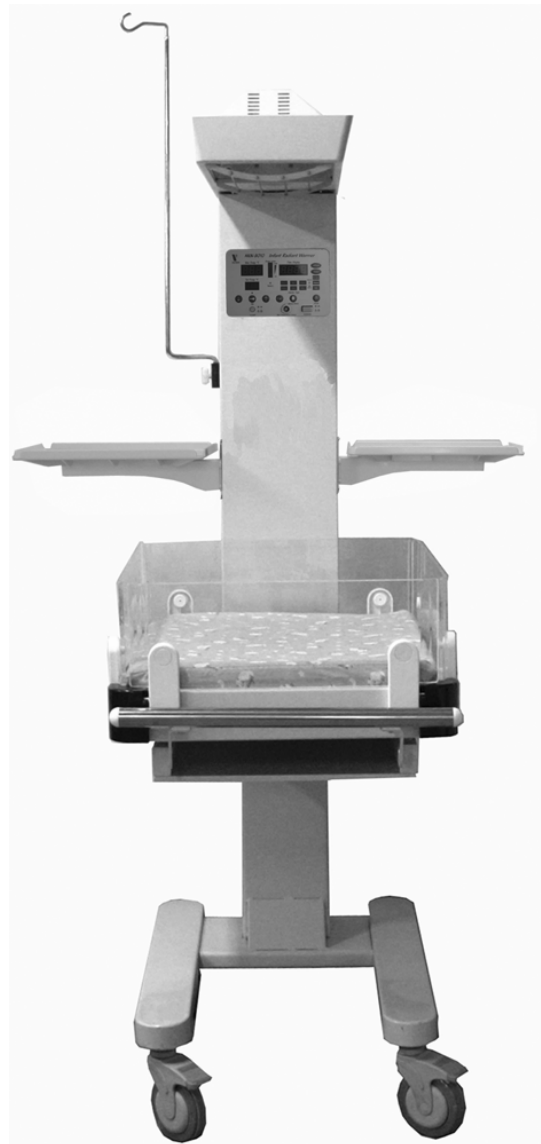




DAVID® NINGBO DAVID

EDITION/REVISION A/0

SERVICE MANUAL



HKN-9010 INFANT RADIANT WARMER

NINGBO DAVID MEDICAL DEVICE CO., LTD.

ADD: NO.158 DAQING ROAD, SHIPU, NINGBO, ZHEJIANG PROVINCE, CHINA

POST CODE: 315731

FAX: 0086-574-65962111

MARKETING CENTER: NO. 11, ALLEY 722 SANGTIAN ROAD NINGBO, ZHEJIANG

POST CODE: 315040

TEL: 0086-574-87800008, 87800009

FAX: 0086-574-87801111

E-MAIL: sales@chinadavid.cn david@mail.nbptt.zj.cn

WEBSITE: <http://www.nbdavid.com>

EUROPEAN REPRESENTATIVE: SHANGHAI INTERNATIONAL HOLDING CORP. GMBH (EUROPE)

ADD: EIFFESTRASSE 80, 20537 HAMBURG, GERMANY

TEL: 0049-40-2513175

FAX: 0049-40-255726

WARRANTY

The product being described in this manual is warranted against defects in materials or workmanship for one year from the date of shipment, with the following exceptions.

1. All consumable and disposable products are guaranteed to be free from defects upon shipment only.

2. Calibrations are considered normal maintenance and are not included in the 1-year warranty.

During the warranty period any defective parts other than those listed above will be replaced at no charge to the customer. This warranty is rendered void and our company cannot be held liable for conditions resultant there from if:

1. Damage to the unit is incurred as a result of mishandling.
2. The customer fails to maintain the unit in a proper manner.
3. The customer uses any parts, accessories, or fittings not specified or sold by our company.
4. Sale or service is performed by the non-certified service/dealer agency.

This warranty is in lieu of all other warranties, expressed or implied, and our company shall in no event be liable for incidental or consequential damages including loss of use, property damage, or personal injury resulting from breach of warranty.

Please test each piece of equipment prior to initial use and at least annually thereafter. To comply with this standard, we recommend that you participate in our training program before selling it. This service can be performed by certified technicians through our Product Service Group and authorized dealers.

SERVICE

For optimal performance, product service should be performed only by qualified service personnel. Technical Services representatives can be reached for fixations and are dispatched for required maintenance by calling 0086-574-87800008, 87800009. Customers outside China should contact their local factory-authorized distributor for service.

COMPLEMENTARY NOTICE

Since Ningbo David, conducts a continuous product improvement program, circuit and component improvements are sometimes incorporated into equipment before they can be incorporated into the printed manuals. This manual contains proprietary information, repairs and authorized modifications should be performed only by qualified service personnel to maintain your warranty and to avoid creating safety hazards. We cannot assume responsibility for any conditions affecting the proper operation of this equipment which may result from unauthorized repair modification. Therefore, some parts used in your equipment may be different than those which appear in the parts list of this manual. This sometimes occurs due to difficulty in parts procurement, but does not alter the function of the equipment

The device, accessories and the packaging have to be disposed of waste correctly at the end of the usage. Please follow Local Ordinances or Regulations for disposal.

TABLE OF DEFINITIONS AND SYMBOLS

TECHNICAL DEFINITIONS

SKIN TEMPERATURE SENSOR: A sensing device including the link with the equipment intended to measure the infant's baby temperature.

CONTROL TEMPERATURE: The preventative control temperature to the temperature control.

PRE-WARM MODE: A warm mode which can keep the mattress at a properly temperature. The heater output will work automatically according to the set programme in this mode.

MANUAL MODE: A operation mode of in which the heater output is either at a fixed level or a proportion of its maximum output set by the operator.

BABY MODE: A mode of operation in which the power output varies automatically in response to the temperature of the baby, to achieve a temperature close to a value set by the operator.

STEADY TEMPERATURE CONDITION: A condition which is reached when the temperature, measured at the center of the TEST DEVICE positioned on the mid point of the EQUIPMENT mattress, does not vary by more than 1°C over a period of 1 hour.

TEMPERATURE ALARM CHECKOUT STATE: The difference between the indicated temperature and control temperature is within $\pm 0.5^{\circ}\text{C}$ and such state lasts for over 10 minutes. When checkout the temperature alarm function, operation should be enter this state.

APGAR TIMER: It offers the functions of three periods alarming indication: 1min, 5min, and 10min for clinical treatment.

NOTE, IMPORTANT, CAUTION AND WARNING

NOTE: A note is inserted in text to point out procedures or conditions, which may otherwise be misinterpreted or overlooked. A note may also be used to clarify apparently contradictory or confusing situations.

IMPORTANT: Similar to a Note but be used where greater emphasis is required.

CAUTION: A caution is inserted in text to call attention of a procedure which, It not followed exactly, can lead to damage or destruction of the equipment.

WARNING: A warning is inserted in text to call attention to dangerous or hazardous conditions inherent to the operation, cleaning, and maintenance of the equipment which may result in personal Injury or death of the operator or patient.

SYMBOLS



Attention, Consult Accompanying Documents.

220-230V~/50Hz Input Power

F 4AH/250V Type F Fuse 4AH/250V

T 400mAL/250V Type T Fuse 400mAL/250V

T 800mAL/250V Type T Fuse 800mAL/250V

T 160mAL/250V Type T Fuse 160mAL/250V



Heater Power Indicator

RS232

Data Communication Connector



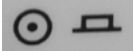
Load Symbol



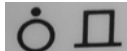
On (Power: Connection to the mains)



Off (Power: Disconnection to the mains)



On (only for a part of equipment)



Off (only for a part of equipment)

CLASS I

Class I Equipment



Type BF Applied Part



Protective Earth (ground)



Earth (ground)

APGAR

APGAR Timer Key

Timer

Timer Key



Set Up Key



Set Down Key



Keypad Lock Key



Calibration Key



Silence/Reset Key



Mode Select Key



Date of Manufacture

SN

Serial Number



0123 CE Marking



Danger! High Voltage!

SEASONAL SAFETY CHECK

1. Please clean the plug of power cord at least once a year. Too much dust on plug may cause the fire.

2. The following safety checks should be performed at least every 12 months by a qualified person who has adequate training, knowledge, and practical experience to perform these tests. The data should be recorded in an equipment log. If the device is not functioning properly or fails any of the above tests, the device has to be repaired.

①. Inspect the equipment and accessories for mechanical and functional damage.

②. Inspect the safety relevant labels for legibility.

③. Inspect the fuse to verify compliance with rated current and breaking characteristics.

④. Verify that the device functions properly as described in the instructions for use.

⑤. Test the protection earth resistance according IEC 60601-1:1988 + A1:1991 + A2:1995: Limit 0.1Ω.

⑥. Test the earth leakage current according IEC 60601-1:1988 + A1:1991 + A2:1995: Limit: NC 500μA, SFC: 1000μA.

⑦. Test the enclosure leakage current according to IEC 60601-1:1988 + A1:1991 + A2:1995: Limit: NC 100μA, SFC: 500μA.

⑧. Test the patient leakage current according IEC 60601-1:1988 + A1:1991 + A2:1995: Limit: for a.c.: 100μA (BF), for d.c.: 10μA (BF).

⑨. Test the patient leakage current under single fault condition with mains voltage on the applied part according IEC 60601-1:1988 + A1:1991 + A2:1995: Limit: for a.c.: 500μA (BF), for d.c.: 50μA (BF).

⑩. Test the patient auxiliary leakage current according IEC 60601-1:1988 + A1:1991+ A2:1995: Limit: NC for a.c.: 100μA (BF), for d.c.: 10μA (BF).SFC 500μA (BF), for d.c.: 50μA (BF).

TABLE OF CONTENTS

SECTION	PAGE
1. GENERAL INTRODUCTION.....	1-1
1.1 INTRODUCTION.....	1-1
1.2 DESCRIPTION.....	1-1
1.3 COMPOSITION OF PRODUCTS.....	1-1
2. INSTALLATION.....	2-1
2.1 UNPACKING.....	2-1
2.2 INSTALLATION.....	2-1
2.3 OPERATION CHECKOUT PROCEDURE.....	2-2
3. TECHNICAL INFORMATION.....	3-1
3.1 SPECIFICATION.....	3-1
3.2 WORKING PRINCIPLE.....	3-3
4. PREVENTATIVE MAINTENANCE.....	4-1
4.1 GENERAL.....	4-1
4.2 CLEANING.....	4-1
4.3 STERILIZATION.....	4-2
4.4 MAINTENANCE.....	4-3
5. SERVICE.....	5-1
5.1 GENERAL.....	5-1
5.2 REPLACEMENT OF CHARGING BATTERY/FUSE/ QUARTZ HEATER/ILLUMINATION LIGHT.....	5-1
5.3 SYSTEM SETTING PROCEDURES.....	5-3
5.4 TROUBLESHOOTING PROCEDURES.....	5-6
6. REPLACEMENT PARTS.....	6-1
6.1 GENERAL.....	6-1
7. DIAGRAMS	7-1
7.1 GENERAL	7-1

SECTION 1

GENERAL INTRODUCTION

1.1 INTRODUCTION

This manual provides instructions for installation and maintenance of Infant Radiant Warmer. This manual provides the guidance for the qualified service personnel.

1.2 DESCRIPTION

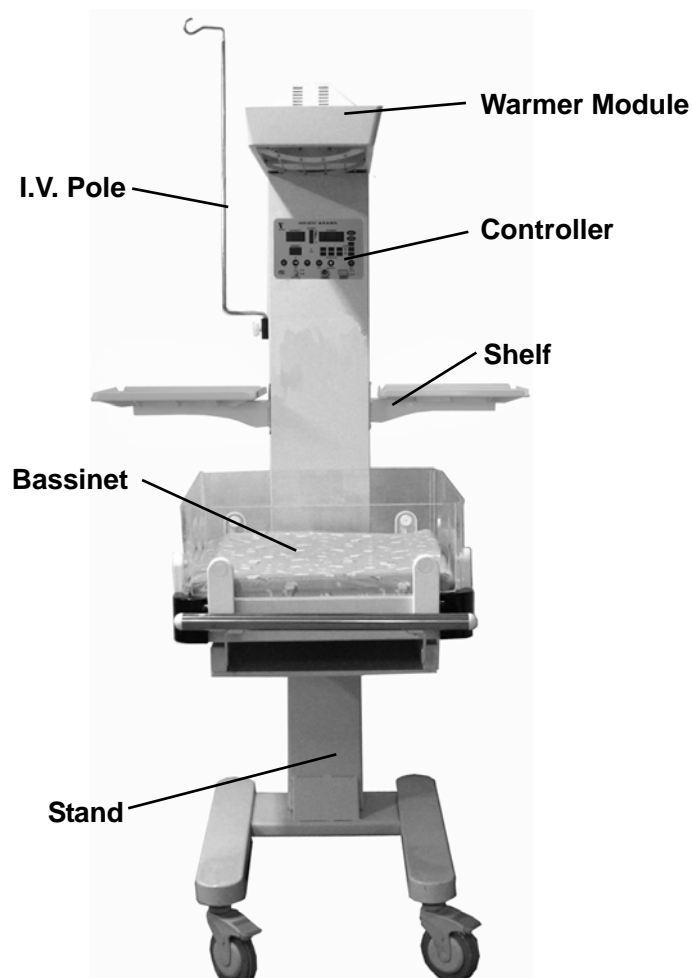
The Infant Radiant Warmer adopts 3 kinds of control mode: Pre-warm mode, Manual mode and Baby mode. Once the device starts working, it can enter into the Pre-warm mode automatically without pressing any key.

The setting temperature and baby temperature can be indicated separately.

Except for the listed parts in 1.3 the warmer also has the quartz halogen lamp, X-ray tray, and 4pcs casters. (Two of them with brakes)

1.3 COMPOSITION OF PRODUCTS

The following diagram shows the main parts of the infant radiant warmer:



DESCRIPTION OF PART	EXPLANATION
Warmer Module	This main part is composed of the Heater, Reflective mantle, it is intended to provide the radiation for electromagnetic spectrum infrared range with weight of 10Kg, and its angle can be adjusted horizontal in two ways. The lifetime of heater is 2000hrs.
I.V. Pole	A kind of bearing part, which is used for hanging the infusion bottle. Max. Load: 2Kg
Controller	The core part with 3 temperature control mode: pre-warm mode, manual mode, baby mode, APGAR timer, timing function, and it is used for automatic controlling of infrared radiation heat output, please refer to the user's manual.
Shelf	A kind of bearing part, which is used for putting some small objects. Max. Load: 2 Kg
Bassinet	It is used for place the infant. The bassinet can be tilted. Max. Load: 10 Kg. This bassinet is equipped with 4pcs of panels to avoid the patient falling off. Size of mattress: W655mm×D510mm
Stand	It provides a mounting for the Warmer Module and Bassinet. The distance from bed to the floor: 900mm

NOTE: 1. Size of whole unit: W1070×H1820×D760mm

2. Weight: 70Kg

SECTION 2 INSTALLATION

2.1 UNPACKING

Generally, the WARMER is usually packed to one carton. When taking out the equipment from the cartons, take care not to damage the spare parts of the WARMER.

2.2 INSTALLATION

At least two professionals are required to do the installation of the WARMER with spanners.

Installation step:

A. Connection between the warmer module and stand.

① Unscrew the pan head bolt M5X20, Spring washerΦ5, Flat washerΦ5 and external teeth serrated lock washers Φ5 on the upper column with the screwdriver.

② Install the lower column with upper column as the direction indicated in figure 2.1, and fix them with the pan head bolt M5X20, Spring washerΦ5, Flat washerΦ5 and external teeth serrated lock washers Φ5.



FIGURE 2.1

③ Install the back cover for upper column with upper column as the figure 2.2, and fix them with the pan head bolt M5X20, Spring washerΦ5, Flat washerΦ5 and external teeth serrated lock washers Φ5 on its original position.

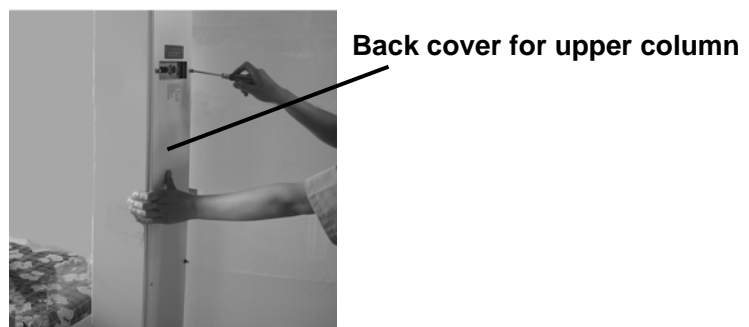


FIGURE 2.2

IMPORTANT: Please make sure that the upper column and the stand are vertical, or else, it will affect the temperature uniformity on the mattress.

B. Install the panel

Insert the panel into the Fixed seat as the arrow indicates in figure 2.3.1, and turn it upward to make it vertical and press it as the figure 2.3.2 indicates.

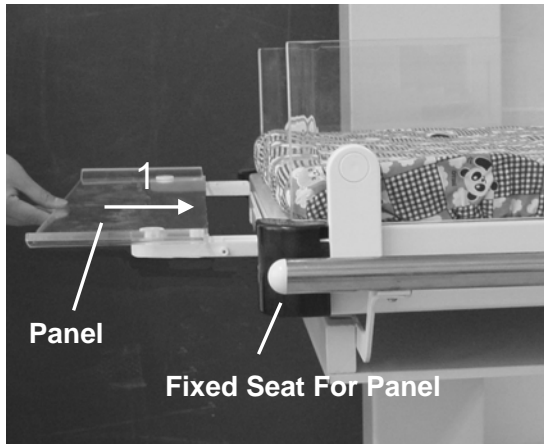


FIGURE 2.3.1

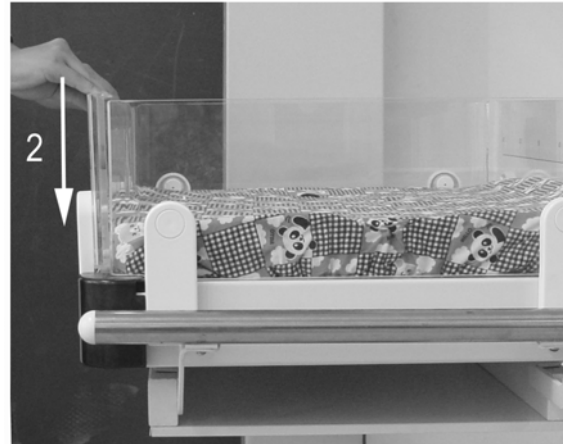


FIGURE 2.3.2

NOTE: 1.Total 4 pieces panels; the panel with groove is the back panel.

2. Make the bassinets tilt when installing the back panel.

C. Install Shelf and I.V. Pole

Fix the tray on the upper column in figure 2.4.1. with the pan head bolt M4X12, Spring washerΦ4, Flat washerΦ4 with screwdriver; See figure 2.4.2, install the I.V. Pole on the upper column, and tighten the bolt with clamp.

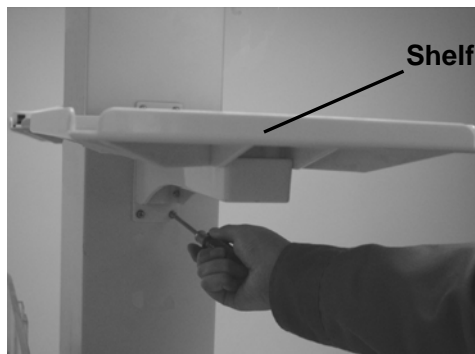


FIGURE 2.4.1



FIGURE 2.4.2

D. Insert the power cord

Insert the power cord into the mains power socket.

Check the WARMER according to the instruction in section 2.3.

2.3 OPERATION CHECKOUT PROCEDURE

Please follow the below operation checkout procedure before use.

A. Check casters

Check whether the caster can drop when lifting the radiant warmer 2cm above the ground. The drop of the caster will cause danger during transporting.

IMPORTANT: At least two persons are required, one lifts the warmers, and the other has to check the casters. It needs Min. 70Kg to light the whole unit. Please support the stand with block to avoid the warmer inclining if the casters drop.

B. CHECK POWER FAILURE ALARM

When the general power supply and the switch of controller are turned off, pull off the power cord of whole unit, the Power failure alarm should active, and the “**Power**” light will flash with continuous audible sound.

This operation is used for checking if the power failure is normal or not. Insert the power cord again or switch off the controller to silence alarming after finishing checking.

IMPORTANT: Please make sure that the internal charging battery is full before use it. If it is not full, it may cause the power failure without any alarming. If the battery is full, and there is no hint when disconnect the power cord, please refer to the qualified service personnel.

C. START-UP THE CONTROLLER

Turn on the switch of the main power supply and controller, the controller performs a long period sound “ringing” .All indicators are on, at this time, the device can do self-test automatically for 5s. After then, the **Set temperature** indicator will display “--.-”, at the same time, the **Baby temperature** indicator displays the baby temperature, and the timer indicates the current time, and the controller can enter into the pre-warm mode automatically, and the pre-warm light will be on. If one of them does not work, or the indication is incomplete, please refer to the qualified service personnel.

D. CHECK WORKING MODE

① Place the skin sensor on the central of mattress, and record the baby temperature in the cold state, and then start the warmer to make the device enter into the pre-warm mode automatically for 30min, and please read the baby temperature to compare the indicated temperature after pre-warm and the one in the cold state, it should not less than 4℃. If not, please replace the heater.

② please select the manual control mode, the system default of heat output proportion is 30%, there is 3grades in the heat indicator, press Up or Down key to adjust the value within range of 0%-100%. Please set the heat output proportion >30%. There is alarm every 15min, “CHECK” alarm light flashes, and the set temperature indicator displays alarm code E0.9, press **Silence/Reset key** to silence alarming. The device still works according to the current mode and heat output proportion. If do not press **Silence/Reset key** when “CHECK” alarm actives, the device will decrease the heat output proportion to 30% in 1min. If not, please refer to the qualified service personnel.

③ In Baby mode, pull off the skin sensor, the audible and visual alarm will occur, the alarm light of sensor and the **set temperature** indicator will show alarm code E0.1. Press **Silence/Reset key** to silence alarming for 4min. Connect again the skin sensor, the device will come back to the normal working condition.

E. CHECK SETTING ALARM

In Baby mode, put the skin sensor into the water cup at temperature lower 3.5°C than the set temperature for 2min, the setting temperature alarm will active. The “**Set**” light should flash with continuous audible sound, and the **set temperature** indicator will show alarm code E0.7. Press silence/reset key to silence alarming for 4min.

Set the temperature at 36°C , after the device enters into the **temperature alarming checkout state**, put the skin sensor into the water cup at temperature $35.3^{\circ}\text{C}\pm 0.1^{\circ}\text{C}$ for 3min, the setting temperature alarm will active. The “**Set**” light should flash with continuous audible sound, and the **set temperature** indicator will show alarm code E0.8. Press **Silence/Reset key** to silence alarming for 4min.

F. CHECK DEVIATION ALARM

In baby mode, set the temperature at 35.0°C . Enter **temperature alarm checkout state**; put the skin sensor into the water cup at 37°C . When the indicated temperature reaches 36.0°C , the upper deviation alarm will active. The “**H/L**” light should flash with continuous audible sound, and the **set temperature** indicator should show alarm code E0.5; Set the temperature at 35.0°C , after the device enters into the **temperature alarming checkout state**, put the skin sensor into the water cup at temperature 33°C , when the indicated temperature decreases to 34.0°C , the lower deviation alarm should active. The “**H/L**” light should flash with continuous audible sound, and the **set temperature** indicator should show alarm code E0.6. Press **Silence/Reset key** to silence alarming for 4min.

