mamii

INFANT INCUBATOR

MODEL NO: CHS-i1000

Operating & Service Manual

It is requested for Operator and Repair Administrator to use this machine.

Read this manual before operation this machine.

Take into custody in the place near and easy to see after reading this manual.

JW Medical

OPERATING MANUAL – OMi1000(En)-07 (26/11/2012)

Before Reading this Manual

The information contained in this manual pertains only to those models of products which are marketed by JW Medical Corporation as of the effective date of this manual or the latest revision thereof.

Read completely through each step in every procedure before starting the procedure; any exceptions may result in a failure to properly and safely complete the attempted procedure.

⚠CAUTION : Servicing of this product in accordance with this service manual should never be undertaken in the absence of proper tools, test equipment and the most recent revision to this service manual which is clearly and thoroughly understood.

This manual is subject to periodic review, update and revision. Customers are cautioned to obtain and consult the latest revision before undertaking any service of the equipment.

※ Definitions of Symbols used

⚠CAUTION : A CAUTION statement is used when the possibility of damage to the equipment exists.

⚠WARNING : A WARNING statement is used when the possibility of injury to the patient or the operator exists.

⚠**NOTE :** A note provides additional information to clarify a point in the text.

	Type BF equipment		Attention, consult accompanying documents
	EN 60601-1 3rd		Manufacturer
	EU Representative		Serial No
	Date of manufacture		

OPERATING AND SERVICE MANUAL

mamii

INFANT INCUBATOR

MODEL : CHS-i1000

JW Medical

Headquarter :
2477, Nambusunhwan-ro, Seocho-gu, Seoul,
Republic of Korea 137-864

Factory :
73, Chungjusandan 1-ro, chungju-si,
Chungcheongbuk-do, Republic of Korea
TEL : (82) 02-2109 - 7700
FAX : (82) 02-852 - 0565

ABOUT LABEL

For safety and proper using, warning label is adhered. Read the followings before operating this machine

The label of CHS-i1000

[1]

⚠ 경고 ⚠ WARNING

HOOD 및 전면도어 개폐시 손이 끼어 상처를 입을 우려가 있습니다.
안전을 위해 손이 끼지 않도록 하여 주십시오.

When operating the hood and front door, your hand or finger can be injured by placing it between those parts. For safety, caution this.

[2]

⚠경고 ⚠WARNING

물통레버 조작시 손이 끼어 상처를 입을 우려가 있습니다.
안전을 위해 손이 끼지 않도록 하여 주십시오.

When operating the lever of water reservoir carelessly, your hand or finger will possibly be injured. For safety, caution this.

[3]

⚠경고 ⚠WARNING

컨트롤러 탈착시 바닥에 떨어져 컨트롤러에 손상을 입힐 우려가 있습니다.
떨어지지 않도록 주의하여 주십시오.

Disassembling control part, it will possibly be damaged by falling off.
For safety, caution this.

[4]

⚠경고 ⚠WARNING

센서 BOX 세척시 무리한 힘을 가하여 세척할 경우 파손될 우려가 있습니다. 세척시 장치의 성능을 위해 센서에 닿지 않도록 하여 주십시오.

Never put excessive force on sensor box when cleaning, or it can be damaged and may bring a fatal risk to operation. For safety caution this.

[5]

⚠ 경고 ⚠ WARNING

감전주의

화상 또는 심한 부상을 일으킬 수 있습니다.
작업전에 전원을 OFF 하십시오.

Hazardous Voltage

Can cause shock burn or severe injury.
Turn off power before service work.

[6] Manufacture information plate

INFANT INCUBATOR (mamii)

EN 60601-1 3rd

Model	**CHS-i1000**	Item No	No. 02-448
SN	**i1K**		
Packing & Weight		1 Set (Max 133kg)	

Electricity	Voltage	Frequency	Input	Fuse
	230 V~	50/60 Hz	Max 590 VA	4 A

JW Medical Corporation

Adress of M.F.G 73, Chungjusandan 1-ro, chungju-si, Chungcheongbuk-do, Republic of Korea

CAUTION - Refer to accompanying documents
CAUTION - ELECTRIC SHOCK
"To avode electrical shock, do not open the cover. Refer servicing to qualified personnel only"

EC	REP

Obelis s.a Boulevard General Wahis 53 1030 Burssels, BELGIUM
Tel +(32) 2. 732.59.54, Fax: +(32) 2.732.60.03

[7] Accessories information plate

ITEM	Quanty	ITEM	Quanty
- Access Port Cover	1EA	- Triangle Fixing Screw	1 EA
- FILTER	4EA	- Power Cord	1 EA
- SKIN TEMPERATURE PROBE	1EA	- Power Cord(Extension)	1 EA
- Dust Cover	1EA	- Hex Socket set screw	6 EA
- Manual	1EA	- Flat Washer/Spring Washer	6 EA
- Fuse(AC250V/4V)	2EA		

CONTENTS

6. OPERATION

7. CLEANING AND DISINFECTION

8. MAINTENANCE AND REPAIR

9. Troubleshooting

Compliance with standards and regulations

Certification of Choongwae medical quality system

The design, manufacturing, marketing, installation and customer servicing of choongwae medical surgical luminaires meets the requirements of the following international standards:

- ISO 13485 : [2012]

The Product class according to Medical Devices Directive is Class IIb by Rule 9 of Annex IX, MDD 93/42/EEC (As amended by 2007/47/EC)

Standards

This surgical luminaires range is designed to fullfill the following applicable standards

- **EN ISO 14971 : 2012**

  Medical devices - Application of risk management to medical devices

- **EN 60601-1 : 2006**

  Medical electrical equipment – Part 1: General requirements for basic safety and essential performance

- **EN 60601-1-2 : 2007**

  Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: Electromagnetic compatibility - Requirements and tests

- **EN 62304 [2006] :** Safety requirements for programmable electronic medical systems

- **EN 60601-2-19 : 2009**

  Medical electrical equipment – Part 2-19: Particular requirements for the basic safety and essential performance of infant incubators

- **EN ISO 14155-1 : 2011**

  Clinical investigation of medical devices for human subjects Part1: General requirements

- **EN 1041 : 2008**

  Information supplied by the manufacturer with medical devices

- **EN 980 : 2008**

  Graphical symbols for use in the labeling of medical devices

- **EN ISO 13485 : 2003-7-15**

  Medical devices - Quality management systems –Requirements for regulatory purposes

- **EN ISO 10993-1 : 2009**

  Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process

Intended use

The CHS-i1000 Infant Incubators provide a controlled thermal environment for neonates who are unable to provide their own thermoregulation. They may be used for short periods of time to facilitate the neonate's transition from the uterus to the external environment. The CHS-i1000 Infant Incubators can be used in two operating modes, such as Air Control Mode and Skin Control Mode.

The CHS-i1000 Infant Incubators have alarms to alert clinicians when certain patient or equipment conditions occur, such as a malfunction, or an excessive departure of the patient's temperature from the set value.

The CHS-i1000 Infant Incubators may incorporate other features, such as humidification of the infant environment, tilting of the bed.

PROLOGUE

Thank you very much for selecting JW mamii infant incubator model CHS-i1000.
To correctly operate the equipment and to keep it in normal function for a long time, it is very important to be well familiarized with the functions of equipment components as well as the operating and maintaining procedures of the equipment.
So it is requested to carefully read this instruction manual before putting the equipment in service.

Although this equipment is designed and manufactured with major consideration for safety of the operator and patient, as well as the reliability of the equipment, strictly observe the following for further assurance of the safety.

CAUTION FOR SAFETY

(1) An INCUBATOR should be used only by appropriately trained personnel and under the direction of qualified medical personnel familiar with currently known risks and benefits of INCUBATOR use.
(2) Never try to remodel the equipment.
(3) Because Equipment is fully set and assembled, don't touch a fixed part.
(4) Keep the assemble and disassemble procedures described in this manual. if not, patient or operator can be received an electric shock or it can give damage to a controller.
(5) Any abnormality occur, immediately disconnect the power to the equipment and contact and consult an nearby JW Service center or local representative office.
(6) If any problems are found, checkup the reason according to the methods described in the manual. In case there is not the method, don't repair it without reason and contact an nearby JW Service center or local representative office.
(7) Room temperature should be maintained with 23.0°C ~ 27.0°C for avoiding the heat loss of operating equipment from environment.
(8) Equipment should not be installed at a place exposed to direct ray of sunlight included reflection light and should not be installed at a place where the risk of a fire or an explosion exists.
(9) Equipment should not be installed in the place as follows.
- The place exposed to noxious gas.
- The place the atmospheric pressure is over 1060hPa or under 700hPa.
- The place exposed to steam.
- The place in water drop
- The place in much dust and sand.
- The place exposed to excessive oil-contained steam

- The place exposed to salinity - contained air.
- The place exposed to explosive gas
- The place in excessive vibration or compact.
- The place the power source and voltage are extraordinarily fluctuated.
- The place the power source and voltage are excessively dropped

(10) There may be the risks of reciprocal interference posed by the presence of the other devices during specific investigations or treatment;

(11) Certainly contact JW Medical Corporation, when equipment is electrically or mechanically connected with the other company' machine.(The equipment which is connected or remodeled or assembled with the part of the other companies without reason can not be given an assurance. caution)

(12) When disposing of this product, contact EC Representative or JW Medical Corporation.

(13) Periodic checks

In order to use the product safely for an extended period of time, check it everyday and take maintenance service periodically as described in Chapter 6.

(14) The lifespan of this product is 7 years.

- However, in case of breakdown by a mistake of users or negligence of periodic checks, the lifespan of the product is not warranted.
- The actual lifespan of the product is largely dependent on the frequency of use and the conditions and environments of the product and therefore may be shorter than 7 years.

1. OUTLINE AND CHARACTERISTICS

1-1. OUTLINE

i1000 is programmed to create optimal conditions through precise control of hood temperature and humidity by the use of a microprocessor. It is designed to minimize the effect of external heat loss on infants.

1-2 CHARACTERISTICS

(1) By user of microprocessor, i1000 makes it possible to control temperature and humidity precisely. This incubator functions to checkup itself for safety of an infant.

(2) It is designed into an air circulation system which minimizes heat loss in hood by the use of a double wall structure and an air wall method.

(3) A humidity controller can adjust humidity precisely between 30~90% to control humidity inside hood

(4) Fourfold safety device is provided so that overheat of a heater can not affect safety of an infant.

(5) Mattress is designed to be smoothly raised and lowered by a handle in front of it to keep its tilt best fitted for a medical treatment.

(6) 8 types of audible & visible alarm devices enable users to identify easily if an incubator has some troubles in its operation.

(7) A filter is installed at an air inlet to prevent outside contaminated air from reaching an infant

(8) The noise level of an incubator in operation is lower than the noise range of particular requirements for safety of an incubator defined by EN 60601-2-19 to provide a comfortable environment for an infant.

(9) The front door and access ports of a hood are designed for a proper treatment of an infant minimizing inside heat loss.

(10) Corners and angled parts of a hood are cleaned and simplified so that operators and a medical team can monitor the status of an infant with accuracy and convenience.

(11) The incubator can be operated by either AIR MODE Control or SKIN MODE Control for an active treatment of an infant.

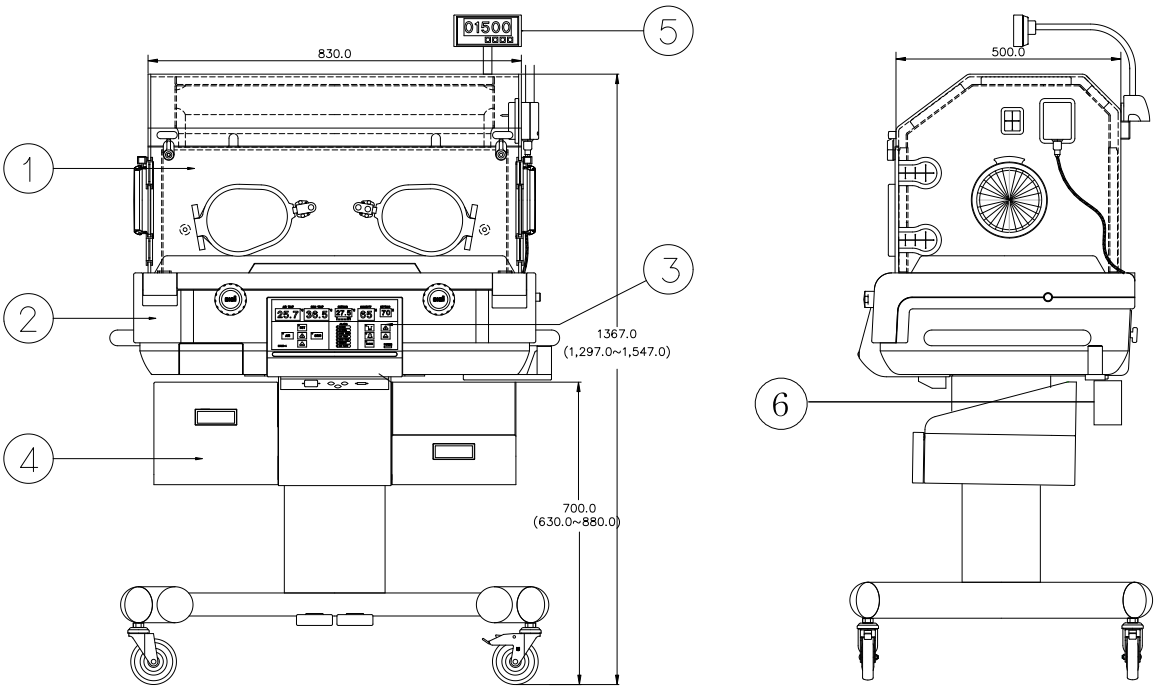
(12) A double wall is designed to be easily installed, removed and moved for cleaning, sanitation, and maintenance & repair of an incubator.

(13) A fixing device which can be simply handled is attached to the control part for its easy installation, and removal.

2. COMPOSITION OF PARTS

2-1. Main Parts

1) Hood Part
2) Base Part
3) Control Part
4) Cabinet Part
5) Scale Part
6) Oxygen supply Part



2-2. Accessories

1) STANDARD ACCESSORIES

- Access Port Cover	1EA	- Triangle Fixing Screw	1 EA
- FILTER	4EA	- Power Cord	1 EA
- SKIN TEMPERATURE PROBE	1EA	- Power Cord(Extension)	1 EA
- Dust Cover	1EA	- Hex Socket set screw	6 EA
- Manual	1EA	- Flat Washer/Spring Washer	6 EA
- Fuse(AC250V/4V)	2EA		

3. SPECIFICATION

3-1. Electric Characteristics

1) Power Supply
   - 230 Vac ~ , 50/60Hz
2) Power Consumption : 600W
   - Main P.C.B : 60W ± 10%
   - Main Heater : 450W ± 10%
   - Humidity Heater : 25W ± 10%
   - Cabinet Part : 50W ± 10%(In case Elevation Cabinet)
   - Oxygen Supply Module : 15W ± 10%
3) Fuse : 250V / 4A

3-2 Characteristics Relating to Use

1) Skin Temperature Measurement
   - Display Range : +22 ~ +42°C
   - Control Range : +34 ~ +37°C(Override Mode: 37.1℃ ~ 38.0℃)
   - Precision : ±0.3°C (within the range)
   - Resolution : ±0.1°C

2) Air Temperature Measurement
   - Display Range : +5°C ~ +50°C
   - Control Range : +20 ~ +37°C(Override Mode: 37.1℃ ~ 38.0℃)
   - Precision : ±0.3°C (within the range)
   - Resolution : ±0.1°C

Table 1. Measurable Range and Precision of a Sensor

TEMPERATURE RANGE	ACCURACY
5 °C ~ 22 °C	± 0.5°C
22°C ~ 50 °C	± 0.3°C

3) Humidity Control
   - Control Range : 30 ~ 90%
   - Indicating Range : 30 ~ 90%
   - Precision : Within 10%

- Resolution : ±1.0%

4) Oxygen Control
- Control Range : 19 ~ 99%
- Indicating Range : 0 ~ 99%
- Precision : Within ±2%
- Resolution : ±1.0%

5) Weight Scale
- Scale Range : 0~15Kg
- Resolution : 5g
- Accuracy : 5g
- Function : Zero, Hold, Tare

6) Heat Characteristic

It is designed in accordance with requirements for safety of an incubator defined by EN 60601-1 and EN 60601-2-19.

7) Alarm Function

(1) Alarm with warning lamp on and unremovable sound
- Power Fail Alarm : In case power is cut off
- System Fail Alarm : In case some errors occur at electrical circuit of a controller

(2) Alarm with warning lamp on and removable sound
- Skin Temp Alarm : In case, the difference between skin temperature and skin control temperature is 1.0°C or higher, In case of lower than 30°C or higher than 42°C (SKIN MODE)
- Air Temp Alarm : In case, the hood temperature is lower than control temperature by 3.0°C or higher by 1.5°C(AIR Mode)

(3) Alarm with warning lamp on, removable sound, and heater off:
- Over Temp Alarm : In case, the hood temperature is higher than 38°C (In case, Override Mode: 40℃) (AIR Control Mode)
  In case, the hood temperature is higher than 40°C (SKIN Control Mode)
- Air Flow Alarm : In case, some errors occur in a motor or a fan

(4) Alarm with warning lamp on, unremovable sound, and values of errors displayed:
- System Fail Alarm : In case, some troubles occur in an electric circuit of a control part

8) Operation Start Warning

When an incubator is switched on, 33.0 is indicated on Set Temp Display Window on a front panel of a control part, and a buzzer rings. Control temperature is set up by the use of Temp Up/Down Button. When the temperature is set up, warning sound disappear, Heater Output Display Window lights up to FULL level, and the incubator starts.

9) The limit of weight of patient : 3Kg

3-3. Safety Characteristic

1) Dielectric Strength

Power neutral line or other input lines should stand next Test voltage for 1 minute. (U: Input Voltage : 230V)

ⅰ) Between live parts and accessible metal parts which are protectively earthen (A-a1) : (1,500V)

ⅱ) Between live parts and parts of the enclosure not protectively earthen (A-a2) : (4,000V)

2) Leakage Current

ⅰ) Earth Leakage Current

ⓐ Normal Condition : Under 0.5mA

ⓑ Single fault condition: Under 1.0mA

ⅱ) Enclosure Leakage Current

ⓐ Normal Condition : Under 0.1mA

ⓑ Single fault condition: Under 0.5mA

ⅲ) Patient Leakage Current

ⓐ Normal Condition : Under 0.1mA

ⓑ Single fault condition: Under 0.5mA

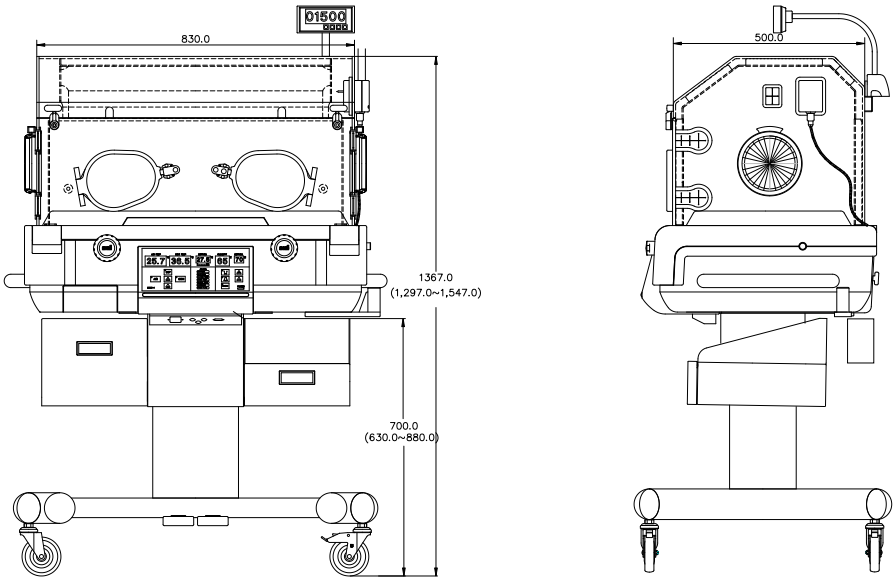
3) Protective Earth Resistance

ⅰ) Between the protective contact in the appliance inlet and any accessible metal part which is protectively earthen shall not exceed 0.1Ω

4) Self Checkup Test

When an incubator is switched on, a microprocessor of a control part checks up program and connection & lining status of the control part in accordance with procedures.

3-4 Instrumental Characteristics



(1) Hood : 830 X 480 X 500 [mm](W X H X D)
(2) Cabinet : 1,016X701X642 [mm](W X H X D)
(In case, Elevation Cabinet: H=630~880)
(3) Mattress : 705 X 20 X 370 [mm](W X H X D)
(4) CASTER : ϕ102.0mm
(5) X-Ray Cassette Tray : 372 X 36 X 375[mm](W X H X D)
(6) Weight Scale : 396 X 67 X 405[mm](W X H X D)

3-5 Other performance

- Air velocity on a mattress : below 10cm/sec
- Noise level inside hood : lower than 47dB during load
- Water Capacity : 1.5 ℓ (About 24 hours)
  Setting Temperature & Humidity : 33℃, 60%
  Environment Temperature & Humidity : 23℃ ~ 27℃ , 50 ~ 70%
- Warm-Up Time : Appox. 25 minutes

  (The time for incubator temperature to rise by 11℃ from ambient temperature. EN 60601-2-19, 50.108)
- CO_2 Level : 0.25%
  Maximum CO_2 level measured per EN 60601-2-19.

3-6 Surrounding environment during use

- Temperature : 23 ~ 27°C
- Humidity : 10 ~ 95% (Non condensing realtive humidity)

3-7 Storage conditions

- Temperature : 10°C to 35°C.
- Humidity : 30 ~ 75% (Non condensing realtive humidity)
- Pressure : 700 hPa to 1060 hPa

3-8 Applied parts

(1) Skin sensor

(2) Mattress

4. Nomenclature and Functions

4-1. Nomenclature and Functions

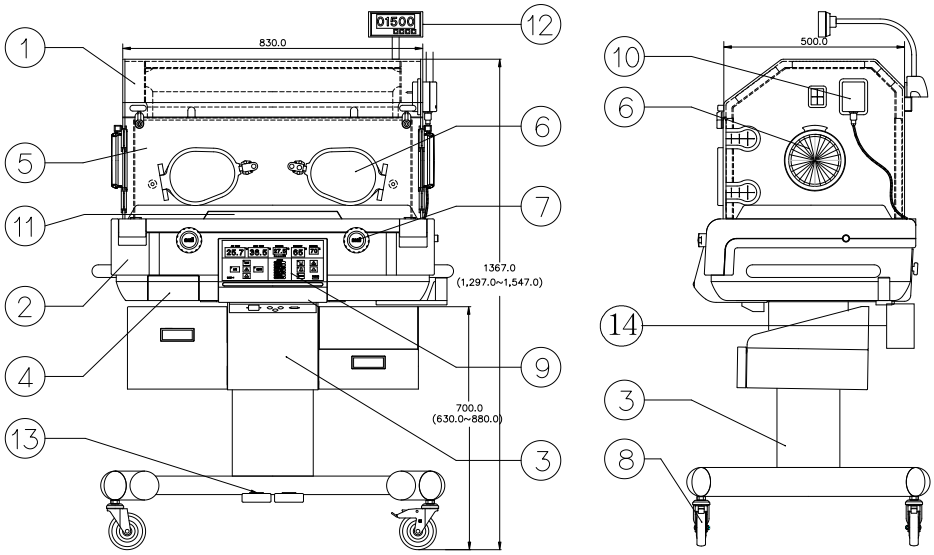


Table 2. Nomenclature & Functions

No.	Name	Functions
1	Hood	It is composed of 4-sided transparent windows which enables users to monitor an infant
2	Base	Composed of a base and a main deck. A mattress is placed, and a control part, a water reservoir is installed for humidity control
3	Cabinet	Incubators are placed on it, and other things may be stored in it.
4	Humidity Reservoir	The water reservoir supplies water to humidity generator. and slides out like a drawer for cleaning and refilling.
5	Front Door	Door designed to enable users to put infants in
6	Access Port	Door which allows treatment of infants without opening a hood door
7	Tilting Handle	Handle-type device which is designed to adjust a mattress to Trendlenburg position and Reverse Trendlenburg position.
8	Caster	Wheels used for easy movement of an incubator. They have a brake device so that they can be fixed on a floor.
9	Controller	Device which regulates hood temperature and removes humidity in a hood
10	Sensor Box	Device which measures the temperature and humidity in Incubator. Temperature and Humidity Sensor is installed in it.
11	X-ray Cassette Tray	The cassette tray which mounts and un-mounts X-ray Cassette(10x12")
12	Weight Scale	Device which measures the weight of the patient
13	Foot Switch	Device which raises and lowers the elevation cabinet
14	Oxygen Supply Module	Device which regulates the oxygen concentration

4-2 Controller Part Nomenclature and Functions

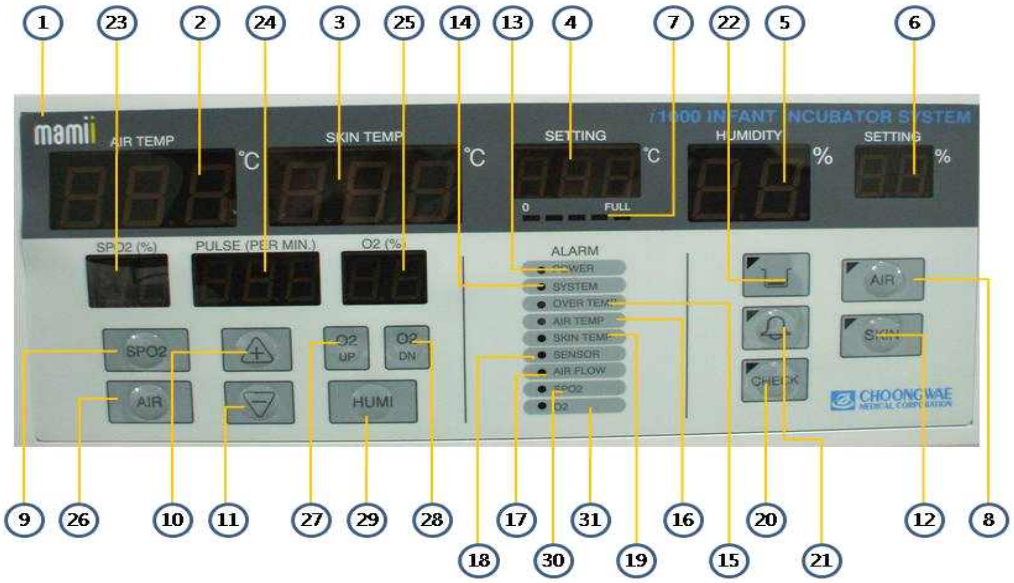


Table 3. Nomenclature of Front Panel

No.	Name	No	Name
1	Controller Front Panel	17	Air Flow Failure Alarm Lamp
2	Air Temperature Display	18	Sensor Failure Alarm Lamp
3	Skin Temperature Display	19	Skin Temperature Alarm Lamp
4	Setting Temperature Display	20	Override Switch
5	Humidity Display	21	Alarm Off Switch
6	Setting Humidity Display	22	Low Water Alarm Lamp
7	Heater Output Display	23	SpO2 Display
8	Air Mode Switch	24	Pulse Display
9	SpO2 Set Switch	25	O2 Display
10	Up Switch	26	Air Set Switch
11	Down Switch	27	O2 Up Set Switch
12	Skin Mode Switch	28	O2 Down Set Switch
13	Power Failure Alarm Lamp	29	Humidity Set Switch
14	System Failure Alarm Lamp	30	SpO2 Alarm Lamp
15	Over Temperature Alarm Lamp	31	O2 Alarm Lamp
16	Air Temperature Alarm Lamp		

(1) Controller Front Panel : This displays the status of incubator.

