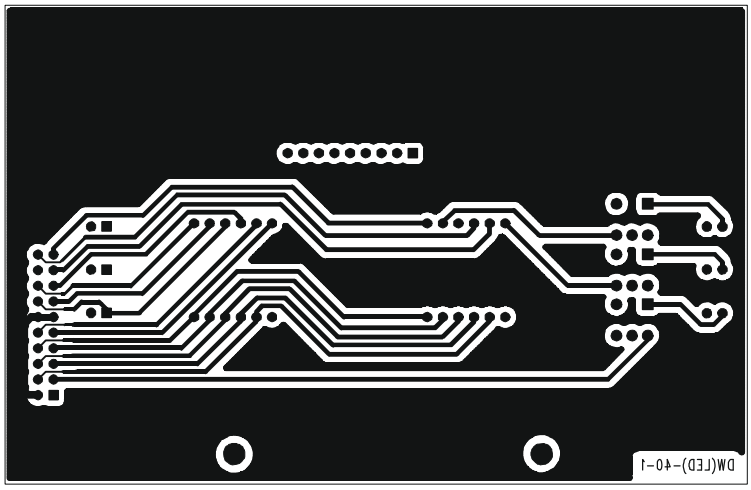
MAINBOARD(ADW-E) DW-12-1 TOP OVERLAY



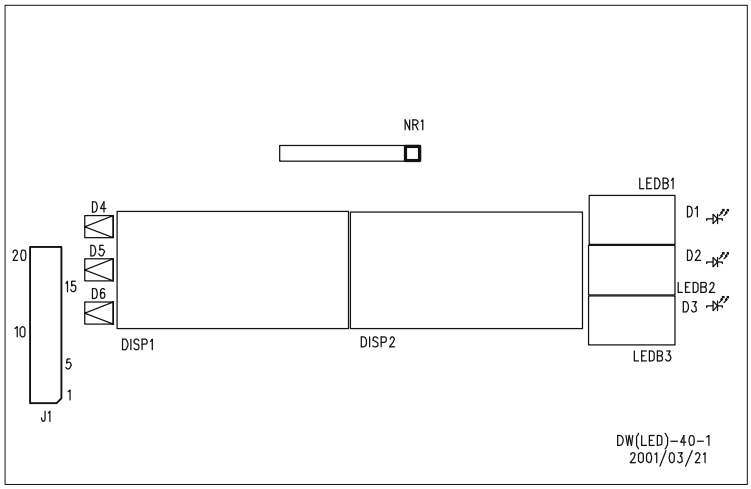
MAINBOARD(ADW-E) DW-12-1 BOTTOM OVERLAY



REAR DISPLAY DW-40-1 TOP LAYER



REAR DISPLAY DW-40-1 BOTTOM LAYER



REAR DISPLAY DW-40-1 TOP OVERLAY

5. BILL OF MATERIAL

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
E1ADM000010	P.C.B. KIT	DM/DW(C)-11-1 MAIN BOARD	1	
E1ADM001000	P.C.B. KIT	DM/DW(C)-41-1 REAR BOARD	1	
A0002030***	LOAD CELL	C2G1	1	
	ADW-1500E	C2G1-3kg		
	ADW-3000E	C2G1-6kg		
	ADW-6000E	C2G1-10kg		
	ADW-15KE	C2G1-20kg		
	ADW-30KE	C2G1-35kg		
A6010230950	ADAPTOR	230V/ 9V 500mA	1	
G0001DW0100	UPPER CABINET	DW SERIES (WHITE)	1	
G0001DW0000	UNDER CABINET	DW SERIES (GRAY)	1	
F0003DW0200	ALUMINUM L/C SUPPORT	DW SERIES	2	
F0002DW0000	S/S PLATTER	DW SERIES	1	
G0002DW0000	PLASTIC PLATTER	DW SERIES	1	
G0002DW0001	PLASTIC PLATTER SUPPORT	DW SERIES	1	
A5005000090	BUBBLE LEVEL	D14	1	
G0004DW0001	ADJUSTABLE FEET RUBBER	DW SERIES, ψ 16x3.5t	4	
G0004DW0000	PLASTIC ADJUSTABLE FEET	DW SERIES,M8xψ28x28	4	
A1600060400	RECHARGEABLE BATTERY	GP4-6/6V 4Ah	1	
C1GW0000000	PANEL PC	GW SERIES,135.5x45.5x0.8	2	
C1ADW030000	OVERLAY	ADW-E SERIES	1	
C1ADW030999	REAR PANEL	ADW SERIES	1	
C1ADW030998	REAR PANEL	ADW-E SERIES REAR DISPLAY	1	
G0005NBS101	PLASTIC PLATTER CAP	NBS SERIES, M-16	1	
G0009DW0000	BATTERY CAP	DW SERIES,ABS(TRANSPARENT)	1	
G0030DW0000	PLASTIC COVER PLATE	DW SERIES, 20x19x3 ABS	2	
Z0010000616	PLASTIC SCREW	M6x1x16	1	
A0906003430	D.C. JACK	DC-343(BLACK)	1	
A1202020151	WIRE ARRAY	2PIN 15cm,SINGLE HOUSING	1	
A1007000002	FERRITE CORE	TR-14.1*6.28*28.6mm	1	
A1007000001	FERRITE CORE	TR-16*9*28mm	1	LOADCELL
A1007000011	FERRITE CORE	19*6.5*32(CLAMP TYPE)	2	POWER,RS-232 TO MAIN BO