NOTE: If the system can not enter into the temperature alarm checkout state or the baby temperature does vary $\pm 1^{\circ}\text{C}$ than the setting temperature, the deviation alarm can not occur.

G. CHECK OVER-TEMPERATURE ALARM

In baby mode, put the skin sensor into the water cups at $39.5^{\circ}\text{C}\pm 0.5^{\circ}\text{C}$, the over-temperature alarm should active. The “**Over**” light should flash with continuous audible sound, and the **Set temperature** indicator should show alarm code E0.4. Press **Silence/Reset key** to silence alarming for 4min. Reduce the baby temperature and press **Silence/Reset key** to silence alarming.

H. CHECK APGAR TIMER

When the temperature controller is under the normal working state, press the **Timer mode** key, and select the APGAR mode, and the relevant indicator is on, the timer start to indicate from 0s, when the timer indicates 50”~1’, 4’50”~5’, 9’50”~10’, it sounds “du...”, at the same time, the APGAR timer is flashing. If not, please refer to the qualified service personnel.

I. CHECK THE TIMER

Under the normal working condition, press to indicate the current running time, If the indicated time is not accurate, please reset, and the specific setting method is as follows:

Press the timer key, at the same time, turn on the controller for 3min, loosen the key when the indicated setting interface appears.

At this time, **Set temperature** indicator shows the setting code, baby temperature indicator will indicate the relevant value (as for setting code, setting item and setting range, please refer to the following table), the timer indicator will indicates P002(it means it has entered into the setting interface). Operator can choose the setting items by pressing the **Timer key** or **APGAR Timer** key, and press the up and **Down key** to choose the data setting. After then, press the set key to store the setting value, or you can press the **Silence/Reset key** to store and exit after finishing all setting procedure. If turn off the power supply without pressing the **Silence/Reset key**, and this setting is invalid, and system will store the previous setting value.

TIME SET CODE

SETTING CODE	INDICATED ITEM	SET RANGE
001	The former two figure of year	19 ~20
002	The latter two figure of year	00 ~99
003	month	01 ~12
004	date	01 ~31
005	week	01~07 (01means Sunday)
006	hour	00~23(24hrs)
007	minute	00~59
008	second	00~59

J. CHECK BASSINET TILT MACHANISM

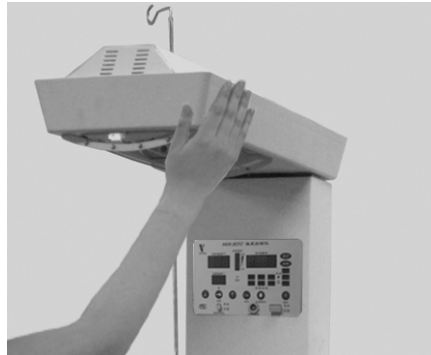
Move the angle adjustment machanism under the bassinet to adjust the bassinet tilt.



Angle Adjustment Machanism

K. CHECK THE ADJUSTMENT FUNCTION OF ANGLE OF WARMER MODULE

Move the warmer module to rotate it at horizon angle.

**L. CHECK ILLUMINATION LIGHT**

Turn on the power switch of illumination light, and the light will be on.

M. CHECK THE PANEL

Push and pull the panel and check if the panels are firm or not.

N. CHECK X-RAY TRAY

Push and pull the X-ray tray to check the working condition.

O. CHECK I.V. POLE

Check if the I.V. Pole stand is tightening or not.

P. End

SECTION 3

TECHNICAL INFORMATION

3.1 SPECIFICATION

Specifications for the Radiant Warmer with model HKN-9010 are provided in table 3.1. All specifications are subject to change without notice.

TABLE 3.1 SPECIFICATIONS

Power Requirements	AC220V-230V/50Hz
Maximum Power Output	600W
Maximum Heater Power Output	540VA/240V
Heater power display	0 to 100%, adjustable in 10% increments
Protective earthed resistance	<0.1 Ω
Earth leakage current	N.C.: <0.5mA
	S.F.C.: <1mA
Patient leakage current	N.C.: <0.1mA
	S.F.C.: <0.5mA
Patient Leakage Current (MAINS VOLTAGE ON THE APPLIED PART)	S.F.C.: <5mA
This equipment belongs to Class I, Type BF applied part, normal device (IP20) continuously operated.	
TEMPERATURE CONTROL RANGE AND ITS SPECIFICATION	
Temperature control range	34.5°C~37.5°C
Baby Temperature display range	5°C~65°C
Deviation between baby temperature and control temperature	≤0.5°C
Accuracy of skin temperature sensor	≤0.3°C
Temperature uniformity of mattress	≤2°C
ALARM (See table 3.2)	
General Power alarm	
Detecting baby temperature Probe failure	
disconnection of skin sensor	Alarm code E0.1
The probe for over-temp failure	Alarm code E0.2
Deviation of two probes failure	Alarm code E0.3
Over-temp alarm for skin sensor	Alarm code E0.4
Upper deviation alarm	Alarm code E0.5
Lower deviation alarm	Alarm code E0.6
Wrong temperature set alarm in baby mode	Alarm code E0.7

TABLE 1.1 SPECIFICATIONS (continued)

The sensor position alarm in baby mode.....	Alarm code E0.8
The tip every min in manual mode.....	Alarm code E0.9
Internal system failure.....	Alarm code H0.1~H1.1
ENVIRONMENT TEMPERATURE	
Operating Range.....	+18°C~+30°C
Storage Range.....	-40°C~+55°C
ENVIRONMENT HUMIDITY	
Operating Range.....	30%RH~75%RH
Storage Range.....	≤93%RH
ATMOSPHERE PRESSURE	
Shipment and store atmospheric pressure range.....	500hPa~1060hPa
Working atmospheric pressure range.....	700hPa~1060hPa
AIR FLOW RATE	
AMBIENT AIR MOVEMENT RATE	<0.3M/S
OTHER SPECIFICATION	
Working noise.....	Ambient noise≤40dB(A), working noise≤50dB(A)
APGAR Timer.....	Tones at 50" ~1', 4'50" ~5', 9'50" ~10'
ALARM NOISE	≤80dB(A) on mattress
SILENCE/RESET KEY	
Press to silence the alarming, press twice to reset alarming.	
Silence	silence alarming for 4min, alamring will silence if there is any other alarming actives
Reset	silence alarming to come back to the setting state
The lifetime	8 years
(Lifetime means the period from sell-by date to the date of discarding as useless.)	
FACTORY DEFAULT SETTING (ORIGINAL STATE)	
Heater mode	Pre-warm mode
Heater output proportion under Manual mode	30%
Set temperature under baby mode	36°C

3.2 WORKING PRINCIPLE

3.2.1 GENERAL

This section covers the function and the working principle, as for the figure for control system, please refer to figure 3.2 and 3.3.

Surface temperature on mattress can be reached during the radiant system in figure 3.1, the radiant heater outputs in the way of fixed proportion to make the body temperature of patient resume; in Baby mode, the device will adjust the heat output proportion automatically by comparing the baby temperature and the set temperature to keep the heat balance.

NOTE: During the process of getting the radiation and heat, the losing heat in convection, evaporation, radiation, conduction will affect the heat balance. Therefore, to make the baby decrease the dissipation, it is necessary to use the device in the environment of no rapid air flowing ,and cover waterproof velum (polyethylene velum) the naked skin or to use the waterproof net to increase the humidity around the skin to decrease the water evaporation.

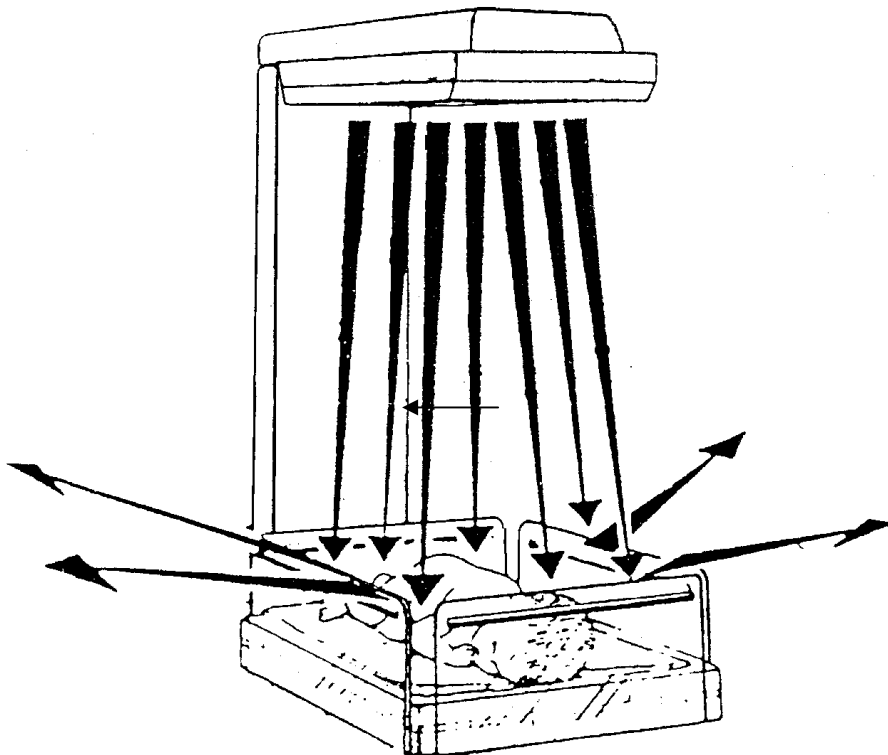


FIGURE 3.1 RADIATION PRINCIPLES

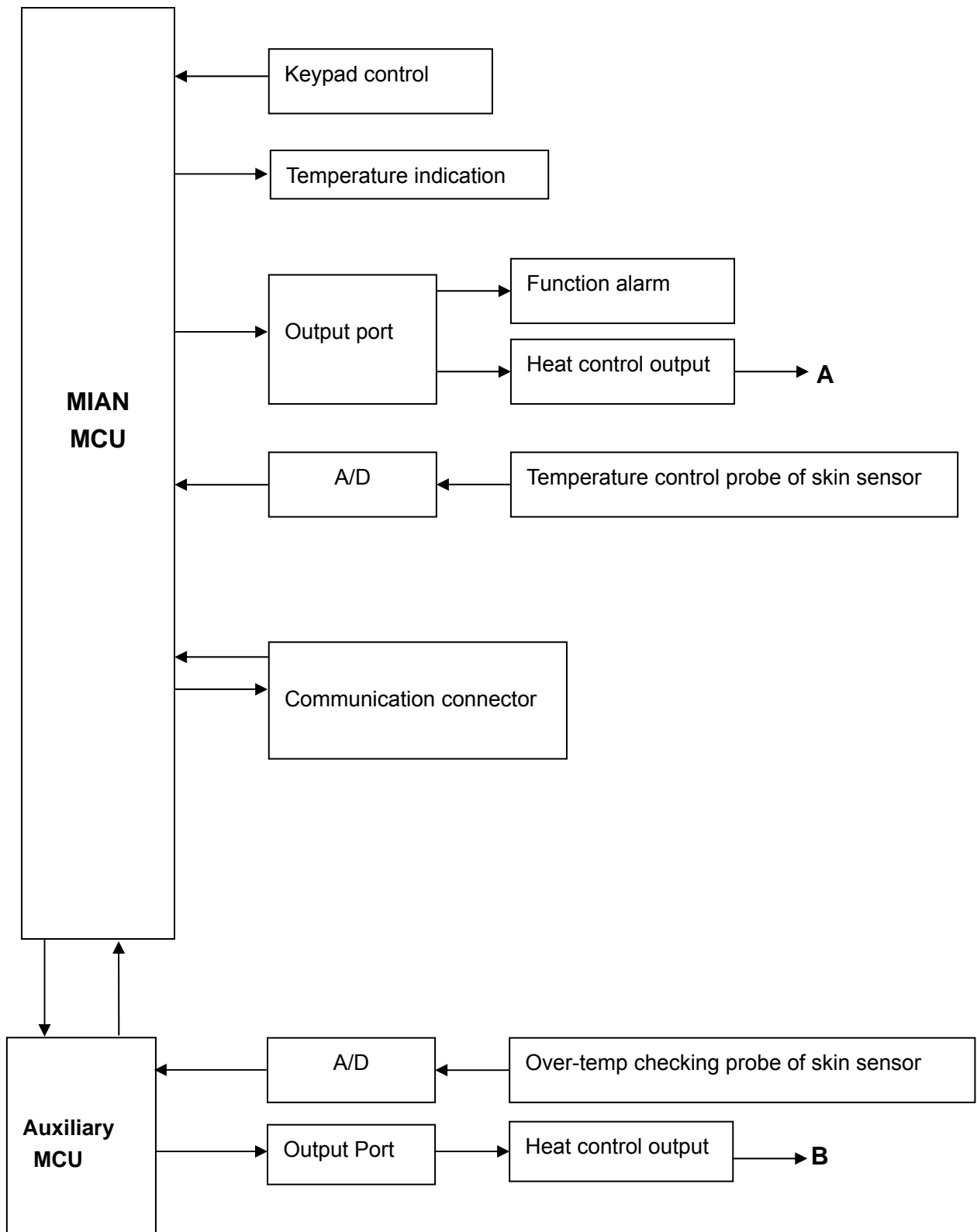


Figure 3.2 Control Block Diagram

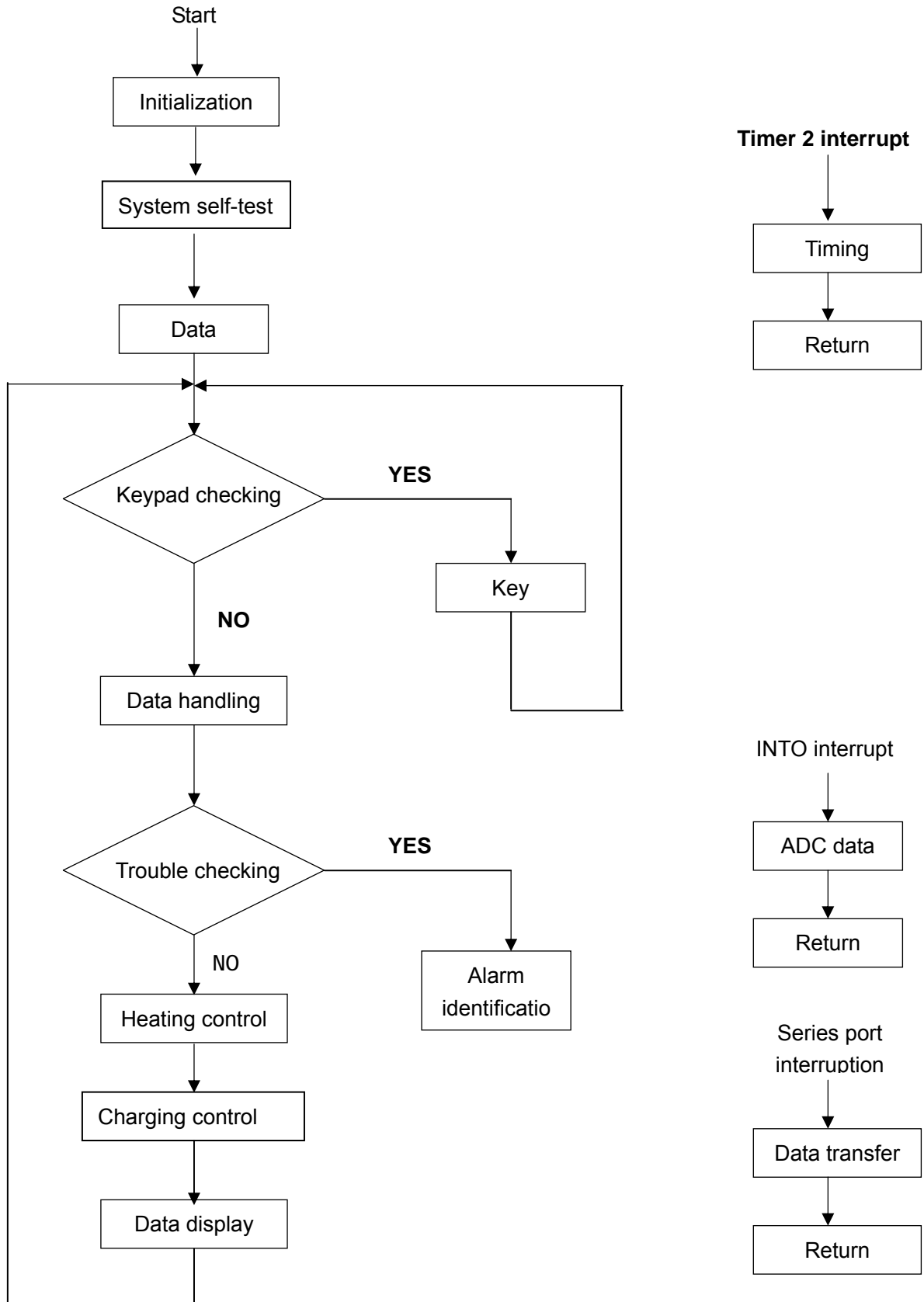


Figure 3.3 Programmed block diagram

3.2.2 Temperature Control

Incubator temperature is adjusted through the compurgation between the baby temperature and the set temperature. The Infant Radiant Warmer adopts 3 kinds of control mode: Pre-warm mode, Manual mode and Baby mode, and the different mode had different way of heating. The user can choose the wanted control mode by pressing the keys on the controller.

Pre-warm model: system will output the heat according to the programme, after a while, the system will output the heat at 30% to maintain the temperature on the mattress until the mode changes.

Manual mode: system will output the fixed heat according to the heat output proportion to make the temperature on the mattress reach the wanted value so as to make the body temperature of patient resume. The system default of heat output proportion is 30%.

Baby mode: System will adjust through the heat output proportion according to the baby temperature and the set temperature to keep the heat balance of patient.

3.2.3 ALARM

Alarm is used for monitoring the control system state. The system will check the state by the alarm checkout procedure. When the checked data is abnormal, it will alarm. Table 3.2 listed alarm condition.

TABLE 3.1 ALARM

ALARM MESSAGE		DESCRIPTION
Power Failure Alarm		There is no power supply.
Sensor Alarm indicator is on	code E0.1	Short-circuit or open-circuit occurs on the temperature control probe inside of skin temperature sensor, or connection with warmer is not well, the heater will stop working, please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
	code E0.2	Short-circuit or open-circuit occurs on the over-temp probe inside of skin temperature sensor, the heater will stop working, please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
	code E0.3	Deviation of baby temperature of two probes inside of skin temperature sensor is more than 0.8℃, the heater will stop working, please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
Over-Temp Alarm indicator is on	code E0.4	In the Baby mode, when the temperature measured by skin temperature sensor is >38.5℃, the heater will stop working, please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
Deviation Alarm indicator is on	code E0.5.	When the indicated baby temperature is more than 1℃(set value), the heater will stop working, please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
	code E0.6	when the indicated baby temperature is lower than 1℃ (set value), the heater will stop working, please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.

TABLE 3.1 ALARM (CONTINUE)

ALARM MESSAGE		DESCRIPTION
Setting Alarm indicator is on	code E0.7	When the baby temperature is lower 3.5°C than the setting temperature, the heater will stop working , please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
	code E0.8	When the device has entered into the steady temperature condition because of the accidental or unreasonable out of the steady temperature condition , and it will not enter into this condition in 3min without the deviation alarm, the heater will stop working , please press the Silence/reset key to silence alarming for 4min, and then it can reset if there is no failure.
Checking Alarm indicator is on	code E0.9	In the Manual mode, the “ CHECK ” alarm with audible and visual will active every 15min, the heater will keep working , please press the Silence/reset key to silence alarming for 4min; the heat output proportion will be limited to 30% without pressing the Silence/reset key.
The alarming indicator is on	code H0.1	RAM inside of main MCU fails, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.2	ROM inside of main MCU fails, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.3	Communication of main and auxiliary MCU fails, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.4	E ² ROM inside main y MCU fails, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.5	RAM inside of auxiliary MCU fails, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.6	ROM inside of auxiliary MCU fails, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.7	ADC1 failure(e.g., main system TLV2544, including wong sample, chip damage, no response and so on), the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.8	ADC2 failure(e.g., main system TLV2544, including wong sample, chip damage, no response and so on), the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H0.9	SRAM failure(including system cord failure), the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H1.0	The timer RTC inside the system fails or is not accurate, the heater will stop working during alarming, it is invalid to press Silence/reset key.
	code H1.1	Heat circuit failure(e.g., heater, solid relay, mechanical relay and all control circuit fails), the heater will stop working during alarming, it is invalid to press Silence/reset key.

SECTION 4

PREVENTIVE MAINTENANCE

4.1 GENERAL

The section provides cleaning and maintenance instructions.

Warning: Please cut off the connection of power supply and turn off all switches before cleaning.

4.2 CLEANING

This device must be cleaned and sterilized for the first time for initial use, or after used it for one week.

4.2.1 DISASSEMBLY BEFORE CLEANING

- A. Please cut off the main power connection and turn off all switches before cleaning.
- B. Take out the skin temperature sensor from the temperature controller.
- C. Take out the mattress from the bassinet, and take off the bedspread.
- D. Please disassemble the panel from the bassinet according to the contrary sequence as the step B of 2.2 in section 2.
- E. Pull out the X-ray tray from the bassinet.

4.2.2 CLEANING PROCEDURE

Please use the deterge registered by nation, and please follow the instruction for detergent usage. Please proceed the following procedure after cleaning all dirt on the disassembled parts. Please dry them after cleaning.

CAUTION: some chemical detergent will conduct electricity or leave some remains so as to the accumulation of dust that is easy conduct electricity. Please keep the detergent away from all electric parts. Please do not leave the detergetn on these parts .

- A. Clean the skin temperature sensor.

Use a disinfectant-detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

- B. Clean the bedspread

Scrub the bedspread with the disinfectant-detergent. After washing in the clean water, then make it dry.

- C. Clean the panel

NOTE: Alcohol can cause crazing of the clear Acrylic panel. Do not use alcohol, acetone, or any organic solvents for cleaning. Do not expose the panel assembly to direct ultraviolet radiation.

Use a disinfectant-detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

D. Clean the X-ray tray

Use a disinfectant-detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

E. Clean the bassinet, tray and the I.V pole

Use a disinfectant-detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

F. Clean the surface of the device.

Use a disinfectant-detergent to thoroughly clean all surfaces; then dry with a clean cloth or paper towel.

NOTE: You should wait for the heater head became cooling completely, then the surface of it can be cleaned.

CAUTION: 1. Please avoid the liquor flowed into the device during cleaning.

2. The reflect cover is an important parts which used to reflect the infrared radiation heater to the mattress. It is easy to damage and you must be very careful to clean it to prevent damaging it, or change the shape of it.

4.2.3 ASSEMBLE AFTER CLEANING

NOTE: Before install the parts onto the radiant warmer, please check each parts carefully and to see whether there is any broken. If there is any broken, it should be replaced immediately.

A. Inset into the X-ray tray into the bassinet.

B. Please assemble the panel into the bassinet according to the step B of 2.2 in section 2.

C. Put the mattress into the bedspread, and then put the mattress on the bassinet.

D. Put the skin temperature sensor into the sensor socket .

4.3 STERILIZATION

NOTE: Please do not steam autoclave.