(2) Air Temp Display Window: The values of measured hood temperature are displayed on Air Temp Display Window. The range of temperature measurement is between 5~50°C and the graduation unit of a temperature sensor is 0.1°C.

(3) Skin Temp Display Window: The temperature measured by Skin Temp Sensor is indicated on Skin Temp Display Window. Thin metal side of the sensor should be attached to abdomen of an infant in order to measure the exact skin temperature. The temperature can be measured by the resolution of 0.1°C between 22~42°C. If the temperature exceeds this range, "HHH" will be displayed, and if it falls behind the range, "LLL" will be indicated.

(4) Setting Temperature Display Window: Users can adjust temperature to be suitable for infants by the use of Up/Down Switch according to an incubator operation mode. Since AIR MODE is automatically selected when an incubator starts, this display window flashes and an alarm goes off until the setting temperature is inputted. The range of temperature control is between 20.0~37.0°C(In case, Override Mode: 37.1℃ ~ 39.0℃) at AIR MODE and between 34.0~37.0°C(In case, Override Mode: 37.1℃ ~ 38.0℃) at SKIN MODE. If System Fail Alarm is activated during normal operation of an incubator, "Err" will be displayed on this window.

(5) Humidity Display Window: Humidity generated by a humidifier is supplied into the hood by an air circulation system and it is measured by a Humidity Sensor to be displayed on Humidity Display Window. The display range is between 30~90%. "LL" will be indicated if humidity is 30% or lower while "HH" will be indicated if it is 90% or higher.

(6) Humidity Control Display Window: Users push Up/Down Button to control humidity volume until it reaches to the value that they want. The range of humidity generation is between 30~90% .

(7) Heater Operation Display Window: This window is indicated by equal 5 divisions from minimum heater output to maximum heater output.

(8) Air Mode Switch: It indicates AIR MODE operation of an incubator and This switch functions to change an operation mode of an incubator into AIR MODE

(9) SpO2 Set Switch : Switch used for setting up the SpO2 alarm value.

(10) Up Switch : It is used to set to control temperature/ Humidity/ SpO2/ O2 UP.

(11) Down Switch : It is used to set to control temperature/ Humidity/ SpO2/ O2 DOWN

(12) Skin Mode Switch: It indicates SKIN MODE operation of an incubator and This switch functions to change an operation mode of an incubator into SKIN Mode.

(13) Power Failure Alarm Lamp : This alarm activated when electricity is cut off

(14) System Failure Alarm Lamp : display an alarm when a system failure occur.

(15) Over Temp Alarm Lamp : display an alarm when an incubator is overheated

(16) Air Temp Alarm Lamp : display an alarm when an incubator temperature is abnormal

(17) Air flow Alarm Lamp : display an alarm when a fan or a motor has some problems

(18) Sensor Alarm Lamp : display an alarm when a fan or a motor has some problems

(19) Skin Temp Alarm Lamp : display an alarm when skin temperature is abnormal at SKIN Mode

(20) Override Switch : Users can adjust override temperature range. When the setting temperature is 37.0°C at any mode, user can set Override Mode by pressing Override Switch. The control range of the override mode is 37.1℃ ~ 39.0℃ in case Air Mode, 37.1℃ ~ 38.0℃ in case Skin Mode.

(21) Alarm Off Switch : This switch functions to remove alarm sound, and it is used to remove all alarm sounds except Power Fail and System Fail alarms.

(22) Low Water Alarm : It means needed water of humidity reservoir.

(23) SpO2 Display : The values of measured oxygen concentration are displayed on SpO2 Display Window.

(24) Pulse Display : The values of measured pulse are displayed on pulse Display Window.

(25) O2 Display : The values of measured oxygen are displayed on pulse Display Window.

(26) Air Set Switch : It is used to set the air temperature in hood.

(27) O2 Up Set Switch : It is used to set O2 up alarm value.

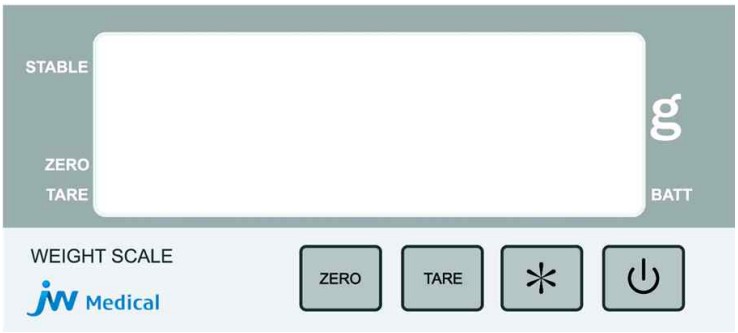
(28) O2 Down Set Switch : It is used to set O2 down alarm value.

(29) Humidity Set Switch : It is used to set the humidity in hood.

(30) SpO2 Alarm Lamp : display an alarm when SpO2 value is lower than a set value, when SpO2 cable is not connect.

(31) O2 Alarm Lamp : display an alarm when oxygen concentration is not within a set value, when oxygen cable is not connect.

4-3 Weight Scale Part Nomenclature and Functions



(1) Switches and Functions

- (Power) : Turn on/off the power
- (Hold) : Using if the patient is moving
- (Tare) : Input and Deleting Tare Weight.
- (Zero): Correct the weight scale to zero if the display value of the weight scale is not zero at empty mattress.

(2) Auxiliary Display and Functions

- ZERO : Displays the weight is zero.
- STABLE : Displays the measuring is stable status.
- TARE : Displays the tare weight is inputted.

5. INSTALLATION

5-1. Product Delivery

(1) Put the package at the place where it is installed.
(2) Unpack the package after checking its outlook to find if there is any defect.
(3) Take the product out and than check up its product outlook to confirm with check-list if it is fine.
(4) Check up if any accessories or parts are missing with check-list.
(5) Please immediately contact JW Medical Corporation if any defect is found. If any defect is not found, fill out the check-list and send us.
(6) Assemble the product in accordance with following procedures, if there is no defect.

5-2. Assembly after Unpacking the Package

(1) There are four protrudent head of bolt under base. Install the incubator on a cabinet by inserting this protrudent parts into cabinet holes and then fasten with six fixing bolt(Truss Screw, M5X16) into the base(Fig. 5). It is strongly recommended to check if a cabinet part and an incubator base part are safely fixed by shaking the upper part a few times.

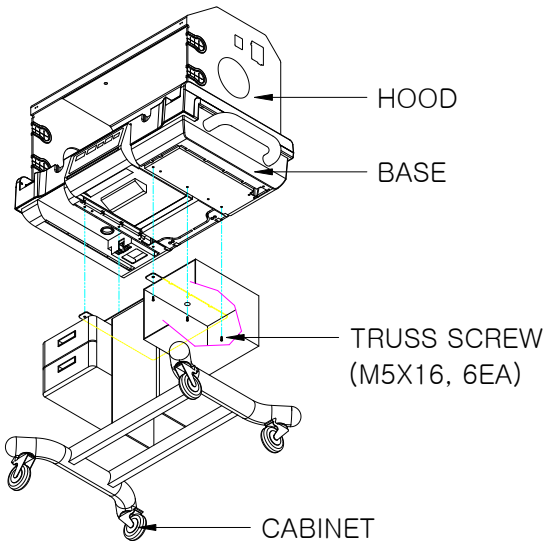


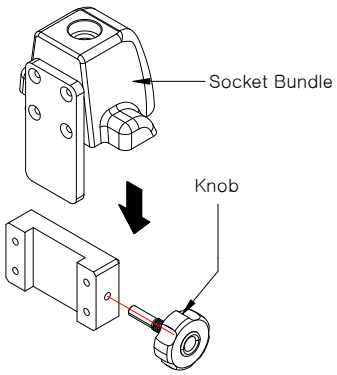
FIG 5. How to assemble the upper part on to the cabinet.

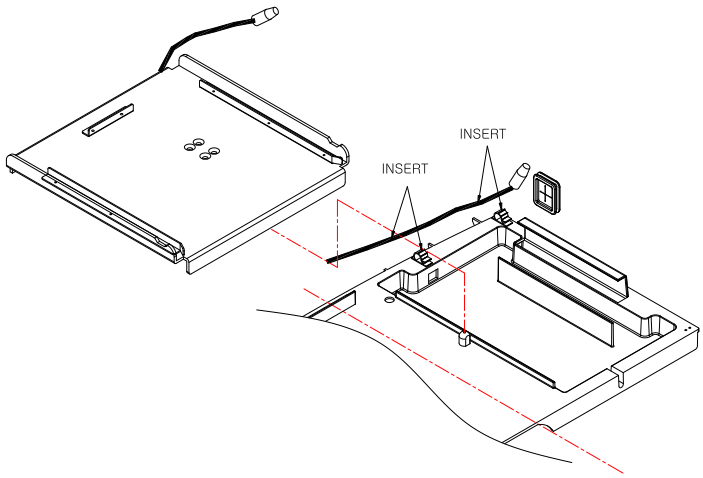
(2) Inset the triangle fixing screw to pole stand plate located on right side of base.

(3) In case, weight scale option

1) Inserting the Socket Bundle of the weight scale to rear side of the hood, and then fix it by fixing knob. And insert Connectors to the Sockets by the colors

2) Fit the scale into scale fixing shaft of maindeck. Route the scale cable outer of Hood though cable clamp attached on maindeck and Tubeinlet(S).
Make sure the cable be not interfere with Upper plate of scale and mattress platform





(4) In case, oxygen supply module option

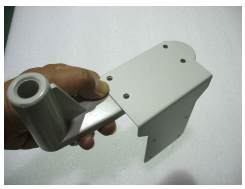


FIG A.

FIG B.

FIG C.

FIG D.

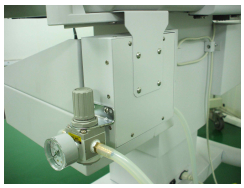


FIG E.

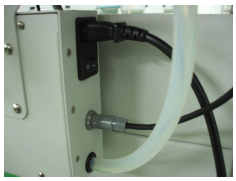


FIG F.

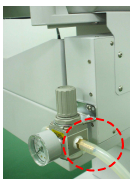


FIG G.

FIG H.

1) Oxygen supply module is assembled to rear side of incubator(FIG C.)

2) Assemble a oxygen supply module bracket and a pole supporter to rear side of the base(FIG A. B.)

3) Insert the oxygen supply module and fix it with bolts.(FIG D. E.)

4) Insert the cable and power cord.(FIG F.)

5) Connect the two oxygen hoses to the external oxygen tank(FIG G.) and the oxygen inlet port(FIG H.)

5-3. Checkup after Installation

⚠WARNING : An incubator should not be checked up when an infant is in it.

⚠CAUTION : An incubator should be proved to have no problem through a checkup before use according to the procedures described in the manual. If any problems are found during checkup, remove the causes or repair the incubator before operation according to the methods described in the manual. Personnels who participated in a professional technical training course should monitor and repair the control or device part of an incubator.

1) Equipment Checkup

⚠CAUTION : Don't switch an incubator on.

(1) Don't switch an incubator on before a checkup. When it is switched on, switch it off.
(2) Check up if a power cord is damaged, and if any damage is found, replace it.
(3) Check up if casters of a cabinet is well exactly fixed after locking them.
(4) Lift the base part on a cabinet a little and then check up if the cabinet is precisely connected to the base.
(5) Check up if it operates well.
(6) Open the door by turning fixing pins on both corners of a front door, and then check up if the inner wall of a hood is exactly and tightly assembled.
(7) Open a hood front door, check up if a mattress and its shelf inside hood are placed exactly and tightly, and check up if the shelf is smoothly pulled outside and it is well fixed by pulling it.
(8) Check up the opening and shutting door of a front door part. Portholes can be opened by pushing a plastic snap locker fixed on the door. Portholes should smoothly open and close, and they should be completely sealed with a hood when they are closed. Check up portholes located on left and right sides of the hood. The portholes are opened by turning them counterclockwise and they are closed by turing them clockwise, and Arm Cuff should not be hindered when portholes are open.
(9) Check up if the double inner walls is exactly and tightly fixed at outside wall. Align fixing holes and fixing spacers of Hood, and then push and slide the double inner wall to fixing spacers of outside wall.
(10) Check up if hood and base are well assembled. And then check up if corners of a base and a hood fit each other.

(11) Check up the Sensor Box which is on right, upper side of hood, is exactly and tightly assembled.

(12) Check up a mattress tilt handle at the front of a hood. And check up if the handle softly turns and a mattress is smoothly raised or lowered by turning the handle.

(13) Check Up if the control box is correctly assembled to base and connect and lock the fixing latch of the control box and bracket attached on cabinet.

(14) Check up if it is well that the pulling and push operation of the water reservoir for humidity control located at the left side from the front of base . Check up the blanket and seal of water reservoir is correctly assembled.

(15) Check up a filter box cover on the back of a base. If the cover from a base is removed by turning fixing handle on both sides, filters will appear. Remove the filter to check up its condition. If the filter is dirty and contaminated, replace it with new one and write replacement date on the filter.

(16) Check up if the display part of the weight scale is correctly fixed with hood and the wiring status is correct.

⚠CAUTION : A filter located at the filter box should not be checked up when an infant is in it.

⚠CAUTION : Check the S/N on label attached on right side of base part and the NO of label attached on under side of control box are accord as following. If they are not same, contact JW Medical Corporation. The temperature and humidity displayed can not be correct.

Check ○○○○○○ are same. (I2K-○○○○○○ : S/N of label)

2) Accessory Checkup

Assemble provided accessories in accordance with the procedures described in manual, and check up if they are firmly and exactly assembled. Move them by the use of moderate force to check up if their movement is smooth.

3) Control Part Check Up

(1) Check up operation power of a control part.

(2) Connect a power, sensor, humidity cable , O2 box cable, O2 sensor cable to the panel on the front-under side of a control part and check up the condition of assemble. In case weight scale option, connect each cables of the weight scale.

(3) Connect a Skin Temp Sensor and sensor cable/O2 sensor cable to the sensor box.

(4) Check up if an adequate volume of water is supplied to a water reservoir for humidity control.

(5) Operate a control part according to following procedures and check up if it is properly operated.

(6) Connect a power cable to inlet of the controller.
(In case elevation cabinet,) Connect a power cable(with Plug) to inlet of the cabinet first. and then connect a power cable(extension) to outlet of the cabinet, and connect an opposite side of the power cable(extension) to inlet of the controller.

(7) Turn on the power by pressing power switch.

① Air Temperature Control MODE(AIR MODE)

⚠NOTE : If temperature is measured below 22℃ during a checkup of Skin Probe, "LLL" will be indicated on a Skin Temp Display Window.

- Plug in.
- Switch on a power on the front side of a control part.
- All display windows at the front panel of a control part will light up and an alarm sound will ring. The control part is operated at AIR MODE during initial operation. Temperature Display Window flashes and the control part waits for the

input by the use of temperature control button(Up/Down), and alarm sound rings.

- Push a temperature switch to check up if temperature can be adjusted up to 20.0°C, lowest AIR MODE control temperature and to 37.0°C(In case Override Mode: 39. 0℃), highest AIR MODE control temperature.

② Skin Temperature Control MODE(SKIN MODE)

⚠NOTE : If temperature is measured below 22°C during a checkup of Skin Probe, "LLL" will be indicated on a Skin Temp Display Window.

- Connect a Skin Temp Sensor to a skin sensor connection hole on side of sensor box.
- Hold a detection part of a sensor and make it warm to check up if the temperature on Skin Temp Displayer rises.
- A Skin Temp Alarm can go on as soon as the operation mode is changed into SKIN MODE by the use of SET Button. This is because a heater is controlled by an infant's skin temperature at SKIN MODE, an alarm would be promptly given by the difference between control temperature and real temperature.
- Push Down Switch for temperature control to check up if minimum control temperature reaches 34.0°C.
- Push Down Switch for temperature control to check up if maximum control temperature reaches 37.0°C.(In case Override Mode: 38.0℃).

③ Alarm Function

⚠NOTE : Alarm operation tests of total 9 alarm systems (Power Fail, System Fail, Over Temp, Air Flow, Sensor Fail, Air Temp, Skin Temp, SpO2, O2) can be done as follows.

◎ Check up Power Fail Alarm and backup battery.

1) Connect power cable to an incubator, and then switch it "ON".
2) Set the temperature at SKIN MODE and AIR Mode.
3) Remove a power cable from a power outlet.
4) Power Fail Warning Lamp light up as soon as power was removed, and alarm sound won't stop, even though Reset Switch is pushed.
5) When a power cable is connected to a power outlet. again after about 2 minutes, temperature values set at each operation mode should be indicated on a display window.

⚠NOTE : **Battery should be charged so that it can activate Power Fail Alarm Lamp and Alarm for about 10 minutes. If this alarm doesn't go off, the incubator should be used for an infant after it is running for at least 2 hours before use to charge a backup battery. It will take up to 8~10 hours to charge a backup battery completely. Battery should be changed every 2 years.**

◎ Check up Over Temp Alarm

1) First, plug an incubator out, slowly heat an Air Temp Sensor part on the sensor box by the use of a hair dryer.
2) The temperature on Air Temp Display Window will rise, and as soon as the measured temperature is 38.0°C(In case Override Mode: 40.0℃). and Over Temp Alarm will be given.
3) At the same time a Heater Operation Display Window Lamp is off because the heater is cut off.
4) Alarm sound will disappear, if Alarm Off Switch is pushed. But Warning Lamp is still on. The control part will be normally operated according to the setting temperature when temperature falls below 38.0°C(In case Override Mode: 40.0℃).

◎ Check up Sensor Fail Alarm

1) Change operation mode to SKIN MODE and set up operation temperature to be 36.0°C
2) Remove a skin temperature sensor from a sensor connection part. Sensor Fail Alarm will promptly go off.
3) Use of alarm off switch will remove alarm sound, but Alarm Warning Lamp is still on. Then the alarm will immediately disappear, if a skin temperature sensor is connected to a sensor connection hole of an incubator.

◎ Check up Air Temp Alarm.

1) This alarm is activated at only AIR MODE, and it takes about 40 minutes to get alarm ready with electric power on during an initial operation. It may be immediately activated by the difference between setting temperature and the initially measured temperature during an early operation. 40 minutes is needed to prevent this initial alarm operation.
2) Use of alarm off switch will remove alarm sound, and the alarm will automatically disappear when the temperature becomes normal.

◎ Check up Skin Temp. Alarm.

This alarm test is done; temperature differences between measured temperature and setting temperature will trigger an alarm, if the operation mode of control part is

changed from AIR MODE to SKIN MODE. Use of alarm off switch will remove the alarm, and a warning lamp is still on. The alarm will disappear when the temperature measured by a Skin Temp sensor in hood reaches setup temperature.

◎ Check up SpO2 Alarm

1) Measure a SpO2 value.
2) When SpO2 value is lower than a set value, alarm is activated.
3) When SpO2 cable is not connect. alarm is activated.

◎ Check up O2 Alarm

1) Measure an O2 value.
2) When oxygen concentration is not within a set value, alarm is activated.
3) When O2 cable is not connect. alarm is activated.

④ Humidity reservoir Operation

⚠CAUTION : Check the height of water of water reservoir located at front-left side of incubator and Press on the power switch.

- If power switch on, then be alarm to set the desired temperature.

- Then you can read the display of humidity control LED 50%.

- First, switch on the SET button, then check the humidity control LED display min 30% to max 80% by using HUMIDITY UP or DOWN switch on the panel.

⑤ Weight Scale

1) Place standard weight(5Kg) to center of mattress platform and turn on power switch.
2) Lift the weight after checking out 
3) Once  is displayed on the screen, place weight back on the mattress platform.
4) Check 5000g is displayed on the screen.

⑥ Elevation Cabinet(Option)

- Operates elevation cabinet to maximum and minimum range pushing "up" and "down" switch, and check up condition of elevation.

6. Operation

6-1 Instruction before operation

⚠CAUTION : An incubator should be checked up before use according to procedures described on its manual. If any FAIL occurs during a checkup, the cause of a breakdown should be checked and the incubator should be repaired or replaced. Personnels who participated in a professional technical training course should monitor and repair the control or device part of an incubator.

⚠CAUTION : Infant incubators should be operated by users who can take proper actions for infants after careful reading of this manual.

⚠CAUTION : Infant incubators should not be installed at a place where the risk of a fire or an explosion exists.

⚠WARNING : The source of a fire or an explosion should be removed before operating incubator.

⚠WARNING : Direct sunlight or other radiant heat sources can cause an increase in INCUBATOR temperature to dangerous levels.

⚠WARNING : Users should monitor incubators. Infants should be monitored at least every 30 minutes. Select a AIR MODE when patients should be monitored for a long time.

⚠WARNING : When one of 9 alarms equipped on a control part is activated, users should transfer an infant under treatment to another incubator and use the incubator again after removing cause of an alarm.

⚠WARNING : Any thing which can affect the air circulation system should not be leave in inside of hood and Inner wall should not be removed when operating the incubator.

⚠WARNING : Hood temperature should be kept stable in accordance with hood control temperature while incubators are running, and air circulation should not hinder by anything. A main deck over a base should cover the base well. Inaccurately assembled main deck affects an air circulation system, resulting in fatal damage to temperature control in a hood.

⚠WARNING : When one of 9 alarms equipped on a control part is activated, users should transfer an infant under treatment to another incubator and use the incubator again after removing cause of an alarm.

⚠WARNING : Normally air circulation will not be possible if the incubator is operated without the inner wall installed. Be certain to install the inner wall on the inside of the HOOD before operating the incubator.

⚠WARNING : Use of electro surgical units or other electrical field radiating equipment can affect the operation of the unit. Keep the patient probe lead as far away as possible from electro surgical cables. Do not allow excess electrical cables to be laid on the bed platform. Use of electro surgical units or other instruments which radiate electrical fields can cause in direct heating, by several tenths of a degree of the skin temperature probe due to absorbed electrical energy

⚠WARNING : The operator must not touch signal input or signal output parts, and the patient simultaneously.

6-2. AIR MODE

⚠NOTE : Skin Temp Sensor doesn't affect a heater operation at AIR MODE.

⚠NOTE : If the temperature measured by Skin Temp Sensor is 22.0°C or lower, "LLL" will be indicated on Skin Temp Display Window.

⚠WARNING : When one of 9 alarms equipped on a control part is activated, users should transfer an infant under treatment to another incubator and use the incubator again after removing cause of an alarm.

(1) Infant incubators should be installed at a place flat and unexposed to direct ray of sunlight. And lock the caster of cabinet
(2) Before connecting the power cable, check up if the power voltage is proper.
(3) Fill the distilled water into water reservoir until Full Line indicated on inside of water reservoir.
(4) Check Up if a power, sensor, humidity cable is exactly connected to the panel on the front-under side of a control part and if the skin Temp Sensor and sensor cable is connected to the sensor box. Connect the power cable and switch power on.
(5) If the incubator is switched on, the microprocessor of a control part performs a self checkup, and if no errors, Set Temp Display Window waits until the setting temperature of 33.0°C is inputted at AIR MODE, and the display window flashes as soon as alarm sound rings. If desired temperature is set by the use of Up/Down switch, the alarm will stop and a heater will be promptly operated. And humidity can be controlled by Up/Down switch located on humidity control part of front panel.

⚠NOTE : The range of temperature display is between 5.0°C~50.0°C at this AIR MODE and the graduation unit of a temperature sensor is 0.1°C. The range of setting temperature is between 20.0°C~37.0°C and the alarm sound will ring in case the hood temperature is higher than setting temperature by 1.5°C or lower than 3.0°C. Refer the alarm part if the alarm occur.

(6) The time is 40 minutes for hood temperature and humidity to reach setting temperature and humidity. This is because that the time needed for stabilization varies depending on the ambient temperature and humidity.
(9) How to change the setting temperature and humidity of hood. Push the set switch then the set switch lamp on. Change the temperature and humidity to desired ones

by using the temperature and humidity control Up/Down switch. In the condition the set switch lamp on, user can change the temperature and humidity. Set switch lamp on for 13 seconds after push on the set switch.

⚠NOTE : If an incubator starts at AIR MODE, Air Temp Fail Alarm won't ring for about 40 minutes after the temperature is set and 15 minutes after the control temperature is changed.

(10) Heater Output indication

Heater Output display indicates the amount of heat supplied as required to maintain the hood temperature at desired temperature. As the incubator temperature rises toward the desired temperature, the heater supply decreases and the reading on the display lowers gradually from FULL, and when the desired hood temperature is reached, the heater output reading remains within the balanced heat supply range between 0 and 1/2. Thus heater output display helps to know varying hood temperature control.

