MMED6000DP-M3-CSN801
Service Manual

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CONTENT

CHAPTER 1 INTRODUCTION

1.1 General

MMED6000DP-M3 is a Portable Patient Monitor that has abundant monitoring functions and is used for the clinical monitoring of adult, pediatric and neonate. Besides, the user may select the different parameter configuration according to different requirements. According to custom's order we have four types of this product: standard type, standar&CO2, standard &IBP, standard & Inner printer.

MMED6000DP-M3 can monitor vital signals as ECG, RR, SpO2, PR, NIBP, TEMP, Dual-channel IBP (optional), CO2 (optional), printer (optional). It integrates parameter measuring modules, display and recorder in one device, featuring in compactness, lightweight and portability. Large true color display provides clear view of 6 waveforms and full monitoring parameters.

Note: This service menu is for standard type, standard & printer.

1.2 Description of Abbreviation

HR:	heart rate 2-channel ECG waveform
SPO2:	arterial oxygen saturation
NIBP:	non-invasive blood pressure
IBP:	invasive blood pressure
S:	systolic
M:	mean blood pressure
D:	diastolic
PR:	pulse rate
RR:	respiration rate
TEMP1:	temperature channel 1
TEMP2:	temperature channel 2
CO2:	end-tidal CO2 concentration

1.3 Explanation of Symbols

Attention ! Refer to the relevant the prompt.

Resistant defibrillator
BF type equipment

Power on/off

Alarm on

Class I Equipment

Heart Beat Detected

Alarm off

Silence

Sound on

Trend menu

System setup menu

AC
50/60 HZ

Equipotential grounding terminal

CE approval

Fuse

This symbol indicates that the instrument is IEC 60601-1 Type CF equipment. The unit displaying this symbol contains an F-type isolated (floating) patient applied part providing a high degree of degree of protection against shock, and is suitable for use during defibrillation.

1.4 Special Features

- Portable, compact, AC power and internal rechargeable battery;
- Resistant high-frequency electrotome design, reliable and special module is used in operation room;
- Optional inner printer with 3 channels wave or external printer;
- Adjust volume more accurately by digital system;
- Menu design adopts Huffman decode, operating more effectively;
- Support Ethernet, wireless LAN and could connect with Central monitoring system (option).

1.5 Appearance of Monitor

1.5.1. Front panel

The display of MMED6000DP patient monitor is TFT LCD, which displays the patient

parameters, waveforms, historical data and monitor status.

The screen is divided into five areas: monitor status, waveforms, the table of historical data, parameters, menu as well as frame of menu status.

Fig.1-1

1. Alarm Indicator

   If there is physiological alarm, it demonstrates that some parameters measuring scale is beyond alarm limitation, in the meantime, the indicator begin flashing. According to the various alarm level, there are three alarm-level in all for selection:

   High level: when alarm occurs, the color of the indicator becomes red and starts flashing once every one second.

   Mid level: when alarm occurs, the color of the indicator becomes orange and starts flashing once every one second.

   Low level: when alarm occurs, the indicator would be turned on continuously and its color becomes orange all the time.

2. Silence:

   Silence setting button, when press it, the alarm of Monitor will be off.

3. Freeze:

   Freeze setting button. During the waveform scrolling period, when press this button, the waveform will be stopped for further observation.

4. NIBP

   Start/cancel BP measuring, when press this button, Monitor will carry out command to measure patient BP condition, press this button again during the BP measuring period and then the BP measuring action is terminated.

5. Print:

Printer button, when Monitor equipped with printer which could be internal thermal array recorder or printer as a peripheral and then press the button, the correspondent data will be printed out.

6. Rotary knob:
   User rotate this knob to select and enter desired item, it is similar in function with PC mouse. For more information, please refer to section of Menu operation.
7. Power supply indicator(green light):
   Demonstrate power supply status, the power supply is from AC power supply or rechargeable batteries.
8. Indicator of batteries charging state(red light):
   The indicator will turn on flashing only when the monitor is powered by the external power and the batteries voltage is low. When the charging end, the red light will light all the time.
9. CALL:
   Menu refreshing button, when press this button, you could exit current menu and return to the main menu and refresh the screen as well.
10. The yellow button:
    Power Supply “on/off” switch.