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DW-12-X MAINBOARD

E0ADW000010	P.C.B.	DW-12-X	1	
A0103000001	7 SEGMENTS LED DISPLAY	14.22mm HEIGHT,3 DIGITS	2	DISP1,2
A0201089582	I.C.	SM8958C25P	1	U5
A0202093462	I.C.	93C46PC27 OR 93LC46	1	U7
A0204742441	I.C.	74LS244	1	U8
A0207029300	VOLTAGE REGULATOR I.C.	LM2930-5	1	U6
A0300000040	I.C. SOCKET	40 PIN	1	U5
A0401007330	TRANSISTOR	A733	2	Q4,6
A0401010610	TRANSISTOR	C1061C OR D880	1	Q5
A0401009450	TRANSISTOR	2SC945	3	Q2,3,7
A0401015150	TRANSISTOR	2SA1515R(2SB1116K,A950Y)	9	Q1,8~13,22,23
A0501004148	DIODE	1N4148	3	D1,2,9
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
A0605050000	L.E.D.	ROUND,5mm,(GREEN)	1	D4
A0603050000	L.E.D.	ROUND,5mm,(ORANGE)	2	D3,5
A0602030000	L.E.D.	ROUND,3mm,(RED)	3	D6,7,8
A0633100000	LIGHT BAR	CML-1003	3	LEDB1,2,3(OPTION)
A0701106017	CAPACITOR (EC)	10uF/25V(SS TYPE)	3	C23,24,50
A0701107016	CAPACITOR (EC)	100uF/16V	1	C38
A0701227017	CAPACITOR (EC)	220μ F/16V (SS TYPE)	3	C30,39,44

				C25~28,31~34,49
A0730104050	CAPACITOR (MLC)	104Z	9	
A0740030050	CERAMIC CAPACITOR (CC)	30pf/50V(30)	2	C42,43
A0804041503	METAL FILM RESISTOR	150KΩ 1/4W	1	R48
A0804045003	METAL FILM RESISTOR	500KΩ 1/4W	1	R49
A0805020120	CARBON FILM RESISTOR	1.2Ω 1/2W	1	R41
A0805021101	CARBON FILM RESISTOR	100Ω 1/2W	1	R38
A0805041102	CARBON FILM RESISTOR	1KΩ 1/4W	2	R19,45
A0805041103	CARBON FILM RESISTOR	10KΩ 1/4W	4	R17,18,43,57
A0805041153	CARBON FILM RESISTOR	15KΩ 1/4W	1	R42
A0805041221	CARBON FILM RESISTOR	220Ω 1/4W	1	R39
A0805041223	CARBON FILM RESISTOR	22KΩ 1/4W	2	R47,50
A0805041272	CARBON FILM RESISTOR	2.7KΩ 1/4W	2	R44,51
A0805041471	CARBON FILM RESISTOR	470Ω 1/4W	1	R40
A0805041472	CARBON FILM RESISTOR	4.7KΩ 1/4W	1	R25
A0805041473	CARBON FILM RESISTOR	47KΩ 1/4W	1	R46
A0802010305	RESISTOR NETWORK	10KΩ 5 PIN	1	NR8
A0802022109	RESISTOR NETWORK	220Ω 9 PIN	1	NR7
A0802110108	RESISTOR NETWORK	100Ω 8 PIN B-TYPE	2	NR1,2
A0802127208	RESISTOR NETWORK	4.7KΩ 8 PIN B-TYPE	2	NR5,6
A0902010020	CONNECTOR	2 PIN WAFER,PITCH=3.9mm	1	J2
A0907020200	CONNECTOR (PIN PLUG)	2 x 10 PIN 180°	1	J4(OPTION)
A0901010020	CONNECTOR	2 PIN WAFER 180°	1	J1
A0907010030	CONNECTOR	1 * 3 PIN 180°	1	JP2
A0910111020	MINI JUMPER	PITCH 2.54	1	JP2
A1100211059	CRYSTAL	11.0592MHZ	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A1306000003	TACT SW.	KPT-1104B	4	SW1-4
A5004000004	HEAT SINK	MB-217-22+PIN	1	Q5