(11) The hood temperature and humidity reaching to the desired temperature and humidity, place the infant on the mattress after open the front door

- In case infants lie: Attach thin metal side of Skin Temp Sensor to the center of the infants' abdomens.
- When infants lie on their stomachs: Attach thin metal side of Skin Temp Sensor to infants' kidneys. Close the front door and lock it with lock lever of front door.

⚠WARNING : Front door should be closed and locked with lock lever of front door certainly after placing the infant on the mattress. And check up if the snap open door is closed.

⚠WARNING : Users should monitor the temperature and humidity of hood at least every 30 minutes.

6-3. SKIN MODE

⚠WARNING : Skin temperature sensor should not be used the other purpose except measuring the skin temperature of infant.

⚠NOTE : If the temperature measured by Skin Temp Sensor is 22.0°C or lower, "LLL" is indicated on Skin Temp Display Window.

⚠NOTE : Skin Temp Alarm rings if the temperature measured by Skin Temp Sensor is lower than 34°C or higher than 37°C and in case the difference between skin temperature and skin control temperature is 1.0°C or higher. Refer the Alarm part.

⚠WARNING : When one of 9 alarms equipped on a control part is activated, users should transfer an infant under treatment to another incubator and use the incubator again after removing cause of an alarm.

(1) Follow the procedures described in 6-2 "AIR MODE" to stabilize the hood temperature and humidity.
(2) Place the infant on the center of mattress after open the front door. And Close the front door and lock it with lock lever of front door.
(3) A gentle touch by the elbow on the port latch opens the snap open door attached on the front door. when closing the port push it to close completely
(4) Check up if the skin sensor probe is inserted firmly to connecting jack on the sensor box which is located on right-upper side of hood. The temperature measured by skin sensor is displayed on skin temp display window.
(5) Clean the skin at the intended probe site with alcohol or lukewarm water to remove smegma embryonum and soil before attaching the probe.
(6) Attach the heat sensing element at the tip of the probe to the skin with a non-irritative adhesive tape.

⚠CAUTION : Make certain that the metal disk heat sensor maintains an airtight seal with the skin. if the skin temperature probe is not properly attached to the infant's abdomen, it will not detect the temperature accurately. If the probe is dislodged accidentally, the hood temperature will have nothing to do with infant's skin temperature.

⚠CAUTION : If the skin sensor probe is covered with a blanket, diapers or the infant's arm and warmed, or if it gets wet with urine or fluid and cooled, it will not detect the temperature accurately.

⚠CAUTION : Be sure to follow the doctor's instructions regarding the intended skin site in attaching the probe with the infant lying on its abdomen.

(7) Check by the skin temperature display four to five minutes after attaching the probe that the infant's skin temperature is stable.

(8) Switch on the set switch and push the skin mode button. then skin mode switch lamp on indicating the temperature of hood be operated by skin mode.

(9) Push the set switch then the set switch lamp on. Change the temperature and humidity to desired ones by using the temperature and humidity control Up/Down switch. In the condition the set switch lamp on, user can change the temperature and humidity. Set switch lamp on for 13 seconds after push on the set switch.

⚠CAUTION : Be sure to follow the doctor's instructions regarding setting of skin temperature.

⚠NOTE : The display range of the skin temperature is between 22~42℃ by the resolution of 0.1℃. If the temperature exceeds this range, "HHH" will be displayed, and if it falls behind the range, "LLL" will be indicated. The control range of the temperature is between 34~37℃

(10) Heater Output indication

Heater Output display indicates the amount of heat supplied as required to maintain the skin temperature at desired temperature. As the skin temperature rises toward the desired temperature, the heater supply decreases and the reading on the display lowers gradually from FULL. and when the desired skin temperature is reached, the heater output reading remains within the balanced heat supply range between 0 and 1/2. Thus heater output display helps to know varying skin temperature control.

(11) How to change mode from Skin Mode to Air Mode

Switch on the set switch and push the Air mode button. then Air mode switch lamp on indicating the temperature of hood be operated by skin mode.

6-4. Alarm Function

The control part is provided with below alarm functions, and its fast direction of alarms enables us to avoid or repair simple breakdown.

⚠WARNING : When one of 9 alarms equipped on a control part is activated, users should transfer an infant under treatment to another incubator and use the incubator again after removing cause of an alarm.

⚠NOTE : If System Fail Alarm is activated, "Err" is displayed on Setting Temperature Display Window and an error value for that error on Humidity Measurement Display Window.

Each of 9 alarm lamps lights up according to error priority, and the priority is given by the order of alarm arrangement.

Power Fail and System Fail alarm and SpO2/ O2 Alarm sound rings completely regardless of alarm off Switch and the sound of the other alarms is removed by pushing alarm off Switch. If top priority alarm goes off, lower priority alarms are automatically removed. If alarm sound is removed after an alarm is activated, the alarm sound will restart in a certain time. And the alarm will be consistently activated unless its cause is removed.

FIG 7. Alarm Display

Functions are described according to alarm priority;

(1) Power Fail Alarm : This alarm is activated by backup battery, when an incubator is cut off in normal operation, and alarm sound incessantly rings regardless of alarm off switch. Operational information collected before the error occurs is stored in Memory by the backup battery and it is called when the error is corrected so that a control part can be normally operated.

(2) System Fail Alarm : Errors on main board of a control part are detected by a microprocessor to cut off a heater automatically and an alarm with unremovable sound is activated. "Err" is also indicated on Set Temp Display Window and an error value for that error on Measured Humidity Display Window so that users and engineers can simply correct and repair the error.

(3) Over Temp Alarm: It warns that the hood air temperature is overheated cutting off a heater automatically. The alarm operation conditions differentiated by operation modes as follows:

Table 4. OPERATION CONDITION

Operation Mode	Operation Temperature
AIR MODE	38.0°C
SKIN MODE	40.0°C

This alarm lights up an alarm warning lamp using alarm off Switch, but only alarm sound is removable.

(4) Air Flow Fail Alarm : This alarm is activated by air circulation errors due to troubles in a hood air circulation system and motor troubles, or it rings when a circulation fan connected to a motor is not well fixed at a motor axis. It cuts off a heater as soon as the error occurs in consideration of an infant's safety, and the alarm sound can be removed by alarm off switch on a control panel of a control part.

(5) Sensor Fail Alarm: This alarm is activated at both AIR & SKIN MODE. It rings at AIR MODE when Air Temp Sensor is short-circuit or cut, and at SKIN MODE when Skin Temp Sensor is short-circuit or cut, and Skin Temp Sensor is not connected to the sensor connecting part on a power panel of a controller. A heater is automatically cut off in consideration of an infant's safety, and the alarm sound can be removed by alarm off switch of a control part.

(6) Skin Temp Alarm/Air Temp Alarm: An alarm rings when below conditions are met:

- Skin Temp Alarm: In case that difference of 1.0°C or higher between skin temperature and skin control temperature appear and if the temperature measured by Skin Temp Sensor is lower than 34°C or higher than 37°C (SKIN MODE)

- Air Temp Alarm: In case that difference between hood temperature and control temperature is higher than 1.5°C or lower than 3.0°C (AIR MODE)

The sound of these alarms can be removed by the use of alarm off Switch on a control panel of a control part. If an incubator starts at AIR MODE, Air Temp Fail Alarm won't ring for about 40 minutes after the temperature is set and 15 minutes after the control temperature is changed. The incubator will be in a normal operation without any alarms at SKIN MODE, if the temperature comes under the range of 34 0.0~37.0°C. But Skin Temp Fail Alarm is activated as soon as the mode is changed from AIR to SKIN, if hood temperature is controlled lower than this range at AIR MODE and if the skin temperature sensor is not attached on the patient skin.

(7) SpO2 Alarm: This alarm is activated at both AIR & SKIN MODE. When SpO2 value is lower than a set value, When SpO2 cable is not connect. alarm is activated, and alarm sound incessantly rings regardless of alarm off switch.

(8) O2 Alarm: This alarm is activated at both AIR & SKIN MODE. When oxygen concentration is not within a set value, When O2 cable is not connect. alarm is activated, and alarm sound incessantly rings regardless of alarm off switch.

6-5. Hood Operation

⚠WARNING : Don't open a hood when an infant is in it. Open it only after an infant receives a medical treatment or when the incubator is maintained & repaired, disinfected, or cleaned.

⚠WARNING : Stay beside an infant when a hood front door is open for its treatment. Users should always monitor the infant.

⚠WARNING : When opening and closing the hood and front door, your hand or finger can be injured by placing it between operating parts. For safety caution this.

⚠CAUTION : Users should check up the cables of a Skin Temp Sensor for monitoring an infant and a Humidity Sensor for humidity control before opening a hood front door or an opening and shutting door.

A Hood should easily be open and closed for cleaning and disinfection. Hold a lower part of the hood front center and lift the hood up to open it after pushing the locking latch button on right side of base. When a hood is open up to maximum level, locking latch on its right back side is designed to be automatically locked. Check up if the latch is exactly locked under the situation the hood is open, and then remove your hands from the hood. You can put down the hood, if you hold the hood center with your left hand and then push the locking latch button when you want to close it. Close the hood with hand by fitting it into a base after putting it down.

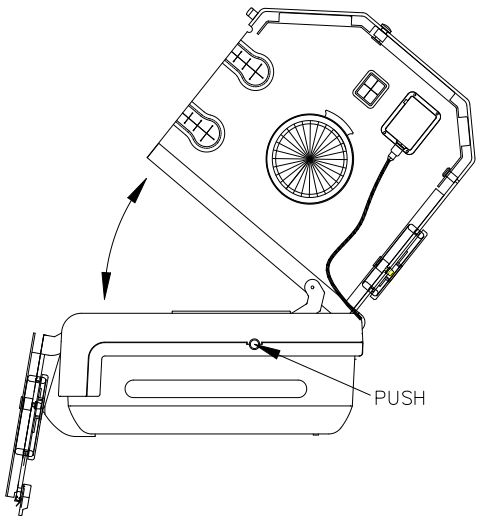


FIG 8. Hood Operation

6-6. Mattress Tilting Operation

⚠CAUTION : Don't move an incubator holding a Mattress Tilt Handle.

⚠CAUTION : Cables or tubes of such as Temp. Sensor for medical treatment of infants should be protected when a mattress shelf are removed out

The Tilt Handle enables users to adjust the position of an infant to be Trendlenburg and Reverse Trendlenburg positions. The handle is in front of a hood allowing users to adjust positions of infants. In case of Rotary Type, User can control the angle of mattress suitable for their treatment smoothly and exactly by the use of Screw Method.

(1) If users want to raise the right side of a mattress, hold a right Tilt Handle and turn it clockwise. If they turn it counterclockwise, the right side of a mattress will be lowered. If users want to raise the left side of a mattress, hold a left Tilt Handle and turn it counterclockwise. If they turn it clockwise, the left side of a mattress will be lowered.

6-7. How to Supply Oxygen

⚠CAUTION : Doctors in charge should decide percentage of oxygen concentration and supply time of concentrated oxygen.

⚠CAUTION : The oxygen supplied must be the one for medical use.

(1) Connect an oxygen supply hose to an oxygen inlet port

⚠WARNING : An Oxygen supply valve is not used during supply of moist-content oxygen. Use of an oxygen supply valve may cause malfunctions of oxygen supply devices during supply of humidity and oxygen provided from a humidity generator.

(2) an oxygen analyzer shall be used when oxygen is delivered to the baby.

(3) If high-density oxygen is required, use an oxygen flowmeter to adjust desired current speed. It takes about 40 minutes to stabilize condensed oxygen supplied from an incubator. (If the concentration percentage is low, the current speed becomes faster while the current speed becomes slower, if the concentration percentage is high). Monitoring of the concentrated oxygen (every 10 minutes) and its current speed

should be done until condensed oxygen inside of a hood will be stabilized. Attentions to infants should be taken when condensed oxygen is used.

⚠WARNING : If the supply of highly concentrated oxygen fails, fresh room air should be able to be immediately supplied into a hood for safety of an infant, and oxygen supply status should be consistently monitored during use of highly concentrated oxygen.

※ General Notes during Use of Oxygen

The concentration percents of condensed oxygen in an incubator depends on operation conditions of a control part, accuracy of an oxygen flowmeter, and other factors. Consistently measure the concentration level inside of a hood by the use of a precise concentrated oxygen sensor to keep its adequate volume. Measure it regularly for accuracy of used oxygen in air(20.9%) and pure oxygen. Follow a doctor's instruction strictly to measure optimal oxygen condensation status of an incubator based on PO2 (Measured value of artery oxygen partial pressure).

⚠WARNING : The use of oxygen increases the danger of fire and that auxiliary equipment producing sparks shall not be placed in the INCUBATOR.

⚠WARNING : Even small quantities of flammable agents, such as ether and alcohol, left in the INCUBATOR can cause fire in connection with oxygen.

⚠WARNING : Administration of oxygen may increase the noise level for the baby within the INCUBATOR.

⚠CAUTION : The concentration percents of oxygen should be measured and monitored around head of an infant when concentrated oxygen is used.

(4) Oxygen Supply Port on the rear side of a Base and Oxygen Flowmeter Port should be exactly connected to each other.

⚠WARNING : Oxygen pressure must adjust under 0.5kgf/cm2.(Use the knob of the regulator)

(5) Oxygen concentration inside hood is measured by Oxygen sensor every second.

(6) How to change the Oxygen concentration upper value of hood. Push the Oxygen concentration upper value set switch. And change the Oxygen concentration upper

value to desired ones by using Up/Down switch. Lastly Push the Oxygen concentration upper value set switch.

(7) How to change the Oxygen concentration lower value of hood. Push the Oxygen concentration lower value set switch. And change the Oxygen concentration lower value to desired ones by using Up/Down switch. Lastly Push the Oxygen concentration lower value set switch.

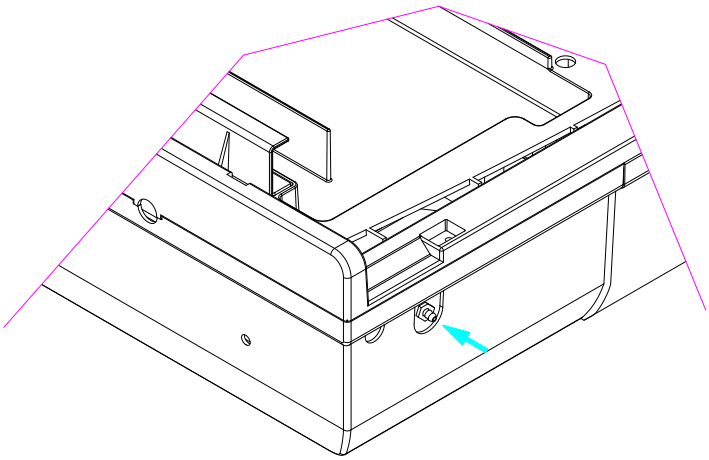


FIG 9. Oxygen Supply Port

6-8. Operation for Humidity Control

⚠CAUTION : Humidity should be controlled in accordance with a doctor's instructions after hood temperature is stabilized at the set temperature.

⚠CAUTION : disinfected and distilled water should be used for humidity control certainly.

(1) The range of setting and display

The range of Humidity setting and display is 30% ~ 90%. If the Humidity exceeds this range, "HHH" will be displayed, and if it falls behind the range, "LLL" will be indicated.

(2) How to exchange the water of water reservoir

- Turn the lever which located on underside of water reservoir counter clock wise and pull the water reservoir.
- After removing the blanket and seal, lift the water reservoir and drain the water.
- Clean the water reservoir according to procedures described on 「7. Cleaning and disinfection.
- Fill the water into water reservoir until Full Line indicated on inside of water reservoir.
- Assemble the water reservoir in the reverse order.

⚠CAUTION : In the condition, the lever of water reservoir being locked, the water reservoir can't be pulled. Exceed Force can damage it. so check up when pull the water reservoir.

⚠CAUTION : In case the direction of blanket of water reservoir being incorrect, humidity can't be operated properly and any troubles can be occurred. Check Up certainly the direction of blanket of water reservoir before pushing the water reservoir into base.

(3) **How to use a humidifier**

- Fill distilled till full line water into a water reservoir for humidity control
- Set the proper humidity volume by the use of Up/Down Button after switch on the Set Button for humidity control in front of a controller. Then humidity volume is indicated on Humidity Setting Display Window.

- A hood gets dim due to evaporation when hood temperature is much higher than

room temperature in which an incubator is used. It is a natural phenomenon caused by the difference between incubator temperature and room temperature rather than an occurrence due to any operational problems of an incubator. It won't occur unless the difference between incubator temperature and its room temperature is great.

- Water volume should be monitored every 5 hours during operation of an incubator, and distilled water should be supplied to a water tank as soon as water runs short. The water of water reservoir in the Base part for humidity control is closely related with hood temperature and humidity control.

⚠CAUTION : If the LOW WATER alarm is lamp on, it indicates there is no water. So distilled water should be supplied to a water reservoir as soon as checking LOW WATER alarm lamp on.

⚠CAUTION : When an incubator is not used, water of reservoir water tank should be removed in accordance with above mentioned procedures.

⚠CAUTION : When operating the lever of water reservoir carelessly, your hand or finger possibly be injured. For safety, caution this.

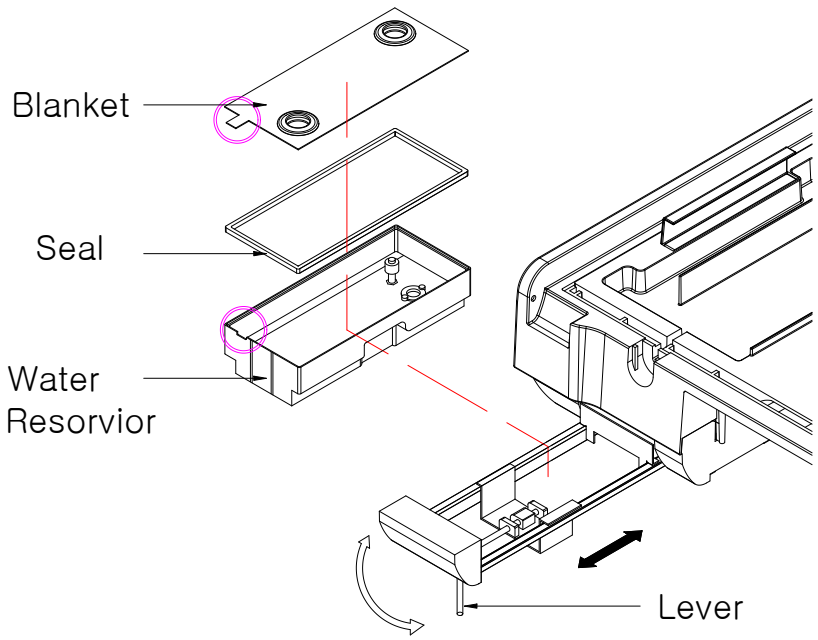


FIG 10 . Water reservoir for Humidity Control

6-9. Operation of the X-ray Cassette Tray

(1) Mounting: Pull cassette tray to front side, and mount x-ray cassette to cassette tray. and push the cassette tray to mattress.

(2) Un-mounting: Pull cassette tray to front side, and un-mount x-ray cassette to cassette tray. and push the cassette tray to mattress.

6-10 Operation of the elevation cabinet

(1) Press foot switch(△) of the cabinet, and then cabinet will be raised.

(2) Press foot switch(▽) of the cabinet, and then cabinet will be down

6-11 Operation of the weight scale

The incubator can be equipped which its own in-bed scale that is operated from screen. See Capter 4. Nomenclature and Fuctions for inforamtion about how to scale menu work

(1) Weighting Procedure

⚠NOTE : The baby should be in approximately the center of the bed. Stuffed animals and other objects should not lean against side walls. All leads, I.V. tubes and ventilator tubes should be secured. Blankets may be tucked under th mattress, but must not be tucked under the weighting platform

1) Make sure the bed tilt platform is completely level; if the scale is tilted it will effect weighting accuracy.

2) Turn on Power of the Weight Scale by pressing  .

3) Check out if  is displayed to display part. And then Lift the baby and any tubing or leads attached to the baby. Make sure that arms, legs, blankets, and clothing are clear of the mattress

4) Hold the baby for a seconds and  appears on the screen. Place the baby back down on the mattress while holding up any leads or tubes attached to the baby.

if  is not displayed on screen, reduce weight of mattress platform removing the things like blanket which can weight over mattress platform.

5) The scale will now calculate the baby's weight which will appear in the display

The baby's weight should be read after the "stable" auxiliarly indication being displayed on the screen

⚠NOTE : The scale weights any object on the platform, so if you replace the baby without holding up lead and tubes, the weight of the leads and tubes will be included with the baby's weight

(2) Weighing with TARE

1) Place the Tare which is the things like blanket on the mattress platform

2) Press "TARE" Key and then TARE function will be setup turning on TARE indication on the screen

(3) Weighing with Hold

This Function can be used When the weight of baby displayed on the screen is not constant because of baby' moving

Press the "HOLD" Key, then the average weighing value will be displayed on screen about 2 seconds later,

(4) Auto Shut Off Function

The weight scale equipped with Auto Shut Off Function which makes power off automatically at 30 seconds after your last operation.

7. Cleaning and Disinfection

7-1 Disassembly

⚠CAUTION : Place an infant into another incubator in normal operation before disassembly.

⚠CAUTION : Switch off incubator before disassembly, and plug out the power cable from power sources.

⚠CAUTION : Remove the control part from the incubator after cooling off a heater for about 40 minutes since it is heated

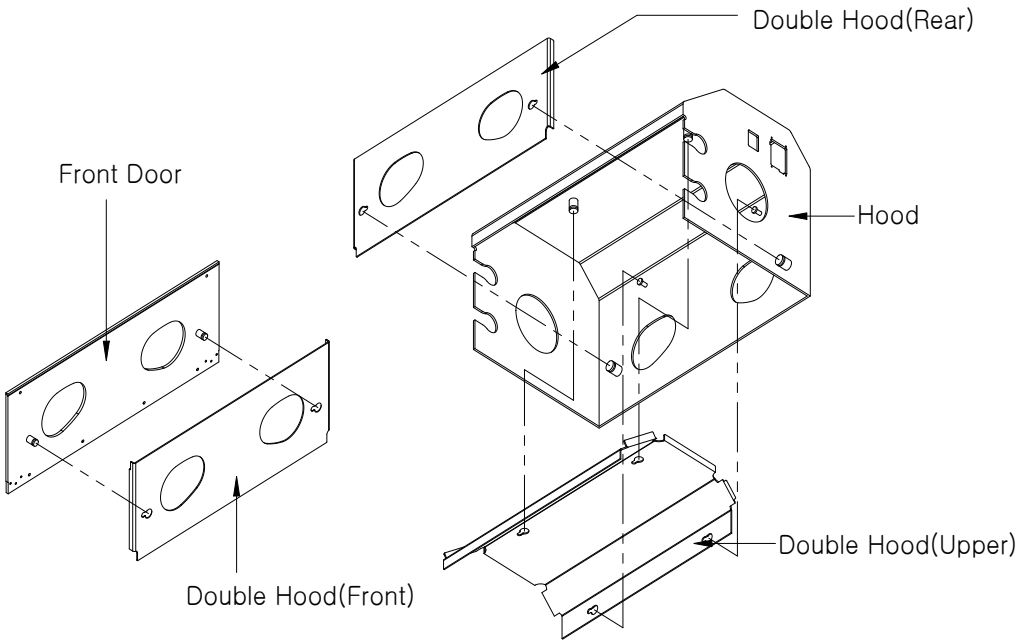


Fig. 11. Removal and Installation of Double Wall(Inner Wall)

1) Hood Part
   (1) Wait for about 40 minutes to cool off a heater after an incubator is plugged out.
   (2) Open a hood front door.
   (3) Pull Double wall(inner wall) with proper force. Then Double wall(inner wall) and outside wall be separated.
   (4) Turn open the outside caps of access ports on both sides of a hood and then remove vinyl Arm Cuff
   (5) Lift the hood until hood locking device on its right back side is locked. If it is lifted utmost, the device is automatically locked.

(6) Remove your hands from the hood after checking up if it is completely fixed by a locking device by shaking it a little.

(7) If the hood is completely open, put your hands into the hood and remove all double walls(inner walls) of hood top and back sides from outside walls.

(8) Remove a mattress shelf on a main deck.

(9) Remove Weight Scale

- Disassemble the Weight Scale from Hood and Base in the reverse order of 「7-1 Assembly after unpacking the package (3)」

(10) Remove maindeck from base

⚠WARNING : When replacing the MATTRESS Shelf on the incubator after taking it out. Make certain that it is installed with its FRONT SIDE in front.

2) Base Part

(1) Unfix base part and control part by unlocking the fixing latch on both - under side of a control part after a heater of a control part gets cool.

(2) Pull the control part by applying equal force to both hands. And then control part will be removed outside from base part.

⚠WARNING : Disassembling control part, it will possibly be damaged by falling off. For safety, caution this.

(3) Remove a water reservoir for humidity control from the front of base.

(4) There is a filter cover behind base part.

(5) Turn off fastener on both sides of the filter cover.

(6) Remove a filter cover, and then remove the filter in it.

7-2. Cleaning and Disinfection

1) Cleaning

First, dip all incubator parts into disinfection solution. Next, rinse them with disinfected, clean and warm water. And then dry them completely. Finally wipe off moisture by the use of a soft cloth. Use disassembly methods of each part described on 「7-1 disassembly」 for cleaning and disinfection. Comply with the following methods for incubator cleaning and disinfection.

- ♣ 0.2~0.5% Benzalkonium chloride solution
- ♣ 0.2~0.5% Benzethonium chloride solution
- ♣ 0.02~0.05% Chlorhexidine solution

⚠CAUTION : It is strictly prohibited to use alcohol for cleaning and disinfection. Undiluted solutions should not be used even though they are earlier mentioned. If the solution is to be used for disinfection, the above mentioned solutions or equivalent one should be diluted for use.

(1) Hood

① Completely remove double inner walls of a hood according to the method described on 「 7-1 Disassembly」.
② Open an opening and shutting door to remove installed silicon arm cuff.
③ Turn access ports on both sides of a hood to remove vinyl Arm Cuff
④ Wash both inside and outside the hood outside wall using a soft cloth dipped into disinfection solution.
⑤ Also wash double inner walls by the use of a soft cloth dipped into disinfection solution.
⑥ Assemble the removed vinyl of ② after disinfecting it.
⑦ Assemble the removed vinyl of ③ after disinfecting it.
⑧ Assemble the hood taking steps in the reverse order of 「7-1 Disassembly」.