1.5.3. Side Panel

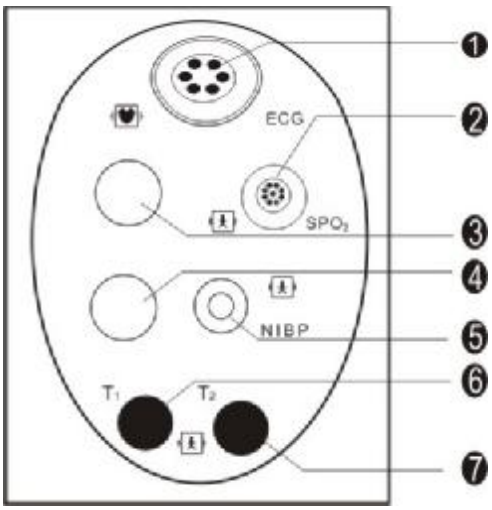


Fig.1-7

1) ECG: ECG lead socket.
2) SPO2 probe port.
3) 4) IBP1, IBP2 socket. (Reserved，supply According to custom’s order)
5) NIBP: Cuff and air tube port
6) 7) T1, T2 Probe port, two ports for selection.

1.5.5 Rear panel

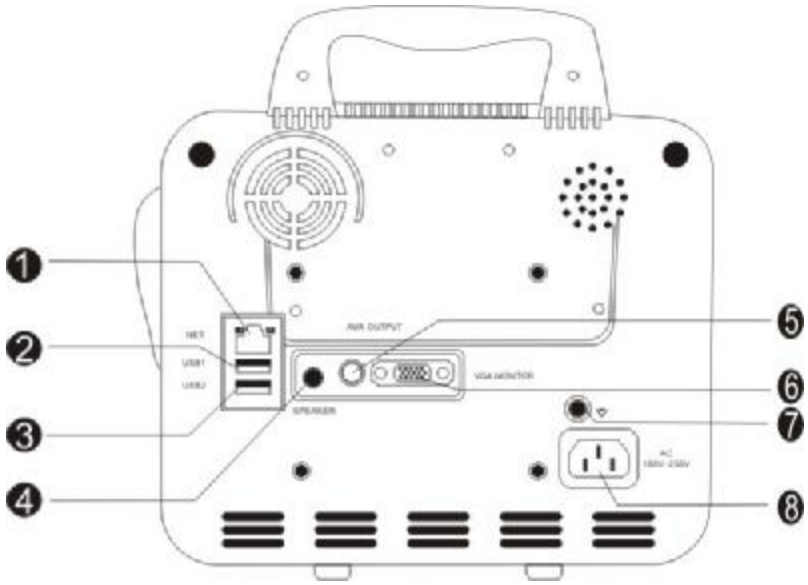


Fig.1-9

(1) NET: net access point: connecting with the central monitoring system through the standard RJ-45

(2) (3)USB1,USB2 (reserved)

(4)Speaker (reserved)

(5) AUX OUTPUT (reserved)

(6)VGA MONITOR: CRT exteriorly connecting screen and standard VGA.

(7)Ground terminal: Ground terminal of equivalent potential.

(8)Power: AC Power supply: 100-240V (AC), 50/60(Hz); fuse: 1.6A

1.6 Specification

Environment

The operation environment should comply with the following conditions:

Operating Temperature:	5℃ to 40℃
Relative Humidity:	0 to 80%, non-condensing
Height of sea level:	-500m ~ 4600m

The transport and storage environment should comply with the following conditions:

Storage Temperature:	-10℃ to 40℃
Relative Humidity:	0 to 90%, non-condensing
Height of sea level:	-500 m~ 13100m

Display

Type:	800*600 pixel color TFT
Screen Size:	8.4 inch diagonal

Displayed Parameters

Time:	Battery-backed quartz crystal clock

Alarms:	High and low limits selectable on patient parameters
ECG:	ECG Waveform Scale, displayed lead
Heart Rate:	Derived from ECG OR SpO2
NIBP:	Pressure (systolic, mean and diastolic)
Pulse Oximeter:	Pulse Rate, Pulse waveform, and percent saturation.
Respiration Rate:	Respiration rate derived from ECG.
Trends:	Heart rate, respiration rate, NIBP (systolic, mean, diastolic), Temperatures and SpO2
Temperatures:	Two channels
Trace Freeze	Traces A or B

ECG

Protected against defibrillator and electro surgery potentials

Standard Lead	I, II, III, aVL, aVR, aVF, V
Display Gain Scales	2.5mm/mV, 5mm/mV, 7mm/mV, 10mm/mV, 15mm/mV, 20mm/mV, 25mm/mV
Sweep Speed	12.5mm/s、25mm/s、50mm/s
Input Resistance	> 5M Ohm (at 10 Hz, not including patient cable)
Frequency Response	0.05Hz-100Hz (3dB)
Common Mode Rejection Ratio	>60dB
Electrode Offset Potential	Maximum ±0.3V
Baseline Recovery	<5s after 5KV defibrillation
Heart Rate range	15 to 300bpm
Resolution	1bpm
Accuracy	＜100bpm ±1% ≥100bpm ±2%
Alarm	Heart rate high and low limits alarm delay<12s
Lead Off condition	Detected and displayed
ST segment	
ST segment range	-0.8mV to +0.8mV
Accuracy	±0.05mV