Please use the low temperature sterilization or gas sterilization.

Please clean the device completely before gas sterilization. All replacements should be moved from the warmer. The new replacement should be installed after the sterilization.

Note: Sterilization must not exceed 54.5°C.

After gas sterilization, please keep ventilation for 16-24hrs. During the ventilation, the warmer should work in the day environment of 32°C-35°C. If you do not use the warmer after ventilation, please cover the warmer with the dustproof mantle.

4.4 MAINTENANCE

4.4.1 RECHARGEABLE BATTERY MAINTENANCE.

Please check the condition of the build-in rechargeable battery before the first use of device or in the alternation of device using.

- A. Operate the unit for a period of 12 to 24 hours.
- B. Trigger a power failure alarm by disconnecting the AC power cord.
- C. The power failure alarm should activate and continue to alarm for at least 10 minutes.
- D. Reconnect the unit to the AC line and recharge the battery.

If the power failure alarm cannot last more than 10 minutes, please replace the rechargeable battery. For this battery, it should be replaced by qualified service personnel.

4.4.2 HEATER'S MAINTENANCE.

In order to ensure the effect of the infrared radiant, when the lifetime of heater ends, it must be replaced even it can still work. The reason is:

The electromagnetism spectrum infrared radiance of the heater will be reduced with the long working time. This will make the device not achieve the standard as table 3.1 in this manual. Therefore, the previous effect will not be good when the doctor uses it to keep the patient warm. For the heater's replacing, please refer to section 5.

4.4.3 ACCURACY CALIBRATUON OF BABY TEMPERATURE SENSOR

Skin temperature sensor must be calibrated every half a year. The reason is:

With aging of skin temperature sensor, and the accuracy of sensor will changes a little to make the baby temperature and the real temperature different so that the output heat can not meet the clinical need heat.

Calibration method: in working state, put the skin sensor into the water cup at 36°C±0.1°C or inset the 36°C calibration device on the socket of skin sensor, press the calibration key until the baby temperature indicator displays "--,--" for 10s, after the flashing stops, the calibration will end when it indicates 36°C, and the you can continue to use the skin sensor. When it indicates "EL.L", it means the calibration error, please replace the skin temperature sensor.

NOTE: The temperature of the water cup must keep at 36°C±0.1°C during calibration.

SECTION 5 SERVICE

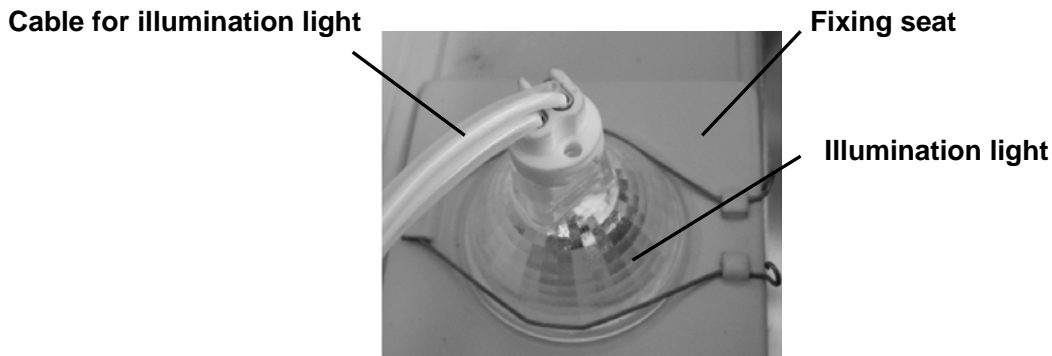
5.1 GENERAL

This section provides system setting procedure and the troubleshooting procedure of these parts: replacement of illumination light, Quartz heater, Fuse, Internal charging Battery and Controller.

5.2 REPLACEMENT OF CHARGING BATTERY, FUSE, QUARTZ HEATER, AND ILLUMINATION LIGHT.

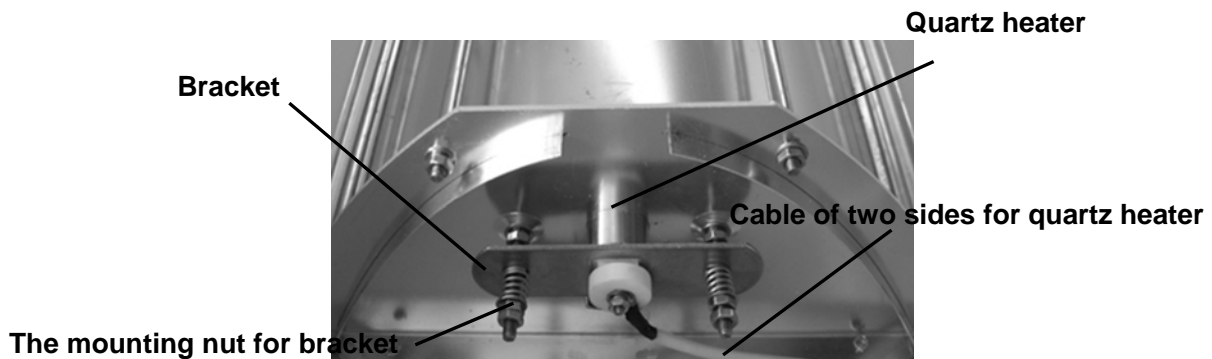
5.2.1 REPLACEMENT OF ILLUMINATION LIGHT

See section 5.5, open the protective cover of warmer module, disconnect the cable for illumination light, and then open its fixing seat with pincher in order to take out the lamp and replace it.



5.2.2 REPLACEMENT OF QUARTZ HEATER

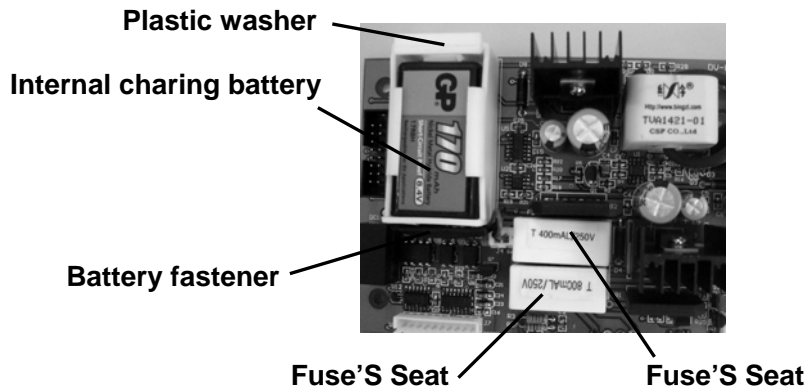
See section 5.4, open the protective cover of warmer module, unscrew the cable of two sides for quartz heater and the mounting nut for bracket, take out the spring, disassemble the bracket to take out the quartz heater.



NOTE: Replacing of the quartz heating pipe must after it is cooled down.

5.2.3 REPLACEMENT OF CHARGING BATTERY

Open Controller and replace internal battery. See figure 5.1, disconnect the battery fastener and the internal charging battery, and take out the plastic washer to replace the battery.

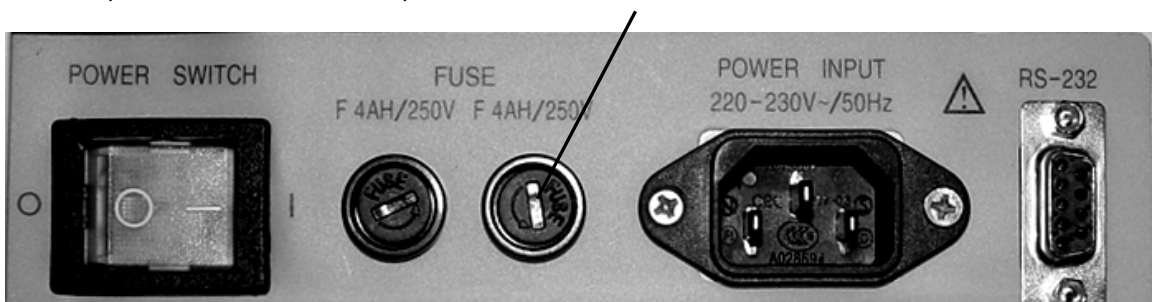


NOTICE: 1. During replacing the internal battery, the plastic washer should be placed the original position, and keep correct connection between the anode/ cathode of battery and its fastener; the faulty connection will cause the damage to the battery and no hont for power failure alarm.

2. Please replace theb internal battery after using it for three years.
3. Battery will be automatically charged when the temperature controller works, charging the battery outside of the incubator is forbidden.
4. The charging battery inside the wartmer is GP17R8H Ni-MH8.4V/170mAh, to ensure safety, do not disassemble battery. Connect the battery correctly, do not use other type battery.
5. It will not influence battery charging and the battery capacity when the battery is full. (Switch on controller)
6. Please do not throw the old battery into fire or water to avoid explosion or leakage.
7. Plrease dispose the Old battery accoring to local law, and please do not throw them away randomly.

5.2.4 REPLACEMENT OF FUSE

A. Open the fuse's cover to replace 2 fuses F4AH/250V.



B. Open the back cover of upper column to replace the fuse T800mAL/250V of power relay R40 for illumination light. Take out the controller. See figure 5.3, open the fuse's cover to take out the fuse T400mAL/250V and T800mAL/250V on power board, and unscrew the fuse's seat of power transformer to replace fuse T160mAL/250V.

Note: When replacing the fuse, please cut off the power supply, and pull off the power cord, please replace it according to the specification.

5.3 SYSTEM SETTING PROCEDURES

5.3.1 GENERAL

This paragraph provides controller system setting procedure. This procedure is only available to the qualified service personnel.

NOTICE: Please follow by the procedures of item 5.3.3. if it is unnecessary, please do not change data of system setting to avoid hazards.

5.3.2 BRIEF INTRODUCTION

Controller system setting procedures listed below:

1. Brightness
2. Spare
3. Baby temperature compensation
4. Machine Number
5. High baby temperature deviation
6. Low baby temperature deviation
7. Upper limit of baby temperature set
8. Lower limit of baby temperature set
9. Over temperature alarm value

CODE 00.1 BRIGHTNESS

Stipulate the brightness of the indicators and the set range is 00.0~01.5. The higher the value is, the brighter the data is.

CODE 00.3 BABY TEMPERATURE COMPENSATION

Stipulate the compensation of the baby temperature and the set range is -5.0~05.0. The first figure for set means increasing or decreasing. Example: 00.2°C means that the baby temperature will be added 0.2°C as compensation. -1.3°C means that the baby temperature will be reduced 1.3°C as compensation.

CODE 00.4 MACHINE NUMBER

Set range is 00.0~04.0. Example 00.1 means No.1 machine, 01.5 means No.15 machine.

CODE 00.5 HIGH BABY TEMPERATURE DEVIATION

Set high deviation under baby mode, set range is 00.0~03.0. Example: the data 01.0 means high deviation 1.0 °C.

CODE 00.6 LOW BABY TEMPERATURE DEVIATION

Set low deviation under baby mode, set range is 00.0~03.0. Example: the data 01.0 means low deviation 1.0 °C.

CODE 00.7 UPPER LIMIT OF BABY TEMPERATURE SET

Set Max. set value of baby temperature, set range is 35.0~38.0. Example: the data 37.5 means high deviation 1.0 °C.






CODE 00.8 LOWER LIMIT OF BABY TEMPERATURE SET

Set Min. set value of baby temperature, set range is 30.0~35.0. Example: the data 34.5 means low deviation 1.0 °C.

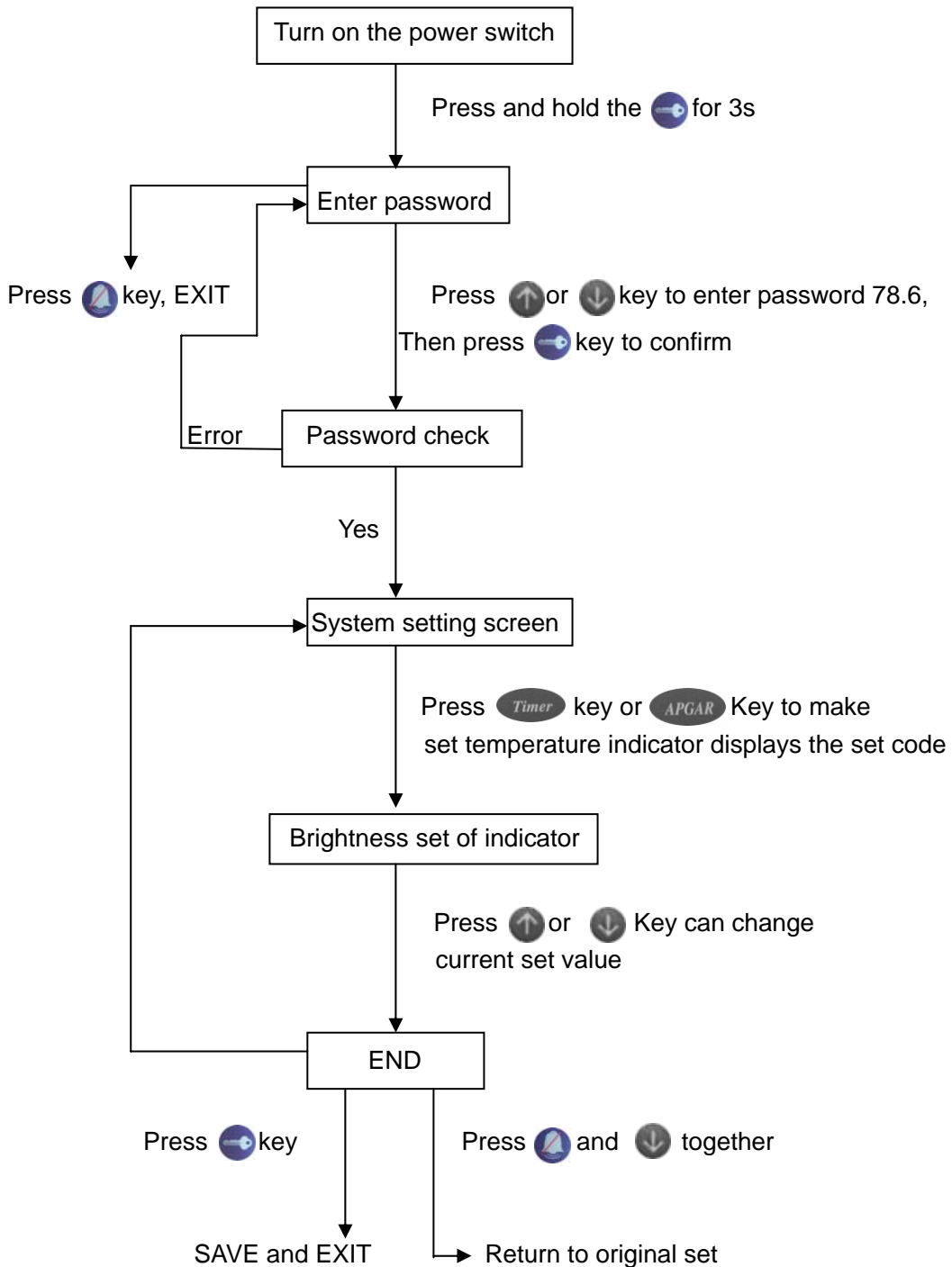
CODE 00.9 OVEUR TEMPERATURE ALARM SET

Set range is 37.0~41.0. Example 38.5 means that alarm value of over temperature is 38.5.°C.

5.3.3 PROCEDURE

At first, connected power supply, press and hold  for 2s as soon as switch on until **baby temprature indicator displays “ --.-”**, and no **display on Set temprature indicator**. And then, press  or  until **Baby temprature indicator displays “78.6”** , after then, press  to enter into the system set screen, or press  to exit.

After entering into the set screen, **Set temprature indicator displays set code**, **Baby temprature indicator displays** the specific set data.



FLOW CHART 5.1 SYSTEM SET PROCEDURE FLOW CHART

5.4 TROUBLESHOOTING PROCEDURES

5.4.1 GENERAL

Troubleshooting guides for the Controller are provided in Paragraph 5.4.3 and Paragraph 5.4.4. Paragraph 5.4.3 provides the alarm code when the controller alarms. Paragraph 5.4.4 provides troubleshooting in the form of flowcharts.

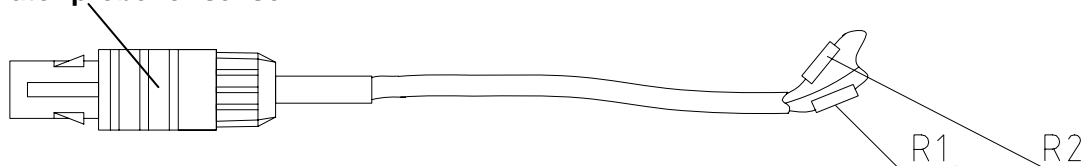
- **It is confirmed that the system settings are correct before troubleshooting.**

5.4.2 TEST EQUIPMENT REQUIRED

The test devices listed below are required for troubleshooting the Controller. Equivalent test device may be substituted.

- Digital VOM, FLUKE 8060A
- 31.0°C Baby Temperature Simulation

Simulator probe for sensor



Resistor R1, 2=23166 Ω \pm 182 Ω /0.25W/0.5%



5.4.3 TROUBLESHOOTING

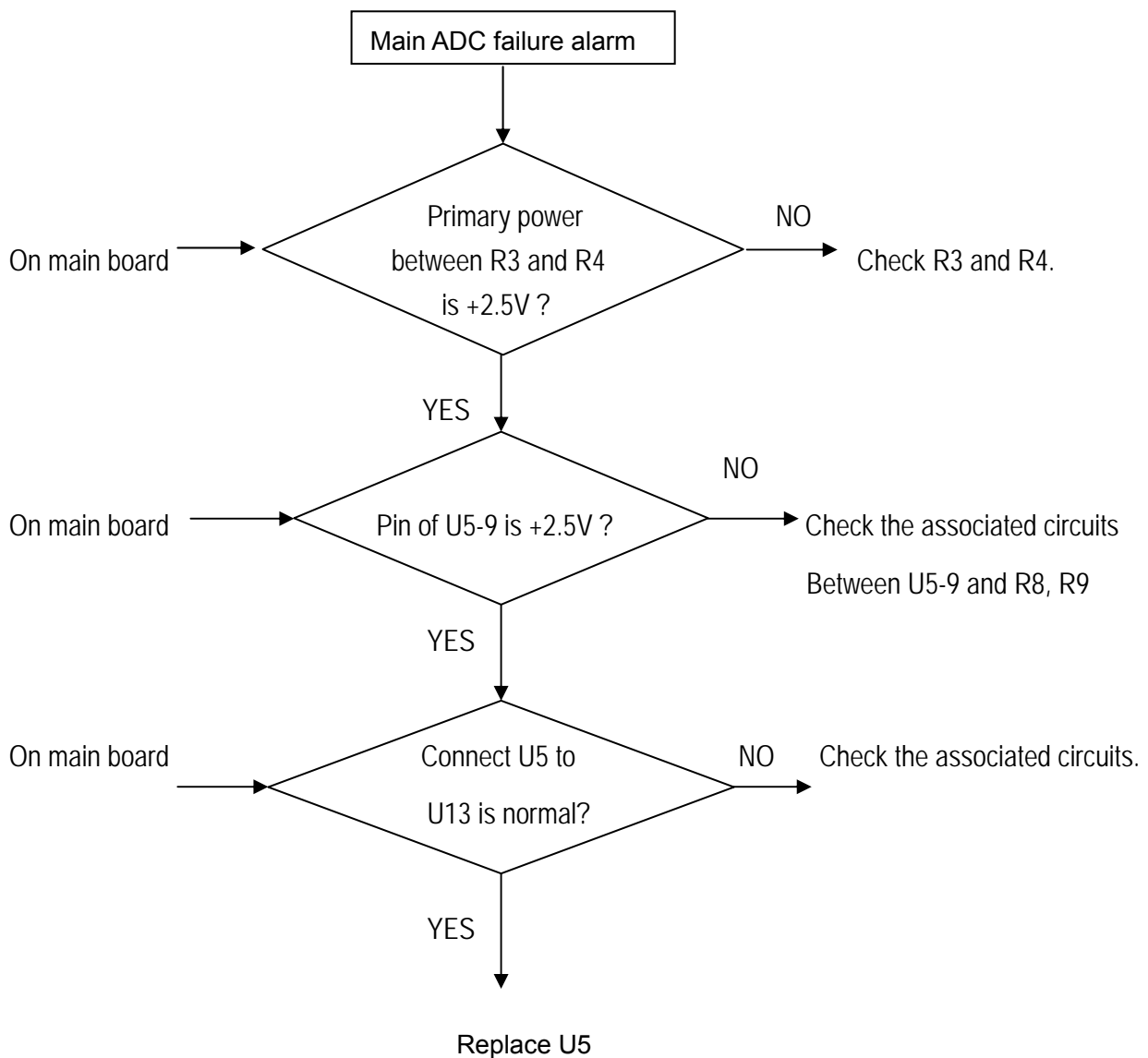
All alarms have the relevant alarm code except for the power failure alarm, please refer to Table 5.1.