⚠WARNING : Never put excessive Force on sensor box when cleaning, or it can be damaged and may bring a fatal risk to operation. For safety caution this.

(2) Mattress

Mattress can be reused after disinfection and cleaning because it is covered with vinyl. If the linking part of mattress rim is damaged, replace it because germs may propagate on it.

(3) Main deck

Disinfect and clean the main deck removed by the method described on 「7-1

Disassembly」 using a soft cloth dipped into disinfection & cleaning solution.

(4) Weight Scale

Disinfect and clean the weight scale removed by the method described on 「7-1 Disassembly」 using a soft cloth dipped into disinfection & cleaning solution.

(5) Base

Clean the base surface with a soft cloth dipped into disinfection & cleaning solution.

(6) Control Part

⚠WARNING : Check it up before washing if a heater on a control part gets cool.

⚠CAUTION : When it is wiped off with a dry cloth, static electricity should be limited to minimum level. Static electricity generated during cleaning may affect electronic parts in control part changing them into poor quality.

Wipe off front panel and other parts of control part removed by the method described on 「7-1 Disassembly」 with a soft and dry cloth. Clean a heater, an air circulation fan, and a thermostat etc. by wiping them off with a cloth dipped into disinfection solution. Pay a careful attention lest these solutions or other fluids should flow into a control part. The fluid flown into the control part may bring a fatal risk to operation of a control part and infants during its use after being assembled. If the fluid flown into the control part, it must be operated after drying.

(7) Water Reservoir for Humidity Control

Clean both inside and outside of water reservoir in Base according to procedures described on 「7-1 Disassembly」 with a soft cloth dipped into disinfection & cleaning solution, dry the reservoir, and rinse it again using disinfected and clean water.

⚠CAUTION : If there is some water on electric contact part of water reservoir backside, any troubles can be occurred in humidity control. Check Up if there is some moisture on it and wipe them off.

(8) Temperature Sensor

Cable of Skin Temp Sensor and Humidity Sensor should be cleaned with a soft and dry cloth, detecting part of the sensor should be cleaned with a soft cloth dipped into disinfection & cleaning solution, and then it should be rinsed.

(9) Oxygen Sensor

Sensor Cable and Oxygen Sensor should be cleaned with a soft and dry cloth, detecting part of the sensor should be cleaned with a soft cloth dipped into disinfection & cleaning solution, and then it should be rinsed.

(10) Oxygen Box

Oxygen Box should be cleaned with a soft cloth dipped into disinfection & cleaning solution, and then it should be rinsed. Pay a careful attention lest these solutions or other fluids should flow into an oxygen box. The fluid flown into the oxygen box may bring a fatal risk to operation of an oxygen box and infants during its use after being assembled. If the fluid flown into the oxygen box, it must be operated after drying.

(11) Cabinet

Clean it using a cloth or sponge dipped into neutral detergent and then rinse it with clean water.

2) Disinfection

Gas disinfection method is desirable to an incubator rather than disinfection lamp or steam disinfection method. In case of a steam disinfection, disinfection time and temperature depend on materials and finishing of parts to be disinfected.

- Gas disinfection

① Remove contaminated materials within an incubator.
② Keep open a hood and access ports of an opening and shutting door.
③ Perform gas disinfection
④ Close a hood and access ports of an opening and shutting door.
⑤ Dry the incubator and then operate it normally with no infant inside.
⑥ Set its temperature to be 37°C and operate it for at least 3-4 hours. The operation time depends on type of gas and disinfection equipments.

⚠CAUTION : Steam or gas disinfection should not be performed for Sensor Probe and Control Part, Oxygen Box etc.

7-3. Assembly

All incubator parts should be exactly assembled after they are cleaned and assembled by the earlier described methods. The parts can be exactly assembled if users take steps in the reverse order of 「7-1 Disassembly」 by use of no immoderate force

7-4. Checkup after Assembly

⚠CAUTION : When an incubator is disassembled for cleaning and disinfection, it can be safely operated, if only it is exactly assembled again in accordance with proper procedures.

Please refer to 「5-3. Checkup after Installation」as for a checkup after assembling the incubator. The disassembled incubator should not be used again until it proves to be operated without any troubles not to bring any risks to infants. If a filter is dirty, it is occupied by an infected infant, or it is used for 3 months, it should be replaced without fail. It is more convenient to maintain a filter, if replacement date is written on it.

8. Maintenance

⚠WARNING : Guarantee or general repair should be performed by only engineers of JW Medical Corporation or personnels who have participated in a technical training hosted by JW Medical Corporation.

⚠WARNING : Do not use equipments whose control or device part has some troubles. Use only repaired equipments through performance test.

Maintenance and repair of this incubator should be performed according to the described procedures as follows.

8-1. User Maintenance

(1) Every Day

- Water reservoir for humidity control should be Clean and disinfected every day by earlier described methods

(2) Weekly or after each infants

- Perform a complete cleaning and if necessary disinfect the entire incubator.
- Check the air filter; replace the air filter after use with an infectious patient.
- Check the front door and the access ports and hinges to make sure that they will not open accidently.

(3) Quarterly

- Replace the air filter. Write replacement date on a new filter during replacement so that it can help next replacement work.
- When the incubator is not in use, use standard analytical methods to make sure that the infant compartment and any direct contact components, such as the humidifier, meet hospital cleanliness standards. Perform a complete cleaning and if necessary disinfect the entire incubator

(4) Yearly

- Replace the oxygen sensor. Write replacement date on a new filter during replacement so that it can help next replacement work.

8-2. Service Maintenance

- Refer 「8-5. Major Check Point」 for detail

This schedule lists the minimum frequencies. Always follow hospital and local regulations for required frequencies

(1) Per hospital protocol

Perform the electrical safety and checkout procedure from this manual.

(2) Annually

Calibrate the scale as described in this manual. If possible verify an acceptable sound level within the infant compartment.

(3) Every two years

Replace the backup battery. Inspect all seals and gaskets. Replace shock mounts and bushings.

⚠**NOTE** : **The battery is used to sound the power failure alarm and to power memory circuits during a power failure.**

⚠**CAUTION** : **In case the disposal of the incubator, backup battery shall be taken proper action regarding the problem of environmental pollution.**

8-3. Performance Test

- When an incubator runs at AIR MODE, the temperature measured at 10cm above from the mattress center(incubator temperature) shall not differ from average incubator temperature by more than 0.5℃. When the mattress is horizontally and vertically divided by two parts, the temperature measured at 10cm away from each center of the area shall not differ from the average incubator temperature by more than 0.8℃ (In any position of the tilted mattress it shall not differ by more than 1℃.).
- When an incubator runs at AIR MODE, the temperature measured at 10cm above from a mattress center by skin temperature sensor shall not differ from the control temperature more than 0.7℃ in steady temperature condition.
(Refer to EN 60601-2-19. Particular requirements for safety of baby incubators)

8-4. Replacement Period of Major Parts

This schedule lists the minimum frequencies. Always follow hospital and local regulations for required frequencies

No.	Part Name	Period	Remark
1	Filter	3 month	It should be immediately replaced when infected patient used incubator
2	Battery	2 year	
3	Humidifier Transducer	2 year	
4	Humidifier PCB	4 year	
5	MATTRESS	2 year	
6	Motor, Fan	4 year	
7	Fan Sensor	4 year	
8	Membrane Switch	2 year	
9	Switch	4 year	
10	Heater	4 year	
11	Access Port Cover	6 month	
12	Packings	1 year	
13	Sensors	4 year (Oxygen Sensor is 1 year)	

8-5. Major Check Point

No.	Item	Check Point	Period	Remark
1	List Check	Checks every accessories and parts using Check List.	install	
2	Caution during installation	After mounting the base to cabinet correctly, and fasten each 6 points with truss bolts.	install	
3	Power	Absolutely disconnects the power, checks voltage between specified power for equipment and external power supply.	install re-install	
4	Temp./Humidity control checking	Checks temperature and humidifier control. Time to setting value: 30 min. Accuracy: temperature: ±0.3°C Humidity: within 10%	6 month	
5	Water Reservoir	Checks Scales and Contacts of the water reservoir.	every before use	
6	Protective Earth	Checks disconnection of P.E. wire. Protective Earth of the hospital below than 100Ω. (3rd P.E.)	1 year	
7	General Electric Parts	Checks fastening, damages, discoloration and dirts of the each electric parts.	1 year	
8	PCB	Eliminates dusts. Checks damages and corrosion of each PCBs.	1 year	
9	Wiring	Checks status of the sheath and disconnection of each cables.	1 year	
10	Fuse	Checks disconnection of the fuse	1 year	
11	Controller	▷Each operation of the Power Switch, Membrane Switch. ▷Lighting of the each FNDs, LEDs. ▷Heater operation ▷Fastening of Each Parts	6 month	
12	Mechanical Parts	▷Operation of Tiling Knob ▷Operation(Open/Closing) of Hood ▷Mounting/un-mounting status of the water reservoir and controller. ▷Status of the Sensor Connect Cable, Humidifier Connect Cable ▷Status of the Sensor. ▷Status of the Hood and Double Hood	6 month	
13	Mattress Packing	Checks abrasion and hardening of each parts	6 month	
14	Fan	Checks damages and noise.	6 month	
15	Gasket	Checks adhesion status of the rear panel gasket.	1 year	
16	Weight Scale	Checks accuracy of scale by standard weight	1 year	
17	Elevation Cabinet	Checks noise when elevating	1 Year	
18	Oxygen Sensor	Checks accuracy	6 month	

9. Troubleshooting

Be acquainted with the below described instructions before repairing an incubator.

⚠WARNING : According to the procedures described on a service manual, personnels who participated in a professional technical training course hosted by JW Medical Corporation or engineers working at the technical department of JW Medical Corporation should monitor and repair the control or device part of an incubator.

⚠NOTE : When a system fail alarm is activated, "Err" is indicated on Set Temp Display Window and breakdown No. for that breakdown is marked on a Humidity Measurement Display Window.

⚠WARNING : When one of 7 alarms equipped on a control part is activated, users should transfer an infant under treatment to another incubator and use the incubator again after removing cause of an alarm.

⚠CAUTION : Users should replace filters immediately after contaminated or infected infants use them, even though 3 months has not passed from the last replacement date. They should indicate the replacement date on a new filter during replacement work.

9-1. Steps to be Taken during Alarm

(1) Power Fail Alarm

This alarm is activated when the power is cut off in normal operation

① Check up the AC power connected to an incubator (AC 110V/220V) if it is cut off. If there is no trouble,

② Check up power cable. If the cable has some troubles, replace it with a new one and if no trouble,

③ Check up fuse(4A) in a fuse box of a control part. If it has some troubles, replace it.

(2) System Fail Alarm

This alarm is activated when the errors are detected on a main board. Repair of this System Fail are described on 「10-2 How to repair system error」 in detail.

(3) Over Temperature Alarm

This alarm is activated when the temperature in the hood is over 38°C at the AIR MODE, or 40°C at the SKIN MODE.

① Check up if an incubator is exposed to direct sun-light and there are any heat transfer materials around it.

② Check up if an air inlet of a filter case is blocked by diapers or gauze.

(4) Air Flow Fail Alarm

This alarm is activated by air circulation errors due to troubles in a hood air circulation system.

① Check up if a motor or fan is operate correctly.

② Check up if a white tape is attached correctly to the motor axis.

③ Check up if a pulse of the CN4-2 is generated correctly(period of the pulse is approximately 50msec)

(5) Sensor Fail Alarm

This alarm is activated at both AIR & SKIN MODE. It rings at AIR MODE when Air Temperature Sensor is short circuit or open circuit.

① Check up if a sensor connect cable is cut or is connected correctly

② Check up if the air temp. sensor or skin temp. sensor is open circuit.

(6) Skin Temp Alarm/Air Temp Alarm

An alarm rings when below conditions are met:

- Skin Temp Alarm : In case that difference of 1.0°C or higher between skin temperature and skin control temperature appear and if the temperature measured by Skin Temp Sensor is lower 34°C or higher than 37°C.
  (SKIN MODE)
- Air Temp Alarm : In case that difference between hood temperature and control temperature is higher than 1.5°C or lower than 3.0°C(AIR MODE)

① Check up if a front door or access port is opened

② When changing the mode to the skin mode, check up if the Skin Temp Sensor is attached on patient's skin. (Skin temp fail alarm is activated as soon as the mode is changed from AIR to SKIN, if the air temperature is lower than 34°C and the Skin Temp Sensor is not attached on skin of Patient.)

(7) SpO2 Alarm

When SpO2 value is lower than a set value, When SpO2 cable is not connect. alarm is activated.

(8) O2 Alarm

When oxygen concentration is not within a set value, When O2 cable is not connect. alarm is activated.

9-2. How to Repair System Error

- Err 01: RAM Test Fail

This error will be occurred, RAM of the microprocessor is abnormal when the self test of the main board.

① Change the EPROM(U18) on the MAIN BOARD. If the system isn't returned normal condition

② Change the microprocessor(U1). If the system also isn't returned normal condition,

③ Change the MAIN BOARD.

- Err 02: EPROM CHECKSUM FAIL

This error will be occurred, EPROM(U18) of the MAIN BOARD is abnormal.

① Change the EPROM(U18). If the system isn't returned normal position,

② Change the MAIN BOARD.

- Err 03: CPU INSTRUCTION FAIL

This error will be occurred, instruction of the microprocessor isn't work properly.

① Change the EPROM(U18). If the system isn't returned normal position,

② Change the microprocessor(U1). If the system also isn't returned normal condition,

③ Change the MAIN BOARD.

- Err 10: WATCHDOG FAIL

This error will be occurred, 2kHz frequency to the watchdog timer isn't supplied.

① Check up the pattern between the PIN 14 of the 82C55(U4) and PIN 1 of the 74LS123(U12). If there is no trouble,

② Change the microprocessor(U1) and the 82C55(U4). If the system also isn't returned normal condition,

③ Change the MAIN BOARD.

- Err 11: SOFTWARE NOT CYCLING

This error will be occurred, software of the microprocessor isn't cycling.

① Change the EPROM(U18). If the system isn't returned normal position,

② Check up the frequency between PIN18 and PIN19 of the microprocessor is 6MHz. If there is no trouble,

③ Change the MAIN BOARD.

- Err 21: HEATER NOT SWITCHING ON

This error will be occurred, heater ON control by the microprocessor isn't work properly.

① Check up the signal of the 82C55(U4)'s PIN 25 is HIGH position. If there is no problem,

② Change the 4N35(PHC3) and 74LS132(U13). If the system isn't returned normal position,

③ Change the MAIN BOARD.

- Err 22: HEATER NOT SWITCHING ON

This error will be occurred, heater OFF control by the microprocessor isn't work properly.

① Check up the signal of the 82C55(U4)'s PIN 25 is LOW position. If there is no problem,

② Change the 4N35(PHC3) and 74LS132(U13). If the system isn't returned normal position,

③ Change the MAIN BOARD.

- Err 24: ANALOG TO DIGITAL CONVERTER FAIL

This error will be occurred, control signal between the microprocessor and the A/D converter is disappeared.

① Using Oscilloscope to monitor signals(START, D0, D1) that a microprocessor outputs to A/D Converter and signals(COMPL). If there is no problem,

② Change the A/D CONVERTER(U8) and MICROPROCESSOR(U1). If the system isn't returned normal position,

③ Change the MAIN BOARD.

- Err 30: A/D LOW CALIBRATION FAIL

This error will be occurred, calibration low signal from the A/D converter is lower and higher 0.5°C than 25.0°C.

① Check up the value of the A/D CAL. LOW TEMP. is indicated on Skin Temp Display Window of the control panel. Correct value is 25.0°C with tolerance of ±0.5°C. If the value is over the tolerance, adjust the VR1 to 25.0°C.

② Check up the short of CN3 cable, sensor connect cable, sensor box cable. If the system isn't returned normal position,

③ Change the MAIN BOARD.

- Err 31: A/D HIGH CALIBRATION FAIL

This error will be occurred, calibration high signal from the A/D converter is lower and higher 0.5°C than 37.0°C.

① Check up the value of the A/D CAL. HIGH TEMP. is indicated on SET Display Window of the control panel. Correct value is 37.0°C with tolerance of ±0.5°C.

If the value is over the tolerance, adjust the VR1 to 37.0°C.

② Check up the short of CN3 cable, sensor connect cable, sensor box cable. If the system isn't returned normal position,

③ Change the MAIN BOARD.

9-3. Simple Repair and Actions to be Taken

Trouble Symptoms	Check Points
Incubator is not switched on	1) Check up power(230VAC) 2) Check up if the plug is exactly connected to an outlet. 3) Check up fuses of a controller
Hood temperature doesn't rise.	1) Check up if a motor rotates. 2) Check up if the fan is exactly fixed on a motor axis. 3) Check up if the setting temperature is low due to wrong input of temperature control value. 4) Check up input power. 5) Check up if the main deck on a base is exactly installed.
Hood temperature rises too high	1) Check up if temperature control value is set higher than desired values. 2) Check up if an incubator is exposed to direct sun-light and there are any heat transfer materials around it. 3) Check up if an air inlet of a filter case is blocked by diapers or gauze.
Humidity doesn't increase	1) Check up if adequate volume of water is filled in water reservoir. 2) Check up if a hood outlet of humidified air is blocked by diapers or gauze. 3) Check up if the blanket of water reservoir is assembled correctly. 4) Check up if the lever of water reservoir is locked 5) Check up if humidity control value is set low.
Humidity increases too much	1) Check up if humidity control value is set high. 2) Measure humidity around it(Rainy season)
Water drops are made	1) This phenomenon occur when the difference in a hood between a room temperature and an incubator control temperature is great.
Oxygen density rises high	1) Monitor oxygen volume which flows into an oxygen flowmeter.
Skin temperature values are not exactly indicated at an incubator at SKIN MODE	1) Check up if Skin Temp Sensor is exactly connected to Sensor Box 2) Check up if thin metal side of Skin Temp Sensor is exactly attached to abdomen(in case the infant lies) or kidney(in case the infant lies on its stomach). 3) Put the sensor together with a precise ther- mometer into 30~35°C water and then observe the difference between thermometer temperature and the temperature indicated on Skin Temp Display Window. If the difference is 1.0°C or higher, replace the temperature sensor.

APPENDIX A. HOOD ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-40-00039-00	Hood	6t-830X500X480
2	2-40-00040-00	Double Hood(Front)	3t-810X310
3	2-40-00041-00	Double Hood(Rear)	3t-810X310
4	2-40-00042-01	Double Hood(Top)	3t-750X667
5	2-04-00031-00	Hood Spacer A	Ø22X22.5
6	2-04-00032-00	Hood Spacer B	Ø22X22.5
7	2-04-00033-00	Hood Spacer C	Ø19X27
8	2-01-41375-00	Rear Hinge Housing(Left)	74.5X36X24
9	2-04-00035-00	Rear Hinge Shaft	Ø12X20
10	2-04-00102-00	Rear Hinge Housing(Right)	74.5X36X24
11	2-40-00043-00	Open & Shut Door Packing	Ø172.6
12	2-40-00044-00	Open & Shut Door Cover	223X160X12
13	2-03-00020-00	Open & Shut Door Pin	Ø5X60
14	2-40-00045-00	Open & Shut Door Rubber	Ø13X10
15	2-04-00038-01	Open & Shut Door Fix Supporter	12X14.5X30
16	2-65-00176-00	Open & Shut Door Spring A	
17	2-65-00177-00	Open & Shut Door Spring B	
18	2-26-00058-00	Inner Reinforce Plate(Left)	3.2t-886X24
19	2-26-00059-00	Inner Reinforce Plate(Right)	3.2t-886X24
20	2-26-00060-00	Rear Inner Reinforce Plate	1t-230X33
21	2-04-00103-00	Right Reinforce Plate	11t-493X35
22	2-04-00104-00	Left Reinforce Plate	11t-493X35
23	2-04-00105-00	Rear Reinforce Plate	7t-851X34.5
24	2-40-00046-00	Side Rubber Packing	10X7X490
25	2-40-00047-01	Rear Rubber Packing	10X7X830
26	2-40-00048-00	Tube Inlet(L)	13X70X95
27	2-40-00049-00	Tube Inlet(S)	12X49.5X59.5
28	4-14-00002-00	Access Port A	Ø171X42
29	4-14-00004-00	Access Port B	Ø153X19
30	2-40-00050-00	Spacer Cap	
31	1-91-00662-00	Access Port Name Plate	0.5t-14.5X58
32	1-91-00662-00	Access Port Silicon Ring	
33	5-03-00006-00	Access Port Vinyl	
34	2-40-00051-00	Lock Absorber Rubber	11X14X4.4
35	2-40-00052-00	Front Door Lock Holder	47X16X17.2
36	2-04-00042-00	Hood Stopper Screw	8(HEX)X29.5-M4
37	2-40-00053-00	Front Door	8t-830X314
38	2-04-00106-00	Door Reinforce Plate	7t-701X34.5
39	2-40-00054-00	Door Rubber Packing(Under)	10X7X700
40	2-40-00055-00	Door Rubber Packing(Upper)	17X18X830

APPENDIX A. HOOD ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-40-00098-00	Hood	6t-830X500X480
2	2-40-00040-01	Double Hood(Front)	3t-810X310
3	2-40-00041-01	Double Hood(Rear)	3t-810X310
4	2-40-00042-02	Double Hood(Top)	3t-750X667
5	2-04-00031-00	Hood Spacer A	Ø22X22.5
6	2-04-00032-00	Hood Spacer B	Ø22X22.5
7	2-04-00033-00	Hood Spacer C	Ø19X27
8	2-01-41375-01	Rear Hinge Housing(Left)	74.5X36X24
9	2-04-00035-00	Rear Hinge Shaft	Ø12X20
10	2-04-00102-01	Rear Hinge Housing(Right)	74.5X36X24
11	2-40-00043-00	Open & Shut Door Packing	Ø172.6
12	2-40-00044-00	Open & Shut Door Cover	223X160X12
13	2-03-00020-00	Open & Shut Door Pin	Ø5X60
14	2-40-00045-00	Open & Shut Door Rubber	Ø13X10
15	2-04-00038-02	Open & Shut Door Fix Supporter	12X14.5X30
16	2-40-00096-00	Sensor Grip	27*36*14
17	1-90-00123-00	Scale Ass'y	
18	2-26-00058-01	Inner Reinforce Plate(Left)	3.2t-886X24
19	2-26-00059-02	Inner Reinforce Plate(Right)	3.2t-886X24
20	4-13-00005-00	Acryle Tube Inlet	60*46*3T
21	2-04-00103-01	Right Reinforce Plate	11t-493X35
22	2-04-00104-01	Left Reinforce Plate	11t-493X35
23	2-04-00105-01	Rear Reinforce Plate	7t-851X34.5
24	2-40-00046-00	Side Rubber Packing	10X7X490
25	2-40-00047-01	Rear Rubber Packing	10X7X830
26	2-40-00048-01	Tube Inlet(L)	13X70X95
27	2-40-00049-01	Tube Inlet(S)	12X49.5X59.5
28	4-14-00002-00	Access Port A	Ø171X42
29	4-14-00004-01	Access Port B	Ø153X19
30	2-40-00050-00	Spacer Cap	
31	2-51-00031-00 2-51-00509-00	Access Port Name Plate(CW) Access Port Name Plate(JW)	0.5t-14.5X58
32	4-13-00021-00	Access Port Silicon Ring	
33	5-03-00006-00	Access Port Vinyl	
34	2-40-00051-00	Lock Absorber Rubber	11X14X4.4
35	2-40-00052-00	Front Door Lock Holder	47X16X17.2
36	2-04-00042-01	Hood Stopper Screw	8(HEX)X29.5-M4
37	2-40-00053-01	Front Door	8t-830X314
38	2-04-00106-01	Door Reinforce Plate	7t-701X34.5
39	2-40-00054-00	Door Rubber Packing(Under)	10X7X700
40	2-40-00055-00	Door Rubber Packing(Upper)	17X18X830

APPENDIX A. HOOD ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
41	2-40-00056-00	Front Hinge Gasket	2tX64X26
42	2-40-00057-00	Front Hinge Housing(Left)	75X50X55
43	2-04-00044-00	Front Hinge Shaft	Ø8X58
44	2-04-00045-00 4-01-00055-00	Front Hinge Release	5X40X20
45	2-65-00178-00	Front Hinge Spring	
46	2-40-00058-00	Front Hinge Housing(Right)	75X50X55
47	2-40-00059-01	Square Door Lock Holder	
48	2-04-00011-00	Handle Fix Plate	Ø12X21
49	2-40-00060-00	Open & Shut Door Lock Holder A	42.6X24.5X21.5
50	2-40-00061-00	Open & Shut Door Lock Holder B	13X11X36
51	2-40-00062-00	Open & Shut Door Lock Holder C	38X38X30
52	2-65-00179-00	Lock Spring	
53	2-04-00046-00	Lock Shaft	Ø3X26
54	2-40-00063-00	Sensor Box A	99.5X78X47.5
55	2-40-00064-00	Sensor Box B	81X62X35
56	2-40-00065-00	Sensor Box Gasket	1.5tX100X78
57	3-93-00363-00	SENSOR MODULE CABLE ASS'Y	
58	3-56-00040-01	AIR TEMP. SENSOR ASS'Y	
59	1-91-00692-00	HUMIDITY SENSOR ASS'Y	
60	1-91-00676-00	SENSOR MODULE PCB ASS'Y	
61	2-04-00077-00	DoubleHood Stopper Pin	Φ3*31.5
62	3-56-00045-00	SKIN TEMP. SENSOR ASS'Y	확인요(위치)
63		Hex Socket Set Screw	M3X6
64		Hex Socket Set Screw	M3X8
65		Hex Socket Set Screw	M4X10
66		Hex Socket Set Screw	M4X20
67		Truss Head Screw	M3X10
68		Truss Head Screw	M3X12
69		Truss Head Screw	M4X12
70		Truss Head Screw	M4X16
71		Truss Head Screw	M4X18
72		Truss Head Screw	M5X12
73		Truss Head Screw	M5X14
74		Truss Head Screw	M5X16
75		Truss Head Screw	M5X20
76		Truss Head Tapping Screw	M3×6
77		Flat Head Screw	M5X14
78		Flat Head Screw	M5X16
79		Pan Head Screw	M3×12
80		Vinyl Washer	Ø17