A/D SECTION

A0203077050	I.C.	AD7705AN	1	U3
A0206000072	I.C	OP177	2	U1-2
A0207029500	VOLTAGE REGULATOR I.C.	AS2950AW	1	U4
A0702226016	CAPACITOR (TC)	22uF/16V(226)	1	C10
A0713105063	POLYESTER FILM CAPACITOR(MEF)	1uF/63V (105)	1	C7
A0730104050	CAPACITOR (MLC)	104Z	10	C1-6,C8-9,C16-17
A0740047050	CERAMIC CAPACITOR (CC)	47pf/50V(47)	2	C11-12
A0740101050	CERAMIC CAPACITOR (CC)	100pf/50V(101)	3	C13-15
A0803041002	METAL FILM RESISTOR	10KΩ 1/4W	2	R7-8
A0803041501	METAL FILM RESISTOR	1.5KΩ 1/4W	1	R12
A0803043001	METAL FILM RESISTOR	3KΩ 1/4W	1	R11
A0803041500	METAL FILM RESISTOR	150Ω 1/4W	1	R9 (SPAN)
A0804044701	METAL FILM RESISTOR	4.7KΩ 1/4W	4	R3-6
A0805041101	CARBON FILM RESISTOR	100Ω 1/4W	3	R10,R13-14
A0805041103	CARBON FILM RESISTOR	10KΩ 1/4W	1	R16

A0805041561	CARBON FILM RESISTOR	560Ω 1/4W	1	R15
A1008000001	EMI FILTER	DSS-306-55Y5S471M100	3	EMI1-3
A1100249152	CRYSTAL	4.9152MHZ	1	X2
F0015000012	PROTECTION BOX	7705-52-1 (UPPER)	1	
F0015000013	PROTECTION BOX	7705-52-1 (UNDER)	1	
Z0010000305	SCREW	M3*6	2	