TABLE 5.1 ERROR CODES

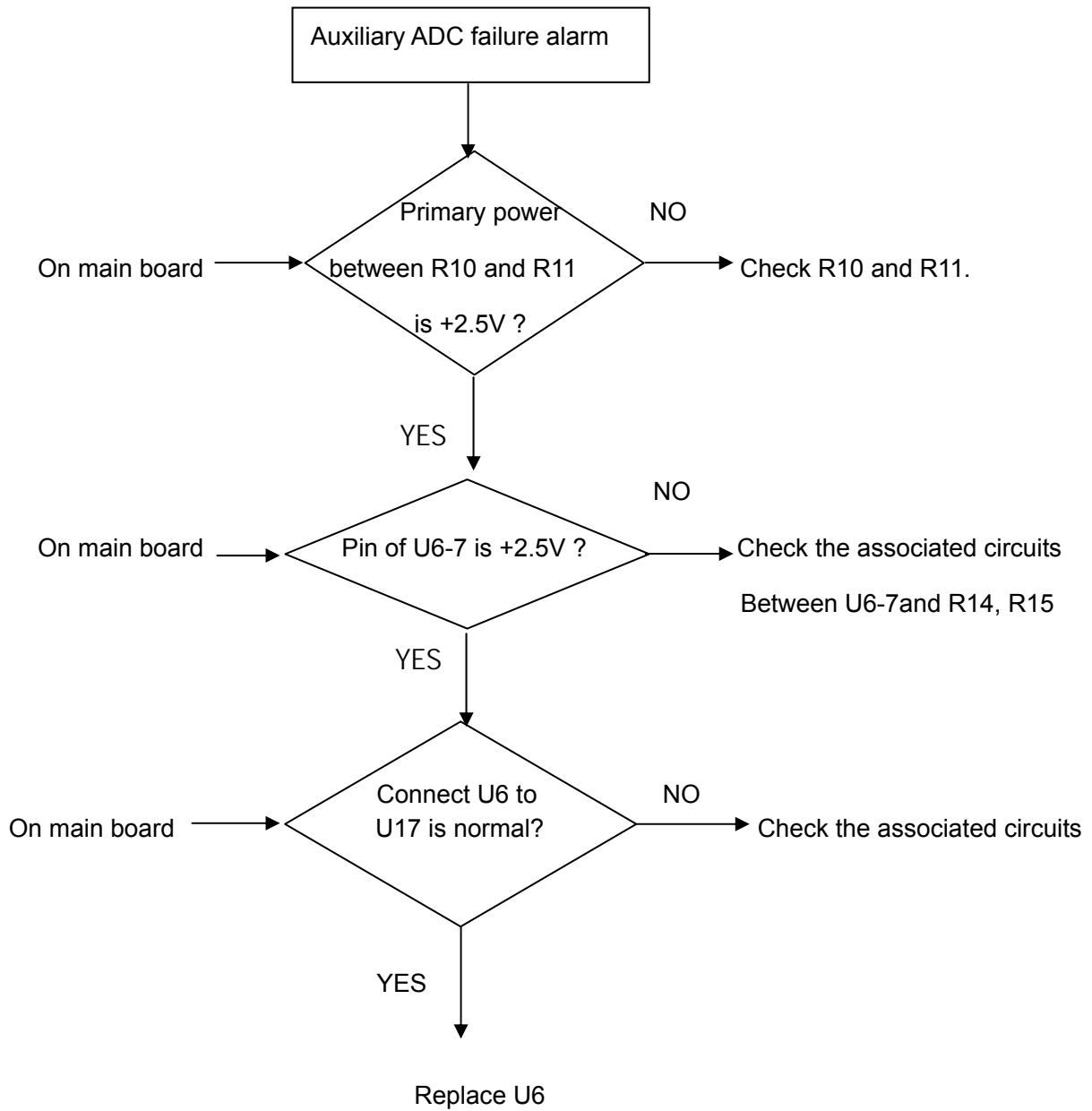
TYPE		ALARM CODE	EXPLANATION AND CORRECTIVE ACTION
Main RAM failure alarm		H0.1	Replace main MCU
Main ROM failure alarm		H0.2	Replace main MCU
Double MCU communication failure alarm		H0.3	1. Check the connection of circuit between the main MUC and auxiliary MCU 2. Replace main MUC and auxiliary MCU
E ² PROM main MCU failure alarm		H0.4	Replace main MCU
RAM failure alarm inside auxiliary MCU		H0.5	Replace auxiliary MCU
ROM failure alarm inside auxiliary MCU		H0.6	Replace auxiliary MCU
Main ADC failure alarm		H0.7	Refer to Flow chart 5.1
Auxiliary ADC failure alarm		H0.8	Refer to Flow chart 5.2
SRAM failure alarm		H0.9	Replace U7 on main board
Real timer RTC failure alarm		H1.0	Replace U21 on main board
Heat circuit failure alarm		H1.1	Refer to Flow chart 5.3
Skin temperature sensor failure alarm		E0.1	Refer to Flow chart 5.4
		E0.2	Refer to Flow chart 5.5
Deviation failure alarm Skin temperature sensor		E0.3	Refer to Flow chart 5.6
Over-temp alarm		E0.4	Refer to Flow chart 5.7
Deviation alarm	Upper deviation	E0.5	1. Check the position of sensor 2. Check the ambient temperature 3. Make the device far away the heat resource
	Lower deviation	E0.6	
Set alarm		E0.7	Please set the temperature or change the control mode correctly
		E0.8	Please check the condition of probe and the patient's skin
Power failure alarm		NO	Refer to Flow chart 5.8

5.4.4 TROUBLESHOOTING FLOW CHART

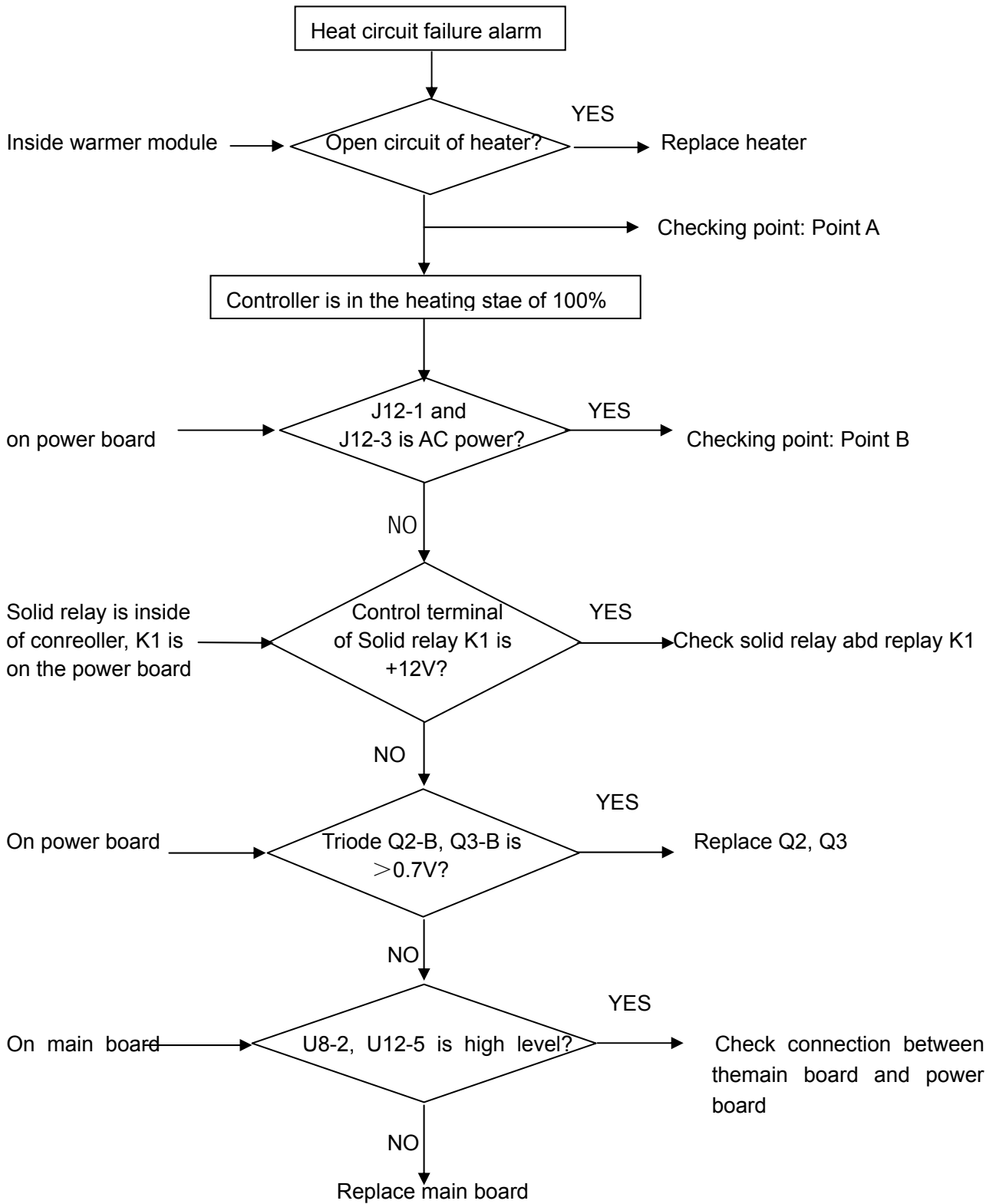
Before troubleshooting, first, please switch off, and disconnect the power cable, and then open the top cover of warmer module and the back cover of column. And then connect the power cable and turn on the switch, at the same time, make sure that power +5V, +12V of controller, element, and all cables are in good condition. In working state, press  Key and  Key, and the **Baby** temperature indicator displays the temperature measured by the Over-temp probe inside skin sensor, and Set temperature indicator displays the voltage of battery, so it is easy to find the reason of failure.



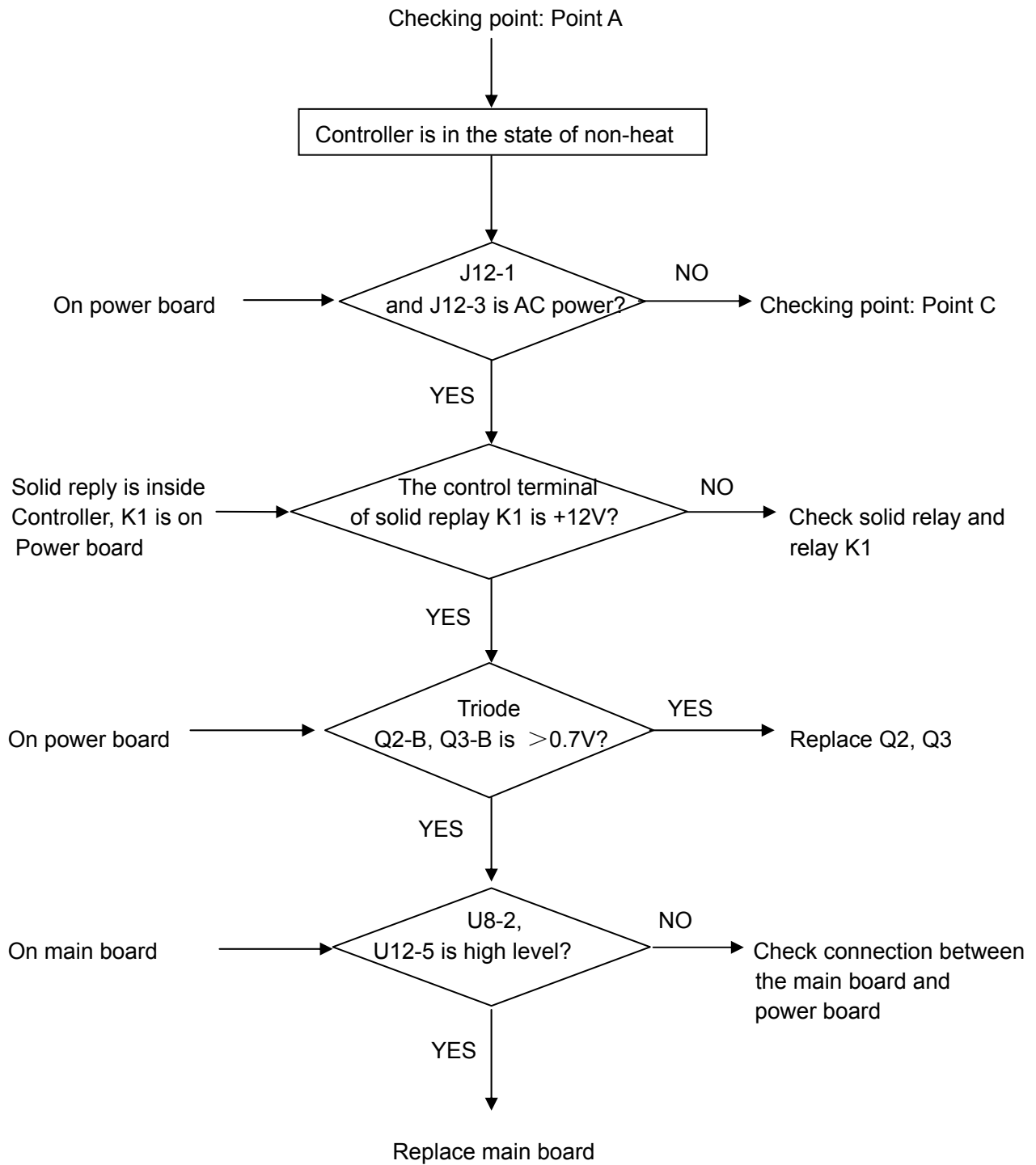
FLOW CHART 5.1 MAIN ADC FAILURE ALARM



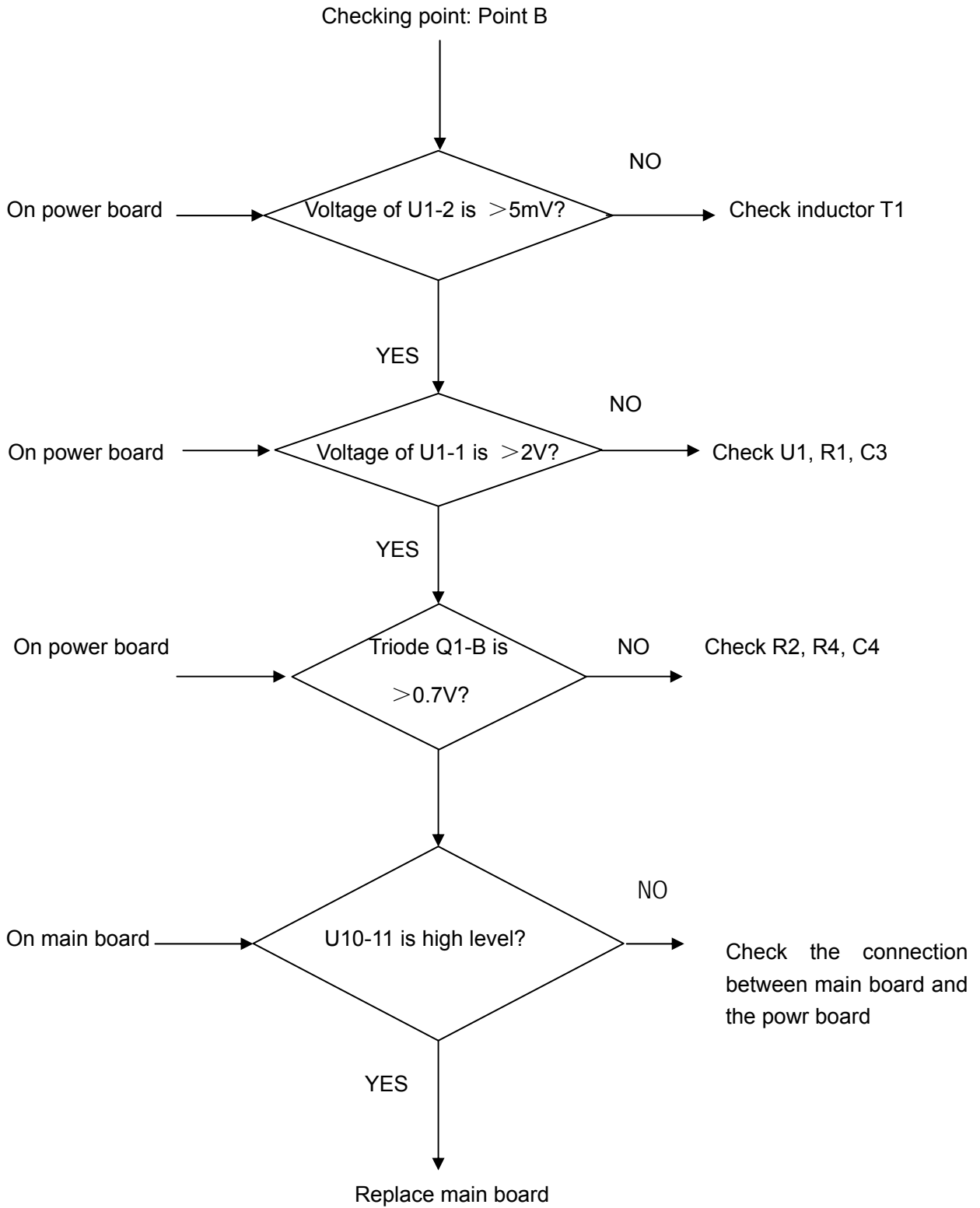
FLOW CHART 5.2 AUXILIARY ADC FAILURE ALARM



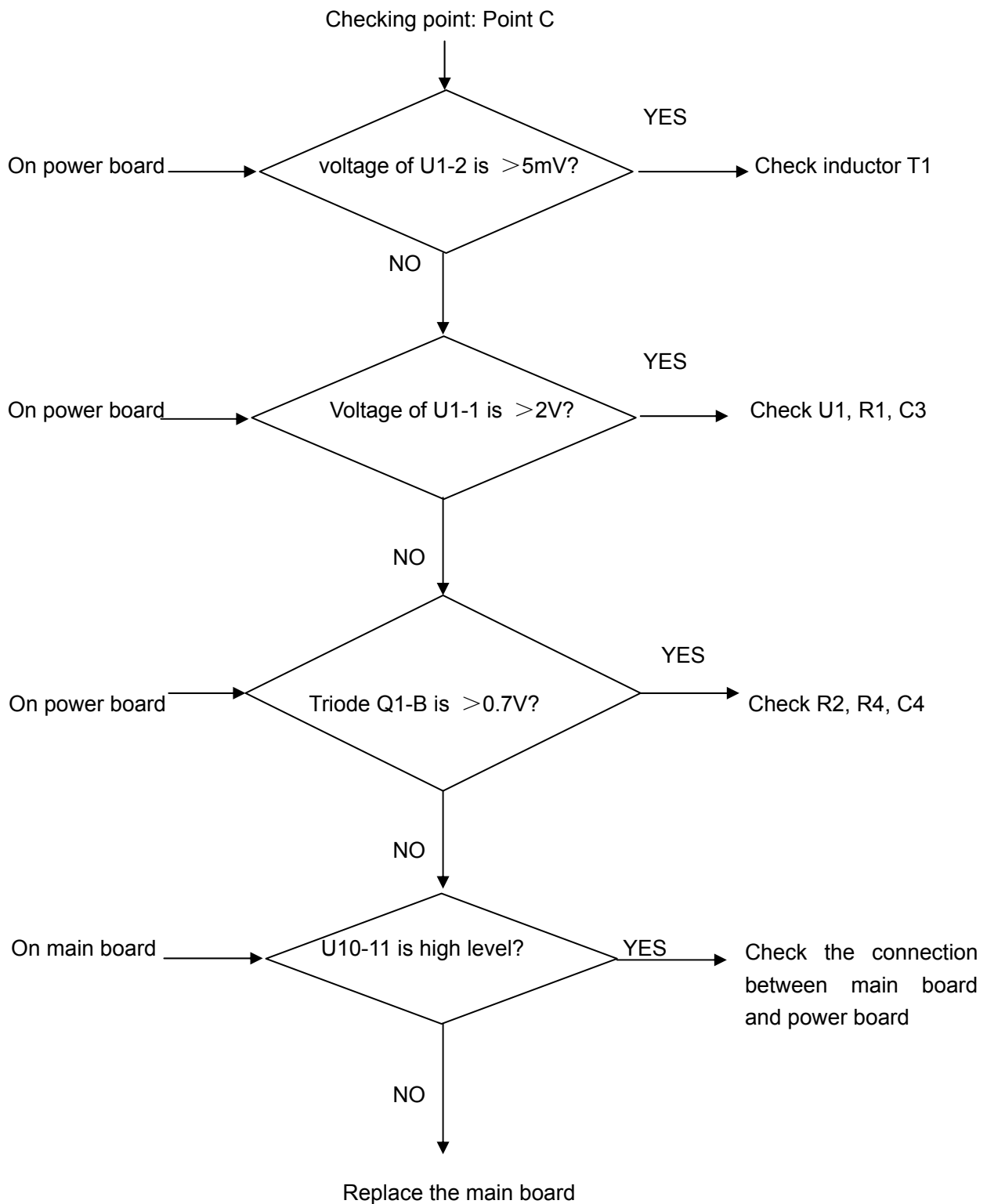
FLOW CHART 5.3 HEAT CIRCUIT FAILURE ALARM (Sheet 1 of 4)



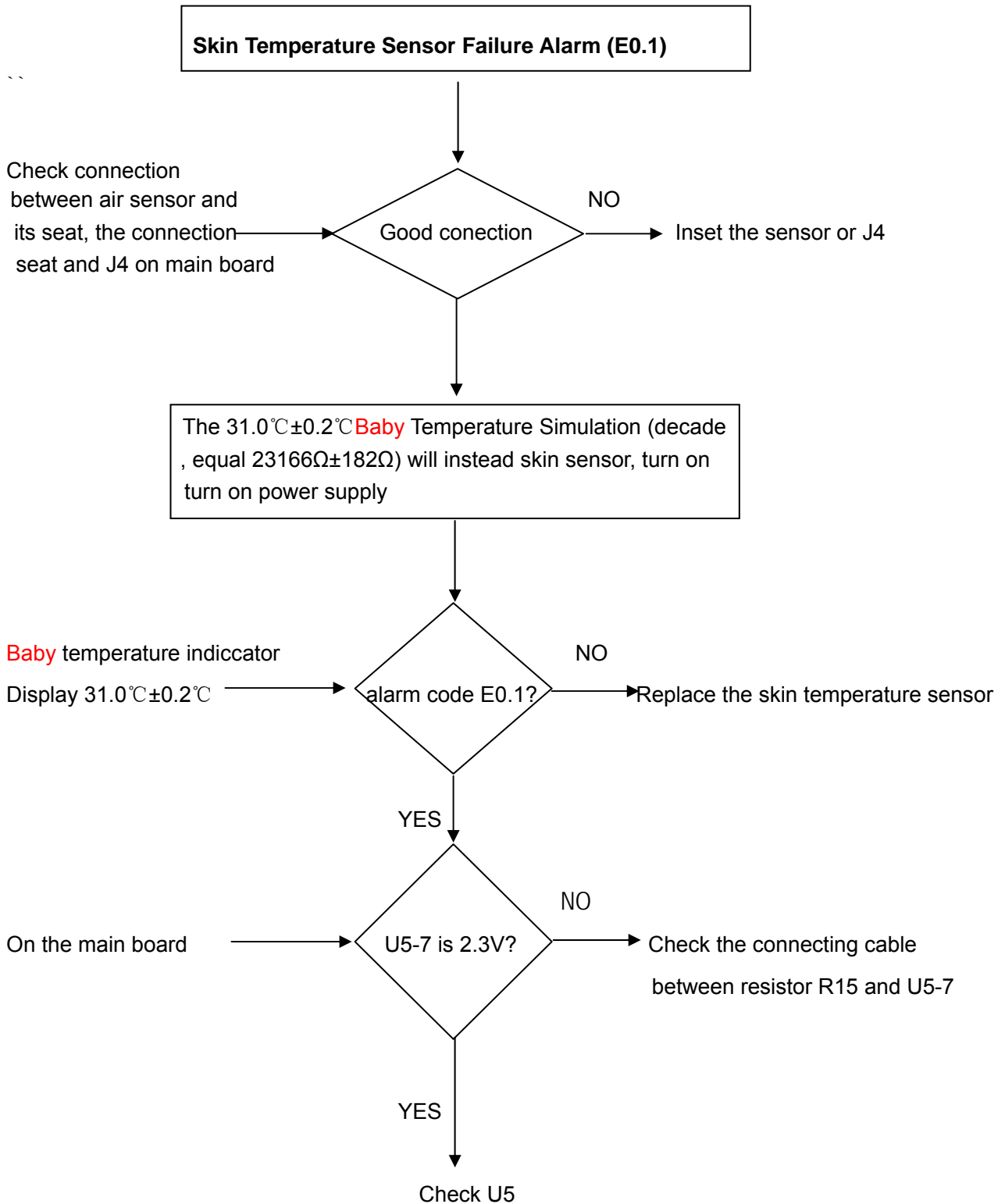
FLOW CHART 5.3 HEAT CIRCUIT FAILURE ALARM (Sheet 2 of 4)