APPENDIX A. HOOD ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
81		Teflon Washer	M5
82		Cap Nut	M4
83		E-Ring	No. 2
84		O-RING	P4
85	2-01-41270-01	Washer Tee	ø12X6.0
86	2-04-00075-01	DoubleHood Stopper A	16*16*27
87	2-04-00076-00	DoubleHood Stopper B	8*26*27
88	2-01-41269-01	Tube Inlet Fixing Nut	ø7.5X10.5
89		Truss Head Screw	M5X16
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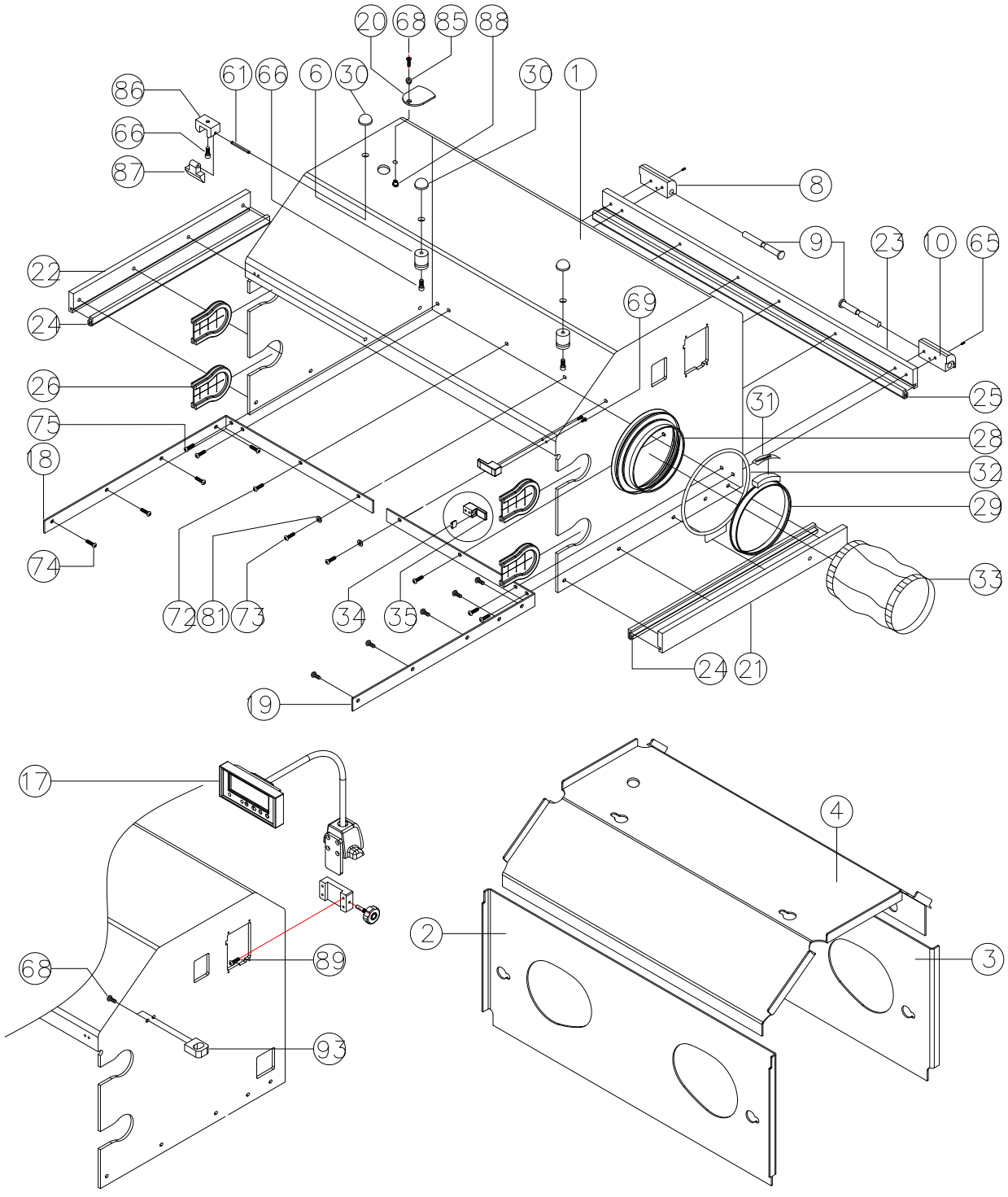
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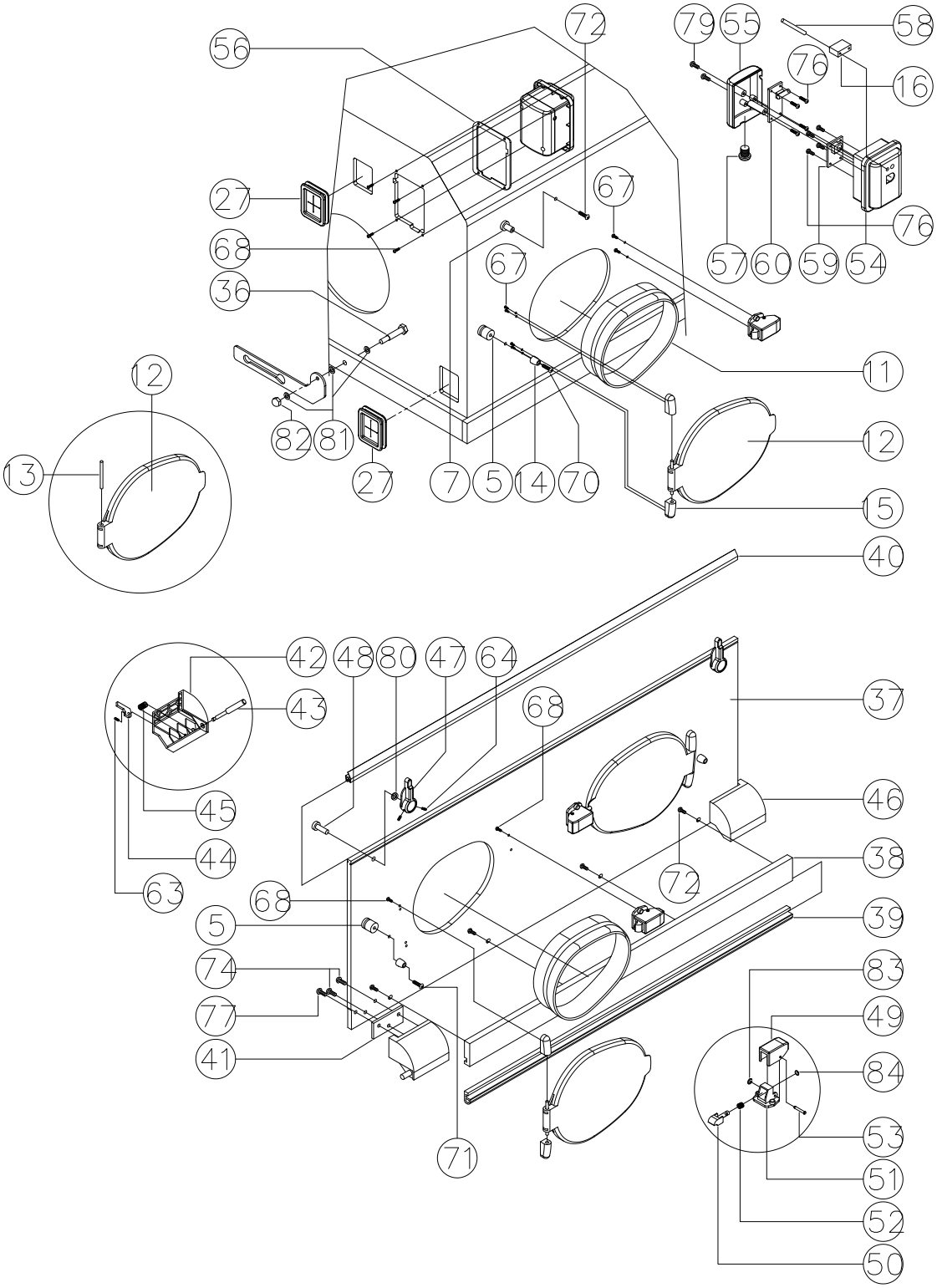
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APPENDIX B. BASE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-40-00066-00	Base(Upper)	
2	4-10-00003-00	Filter	232X94X18
3	2-26-00061-01	Filter Cover	320X148X57
4	2-19-00002-00	Filter Cover Knob	19-51-01
5	2-40-00067-01	Side Handle	Ø31X353X82.5
6	2-04-00047-00	Stopper Bracket	41X26X15
7	2-26-00062-01	Hood Stopper	3t-192X60.5
8	2-04-00048-00	Stopper Fix Shaft	Ø18X76
9	2-04-00049-00	Stopper Holder	Ø19X29
10	2-65-00180-00	Fix Pin	Ø1.4X69
11	2-65-00181-00	Stopper Spring	
12	2-04-00050-00	Oxygen Supply Valve	Hex 16X33
13	2-26-00063-00	Rail Bracket(Left)	2t-285X20X11.5
14	2-26-00064-00	Rail Bracket(Right)	2t-285X20X11.5
15	2-04-00113-01	Reinforce Hinge	20X28X31
16	2-40-00354-00	Pole Stand Fix Holder	196X44X76
17	2-40-00069-00	Base Under(Left)	
18	2-26-00065-01	Filter Case	2t-240X102X20
19	2-40-00070-00	Base Under(Right)	
20	2-26-00067-01	Rear Connect Bracket	2t-300X32.6X25
21	2-61-00035-01	Filter Cover Hinge	
22	2-26-00120-00	손잡이(추가요망)	Uwauns
23	2-26-00069-00	Filter Bracket	3t-25X20
24	2-11-01916-01	Copper Spring Plate Bracket	3t-120X79X26.2
25	2-40-00071-01	Water Reservoir Front Cover	3t-140X69X50
26	2-26-00070-01	Rail Assembly	
27	2-26-00071-00	Water Reservoir Rail(Right)	2t-445X21X21
28	2-26-00072-00	Water Reservoir Rail(Left)	2t-445X21X21
29	2-04-00052-00	Stopper A	1t-25X13.2
30	2-04-00053-00	Stopper B	1t-25X15
31	2-04-00054-00	Water Reservoir Cam	20X20X22
32	2-04-00055-00	Cam Fix Plate A	10t-30X9
33	2-04-00056-00	Cam Fix Plate B	10t-30X11
34	2-04-00057-00	Cam Fix Plate C	10t-30X20
35	2-04-00058-00	Cam Fix Shaft	Ø8X305
36	2-40-00072-02	Water Reservoir	4t-320X140X87
37	2-40-00073-03	Water Reservoir Cover	2t-316X136
38	2-26-00073-01	Humidity Hole Seal	Ø55X11.6
39	2-40-00074-02	Copper Plate	2t-33X8
40	2-26-00074-01	Copper Plate Gasket	1.5t-17X8

APPENDIX B. BASE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
41	2-26-00075-01	Humidification Cover	2t-107X102
42	2-40-00075-02	Humidification Gasket	1.5t-107X102
43	2-40-00076-00	Water Reservoir Seal	4.3X6.5X860
44	2-04-00078-01	Roller Bracket	3t-16*12.5*21
45	2-40-00078-00	Main Deck	4t-820X474X153
46	2-40-00079-00	Mattress Shelf	4t-772X395X80
47	2-46-00140-00	Mattress	30X686X369
48	2-40-00080-00	Tilting Handle	97X37X30
49	2-40-00081-00	Tilting Bracket	47X47X48.5
50	2-26-00076-01	Tilt Control Shaft	Ø8-525X37X108
51	2-04-00059-00	GRIPPER A	10t-22X11
52	2-04-00060-00	GRIPPER B	10t-22X11
53	2-04-00028-00	Aircurtain Ring	Ø14X10.5
54	3-81-00010-00	Humidifier PCB Ass'y	
55	3-42-00201-00	Float Switch	
56	3-93-00364-00	Sensor Module Connector cable Ass'y	
57	3-93-00365-00	Humidifier Connect Cable Ass'y	
58		Hex Socket Set Screw	M4X15
59		Truss Head Tapping Screw	M4X25
60		Truss Head Tapping Screw	M5X12
61		Truss Head Tapping Screw	M5X15
62		Pan Head Tapping Screw	M3X10
63		Pan Head Tapping Screw	M3X8
64		Pan Head Tapping Screw	M5X15
65		Flat Head Tapping Screw	M3X8
66		Flat Head Tapping Screw	M4X8
67		Pan Head Screw	M4X12
68		Flat Head Screw	M3X10
69		Flat Head Screw	M3X12
70		Flat Head Screw	M3X16
71		Flat Head Screw	M3X18
72		Flat Head Screw	M3X8
73		Flat Head Screw	M4X10
74		Truss Screw	M4X10
75		Truss Screw	M5X10
76		Truss Screw	M6X25
77		Flat Washer	M3
78		Flat Washer	M8
79		Spring Washer	M3
80		Spring Washer	M8

APPENDIX B. BASE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
81		Nut	M12
82		Nut	M8
83		Nut	M3
84		Cap Nut	M4
85		E-RING	Ø6
86	2-04-00101-01	Water Reservoir Cover A	104.5*92.5*10-10t
87	2-26-00113-00	Contact Shaft	ϕ5 * 41
88	2-26-00114-00	Contact Holder	75*24.5*10
89	2-26-00115-00	Contact Spring	ϕ5
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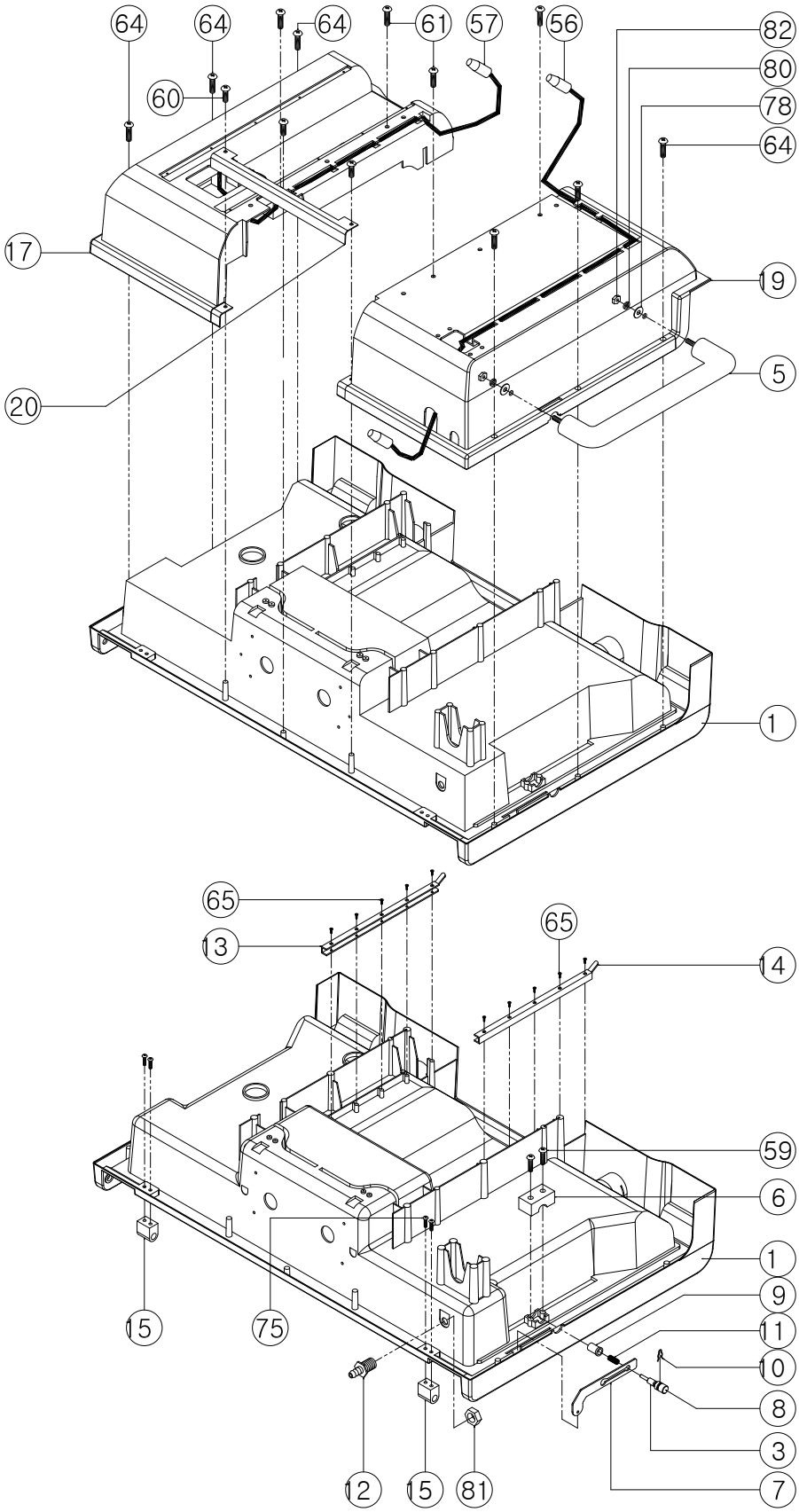
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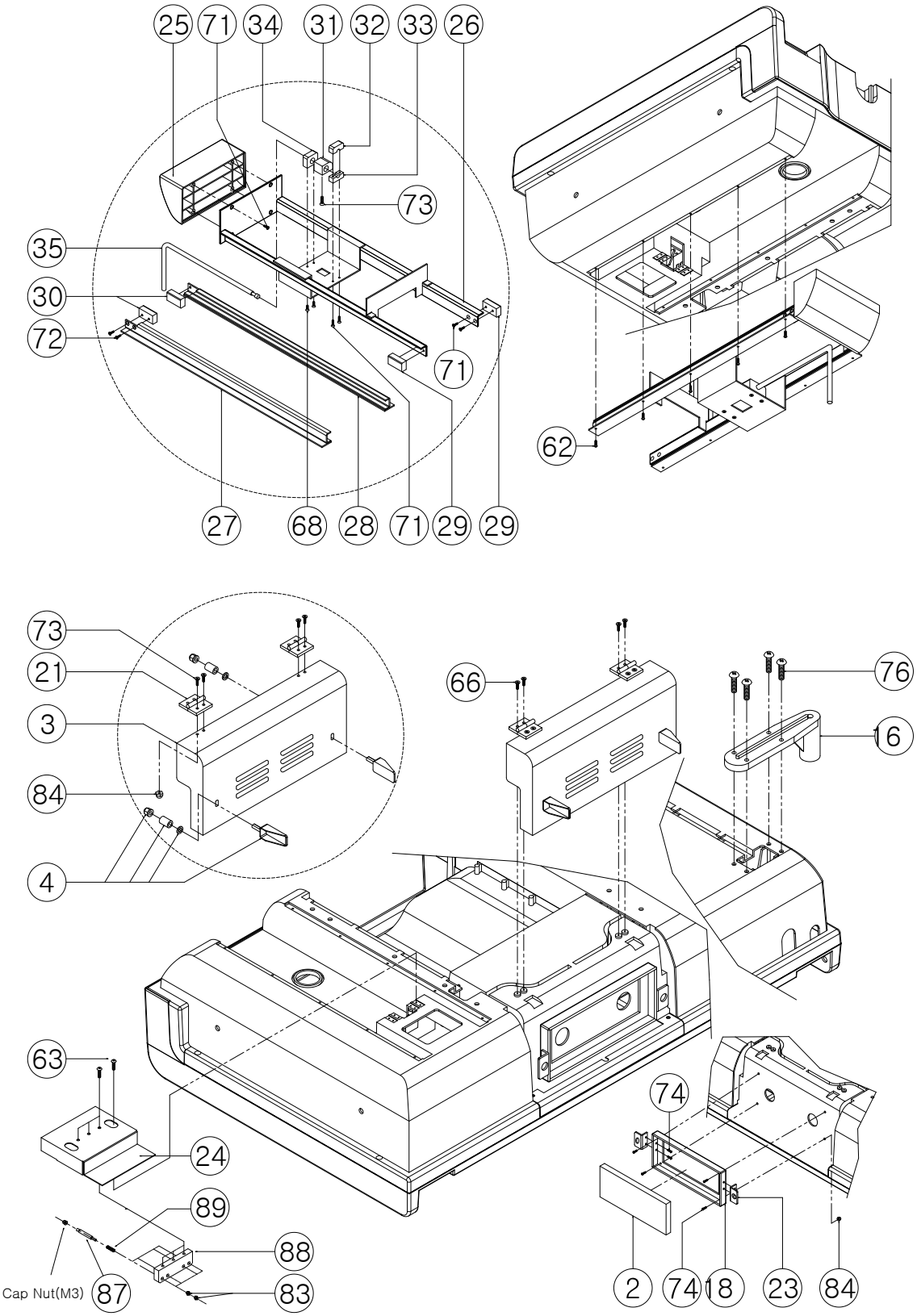
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Cap Nut(M3)
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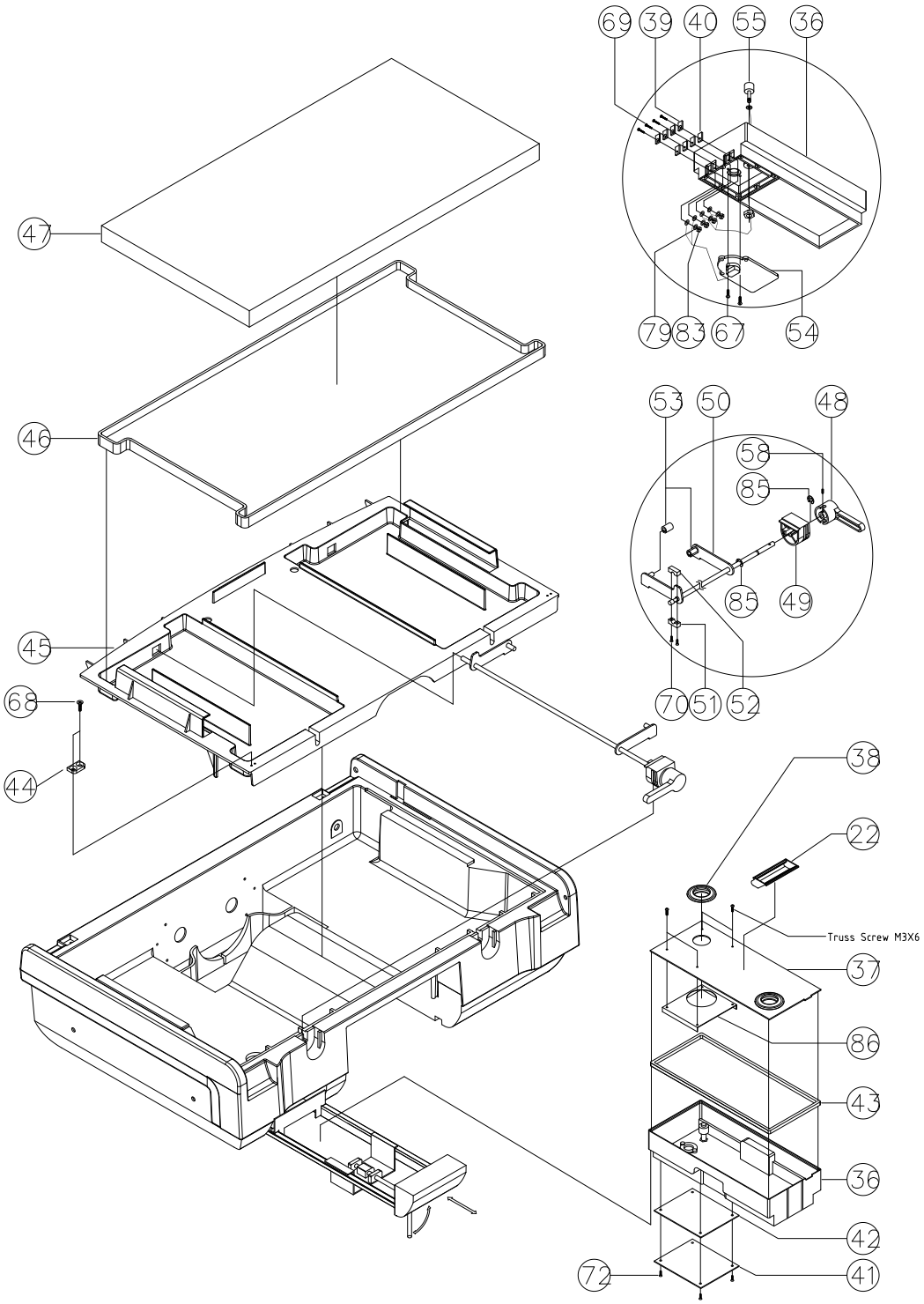
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Truss Screw M3X6
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APPENDIX C. CONTROLLER ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-40-00082-00	Air Circulation Fan	
2	2-04-00061-01	Fan Fix Nut	Ø16X6
3	2-26-00078-02	Controller Box	148X324.5X280
4	2-26-00077-01	Controller Cover	1t-291X274X97.4
5	2-19-00003-00	Controller Latch	C7-12
6	2-12-00013-00	Battery Bracket	2t-25X130
7	2-26-00079-02	MOTOR BRACKET	2t-165X137
8	2-04-00062-00	Controller Rail	10tX260
9	2-26-00080-01	Stopper Bracket(Left)	1.2t-43X40X26.5
10	2-26-00081-01	Stopper Bracket(Right)	1.2t-43X40X26.5
11	2-04-00063-00	Stopper Shaft	Ø4X32
12	2-65-00182-00	Stopper Spring A	
13	2-65-00183-00	Stopper Spring B	
14	2-40-00083-00	Controller Front Plate	3t-300X177X110
15	3-30-00006-01 3-30-00218-00	Membrane Switch Panel(CW) Membrane Switch Panel(JW)	
16	2-40-00084-03 2-40-00393-00	Controller Front Seal(CW) Controller Front Seal(JW)	8X8X276
17	2-40-00085-00	Controller Rear Plate	3t-280X165X54
18	2-40-00086-00	Rear Plate Gasket A	4t-148X177
19	3-64-00005-00	HEATER	Ø11X125X100
20	2-40-00087-00	HEATER Gasket	2t-115X45
21	2-26-00082-00	Photo Sensor Bracket	1.2t-35X38
22	4-19-00008-01	Main Board Ass'y	
23	2-26-00116-00	Motor bracket	
24	3-27-00105-00	TRANSFORMER	
25	3-24-00016-01	SSR	
26	3-68-00016-00	Motor	
27	3-20-42021-00	Capacitor	
28	3-47-00003-00	Battery Ass'y	1.2V/700mA
29	3-63-00019-00	Scale Power P.C.B (Scale Option)	18 X 95-1.2t
30	3-93-00366-00	CN1 Cable Ass'y	
31	2-04-00072-02	Motor Spacer	p9.5 X 21.0 X 1.0t
32	3-93-00367-00	CN3 Cable Ass'y	
33	3-93-00367-00	CN7-2 Cable Ass'y	
34	3-93-00371-01	CN7-2 Cable Ass'y(삭제)	
35	3-30-00005-00	POWER RECEPTACLE	
36	3-65-00127-00	FUSE	
37	3-81-00009-01	DISPLAY BOARD ASS'Y	
38	3-42-00087-00	PUSH S/W	
39	3-56-00046-00	FAN SENSOR	
40	3-42-00206-00	Thermal S/W	