Spo2

Display range	0 to 100%		
Accuracy	80-100%:±2digits;70-80%:±3digits;0-69% Unspecified		
LED Specifications		Wavelength	Radiant Power
	RED	660±2nm	1.8mW
	IR	905±10nm	2.0mW
Alarm delay	Spo2 high and low limits alarm delay<7s		
Display Update	<5s		
Resolution	1%		

Pulse Rate

Measurement Range	30 to 300bpm
Resolution	1bpm
Accuracy	±1bpm
Alarm delay	Pulse rate high and low limits alarm delay<7s

NIBP

Technique	Oscillometric method (with inflatable cuff) Determines systolic, diastolic and mean arterial pressures.
Patient Types	Adult, Pediatric and Neonate
Cuff Inflation Time	3-15 seconds depending on cuff size.

Cuff Inflation Pressure	Auto: 180mmHg Manual : 9.3kPa(70 mmHg), 13.3kPa(100 mmHg） 16.0kPa(120 mmHg),18.6kPa(140 mmHg） 20.0kPa(150 mmHg), 21.3kPa(160 mmHg） 24.0kPa(180 mmHg）
Measurement Modes	Manual: Immediate upon operator command AUTO: Determinations automatically made with selectable intervals STAT: Determinations continues in 5 minutes
Measurement Interval Time	1-240min Step:1min(1-10min) 、 5min(10-30min) 、 10min(30-90min) 、 30min(90-240min)
Measurement Range	
Systolic	30-255mmHg
Diastolic	10-220mmHg
Mean Arterial	20-235mmHg
Pressure Resolution	1mmHg
Accuracy	Cuff Pressure Range: 0 to 275mmHg Pressure Span Accuracy: ±3mmHg Mean difference: ±5mmHg Standard deviation: 8mmHg
Determination Time	Typically 25seconds.Varies with patient's pulse rate, pulse pressure and amount of artifact present.
Overpressure Valve Adult/Neonate	Automatically releases cuff pressure if inflation pressure exceeds 280mmHg/150mmHg
Overtime Protection Adult/Neonate	Stop determinates if the measurement time exceeds 120s/90s.
Alarm delay	Pressure high and low limits alarm delay<7s

RR

Technique	Resistance method (RA-LL)
Range	2-60 rpm
Resolution	1 rpm
Alarm delay	Respiration rate high and low limits alarm delay<7s

TEMP

Technique	Resistance
Channel	2 (T1 and T2)
Scales	F. Or ℃
Probes	Resistive; recta and skin (reusable and disposable) YSI 400 Series types
Range	0-50℃
Revolution	0.1℃
Accuracy	during the 25℃～45℃, the measuring error≤±0.2℃
Alarm delay	Body temperature high and low limits alarm delay<7s

CO2 (Optional)

Technique

Side Stream, non-dispersive infrared (NDIR) absorption technique. Including multiple water trapped/filtration system and microprocessor logic control of sample handling and calibration.

Measurement Range	0-99mmHg
Respiration rate	1-99 breaths per minute
Accuracy	+/- 3 mmHg 0 - 40 mmHg +/- 8% of reading 41 - 76 mmHg +/- 10% of reading 77 - 99 mmHg
Flow rate range	User-selectable, variable from 90 to 200 ml/min (defaults to 175 ml/min)

IBP(Optional)

Range	-50 to +350mmHg
Sensitivity	5uV/V/mmHg
Gain Accuracy	0.5%
Bandwidth	0 to 12Hz

Power Requirements

Power Supply:	100V-230V±10%, 50/60Hz
Internal Battery:	12V 7AH; Type- sealed lead-acid
Operating Time: (fully charged battery)	2 hours typical at 25℃,no printing, one NIBP measurement per 15 min.

CHAPTER 2 SPECIAL OPERATION IN MENU

Some operations of monitor aim at the dealer but not the doctor, such as “Language setup” or “Hz selection”, the dealer should note the following points before monitor getting end user.

NOTE: you must keep the correct setup according customer’s condition before using the equipment.

In monitoring status, rotate the knob to highlight the  MENU icon, and then press the knob, the menu bar of “system setup” appears on the bottom of screen.