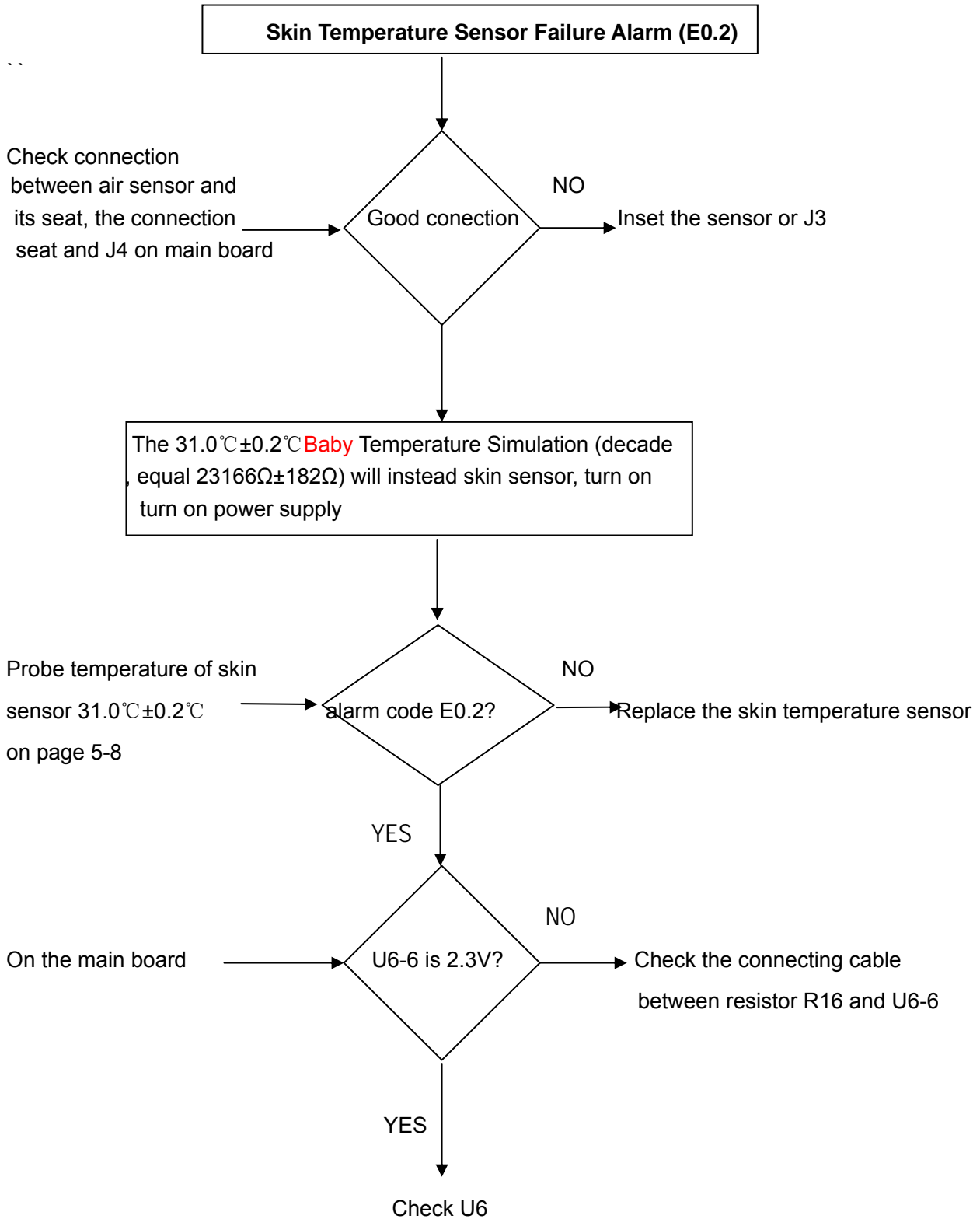
FLOW CHART 5.3 HEAT CIRCUIT FAILURE ALARM (Sheet 3 of 4)



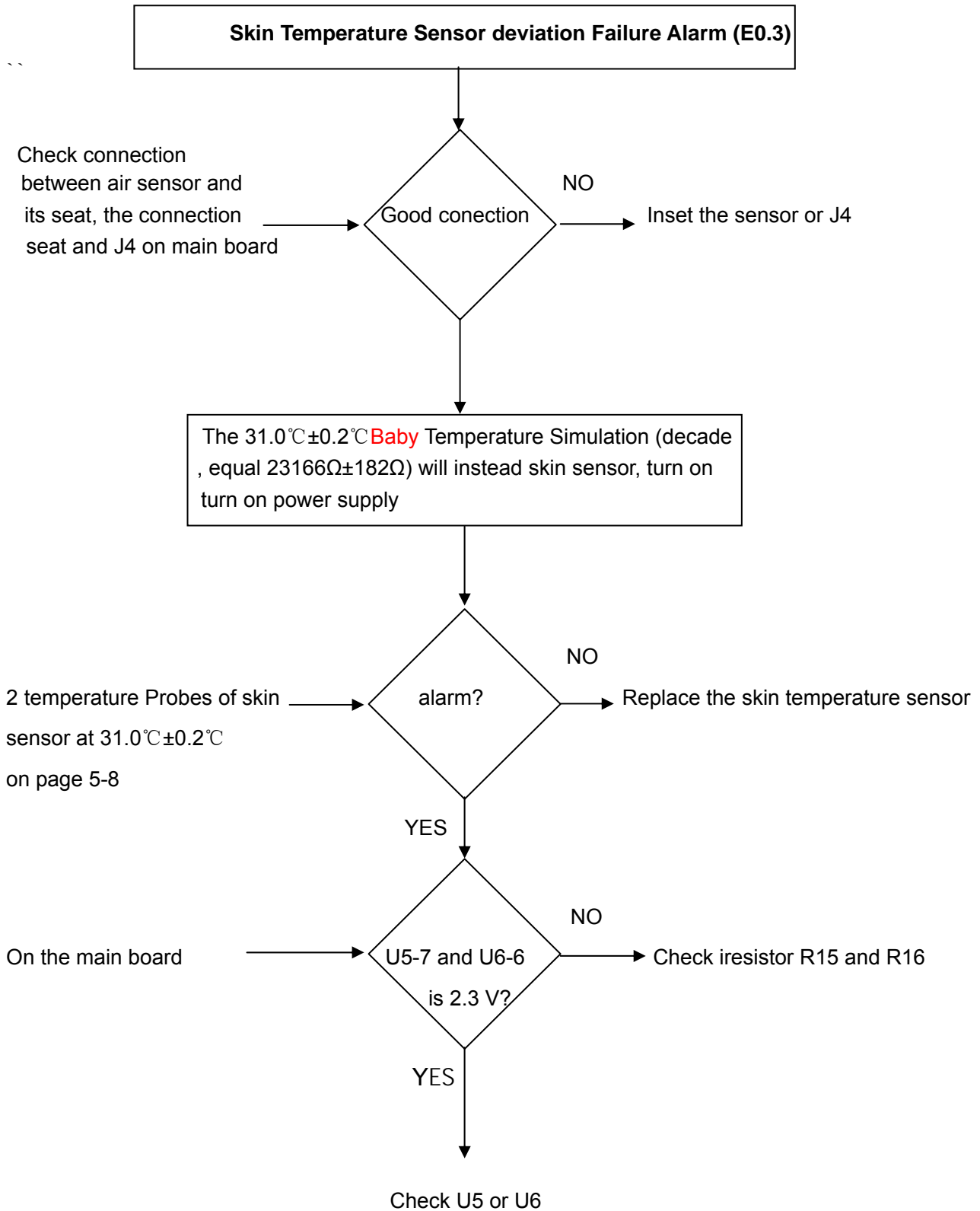
FLOW CHART 5.3 HEAT CIRCUIT FAILURE ALARM (Sheet 4 of 4)



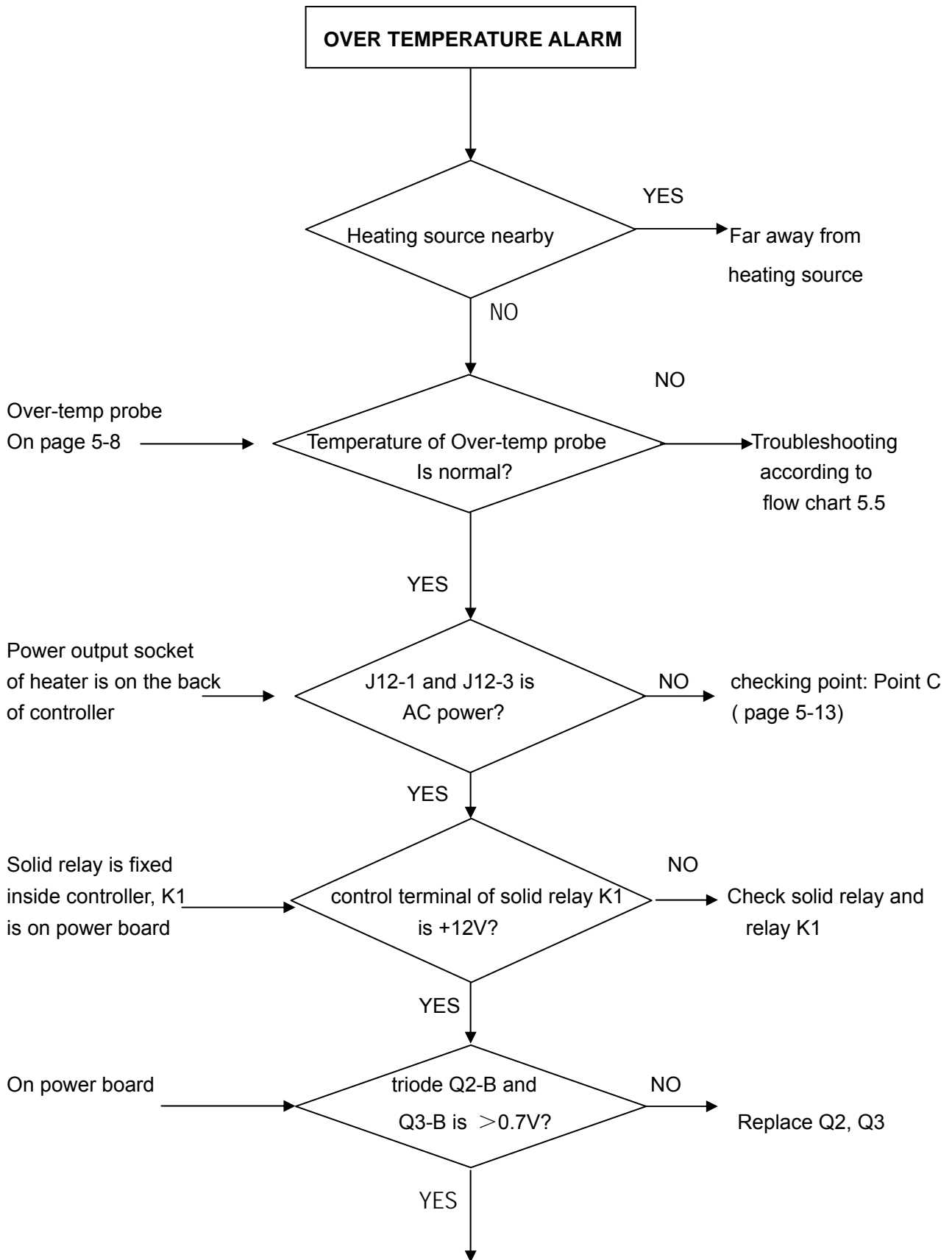
FLOW CHART 5.4 Skin Temperature Sensor Failure Alarm



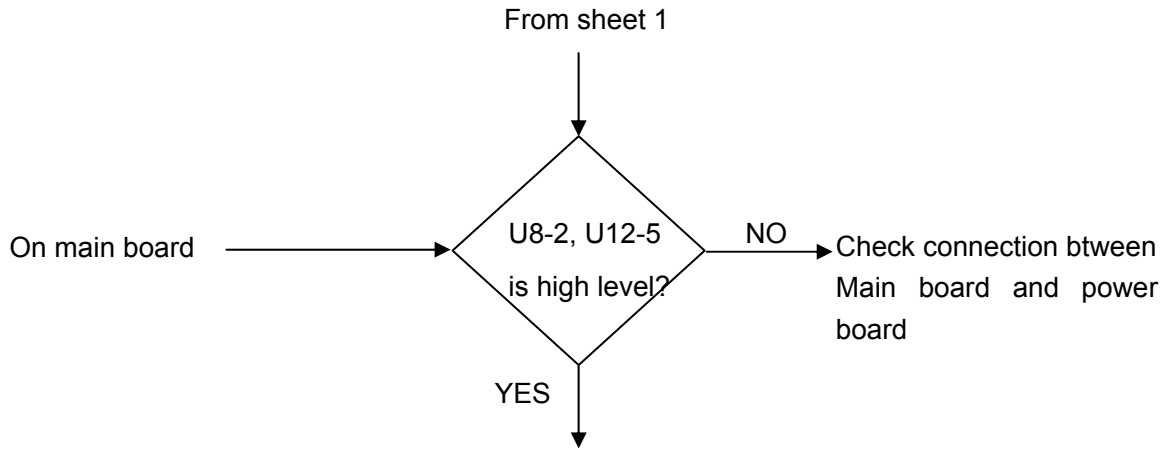
FLOW CHART 5.5 Skin Temperature Sensor Failure Alarm



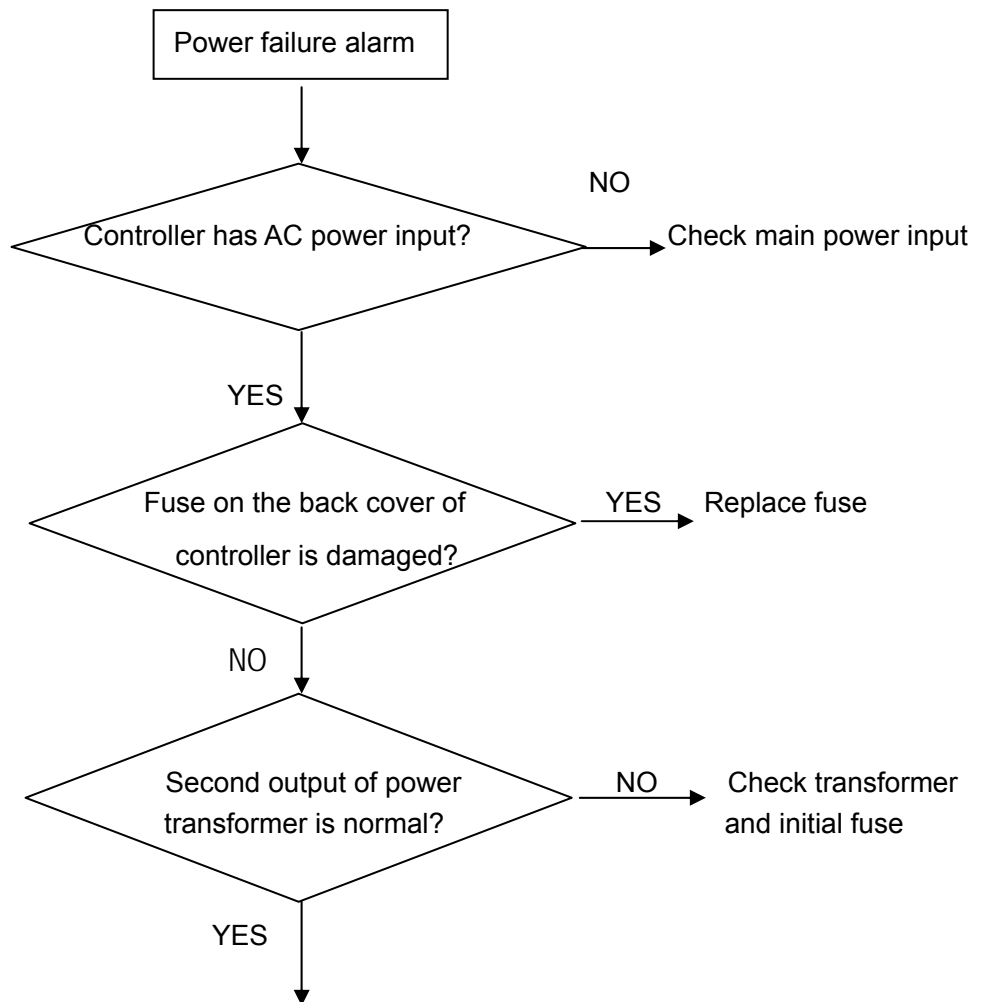
FLOW CHART 5.6 Skin Temperature Sensor devoation Failure Alarm



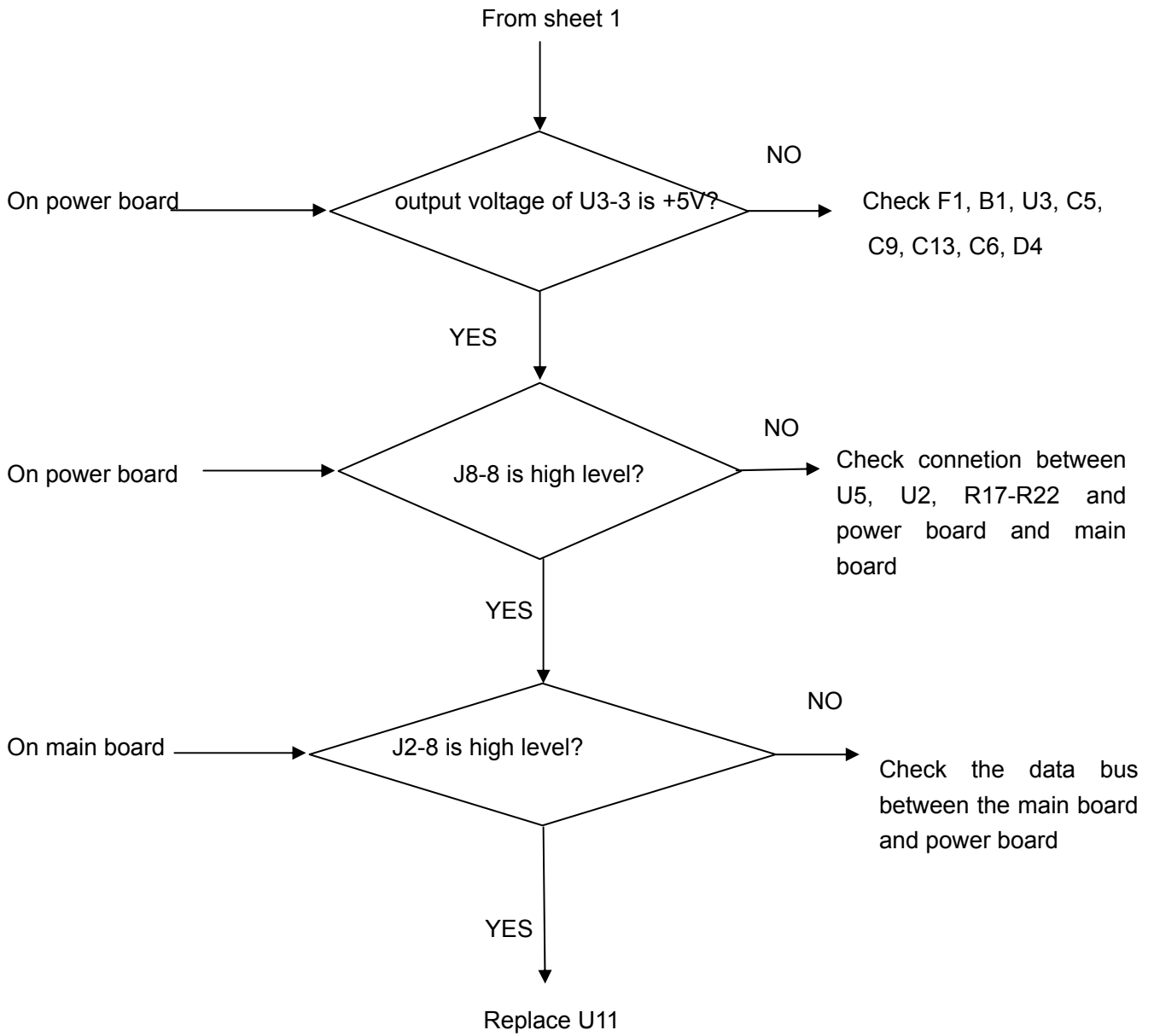
FLOW CHART 5.7 Over Temperature Failure Alarm (Sheet 1 of 2)



FLOW CHART 5.7 Over Temperature Failure Alarm (Sheet 2 of 2)



FLOW CHART 5.8 Power Failure Alarm (Sheet 1 of 2)



FLOW CHART 5.8 Power Failure Alarm (Sheet 2 of 2)

SECTION 6 REPLACEMENT PARTS

6.1 GENERAL

This section provide the parts list of infant radiant warmer.