APPENDIX C. CONTROLLER ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
41		Truss Head Screw	M3×10
42		Truss Head Screw	M3×12
43		Truss Head Screw	M3×6
44		Truss Head Screw	M3X8
45		Truss Head Screw	M4×12
46		Truss Head Screw	M3×15
47		Truss Head Screw	M4×35
48		Truss Head Screw	M4×8
49		Pan Head Screw	M3×10
50		Pan Head Screw	M3×15
51		Pan Head Screw	M3×25
52		Pan Head Screw	M3×6
53		Pan Head Screw	M3X10
54		Round Head Screw	M4X10
55		Round Head Screw	M4X35
56		Flat Head Screw	M3×12
57		Flat Washer	M3
58		Flat Washer	M4
59		Flat Washer	M5
60		Spring Washer	M3
61		Spring Washer	M4
62		Spring Washer	M5
63		Nut	M3
64		Nut	M4
65		Nut	M5
66		E-RING	ϕ3
67		PCB Supporter	M3×30
68		PCB Supporter	M4×30
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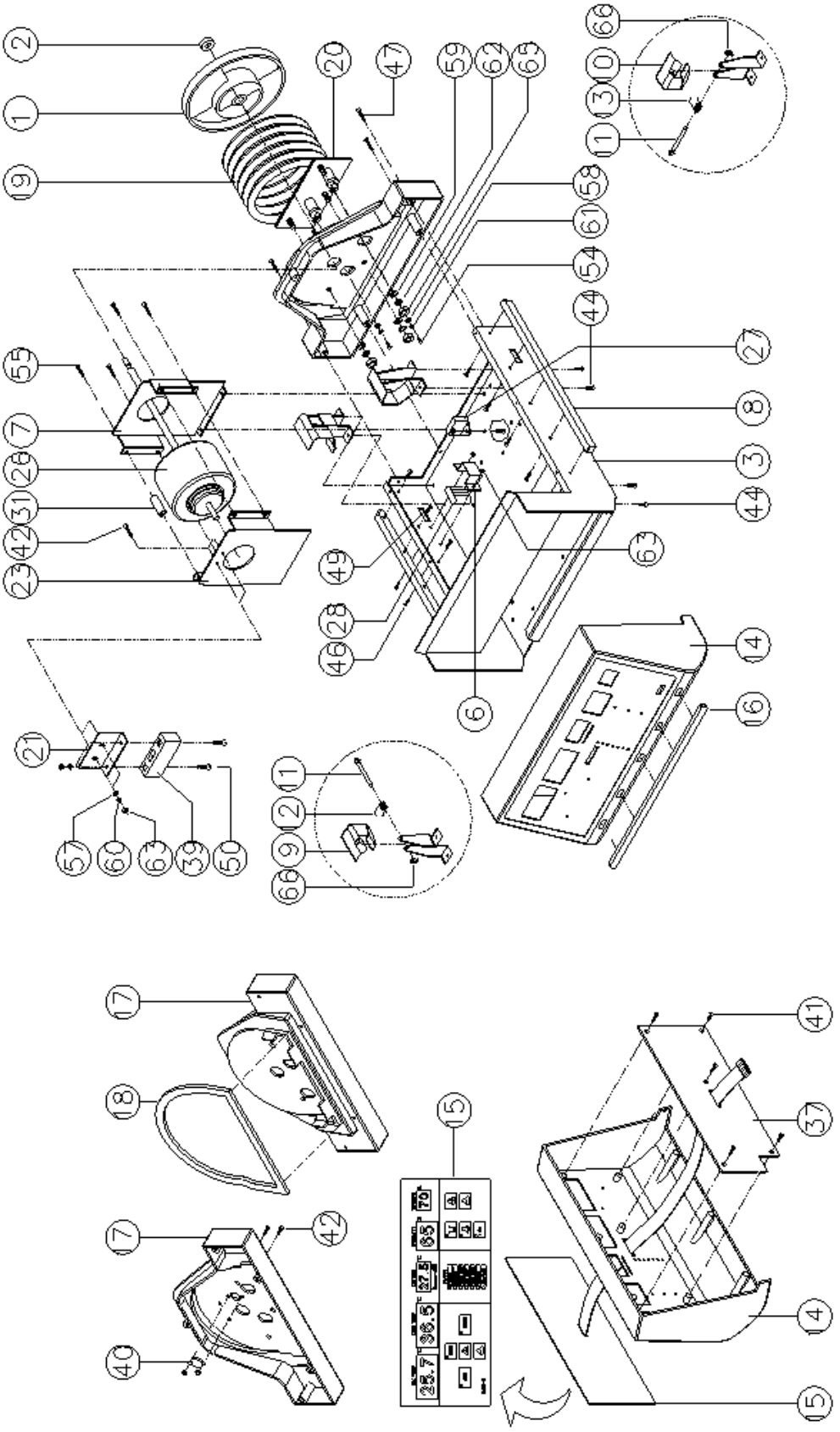
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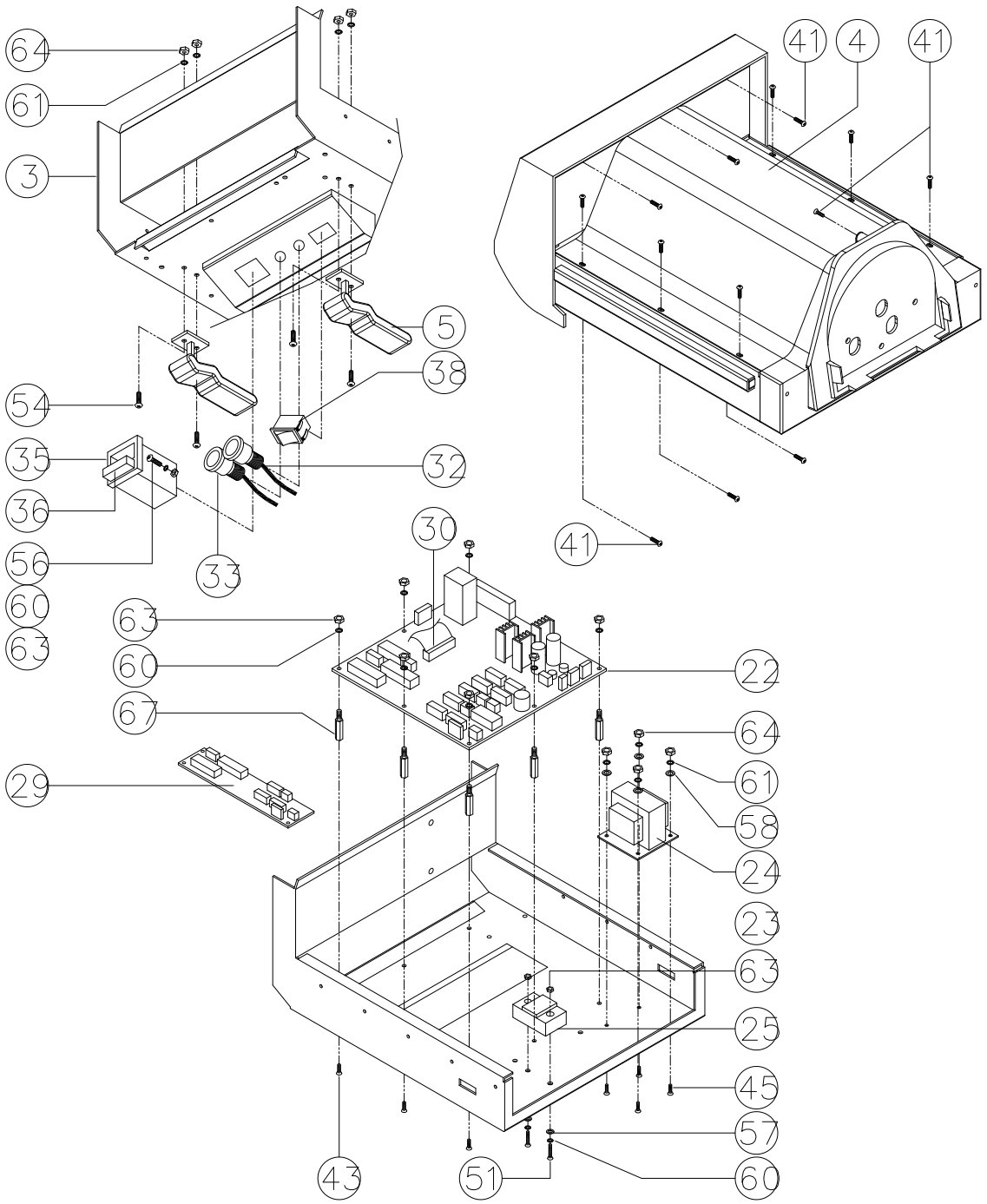
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APPENDIX D. CABINET ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-26-00085-00	Cabinet Frame	
2	2-26-00109-00	Drawer Case A Ass'y	
3	2-94-00606-00	Drawer A Ass'y	
4	2-26-00110-00	Drawer Case B Ass'y	
5	2-26-00098-00	Drawer B Ass'y	
6	2-58-00402-00	Slide Rail	
7	2-04-00085-00	Bracket	2t-7*20*80
8	5-03-00224-00	Bumpon	3.2t*5*50
9	2-42-00187-00	Hole Cap	Φ14X8
10	2-40-00088-01	Leg Cap	Φ76.3*48.2
11	2-30-00001-00	Caster	
12	2-93-00120-00	Door Knob	P2-41
13	2-04-00092-00	Cord Hanger(Right)	130*30*2.3t
14	2-04-00088-00	Cord Hanger(Left)	
15	2-19-00003-00	Latch Bracket	
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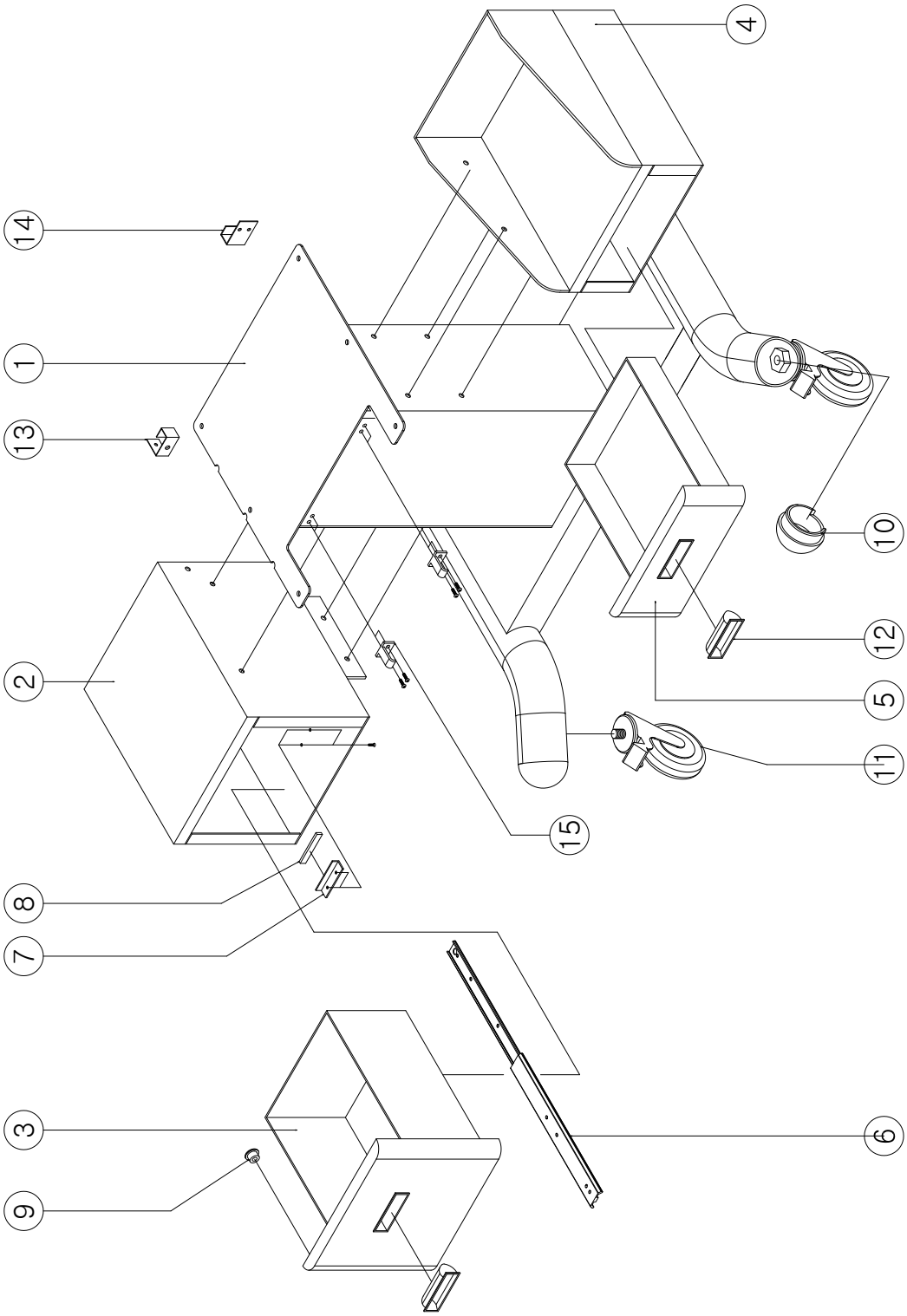
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APPENDIX E. Rotary Tiling, Scale ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	1-90-00121-00	Rotary ASS'Y	CHS-i000(NEW)
2	2-04-00147-01	Stopper Bracket(Left)	70*50*17
3	2-04-00148-00	Scale Fixing Shaft	Φ12.5*25
4	2-04-00149-00	Platform Supporter	70*30*15
5	2-04-00150-00	Tray Supporter	350*299.5*47-2t
6	2-04-00166-01	Stopper Bracket(Righter)	70*50*17
7	2-40-00335-01	Mattress Platform(A)	800.5*437*66-4t
8	2-40-00336-00	Tray	371.5*374.5*36-4t
9	2-46-00208-00	Mattress(A)	20t*705*370
10	3-92-00035-00	Cable Clamp	DQC-101
11	2-04-00167-00	Scale Ass'y	
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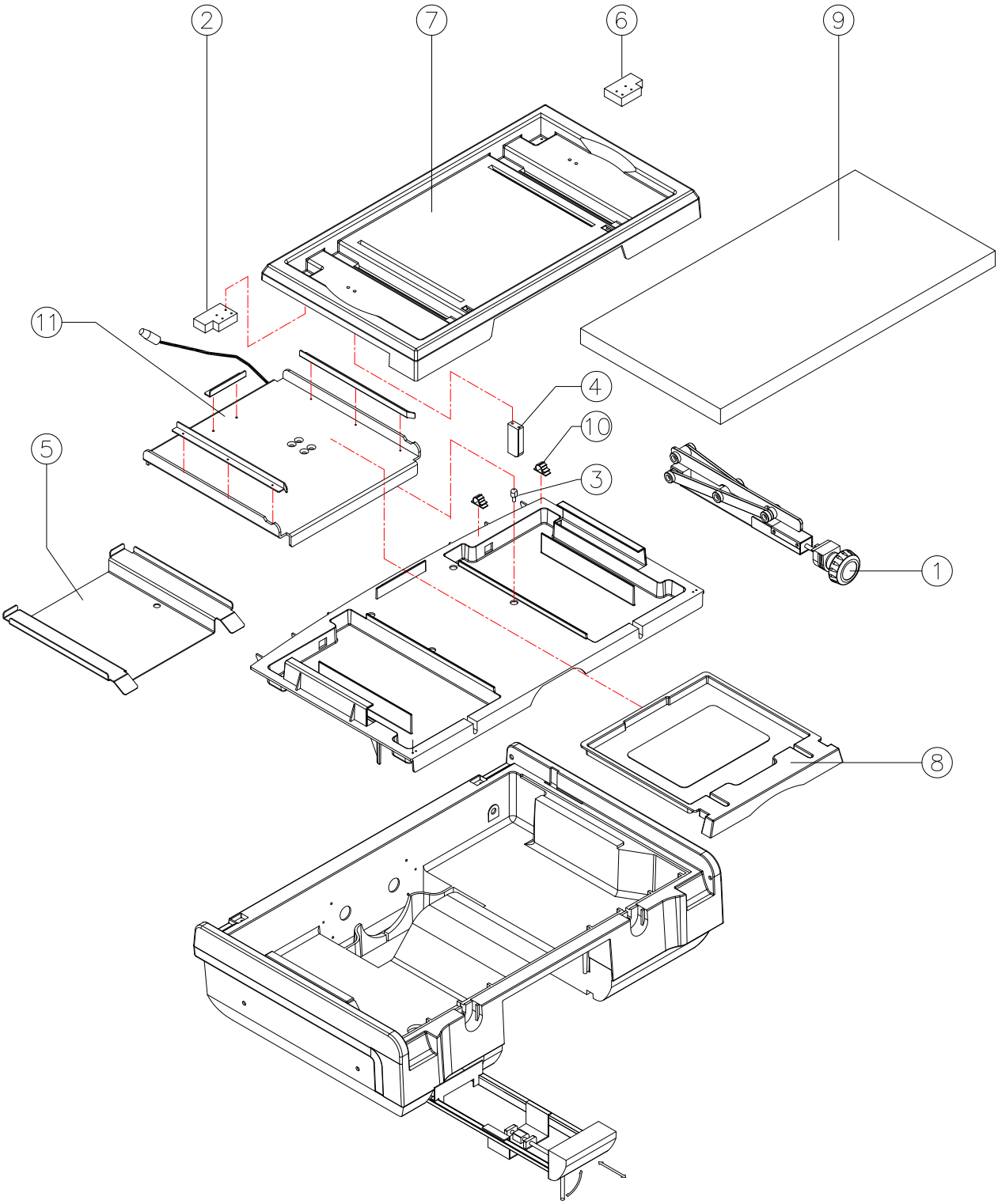
※ Tray Supporter(Part NO. 5) is applied when weight scale is not adopted for option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APPENDIX F. Elevation Cabinet ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-04-00151-00	Frame Upper	400*400*377
2	2-04-00152-00	Code Hanger(Right)A	55*31*30-2.3t
3	2-04-00153-00	PCB Cover	207.4*150*55
4	2-04-00154-00	Frame Lower	838.5*553.2*557
5	2-04-00155-00	Cabinet Cover1	207.4*150*55
6	2-04-00156-00	Plate(Upper)	230*190*47-6t
7	2-04-00157-00	Plate(Lower)	230*190*47-6t
8	2-04-00158-00	Cylinder Shaft	Φ10*48
9	2-04-00159-00	Switch Bracket	62.6*27.2*33-3.2t
10	2-04-00160-00	Foot Plate Rod	128*70*19.7*3.2t
11	2-04-00161-00	Switch Cover	188*34*58-3.2t
12	2-04-00162-00	Foot Plate Shaft	Φ5*75.6
13	2-09-00281-00	Shaft	Φ14*18
14	2-09-00282-01	Eccentric Shaft	Φ14*18
15	2-40-00337-00	Foot Plate(Left)	76.4*60*24-3t
16	2-40-00338-00	Foot Plate(Right)	76.4*60*24-3t
17	2-58-00404-00	BEARING(NSK)	6000ZZ
18	2-65-00269-00	Foot Plate Spring	Φ11.4*40-Φ1.4
19	3-27-00136-01	TRANSFORMER(CE)	IN:220V, OUT:19V, 2.5A(CE)
20	3-30-00005-00	AC INLET(SHURTER/SWISS)	5220. 0423. 3
21	3-30-00175-00	AC OUTLET(RongFeng)	SS-8B-6.3, outlet screw
22	3-42-00284-00	Micro S/W (Omron)	VX-5-1A3
23	3-52-00207-00	Teminal Block	KTB1-01004,KACON
24	3-68-00047-00	LinEAr Motor	Liank(312110+0125014C)
25	3-96-00110-00	Table Elevation PCB Ass'y	조립도
26	5-18-00025-00	Cushion Rubber	2.0t-11*8*7.5
27	5-18-00026-00	Bump ON	3t-20*165
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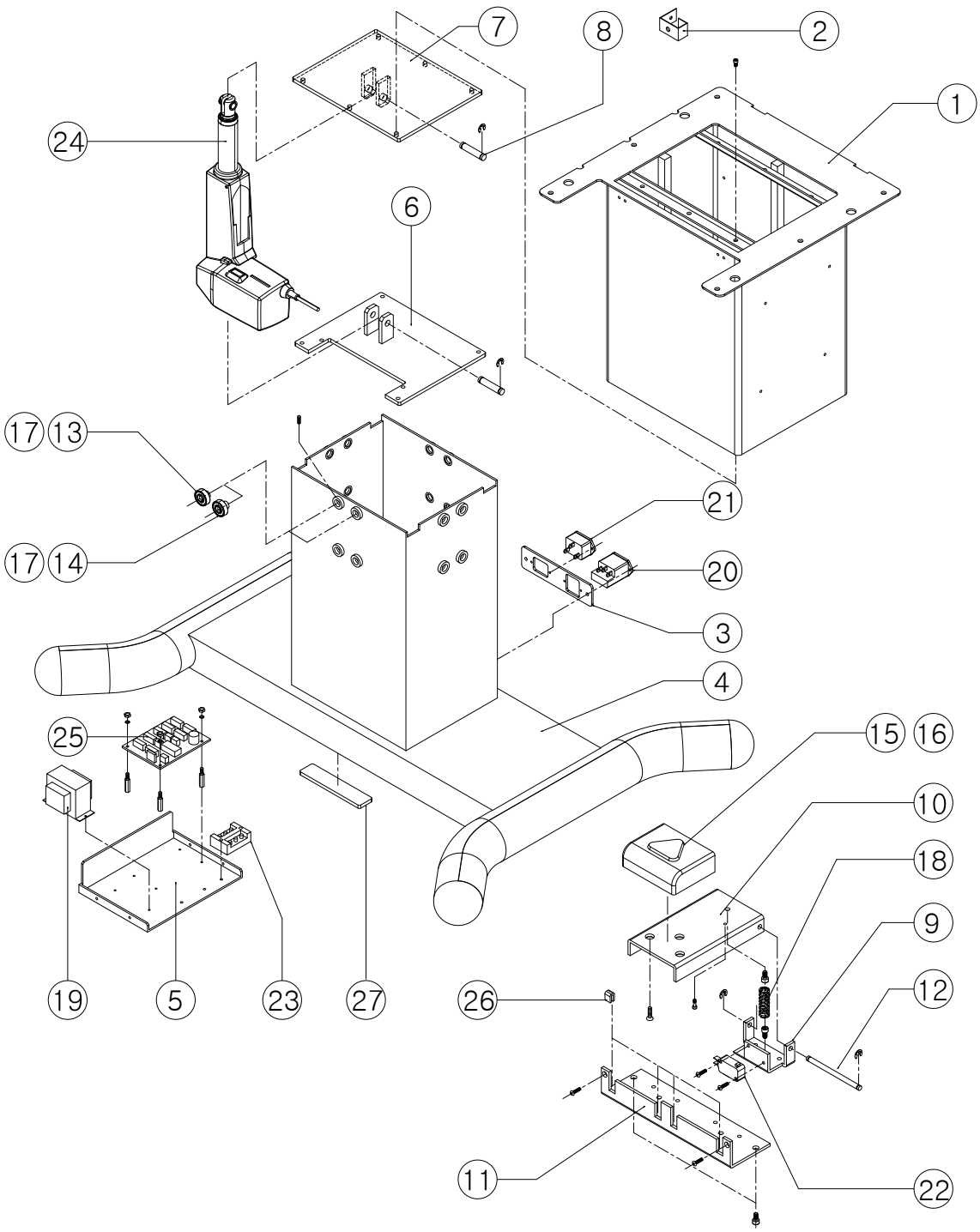
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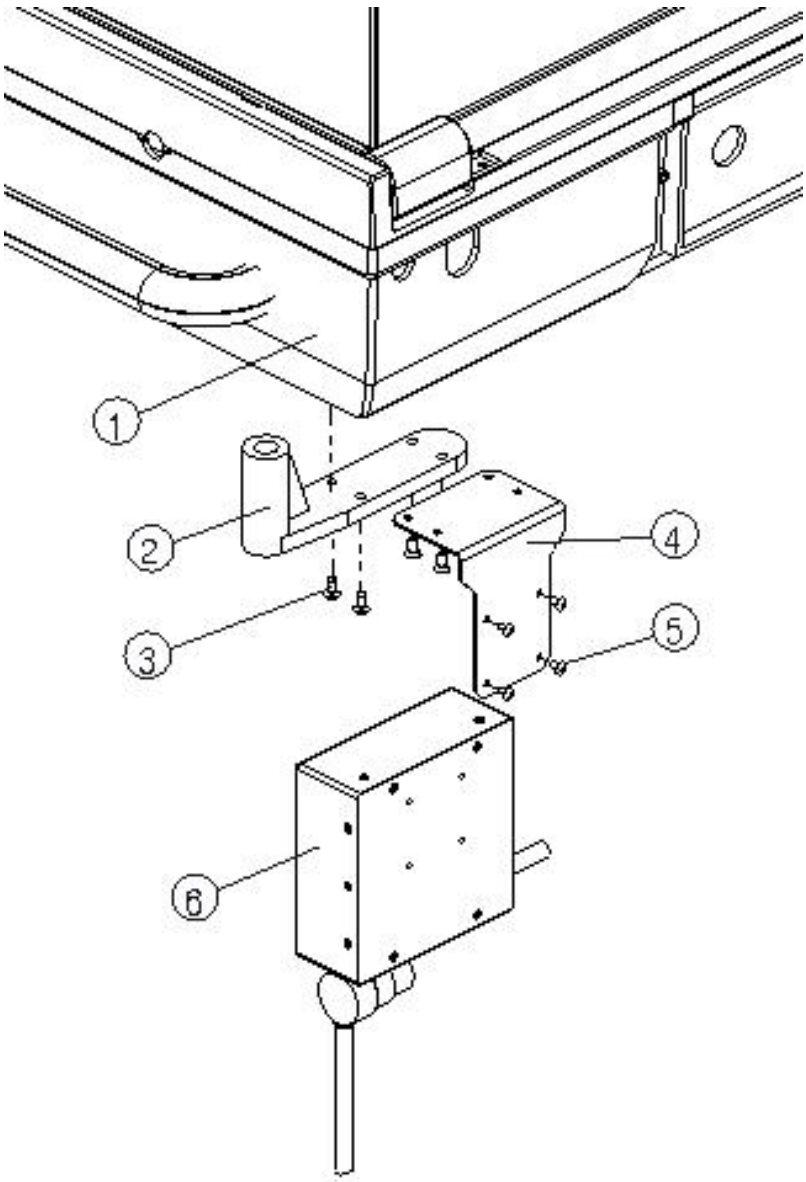
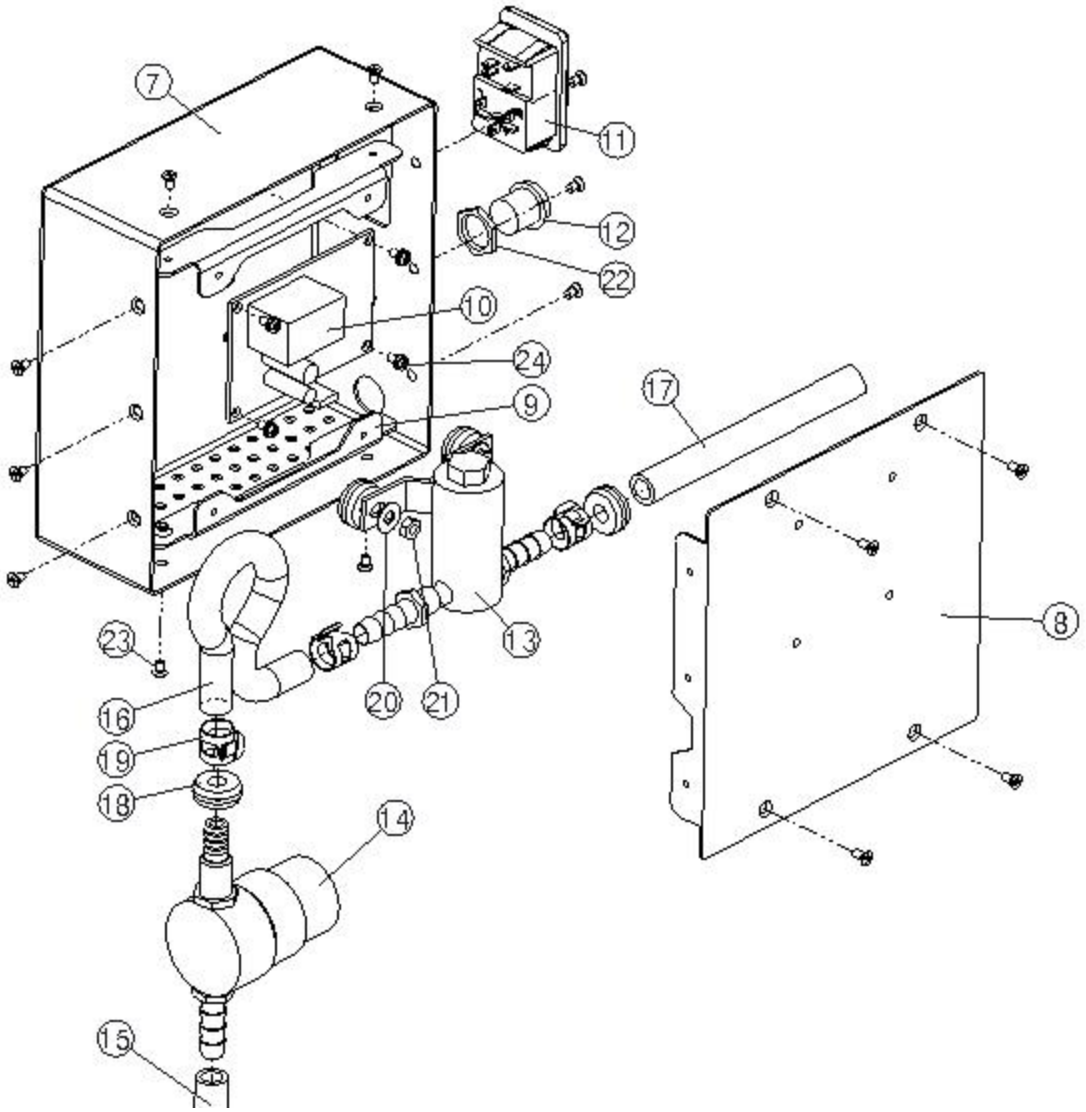
APPENDIX G. O2 MODULE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	1-91-00678-00	Base ASS'Y	
2	2-04-00354-00	Pole Stand Fix Holder	80X45
3		Truss head screw	M6X25
4	2-26-00125-00	Case Plate	100X120X1.6T
5		Truss head screw	M6X25
6	1-21-00032-00	Oxygen Supply Module Ass'y	