Fig.2-1

Rotate the knob and select “EXTEND” item to access the sub-menu shown as below

Fig.1-2

Fig.2-2

The functions of the items in the submenu please refer to Operator’s manual.
Select “SYS-ACC” item to access the sub-menu shown as Fig.2-3,

Fig.2-3

Then Input “2” in each of the items, press PW-ENTER to enter another sub-menu shown as Fig.2-5:

Fig.2-4

Fig.2-5

Rotate the knob to select “SETUP” menu to enter in the sub-menu shown as Fig.2-6

Fig.2-6

Language Setup

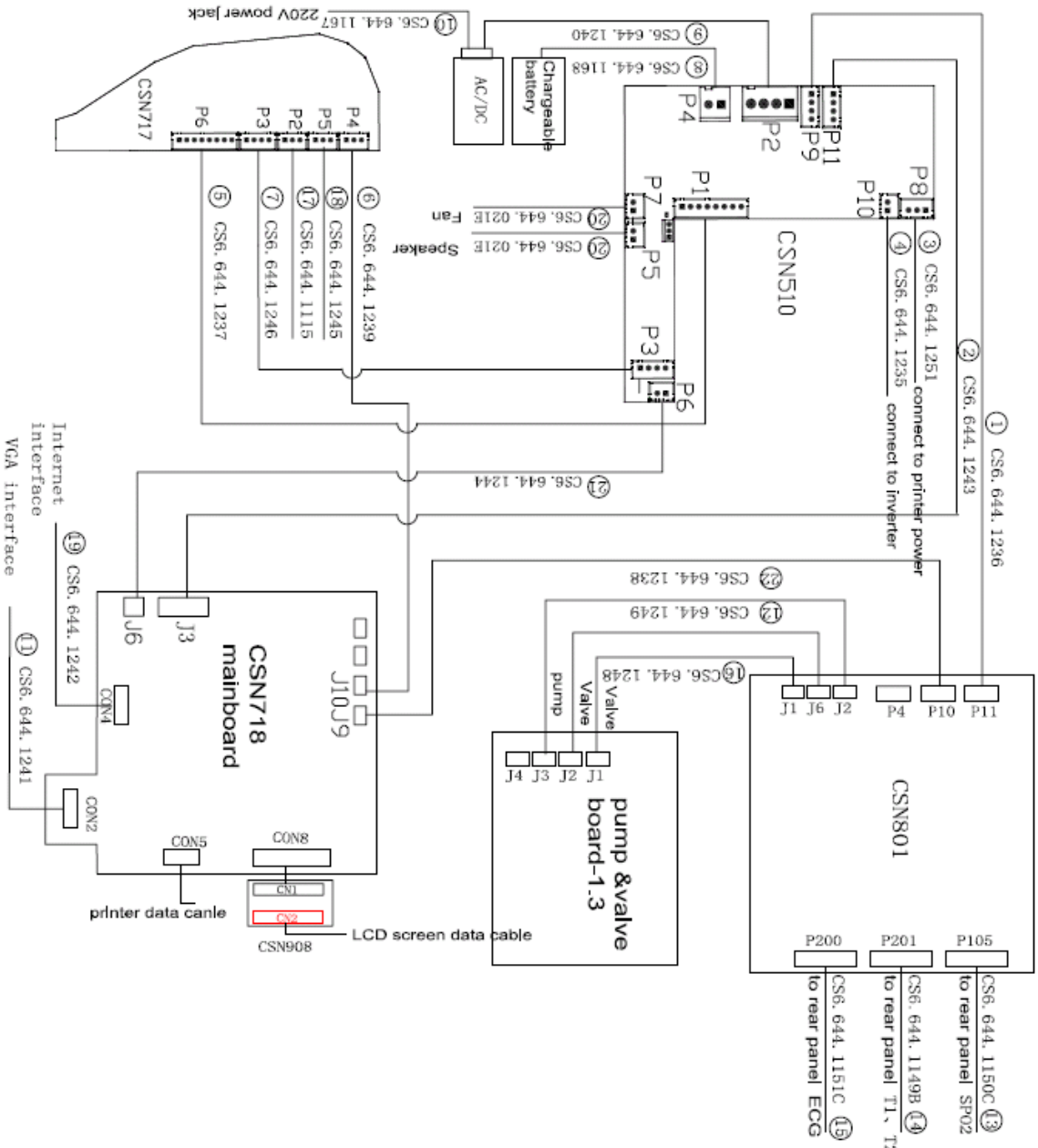
The system offers two languages: English and Chinese. Technician is able to set the required menu as per customer’s demand.

ACCHOICE

It is the AC 50HZ or 60HZ filter.