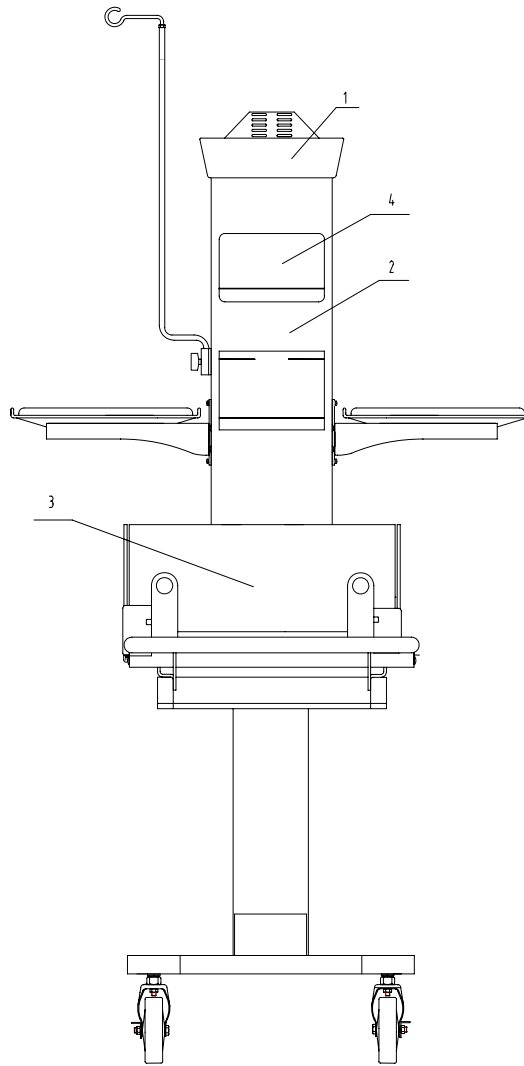


Figure 6.1 Parts Location Diagram, Whole unit

Table 6.1 Replacement Parts List, Whole unit

ITEM No.	DESCRIPTION	PART NUMBER
1	Warmer module	N05 000 00
2	Column	N03 000 00
3	Bassinet	N04 000 00
4	Controller	N02 000 00

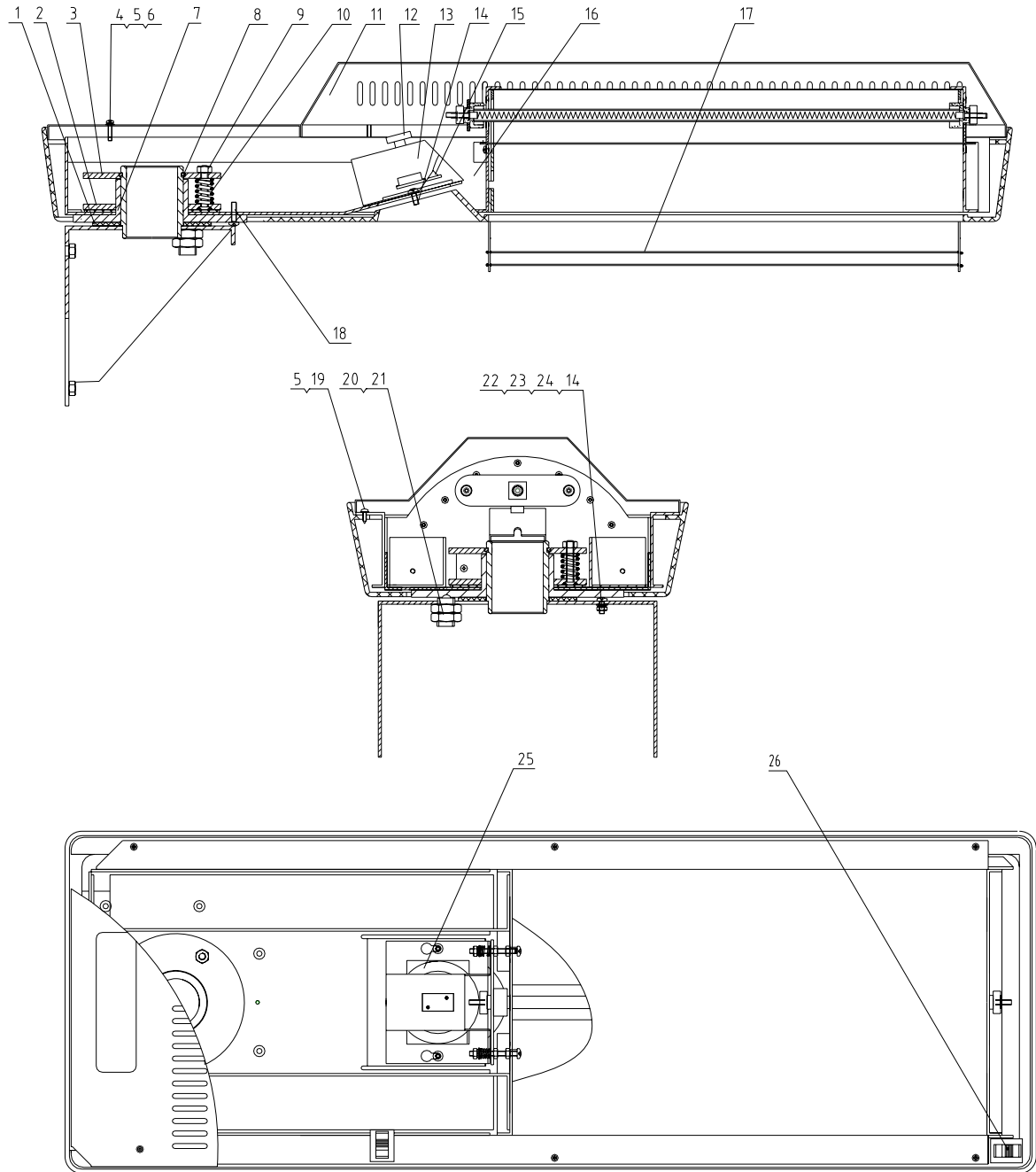


Figure 6.2 Parts Location Diagram, Warmer Module

Table 6.2 Replacement Parts List, Warmer Module

ITEM No.	DESCRIPTION	PART NUMBER
1	Friction slice (I)	N05 001 00
2	Spring seat	N05 002 00
3	Spring plate	N05 003 00
4	Cross groove pan head oval tapping bolt ST2.9×16	See No. of standard Parts
5	Flat washer 3	See No. of standard Parts
6	external teeth serrated lock washers 3	See No. of standard Parts
7	Friction slice (II)	N05 004 00
8	Moon pin	N05 005 00
9	Hexagon nut M6	See No. of standard Parts
10	Compressed spring	N05 006 00
11	Top cover (I)	N05 007 00
12	Lamp feet A35	N05 008 00
13	lampshade	N05 009 00
14	Cross groove pan head bolt M4×10	See No. of standard Parts
15	Cold lamp	K05 009 00
16	Reverberation frame	N05 010 00
17	Humper	N05 011 00
18	Cross groove pan head bolt M4×16	See No. of standard Parts
19	Cross groove countersunk head oval tapping bolt ST2.9×9.5	See No. of standard Parts
20	Hexagon thin nut M14×1.5	See No. of standard Parts
21	Metallic ball	N05 012 00
22	Flat wahser 4	See No. of standard Parts
23	Spring washer 4	See No. of standard Parts
24	Hexagon nut M4	See No. of standard Parts
25	Heat insulation glass	N05 013 00
26	Wiring clip	N05 014 00

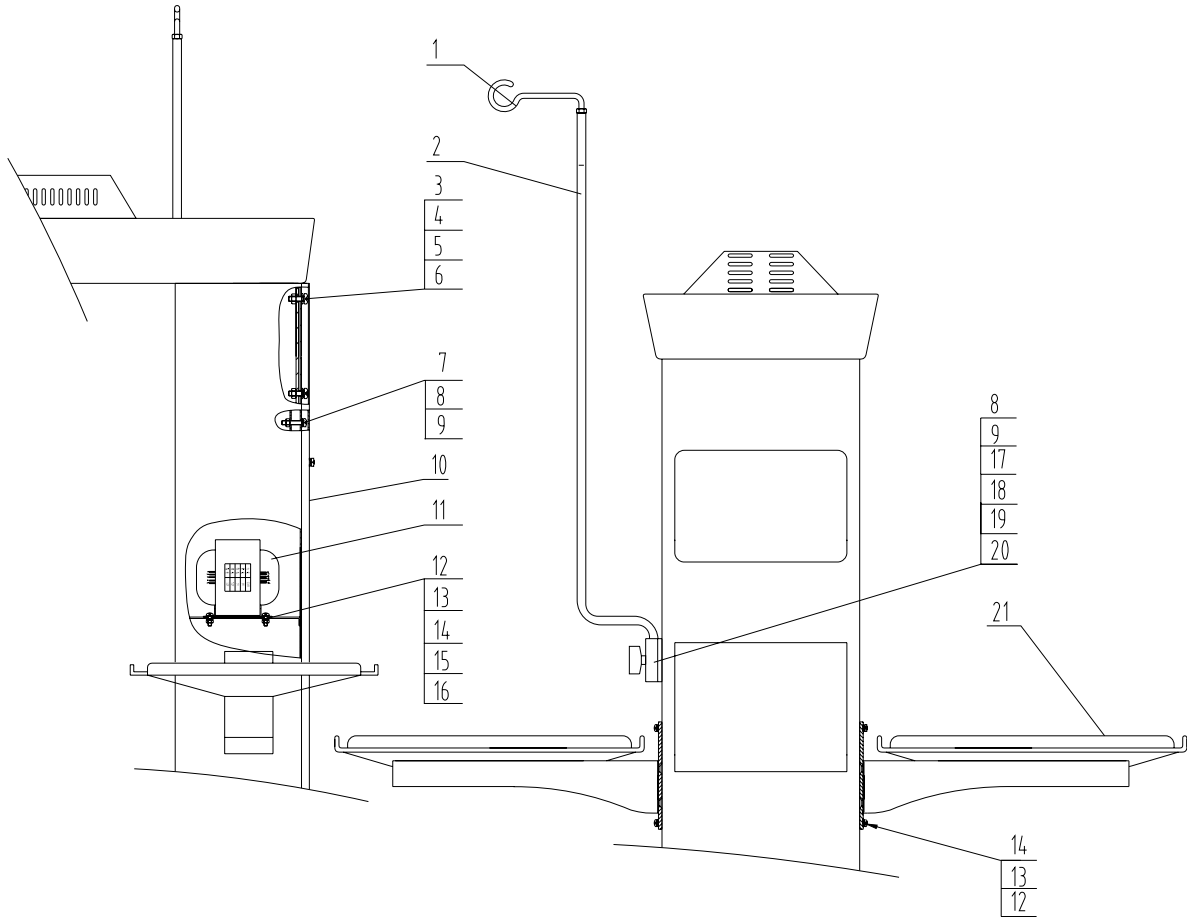


Figure 6.3 Parts Location Diagram, Column

Table 6.3 Replacement Parts List, Column

ITEM No.	DESCRIPTION	PART NUMBER
1	Cross arm of I.V. Pole	K03 004 00
2	Infusion rod	K03 005 00
3	Spring washer 6	See No. of standard Parts
4	Flat washer 6	See No. of standard Parts
5	external teeth serrated lock washers 6	See No. of standard Parts
6	Hexagon bolt M6×16	See No. of standard Parts
7	Cross groove pan head bolt M5×25	See No. of standard Parts
8	Flat washer 5	See No. of standard Parts
9	Spring washer 5	See No. of standard Parts
10	Back cover of upper column	N03 001 00
11	R40 transformer	K05 010 00
12	Cross groove pan head bolt M4×12	See No. of standard Parts
13	Spring washer 4	See No. of standard Parts
14	Flat washer 4	See No. of standard Parts
15	Hexagon nut M4	See No. of standard Parts
16	external teeth serrated lock washers 4	See No. of standard Parts
17	Holder of shelf	K03 003 00
18	Tightening clamp	K03 001 00
19	Cross groove countersunk head bolt M5×12	See No. of standard Parts
20	Washer for Front push	N03 002 00
21	Shelf	K03 002 00

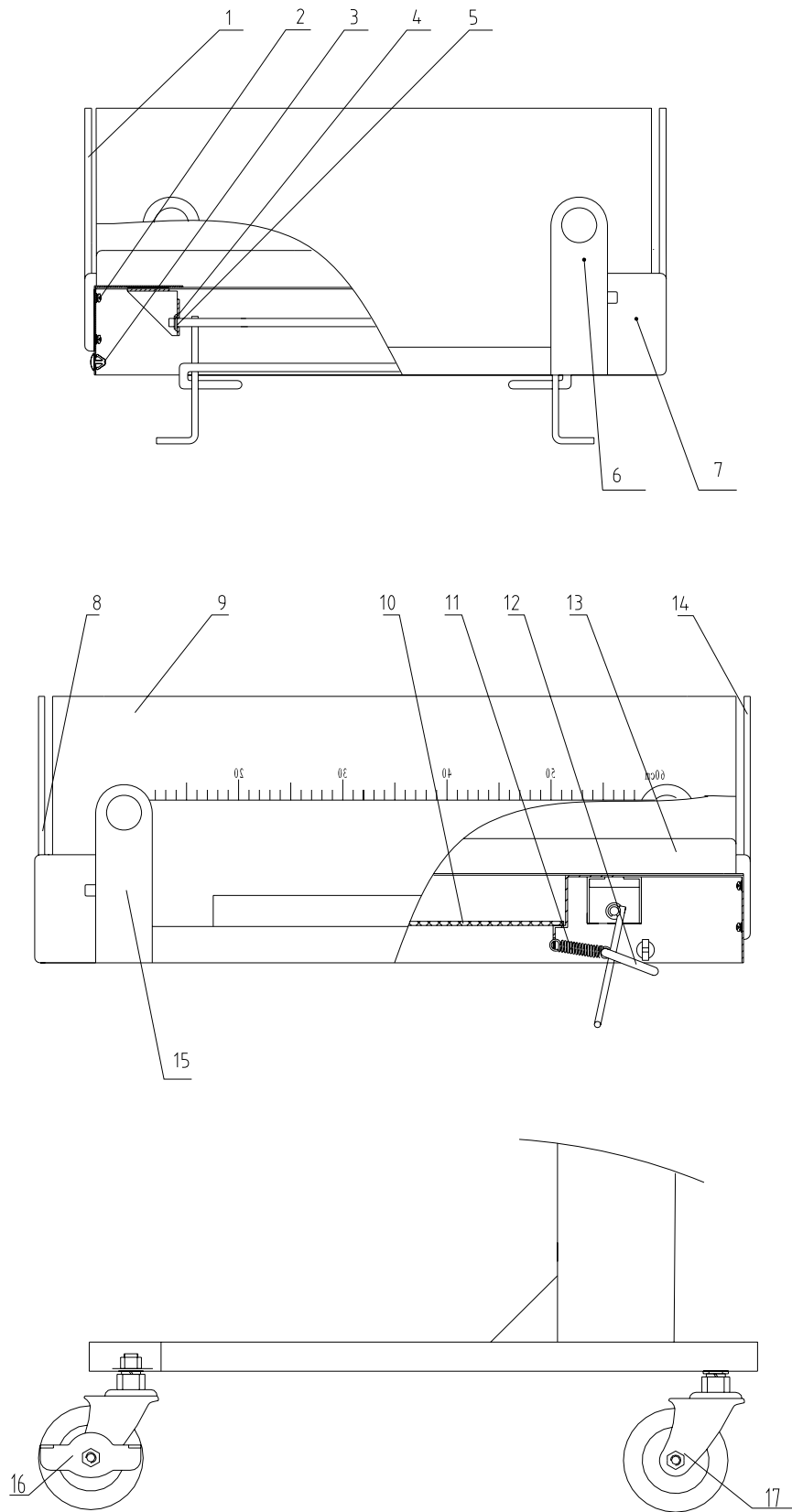


Figure 6.4 Parts Location Diagram, Bassinet and casters

Table 6.4 Replacement Parts List, Bassinet and casters

ITEM No.	DESCRIPTION	PART NUMBER
1	Left panel	K04 003 00
2	Cross groove pan head bolt M4×8	See No. of standard Parts
3	Hole stopper	N04 001 00
4	Slot pin1.8×12	See No. of standard Parts
5	Flat wahser 8	See No. of standard Parts
6	Latch holder	K04 008 00
7	Fixed seat	K04 005 00
8	Front panel	K04 002 00
9	Right panel	K04 004 00
10	X-ray tray	N04 005 00
11	Spring	N04 006 00
12	Tilt machanism	N04 007 00
13	Mattress	N04 008 00
14	Back panel	K04 001 00
15	Left socket	K04 006 00
16	Caster with brake	K01 001 00
17	Caster without brake	K01 002 00

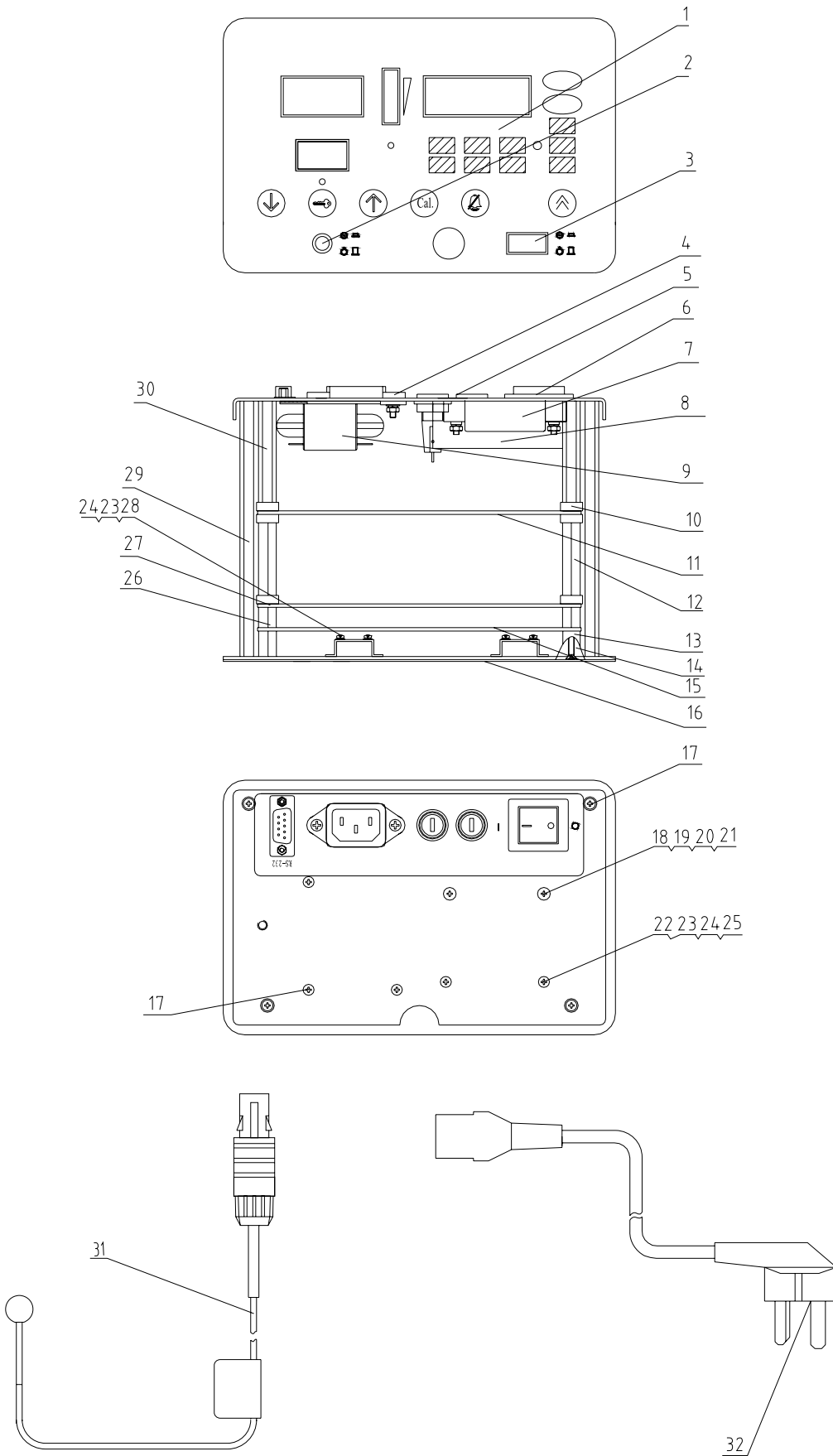


Figure 6.5 Parts Location Diagram, Controller

Table 6.5 Replacement Parts List, Controller

ITEM No.	DESCRIPTION	PART NUMBER
1	Operation panel of controller	N02 001 00
2	Illumination lightPWL-2P2T	N02 002 00
3	Control switch PWL-2P2T	N02 003 00
4	Power socket (FN922-10-06 include power filter)	02 043 01
5	Fuse's seat	Y02 025 00
6	Power socket 129-432	K02 001 00
7	Buzzer	02 040 00
8	Solid relay	K02 003 00
9	Transformer group	02 032 00
10	Bolt knot	P02 029 00
11	Power board	N02 004 00
12	Hexagon insulation column S6×40	N02 005 00
13	Limit knot $\Phi 6 \times 8$	N02 006 00
14	Cross groove countersunk head bolt M3×30	See No. of standard Parts
15	Display board	N02 007 00
16	Front panel groupware	N02 008 00

Table 6.5 Replacement Parts List, Controller

ITEM No.	DESCRIPTION AND SPECIFICATION	PART NUMBER
17	Cross groove countersunk head bolt M3×8	See No. of standard Parts
18	Cross groove countersunk head bolt M4×10	See No. of standard Parts
19	Flat Washer 4	See No. of standard Parts
20	Spring washer 4	See No. of standard Parts
21	Hexagon nut M4	See No. of standard Parts
22	Cross groove countersunk head bolt M3×16	See No. of standard Parts
23	Flat Washer 3	See No. of standard Parts
24	Spring washer 3	See No. of standard Parts
25	Hexagon nut M3	See No. of standard Parts
26	Limit knot $\Phi 6 \times 11$	N02 009 00
27	Main control board	N02 010 00
28	Cross groove pan head bolt M3×6	See No. of standard Parts
29	Hexagon insulation column S6×130	N02 011 00
30	Hexagon insulation column S6×63	N02 012 00
31	Skin temperature sensor	H02 030 00
32	AC power cord	02 030 00

Table 6.6 Standard parts list

ITEM No.	DESCRIPTION AND SPECIFICATION	PART NUMBER
1	Cross groove pan head oval tapping bolt ST2.9×16	BZ 165
2	Flat Washer 3	BZ 036
3	external teeth serrated lock washers 3	BZ 102
4	Hexagon nut M6	BZ 056
5	Cross groove pan head bolt M4×10	BZ 008
6	Cross groove pan head bolt M4×16	BZ 010
7	Cross groove countersunk head oval tapping bolt ST2.9×9.5	BZ 031
8	Hexagon thin nut M14×1.5	BZ 166
9	Flat Washer 4	BZ 037
10	Spring washer 4	BZ 044
11	Hexagon nut M4	BZ 054
12	Spring washer 6	BZ 046
13	Flat Washer 6	BZ 039
14	external teeth serrated lock washers 6	BZ 052
15	Hexagon bolt M6×16	BZ 063
16	Cross groove pan head bolt M5×25	BZ 014
17	Flat Washer 5	BZ 038
18	Spring washer 5	BZ 045
19	Cross groove pan head bolt M4×12	BZ 009
20	external teeth serrated lock washers 4	BZ 088
21	Cross groove countersunk head bolt M5×12	BZ 167
22	Cross groove pan head bolt M4×8	BZ 007
23	Slot pin 1.8×12	BZ 168

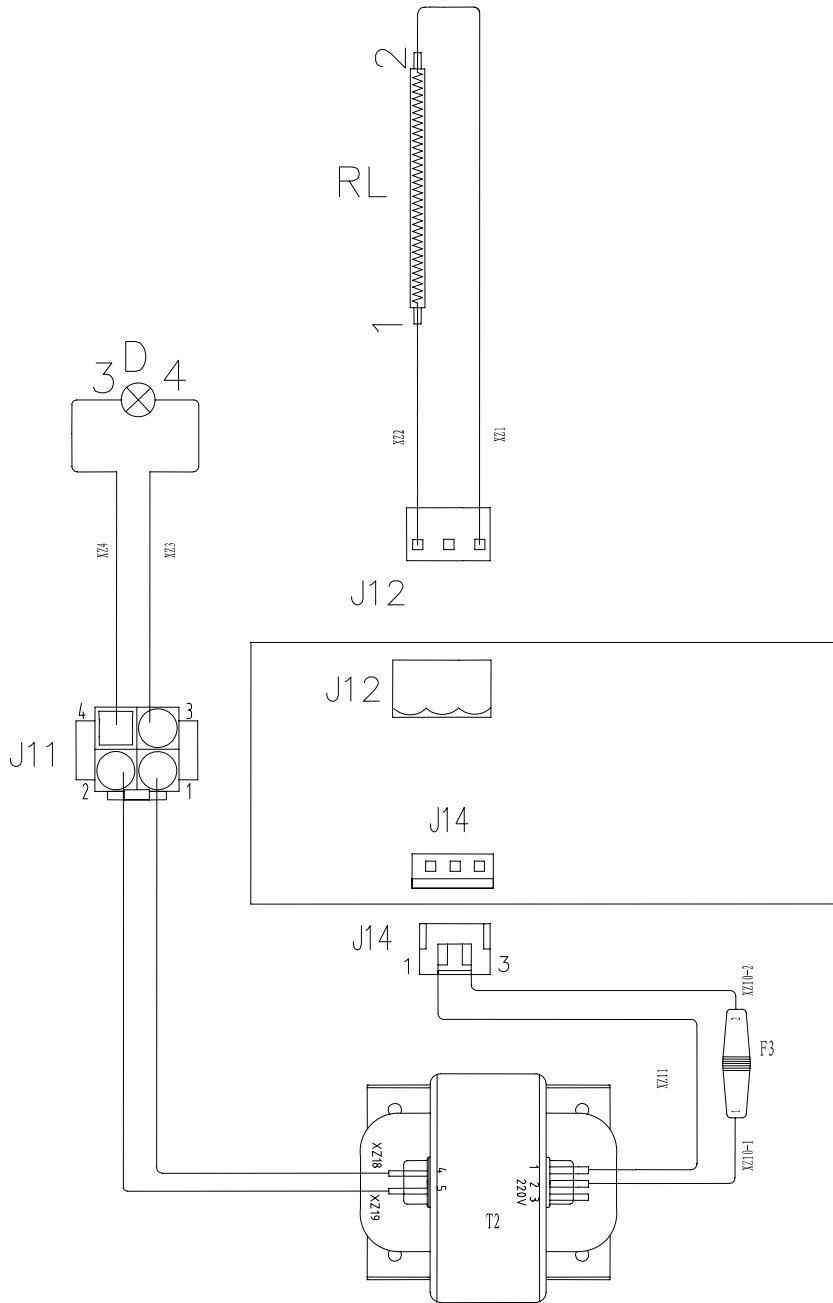
Table 6.6 Standard parts list

ITEM No.	DESCRIPTION AND SPECIFICATION	PART NUMBER
24	Flat washer 8	BZ 040
25	Cross groove countersunk head bolt M3×30	BZ 163
26	Cross groove countersunk head bolt M3×8	BZ 018
27	Cross groove countersunk head bolt M4×10	BZ 085
28	Cross groove countersunk head bolt M3×16	BZ 021
29	Spring washer 3	BZ 043
30	Hexagon nut M3	BZ 053
31	Cross groove pan head bolt M3×6	BZ 001

SECTION 7 DIAGRAMS

7.1 GENERAL

The section provides wiring diagrams for Infant radiant warmer, parts location diagrams, and schematic diagrams of controller.