APPENDIX G. O2 MODULE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
7	2-26-00122-00	Case Body	150*150*60
8	2-26-00123-00	Case Cover	147.6*147.6*16.2
9	2-26-00124-00	Case Cover Plate	100*15*1.2T
10	3-46-00505-00	Interface PCB	
11	3-42-00295-00	Power S/W	0717-1S
12	3-93-00635-00	CN18 Cable Ass`y(O2)	Circular 4P,Gray
13	3-35-00020-00	Solenoid valve	Y240115
14	3-35-00022-00	Regulator	R16-159-N50A
15		Silicone hose	Φ12*Φ7
16		Silicone hose	Φ12*Φ7
17		Silicone hose	Φ12*Φ7
18	3-69-00023-00	Bushing	Φ8
19		Band	Φ12
20		Flat Washer	M5
21		Nut	M4
22		CN18 Cable Ass`y(O2) Nut	
23		Flat Head Screw	M3×6
24		Pan Head Sems Screw	M3×6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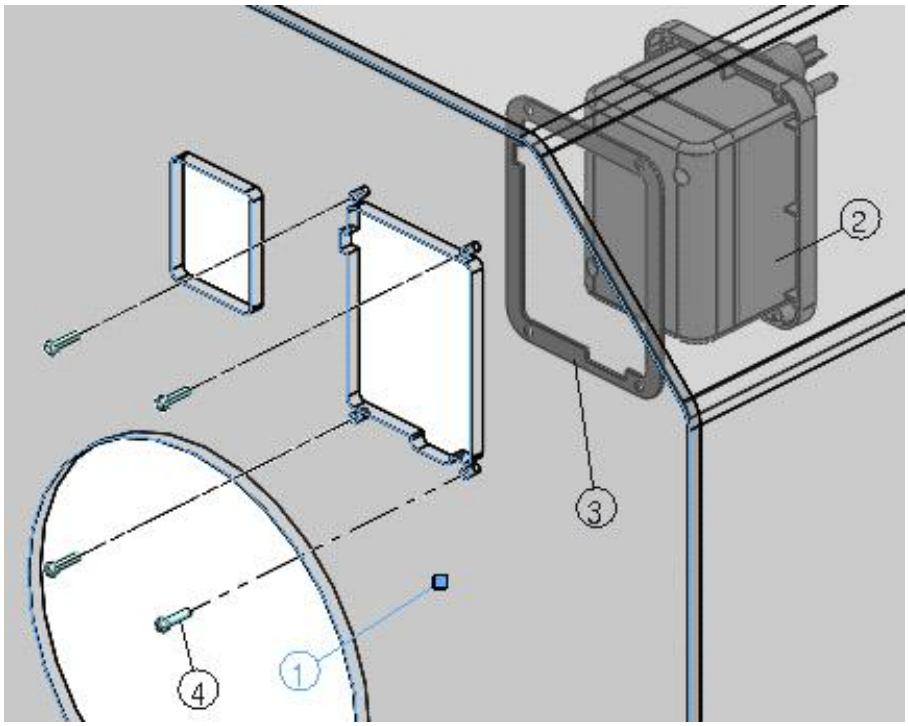
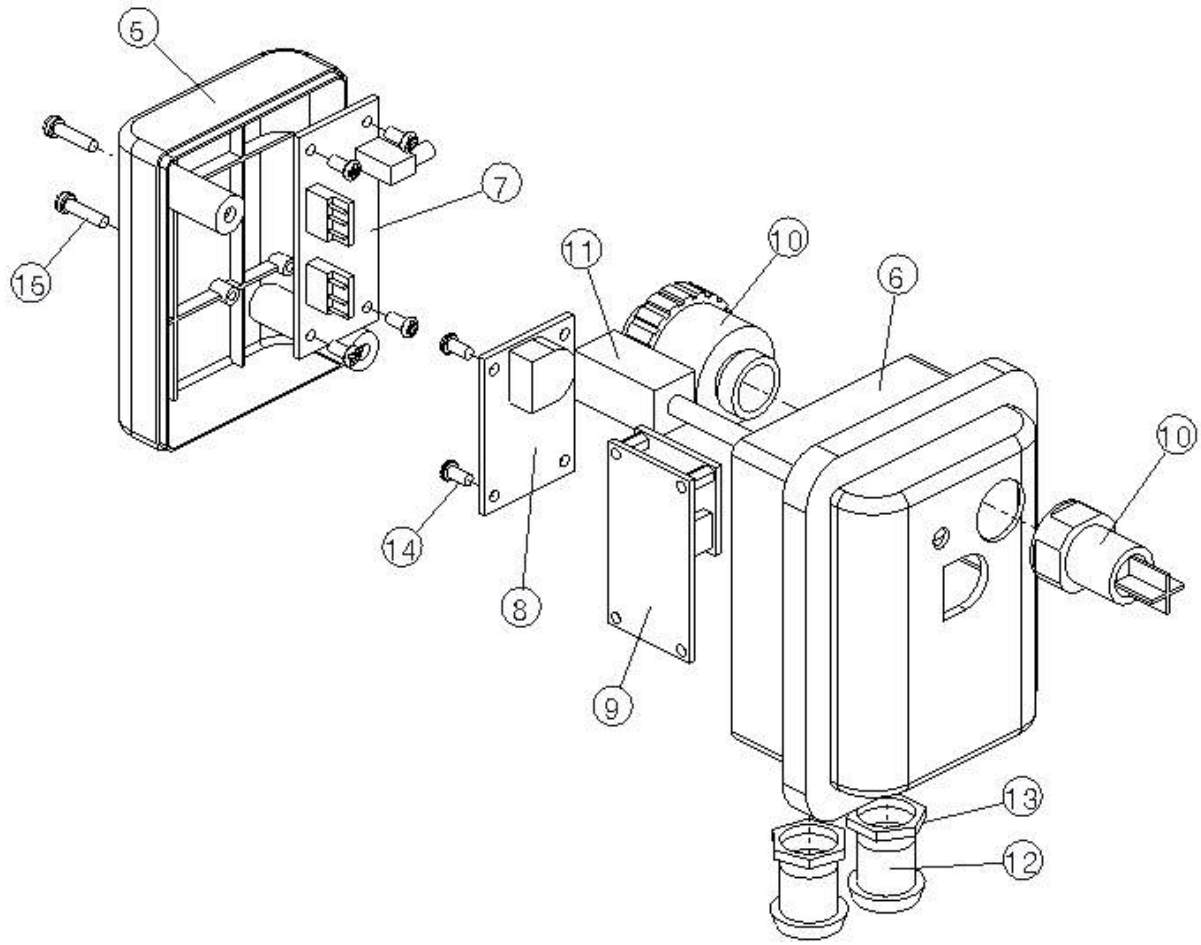
APPENDIX H. SPO2 MODULE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
1	2-40-00098-00	Hood Body	860X500X480
2	1-90-00074-00	Sensor Box Ass'y	
3	2-40-00065-00	Sensor Box Gasket	1.5tX100X78
4		Truss Head Screw	M3×12



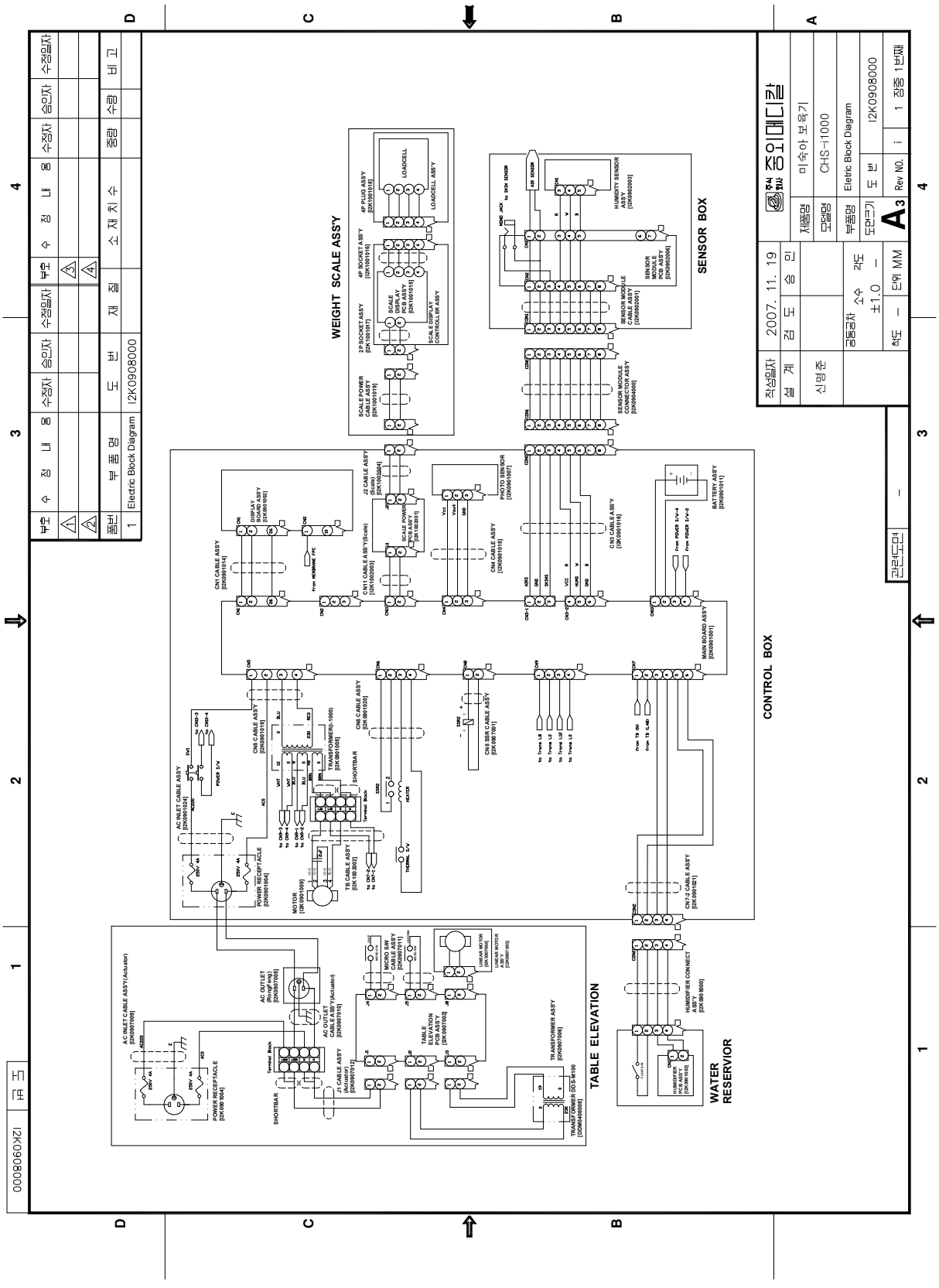
APPENDIX H. SPO2 MODULE ASSEMBLY PART LISTS

NO	Stock-NO	Part Name	Specification
5	2-40-00063-00	Sensor Box A	99.5*78*47.5
6	2-40-00064-00	Sensor Box B	81*62*35
7	1-91-00692-00	HUMIDITY SENSOR ASS'Y	
8	1-90-00074-00	SENSOR MODULE PCB ASS'Y	
9	3-46-00506-00	SPO2 PCB Ass`y	MD1(CHIPO2PM)P1102-2
10	3-56-00080-00	SPO2 Sensor	WA100(A0288-0)
11	3-56-00040-00	AIR TEMP. SENSOR ASS'Y	
12	3-93-00363-00	SENSOR MODULE CABLE ASS'Y	
13		SENSOR MODULE Nut	
14		Truss Tapping Screw	M3×6
15		Pan Head Screw	M3×12



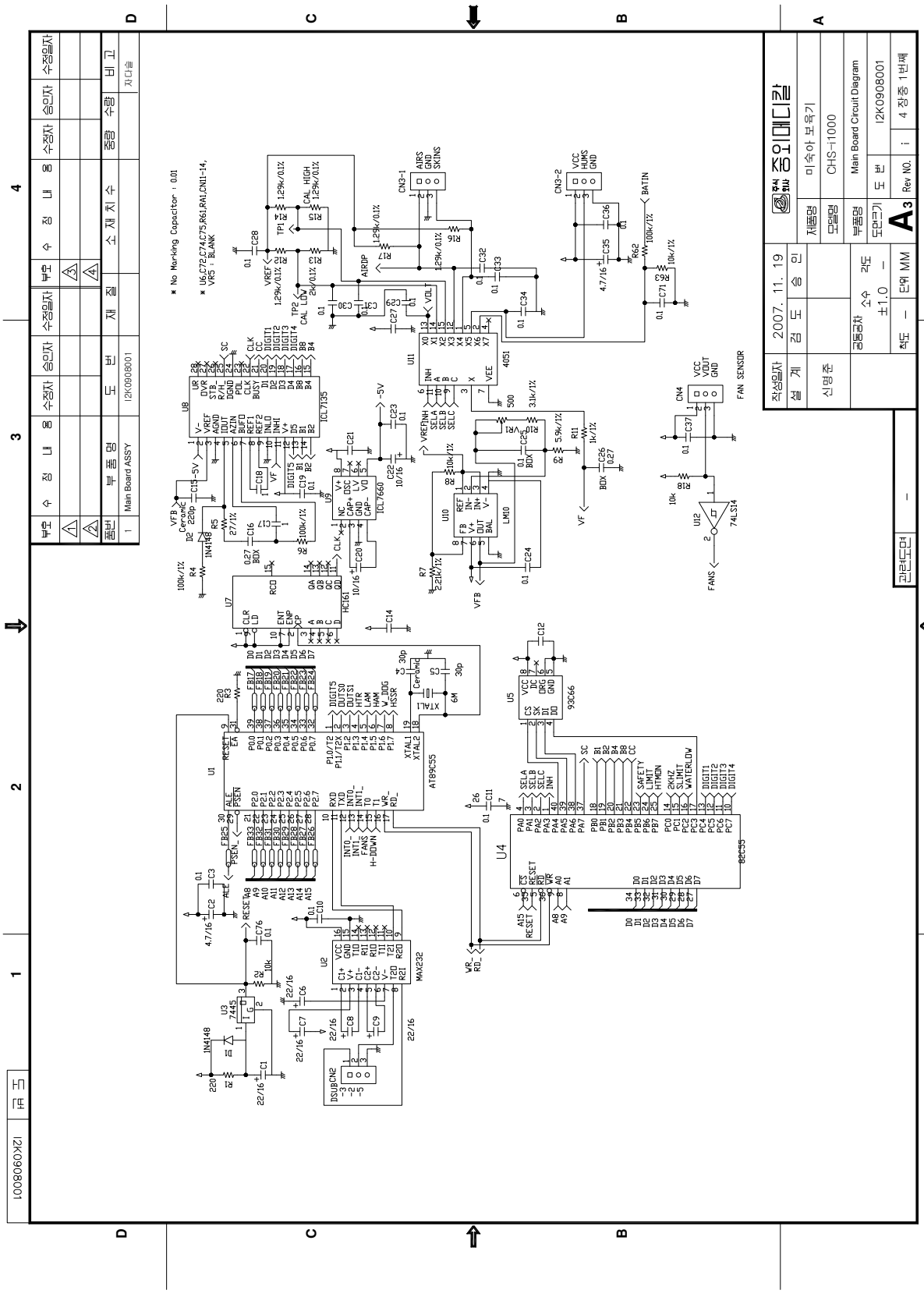
ELECTRIC CIRCUIT DIAGRAM

① Electric Block Diagram (1/1)

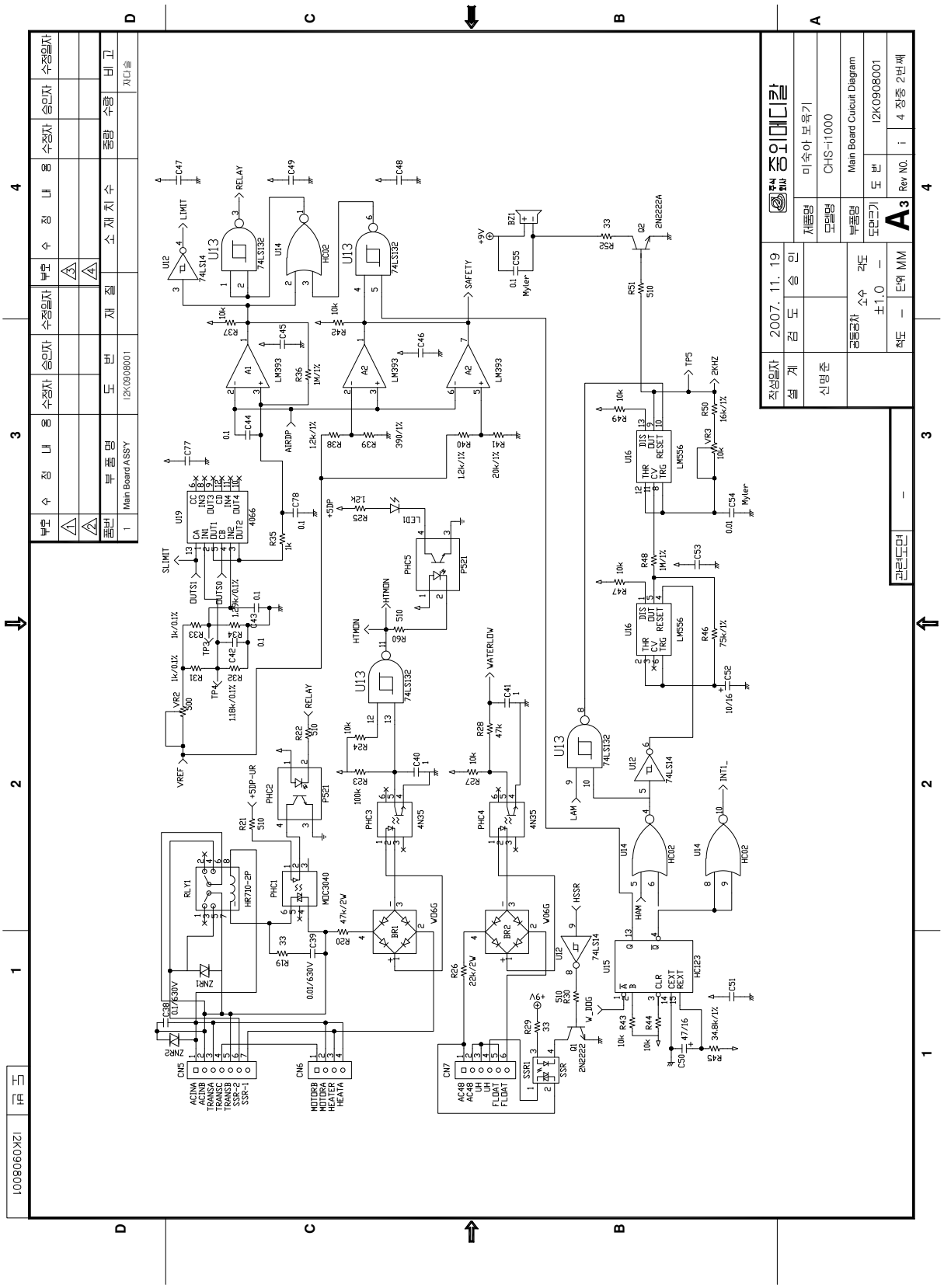


ELECTRIC CIRCUIT DIAGRAM

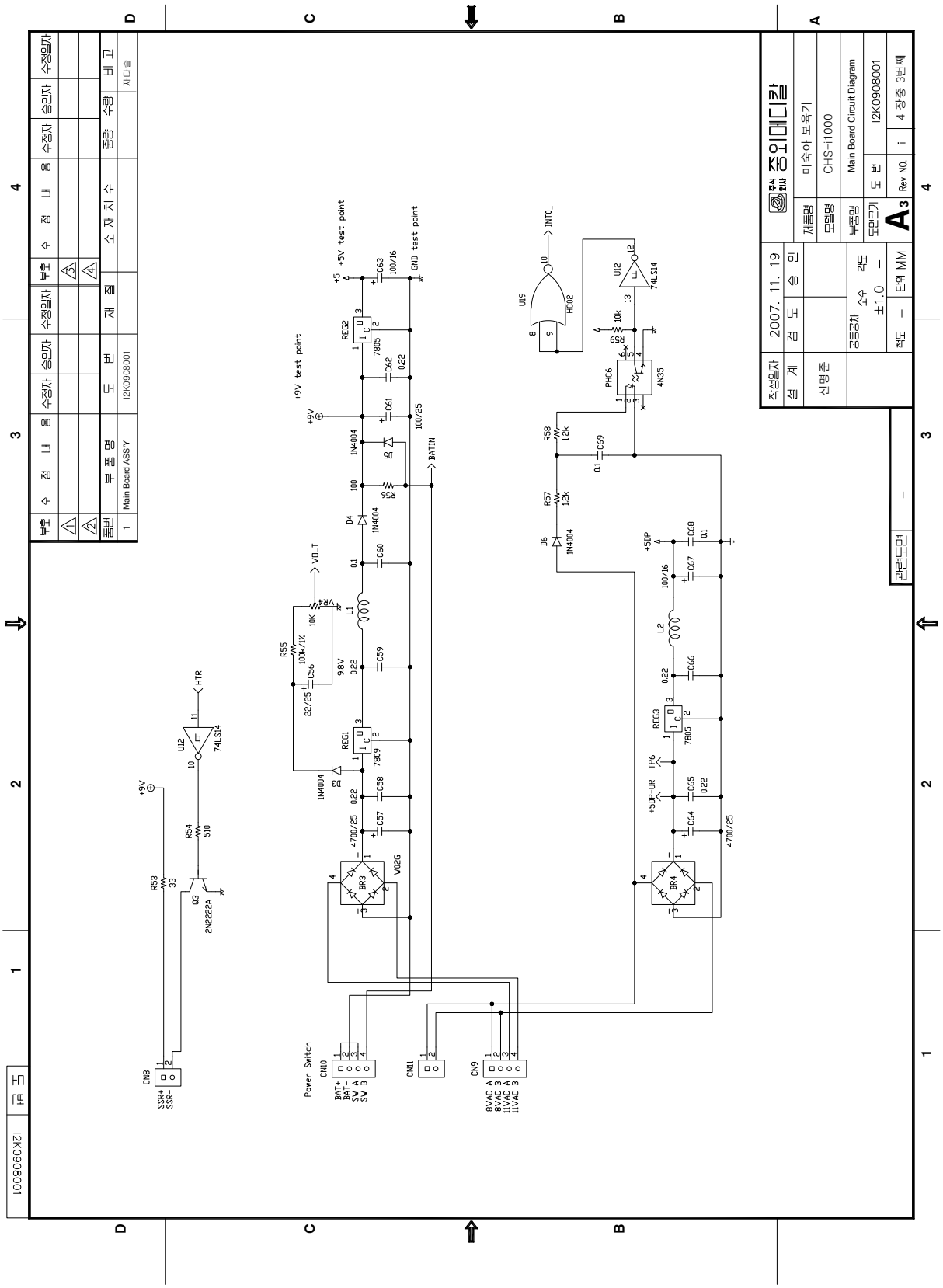
② Main Board Circuit Diagram(1/4)