CHAPTER 3 MONITOR FUNCTION and PRINCIPLE

3.1 Connection Drawings



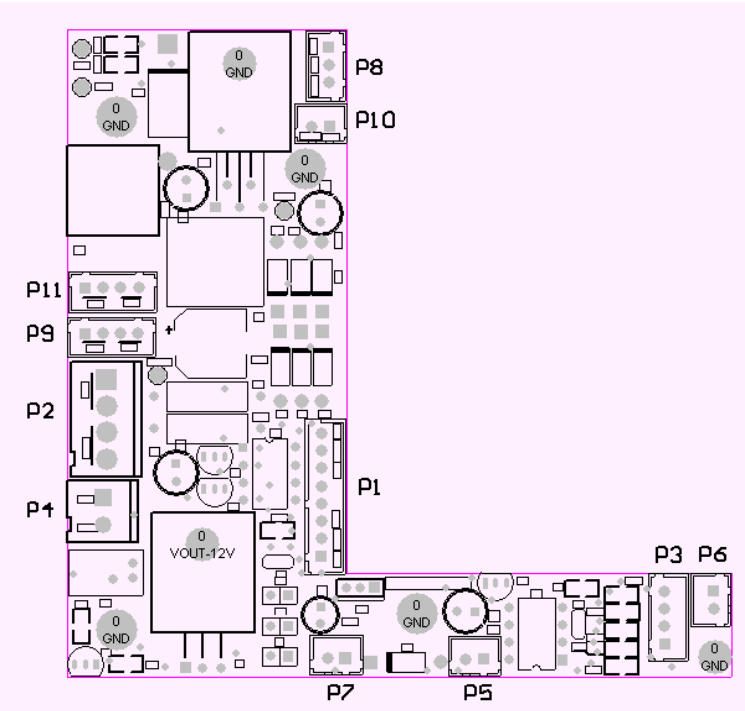
The concrete connection is described in the following table:

Number	From	To	Cable and specification
1	Power board P9	801 board P11	CS6.644.1236
2	Power board P11	Main board J3	CS6.644.1243
3	Power board P8	Printer power	CS6.644.1251
4	Power board P10	Inverter	CS6.644.1235
5	Power board P1	Keyboard P6	CS6.644.1237
6	Keyboard P4	Mainboard J10	CS6.644.1239
7	Power board P3	Keyboard P3	CS6.644.1246
8	Power board P4	Chargeable battery	CS6.644.1168
9	Power board P2	Power adapter	CS6.644.1240
10	AC-DC power	220V power jack	CS6.644.1167
11	CSN718 CON2	VGA interface	CS6.644.1241
12	CSN801 board J2	J3 on Pump &valve board	CS6.644.1249
13	CSN801 board P105	Rear panel SpO2	CS6.644.1150C
14	CSN801 board P201	Rear panel T1,T2	CS6.644.1149B
15	CSN801 board P200	Rear panel ECG	CS6.644.1151C
16	CSN801 board J1	J1 of Pump &valve board	CS6.644.1248
17	Keyboard P2	Alarm light board	CS6.644.1115
18	Keyboard P5	Sensor	CS6.644.1245
19	Mainboard CON4	Internet interface	CS6.644.1242
20	Power board P7	Fan	CS6.644.021B
21	Power board P5	Speaker	CS6.644.021E
22	Power board P6	Mainboard J6	CS6.644.1244
23	P10 of CSN801board	Mainboard J9	CS6.644.1238

3.2 Power supply unit

3.2.1 Power board

CSN510 is special power board for 6000DP-M3.The PCB of CSN510 is as follows:



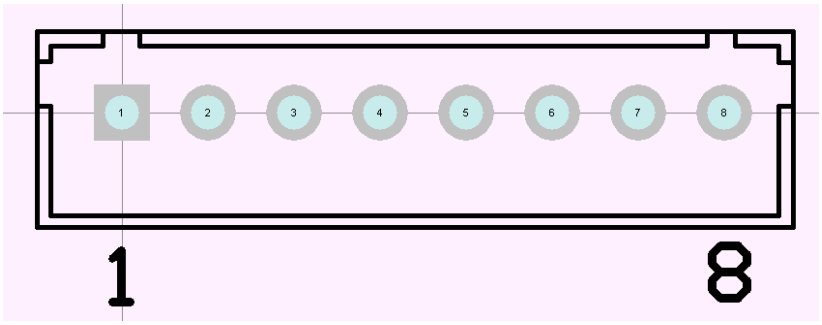
3.2.2 Ports of power board

The Power board CSN510 provides power supplies to SN718 mainboard, CSN801 board, CSN717 keyboard, charge battery, LCD displayer, speaker, fan and printer and so on.