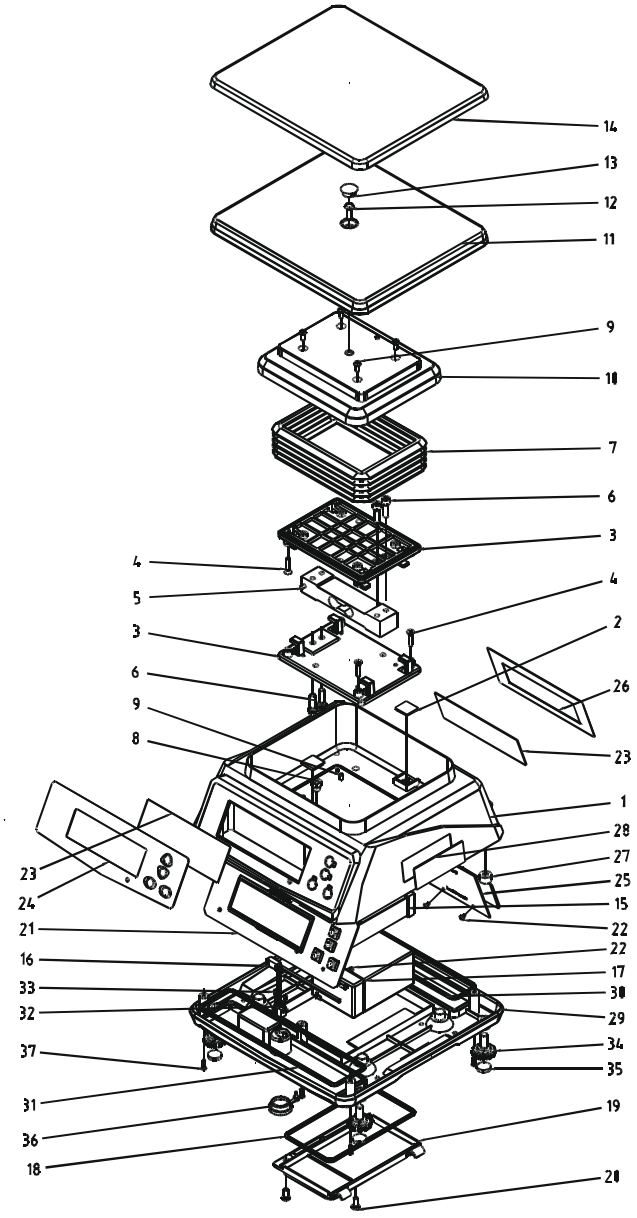
DW-40-X REAR BOARD

E0DW0001000	P.C.B.	DW-40-X	1	
A0103000001	7 SEGMENTS LED DISPLAY	14.22mm HEIGHT,3 DIGITS	2	DISP1,2
A0605050000	L.E.D.	ROUND,5mm,(GREEN)	1	D2
A0603050000	L.E.D.	ROUND,5mm,(ORANGE)	2	D1,2
A0602030000	L.E.D.	ROUND,3mm,(RED)	3	D4,5,6
A0633100000	LIGHT BAR	CML-1003	3	LEDB1,2,3(OPTION)
A0907021200	CONNECTOR (PIN PLUG)	2 x 10 PIN 90°	1	J1
A0802022109	RESISTOR NETWORK	220Ω 9 PIN	1	NR1
A1203200400	FLAT CABLE	20PIN 40CM	1	J1

RS232 OPTION

E1DM0100000	P.C.B. KIT	DM-70-1	1	
A0901010040	CONNECTOR	4 PIN WAFER	1	J3
A1202040401	WIRE ARRAY	4PIN 40cm, SINGLE HOUSING	1	

6. APPENDIX



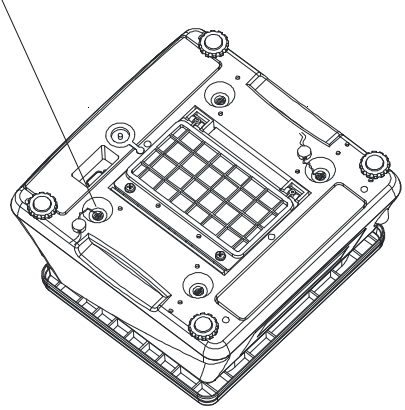
TEM	PART NAME	DESCRIPTION	QTY
1	UPPER CABINET	DW SERIES (WHITE)	1

2	PLASTIC COVER PLATE	DW SERIES, 20x19x3 ABS	2
3	ALUMINUM L/C SUPPORT	DW SERIES	2
4	S/S SCREW(NYLOK)	M4 x 0.7 x 20	4
5	LOAD CELL	C2G1	1
	ADW-1500E	C2G1-3kg	
	ADW-3000E	C2G1-6kg	
	ADW-6000E	C2G1-10kg	
	ADW-15KE	C2G1-20kg	
	ADW-30KE	C2G1-35kg	
6	S/S HEX. SCREW	M6 x 1 x 20	4
9	S/S SCREW	M4 x 0.7 x 10	8
10	PLASTIC PLATTER SUPPORT	DW SERIES	1
11	PLASTIC PLATTER	DW SERIES	1
12	PLASTIC SCREW	M6 x 1 x16,M06016D,PA66	1
13	PLASTIC PLATTER CAP	NBS SERIES, M-16	1
14	S/S PLATTER	DW SERIES,251 x 216 x 0.8t	1
15	FLAT CABLE	20PIN,40cm	1
16	BATTERY WIRE	2PIN,25cm	1
17	RECHARGEABLE BATTERY	GP4-6/6V 4Ah	1
19	BATTERY CAP	DW SERIES,ABS(TRANSPARENT)	1
20	S/S HEX. SCREW	M5 x 0.8 x 12	2
21	P.C.B.	DW-12-X	1
22	SCREW	M3 x 10,TAPER	4/2
23	PANEL PC	GW SERIES,135.5x45.5x0.8	2
24	OVERLAY	ADW-E SERIES	1
25	P.C.B.(REAR DISPLAY)	DW-40-X	1
26	REAR PANEL	ADW-E SERIES	1
27	BUBBLE LEVEL	D14	1
28	NAME STICKER	ADW-E SERIES	1
29	UNDER CABINET	DW SERIES	1
32	D.C. JACK	DC-343(BLACK)	1
33	SCREW	M2 x 6,TAPER	2
34	PLASTIC ADJUSTABLE FEET	DW SERIES,M8xψ28x28	4
35	ADJUSTABLE FEET RUBBER	DW SERIES, ψ16x3.5t	4
37	S/S SCREW	M3 x 12,TAPER	6

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

ADM/ADW SERIES SEALING DIAGRAM

SEALING POSITION



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Model Number	AHGM Series
Capacity	1.5~30kg
External Resolution	1/3000

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Maximum Tare Range	33.33% of R.O.

Page 6: [3] Deleted **9030** **10/23/1998 7:34:00 PM**

Power on Zero Range	±10%

Page 6: [4] Deleted **9030** **10/23/1998 7:34:00 PM**

Manual Zero Range	±2%

Page 20: [5] Deleted **9030** **10/23/1998 7:34:00 PM**

A0002030*** LOAD CELL C2G1-XXKG-F 1

Page 20: [6] Deleted **9030** **10/23/1998 7:34:00 PM**