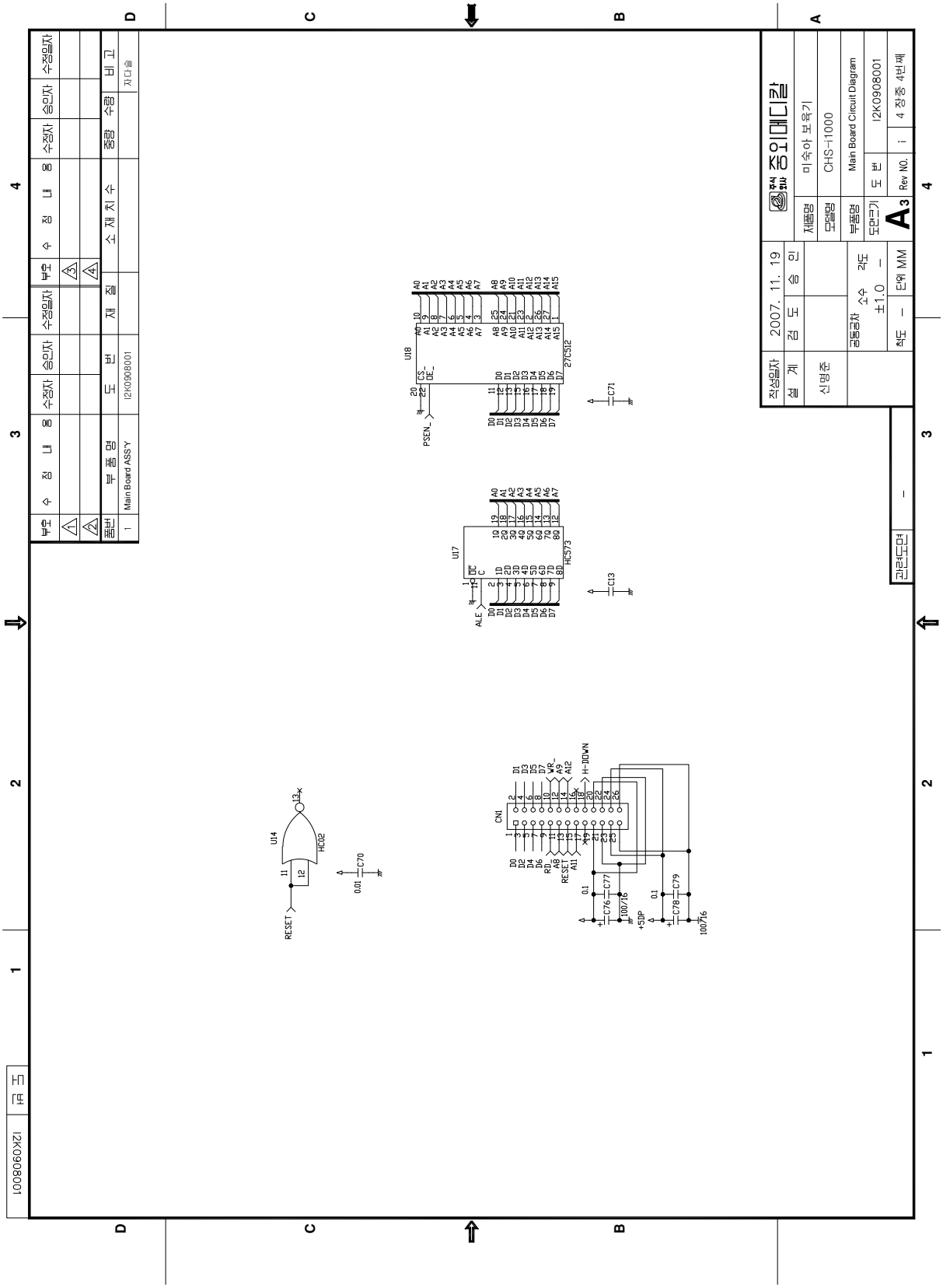
② Main Board Circuit Diagram(2/4)



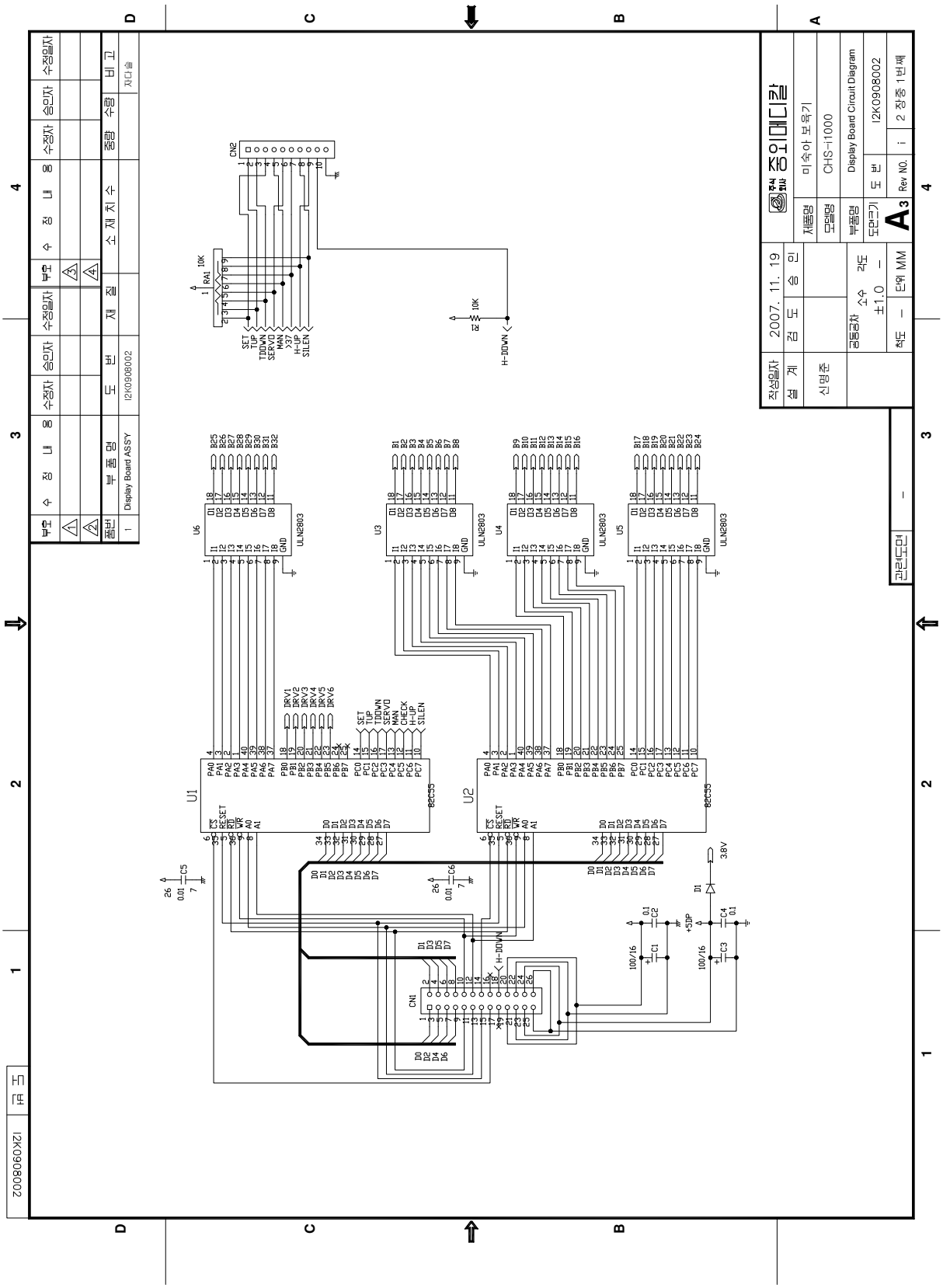
② Main Board Circuit Diagram(3/4)



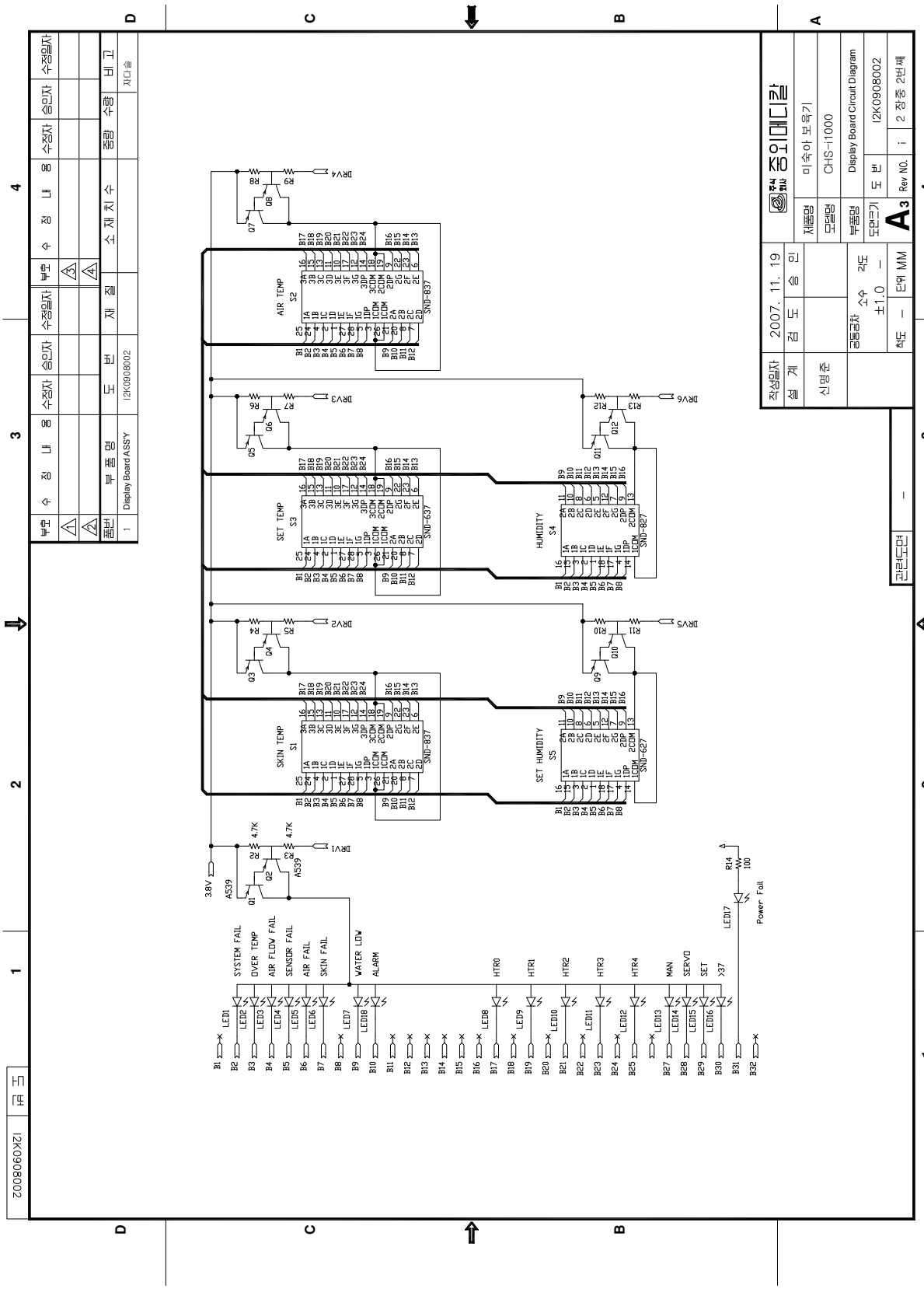
② Main Board Circuit Diagram(4/4)



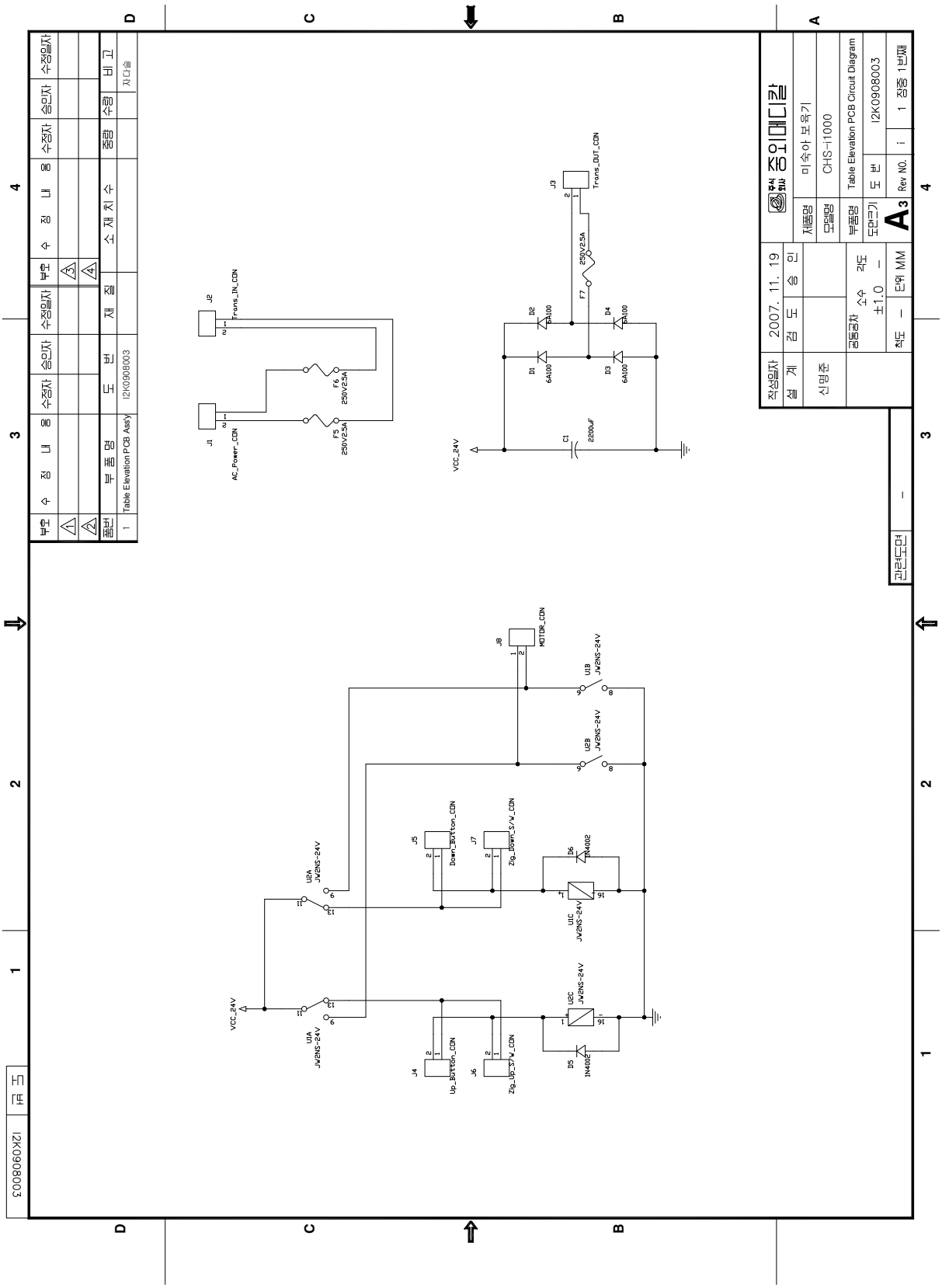
③ Display Board Circuit Diagram(1/2)



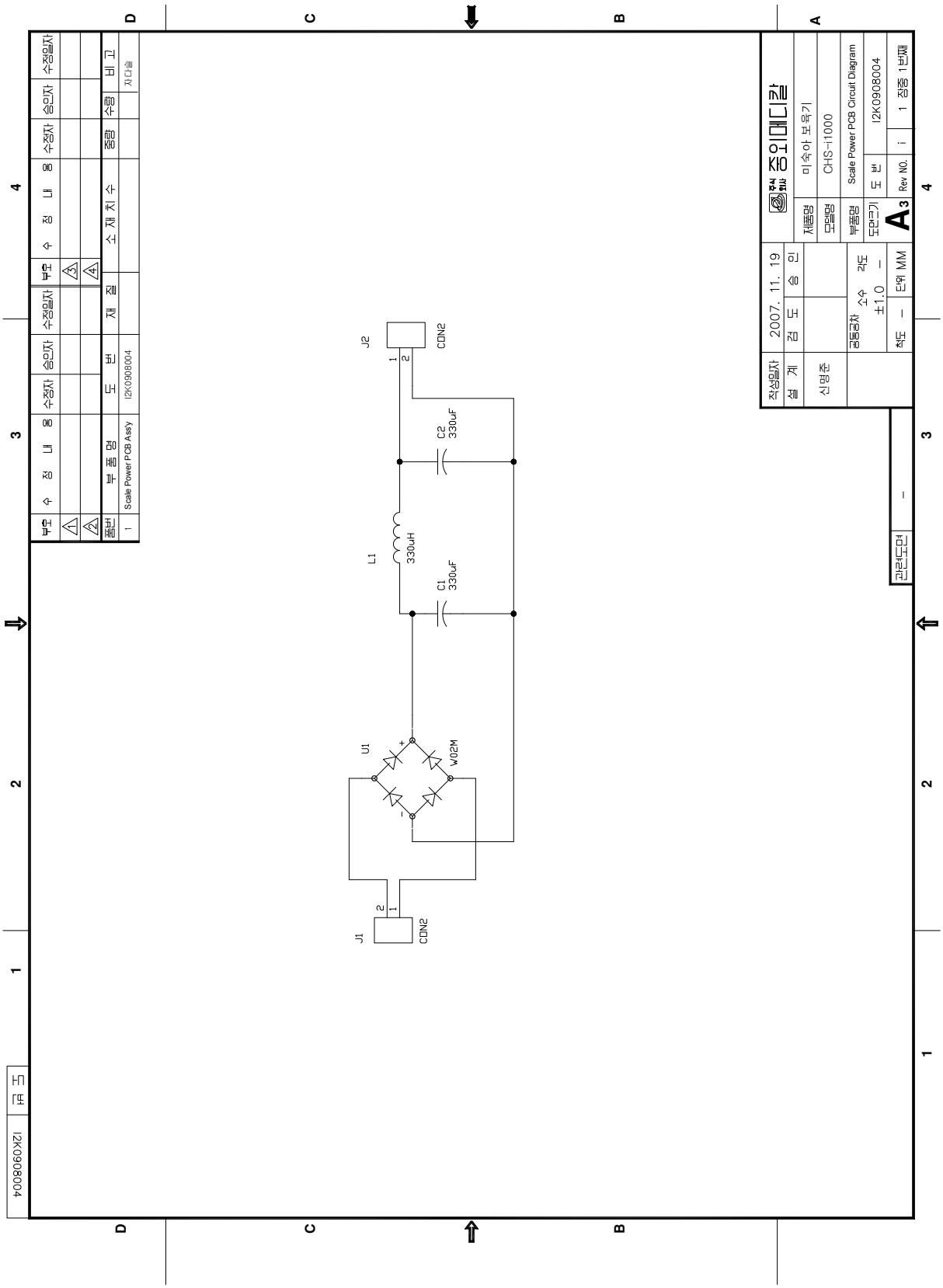
③ Display Board Circuit Diagram(2/2)



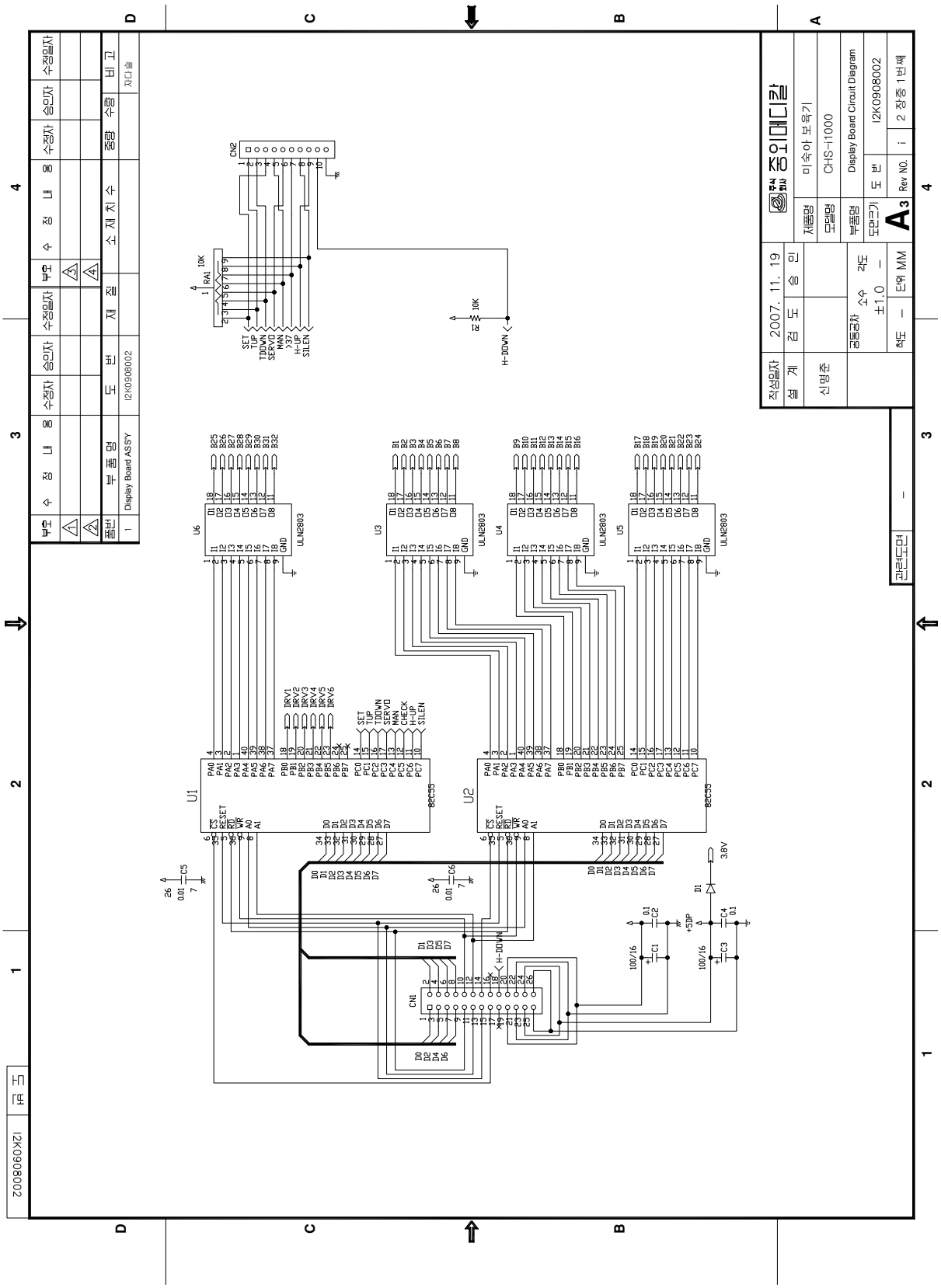
④ Table Elevation PCB Circuit Diagram(1/1)



⑤ Scale Power PCB Circuit Diagram(1/1)



⑥ Display Board Circuit Diagram(1/2)



⑥ Weight Scale PCB Circuit Diagram(2/2)