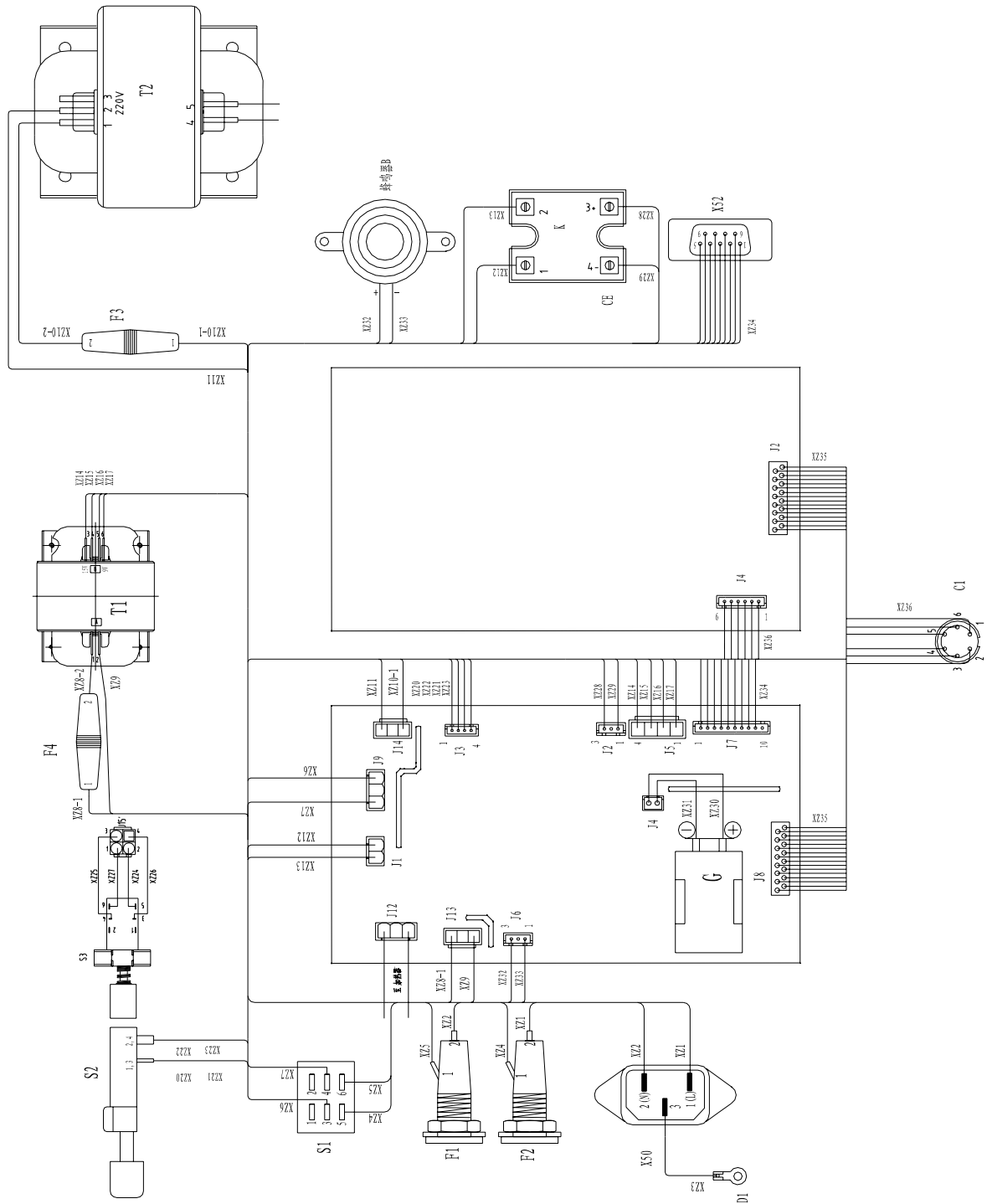
D: Illumination light SD-14.5V/50W

RL: heater 540W/AC240V

T2: Transformer R.40

F3: T type fuse 800mA/250V

WIRING DIAGRAMS OF INFANT RADIANT WARMER



F1, F2: F type fuse 4AL/250V F3: T type fuse 800mAL/250V

F4: T type fuse 160mAL/250V S2: Controller's switch KCD3A-2×2

X50: Power filter FN9222-10-06 X52: RS232connector

B: Buzzer EFM-236LB/12VDC T1: Transformer R.20

G: Charging battery GP17R8H Ni-MH8.4V/170mAh

S1: General power switch
129-432

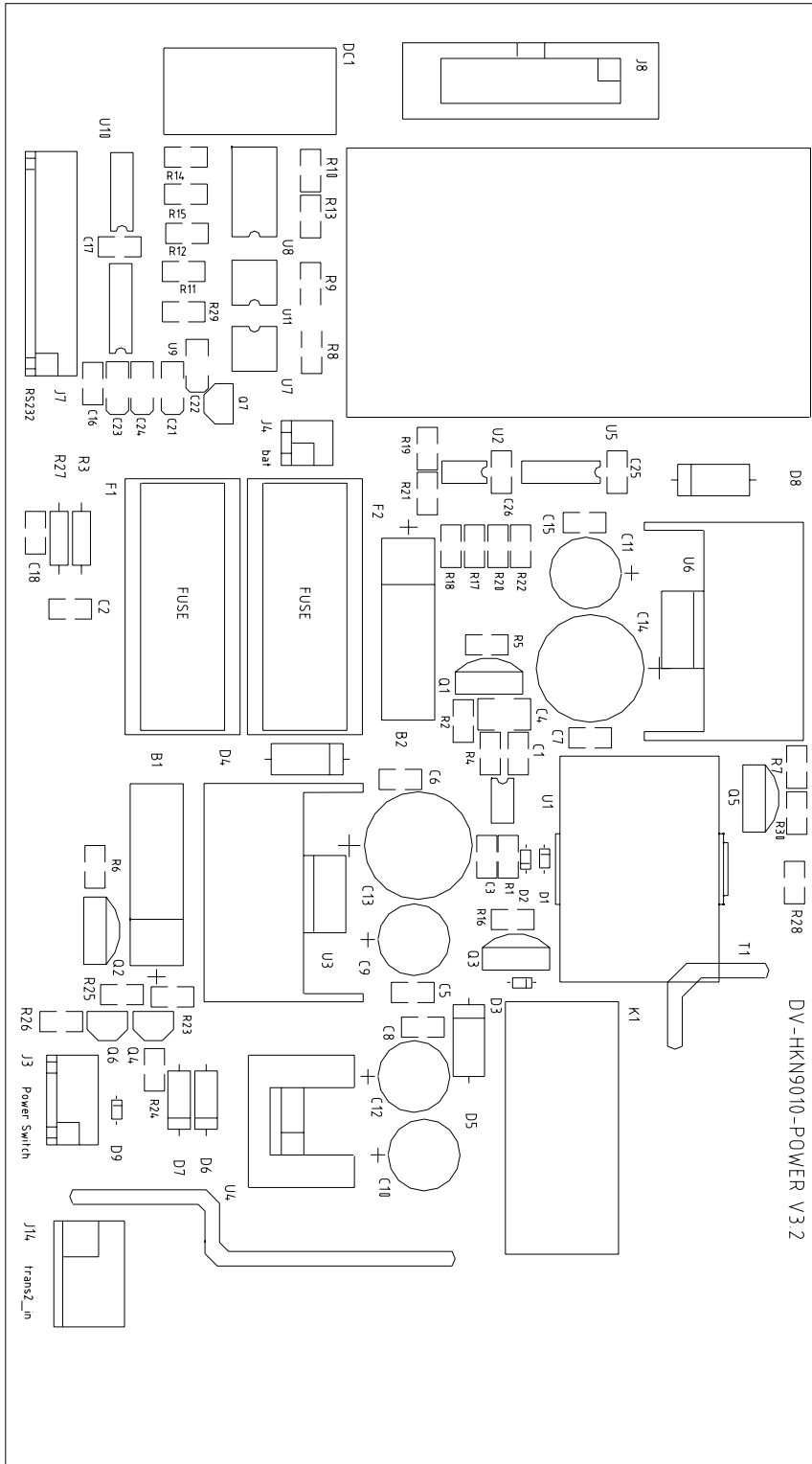
S3: Switch of illumination light
PWL-2P2T

D1: Earthed slice OT1.5-4

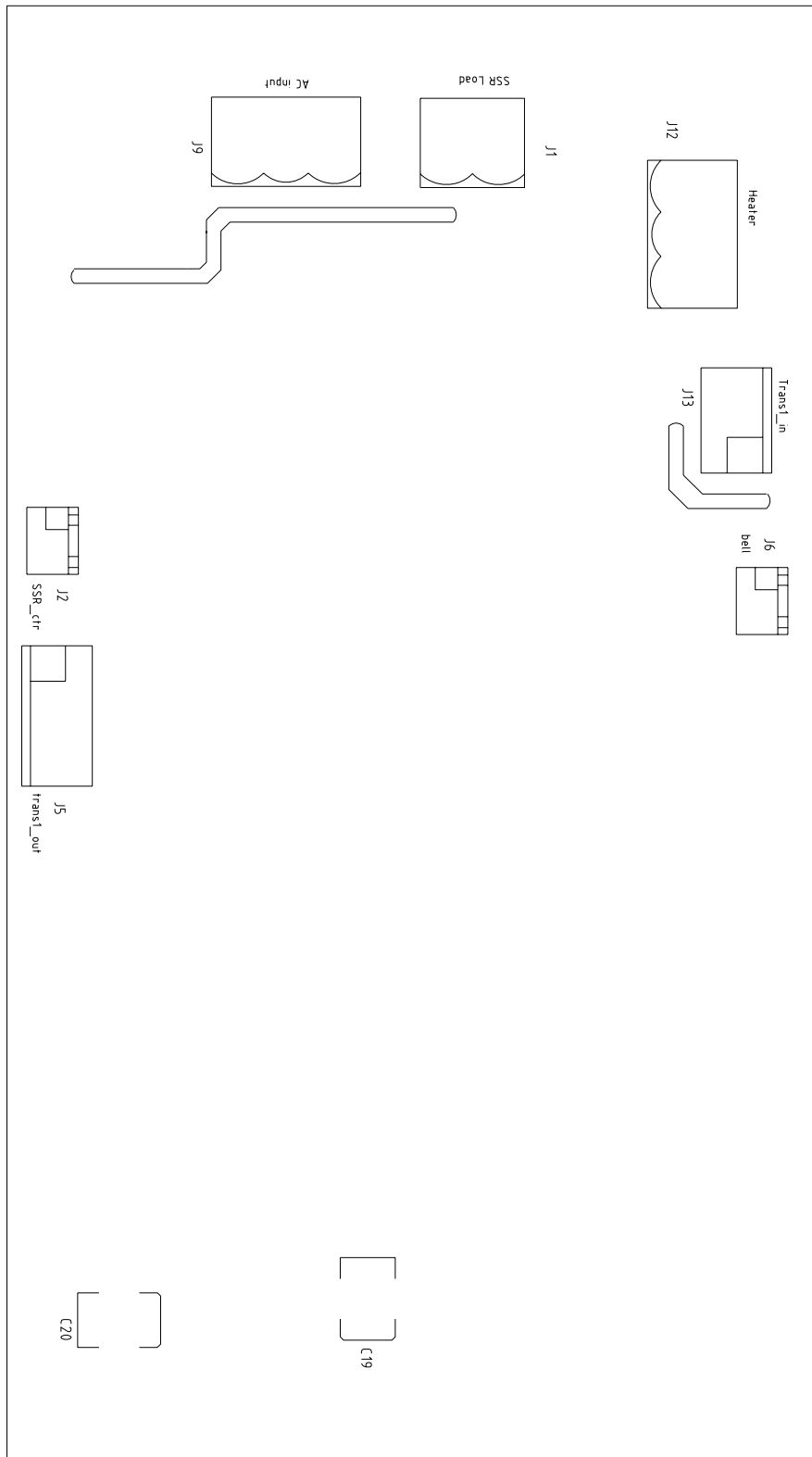
T2: Transformer R.40

K: Solid relay
GN84137010-25A

WIRING DIAGRAMS OF CONTROLLER



PARTS LOCATION DIAGRAM FOR POWER BOARD 1



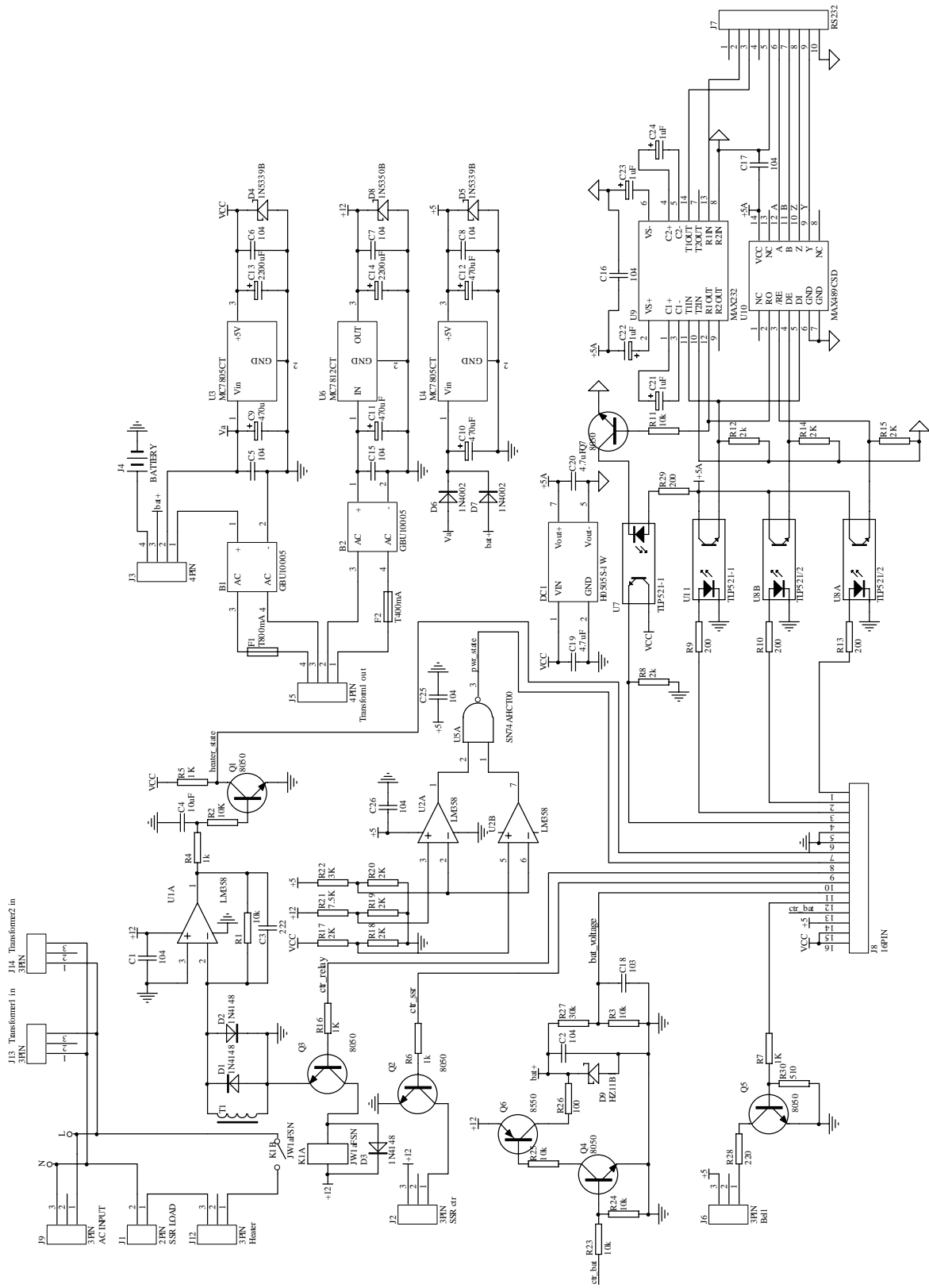
PARTS LOCATION DIAGRAM FOR POWER BOARD 2

Parts List of power board

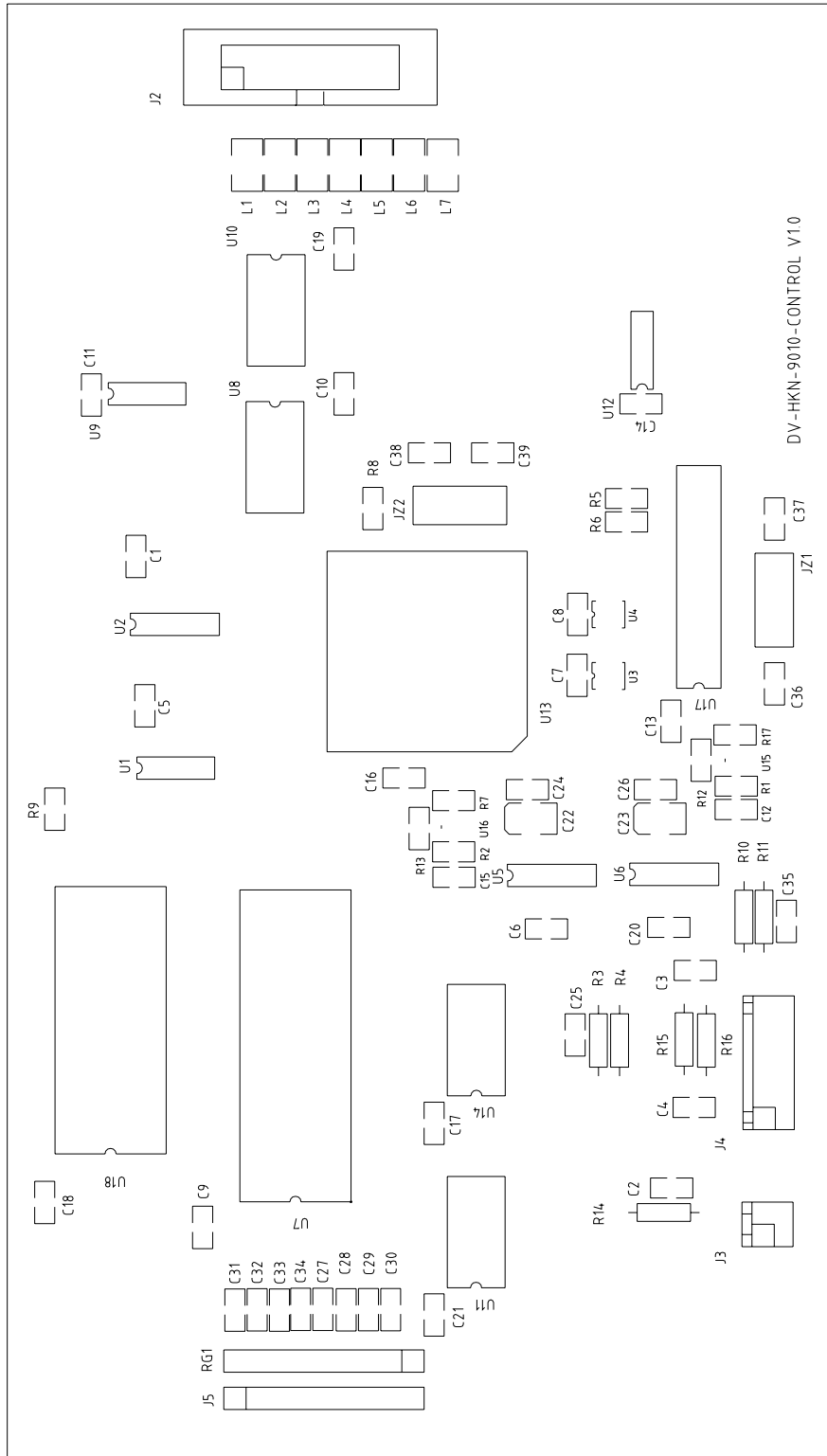
ITEM NO.	CODE	DESCRIPTION AND SPECIFICATION	QUANTITY
1	R1、R2、R11、R23~R25	Resistor 0805-10KΩ	6
2	R3	Resistor RJ-0.25-10KΩ	1
3	R4~R7、R16	Resistor 0805-1KΩ	5
4	R8、R12、R14、R15、 R17~R20	Resistor 0805-2KΩ	8
5	R9、R10、R13、R29	Resistor 0805-200Ω	4
6	R21	Resistor 0805-7.5KΩ	1
7	R22	Resistor 0805-3KΩ	1
8	R26	Resistor 0805-100Ω	1
9	R27	Resistor RJ-0.25-30KΩ	1
10	R28	Resistor 0805-220Ω	1
11	R30	Resistor 0805-510Ω	1
12	C1、C2、C5~C8、C15~C17、 C25、C26	Capacitor 0805-0.1μF	11
13	C3	Capacitor 0805-2200pF	1
14	C4	Capacitor 1210-10μF	1
15	C9~C12	Capacitor CD11-25V-470μF	4
16	C13、C14	Capacitor CD11-16V-2200μF	2
17	C18	Capacitor 0805-0.01μF	1
18	C19、C20	Capacitor CA45D-50V-4.7μF	2
19	C21~C24	Capacitor CA45A-25V-1μF	4
20	U1、U2	Integrated circuit LM358	2
21	U3、U4	Integrated circuit MC7805CT	2
22	U5	Integrated circuit SN74AHCT00	1
23	U6	Integrated circuit MC7812CT	1
24	U7、U11	Integrated circuit TLP521-1	2
25	U8	Integrated circuit TLP521-2	1