The port function is described as follows table:

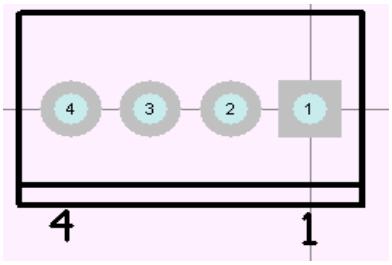
NUMBER	FUCTION
P1	Port of Keyboard CSN717
P2	Port of 15VDC input
P3	Control port of fan and speaker（connect to the keyboard）
P4	Port of chargeable battery
P5	Port of speaker
P6	Port of audio frequency input（ connect to the csn718 main board）
P7	Port of fan
P8	Power Port of printer
P9	Power Port of 801 mainboard
P10	Power Port of inverter
P11	Power Port of csn718 mainboard

3.2.2.1 P1- Port of CSN717



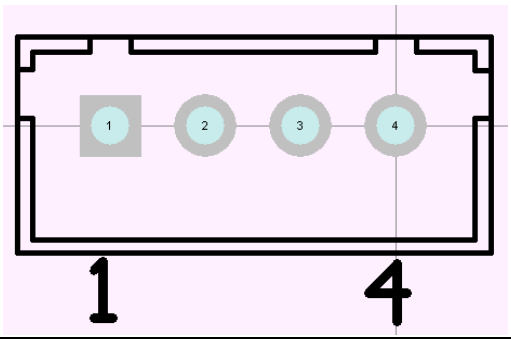
Pin	Name	Definitions
1	V-15V	Power output of Charge indicate light
2	VBatt	Examination output of battery power
3	GND	Ground
4	Bett-ST	Control of charge indication light
5	Open/Close	Power switch input
6	Vout-5V	5V output
7	VIS-5V	5V input
8	Vin	15V DC power input

3.2.2.2 P2-15VDC Input Port



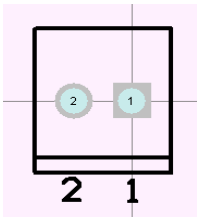
Pin	Name	Definition
1	GND	Power Ground Input
2	GND	Power Ground Input
3	＋15V	Power input (15V)
4	＋15V	Power input (15V)

3.2.2.3 P3- Fan and speaker control port



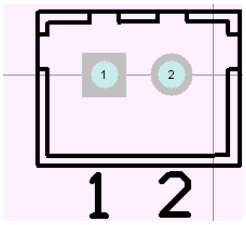
Pin	Name	Definition
1	SPK-CTLA	Speaker volume control input
2	SPK-CTLB	Speaker volume control input
3	SPK-CTLC	Speaker volume control input
4	FAN-CTL	Fan control input

3.2.2.4 P4-Chargeable Battery Port



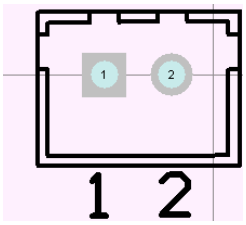
Pin	Name	Definition
1	GND	Ground
2	VBatt	Battery input

3.2.2.5 P5-Speaker Port



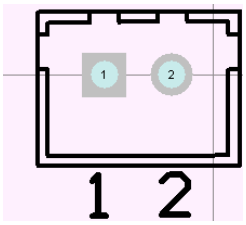
Pin	Name	Definition
1	GND	Ground
2	SPK-CTL	Speaker control signal output

3.2.2.6 P6-Audio Frequency Signal Input Port



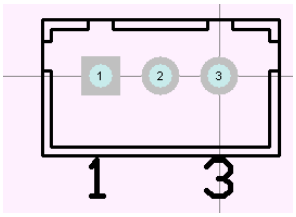
Pin	Name	Definition
1	GND	Ground
2	SPK-IN	Audio frequency signal input

3.2.2.7 P7- Fan port



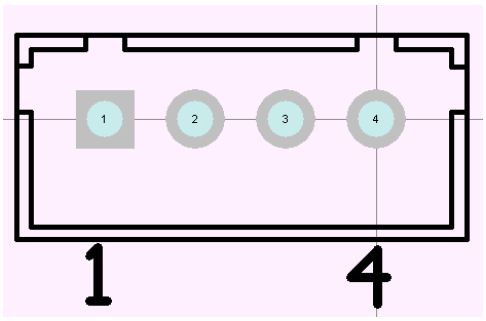
Pin	Name	Definition
1	FAN-OUT	Control signal output
2	Vout-12V	Fan power output

3.2.2.8 P8-Printer Power Port



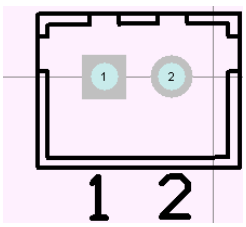
Pin	Name	Definition
1	Vout-5V	5Voutput
2	GND	Ground
3	Vout-12V	Power output

3.2.2.9 P9-801 Function Panel Power Port



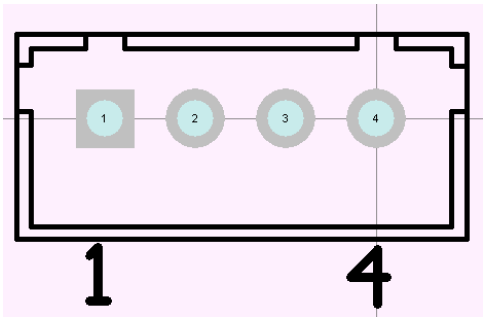
Pin	Name	Definition
1	GND	Ground
2	GND	Ground
3	Vout-6V	Power output
4	Vout-6V	Power output