Parts List of power board

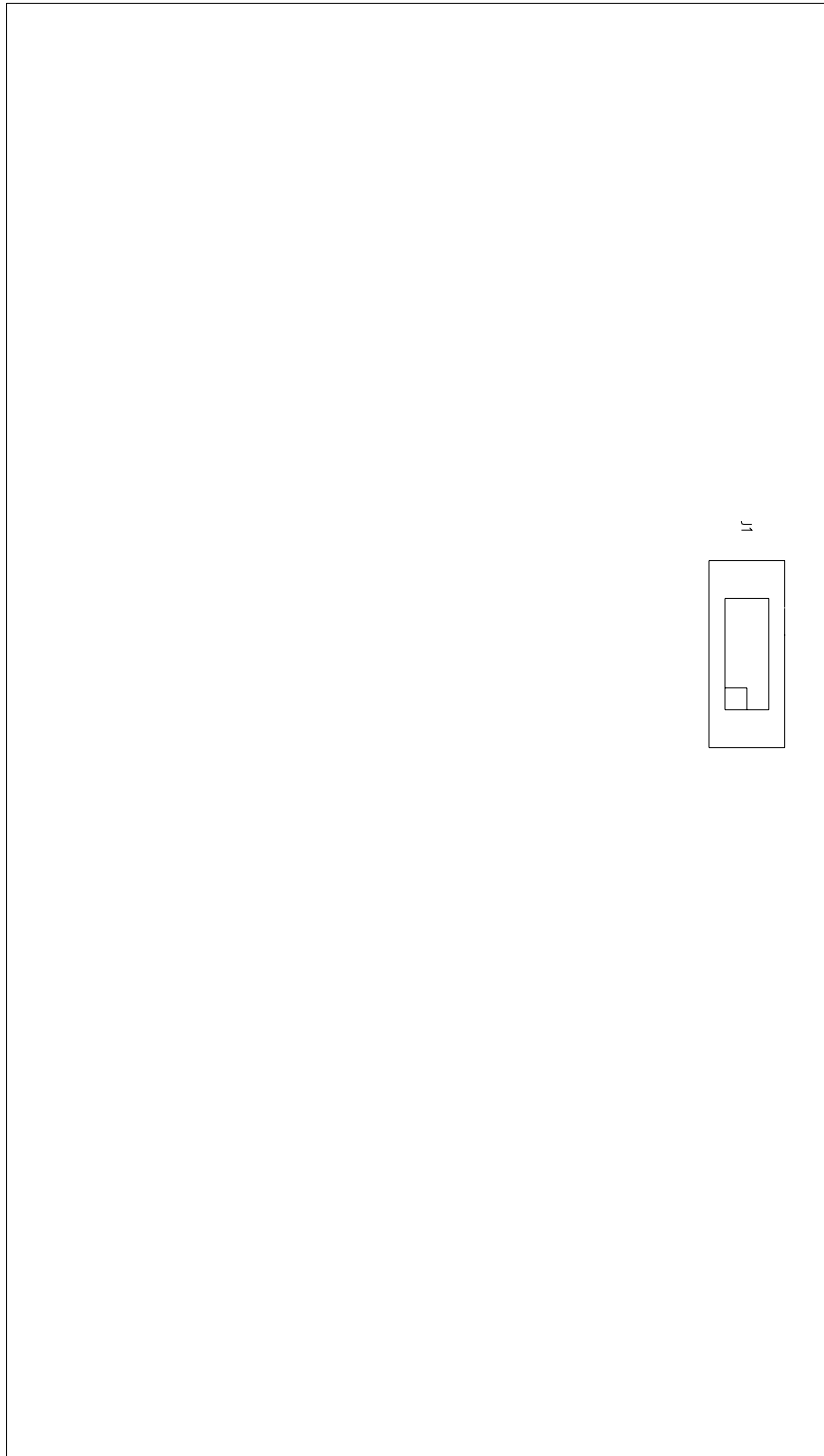
ITEM NO.	CODE	DESCRIPTION AND SPECIFICATION	QUANTITY
26	U9	Integrated circuit MAX232CPE	1
27	U10	Integrated circuit MAX489CSD	1
28	D1~D3	Diode 1N4148	3
29	D4、D5	Diode 1N5339B	2
30	D6、D7	Diode 1N4002	2
31	D8	Diode 1N5350B	1
32	D9	Diode HZ11B1	1
33	Q1~Q5、Q7	Triode S8050	6
34	Q6	Triode S8550	1
35	B1、B2	Rectifier, Bridge GBU10005	2
36	K1	Relay JW1aFSN	1
37	DC1	Power module F0505S-1W	1
38	F1	Fuse T 800mAL/250V	1
39	F2	Fuse T 400mAL/250V	1
40	J1	Connection Receptacle, Female ME040-50802	1
41	J2、J6	Connection Receptacle, Female XY2.5-3	2
42	J3	Connection Receptacle, Female XY2.5-4	1
43	J4	Connection Receptacle, Female XY2.5-2	1
44	J5	Connection Receptacle, Female 4-4	1
45	J7	Connection Receptacle, Female XY2.5-10	1
46	J8	Connection Receptacle, Female DC-2-16(vertical)	1
47	J9、J12	Socket ME040-50803	2
48	J13、J14	Socket XY4-3	2
49	T1	Inductor TVA1421-01	1



SCHEMATIC DIAGRAM OF POWER BOARD



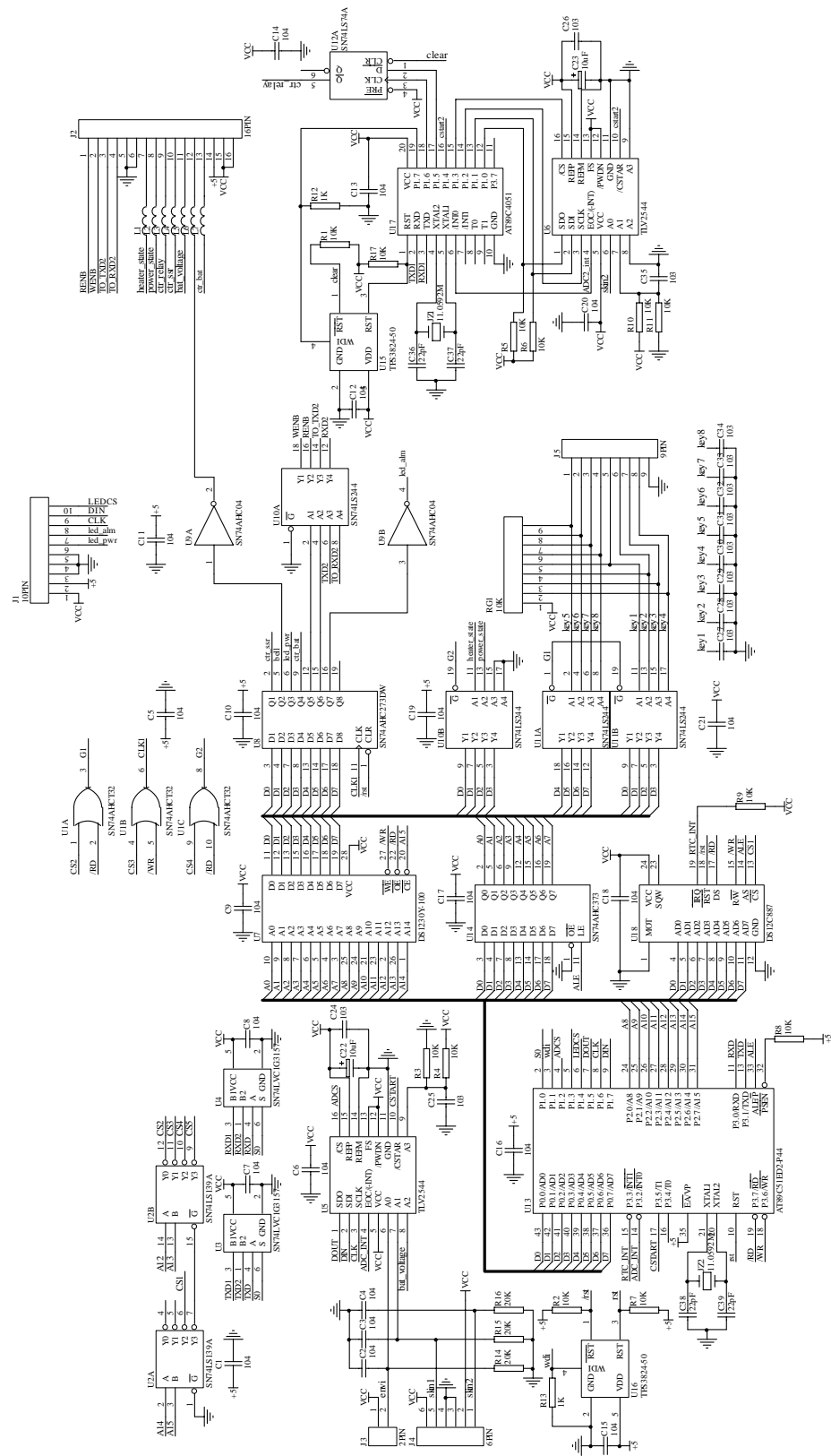
PARTS LOCATION DIAGRAM OF MAIN BOARD 1



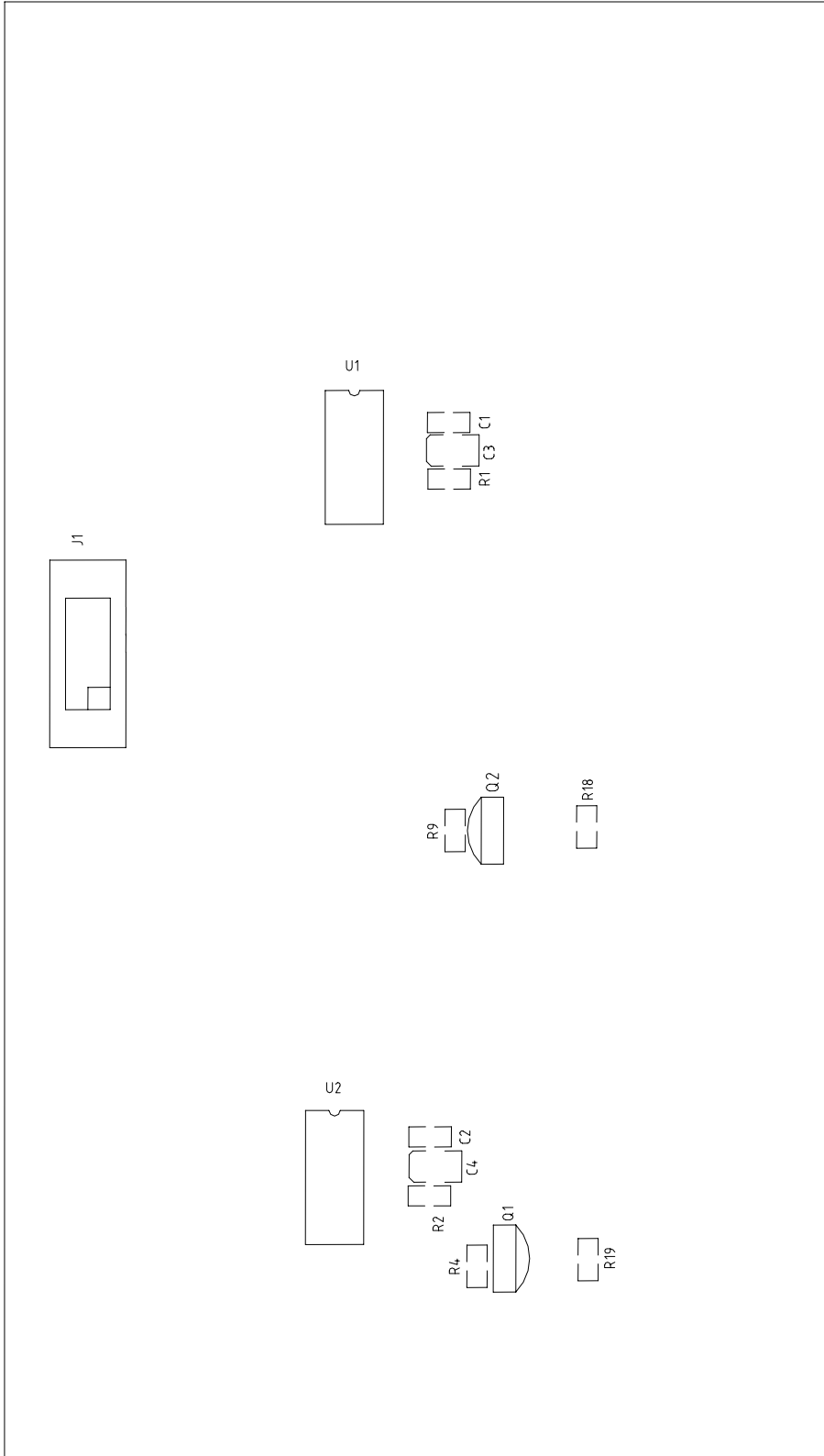
PARTS LOCATION DIAGRAM OF MAIN BOARD 2

Parts List of main board

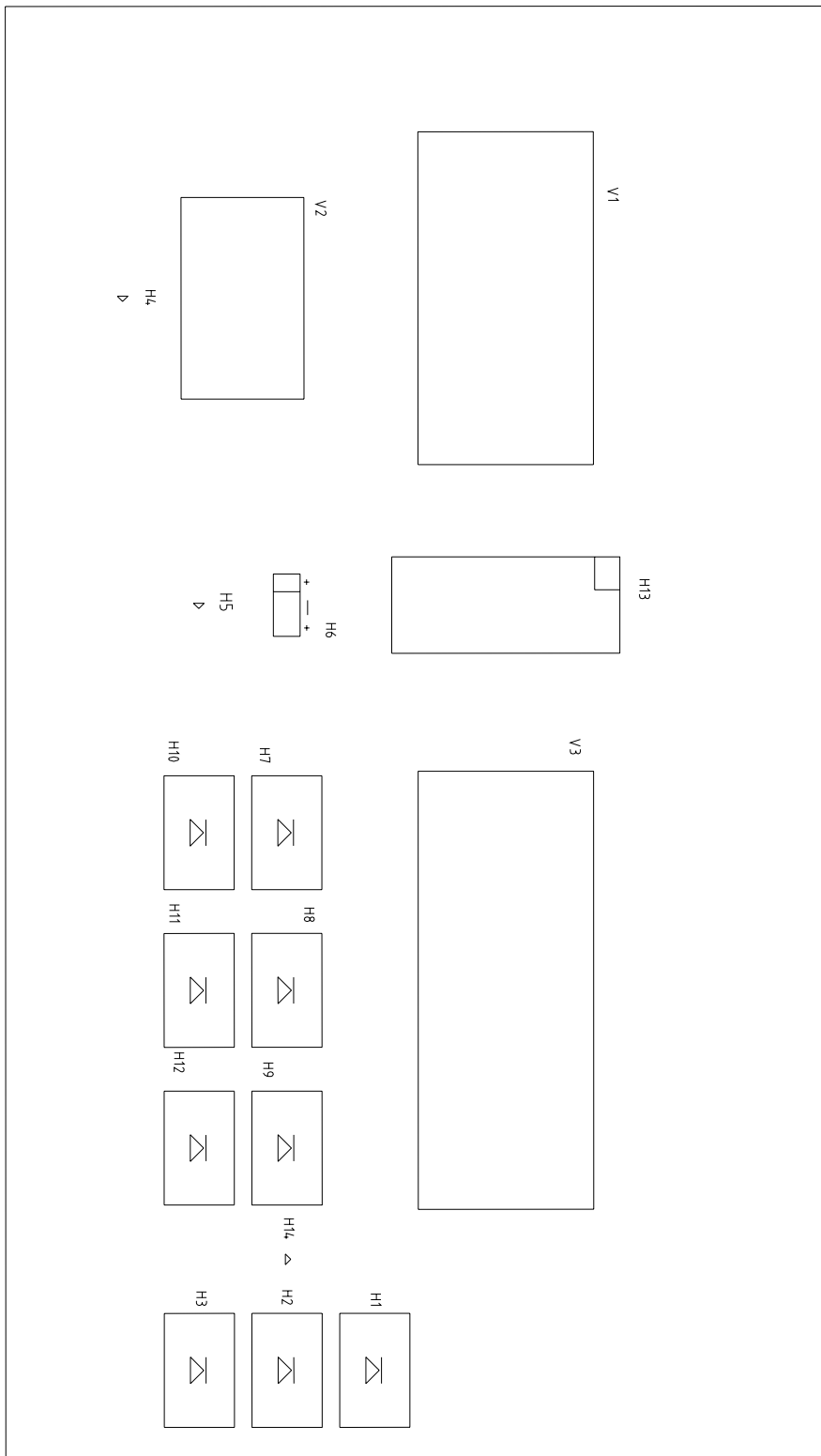
ITEM NO.	CODE	DESCRIPTION AND SPECIFICATION	QUANTITY
1	R1、R2、R5~R9、R17	Resistor 0805-10KΩ	8
2	R3、R4、R10、R11	Resistor RJ-0.25-10KΩ	4
3	R12、R13	Resistor 0805-1KΩ	2
4	R15、R16	Resistor RJ-0.25-20KΩ	2
5	RG1	Resistor Group 10KΩ	1
6	C1~C21	Capacitor 0805-0.1μF	21
7	C22、C23	Capacitor CA45A-16V-10μF	2
8	C24~C35	Capacitor 0805-103	12
9	C36~C39	Capacitor 0805-22pF	4
10	U1	Integrated circuit SN74AHCT32	1
11	U2	Integrated circuit SN74LS139A	1
12	U3、U4	Integrated circuit SN74LVC1G3157	2
13	U5、U6	Integrated circuit TLV2544	2
14	U7	Integrated circuit DS1230Y-100	1
15	U8	Integrated circuit SN74AHC273DW	1
16	U9	Integrated circuit SN74AHC04	1
17	U10、U11	Integrated circuit SN74LS244	2
18	U12	Integrated circuit SN74LS74A	1
19	U13	Integrated circuit AT89C51ED2-P44	1
20	U14	Integrated circuit SN74AHC373	1
21	U15、U16	Integrated circuit TPS3824-50	2
22	U17	Integrated circuit AT89C4051	1
23	U18	Integrated circuit DS12C887	1
24	J1	Connection Receptacle, Female Double row , Male, 10contacts	1
25	J2	Connection Receptacle, Female DC-3-16 (vertical)	1
26	J3	Connection Receptacle, Female XY2.5-2	1
27	J4	Connection Receptacle, Female XY2.5-6	1
28	J5	Connection Receptacle, Female XY2.5-9	1



SCHEMATIC DIAGRAM OF MAIN BOARD



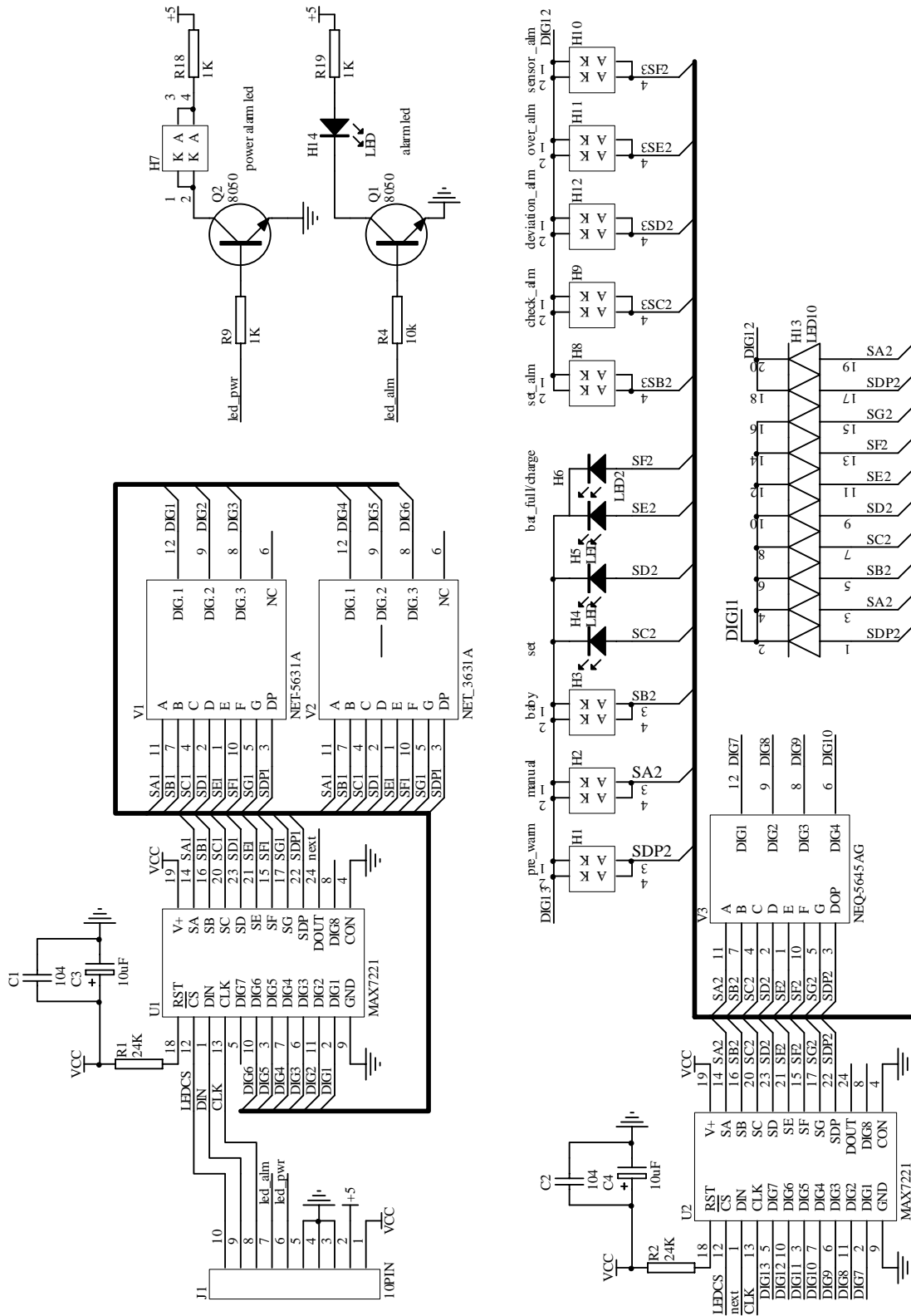
PARTS LOCATION DIAGRAM OF DIPALY BOARD 1



PARTS LOCATION DIAGRAM OF DIPALY BOARD 2

Parts List of Display board

ITEM NO.	CODE	DESCRIPTION AND SPECIFICATION	QUANTITY
1	R9、 R18、 R19	Resistor 0805-1 K Ω	3
2	R4	Resistor 0805-10 K Ω	1
3	R1、 R2	Resistor 0805-24 K Ω	2
4	C1、 C2	Capacitor 0805-0.1 μ F	2
5	C3、 C4	Capacitor CA45A-16A-10 μ F	2
6	Q1、 Q2	Triode 8050	2
7	U1、 U2	Integrated circuit MAX7221CWG	2
8	J1	Group leads 5 \times 2 (10contacts)	1
9	V1	Nixietube NET-5631AG	1
10	V2	Nixietube NET-3631AG	1
11	V3	Nixietube NEQ-5645AG	1
12	H1~H3	LED NEA-L10ZAG	3
13	H4、 H5	LED ϕ 5 green	2
14	H6	LED double light (yellow and green)	1
15	H7~H12	LED NEA-L10ZAD	6
16	H13	LED NEA-B10ZAG	1
17	H14	LED ϕ 5 red	1



SCHEMATIC DIAGRAM OF DISPLAY BOARD