3.2.2.10 P10-Inverter Power Port



Pin	Name	Definition
1	GND	Ground
2	Vout-12V	Power output

3.2.2.11 P11- CSN718 Main board Power Port

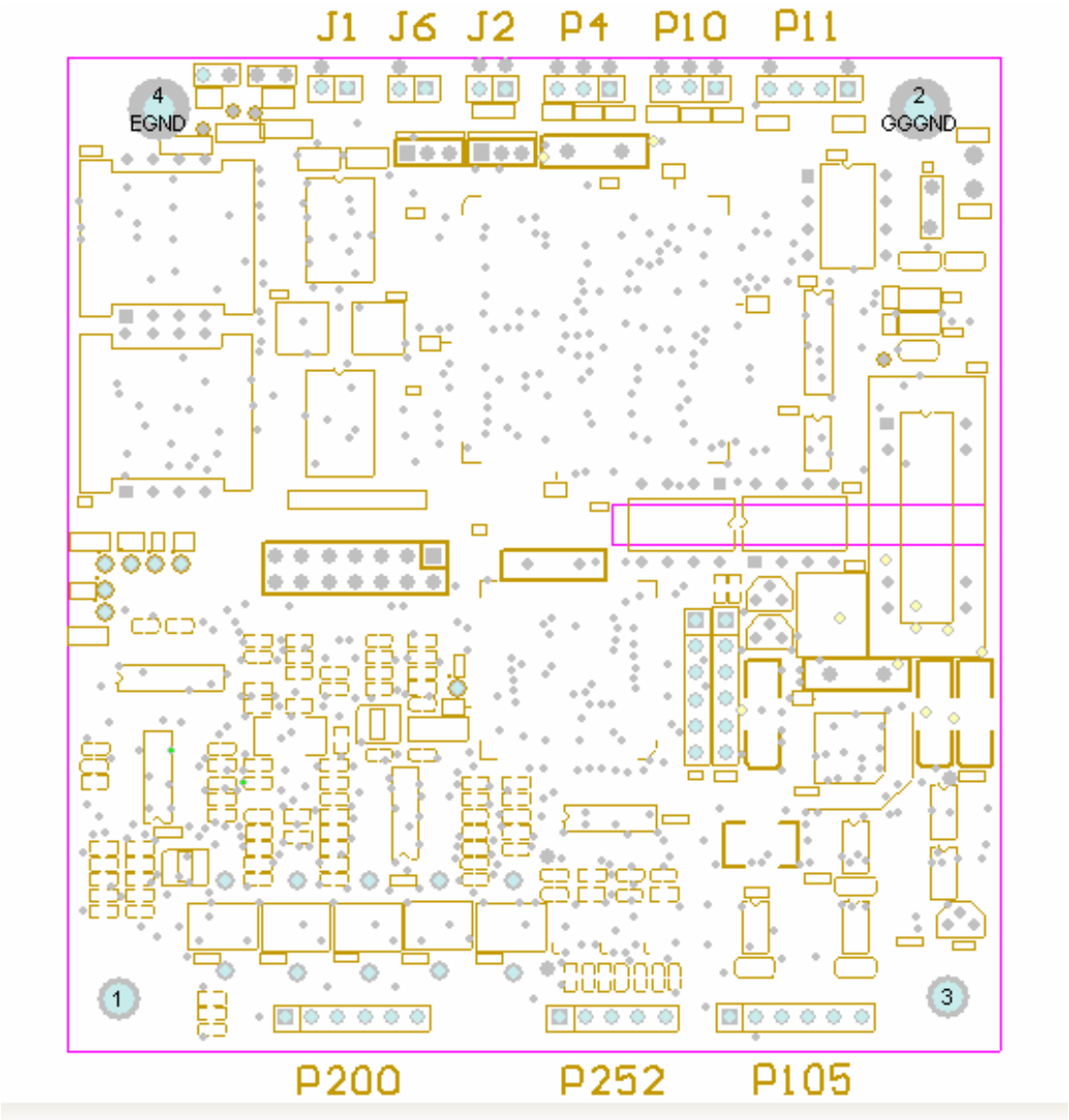


Pin	Name	Definition
1	GND	Ground
2	GND	Ground
3	Vout-5V	Power output
4	Vout-5V	Power output

3.3 CSN801 board

3.3.1 General description

PCB of 801：



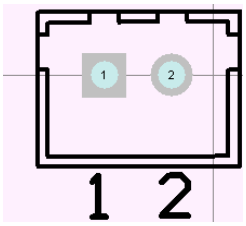
3.3.2 801 Ports

Functions of 801 ports are described as follows:

Designator	Function
J1	Valve port
J2	Pump port
J6	Valve port
P4	Reserved
P10	Serial port connecting to CSN718
P11	Power input
P105	SpO2 signal input port
P200	ECG signal input port

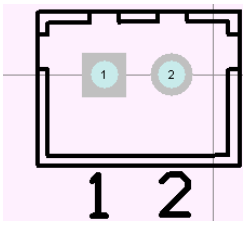
P252	T1，T2 signals input port

3.3.2.1 J1-Valve port



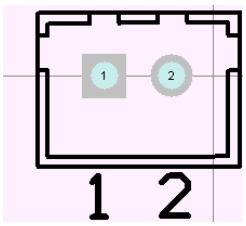
Pin	Name	Definition
1	VDD	Power output
2	Signal	Control signal output

3.3.2.2 J2- Pump Port



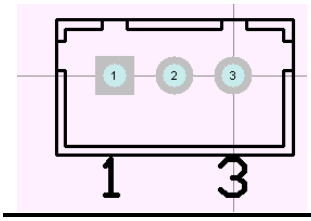
Pin	Name	Definition
1	VIN	Power output
2	Signal	Control signal output

3.3.2.3 J6- Valve Port



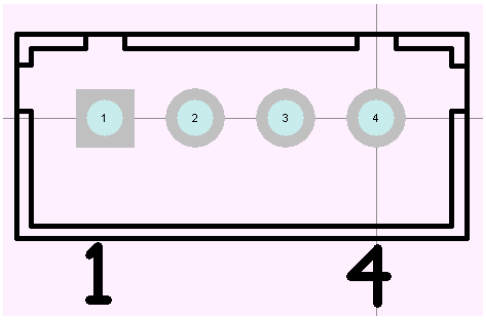
Pin	Name	Definition
1	VDD	Power output
2	Signal	Control signal output

3.3.2.4 P10- Serial Port Connecting to CSN718



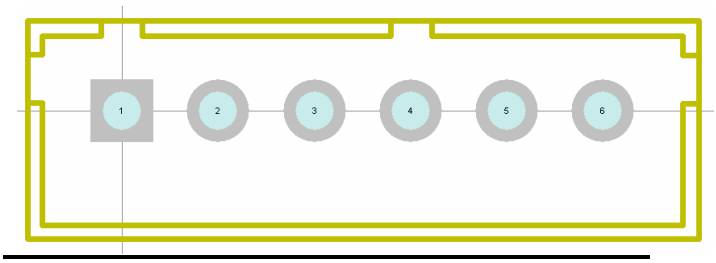
Pin	Name	Definition
1	OTXD	Serial output
2	ORXD	Serial receipt
3	GND	Ground

3.3.2.5 P11- Power Input Port



Pin	Name	Definition
1	VIN	Power input
2	VIN	Power input
3	GND	Ground
4	GND	Ground

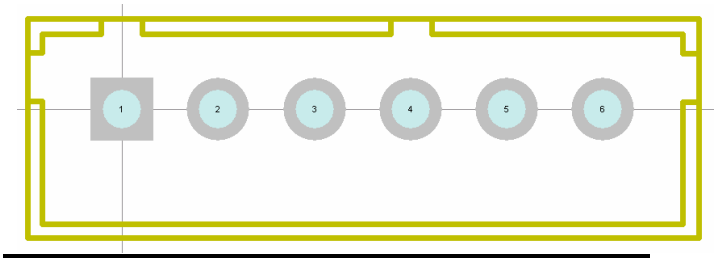
3.3.2.6 P105-SpO2 Signal Input Port



Pin	Name	Definition
1	Signal	Signal pin
2	LED－	Driving signal
3	LED＋	Driving signal
4	IN－	Receipt signal input
5	IN＋	Receipt signal input

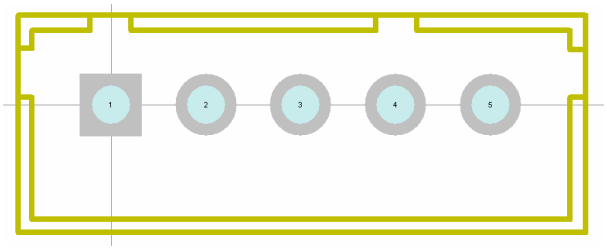
6	GND	Ground

3.3.2.7 P200-ECG Signal Input Port



Pin	Name	Definition
1	SHIEID	Shield pin
2	RL	RL electrode
3	VX	VX electrode
4	LL	LL electrode
5	RA	RA electrode
6	LA	LA electrode

3.3.2.8 P252-T1，T2 Signals Input Port

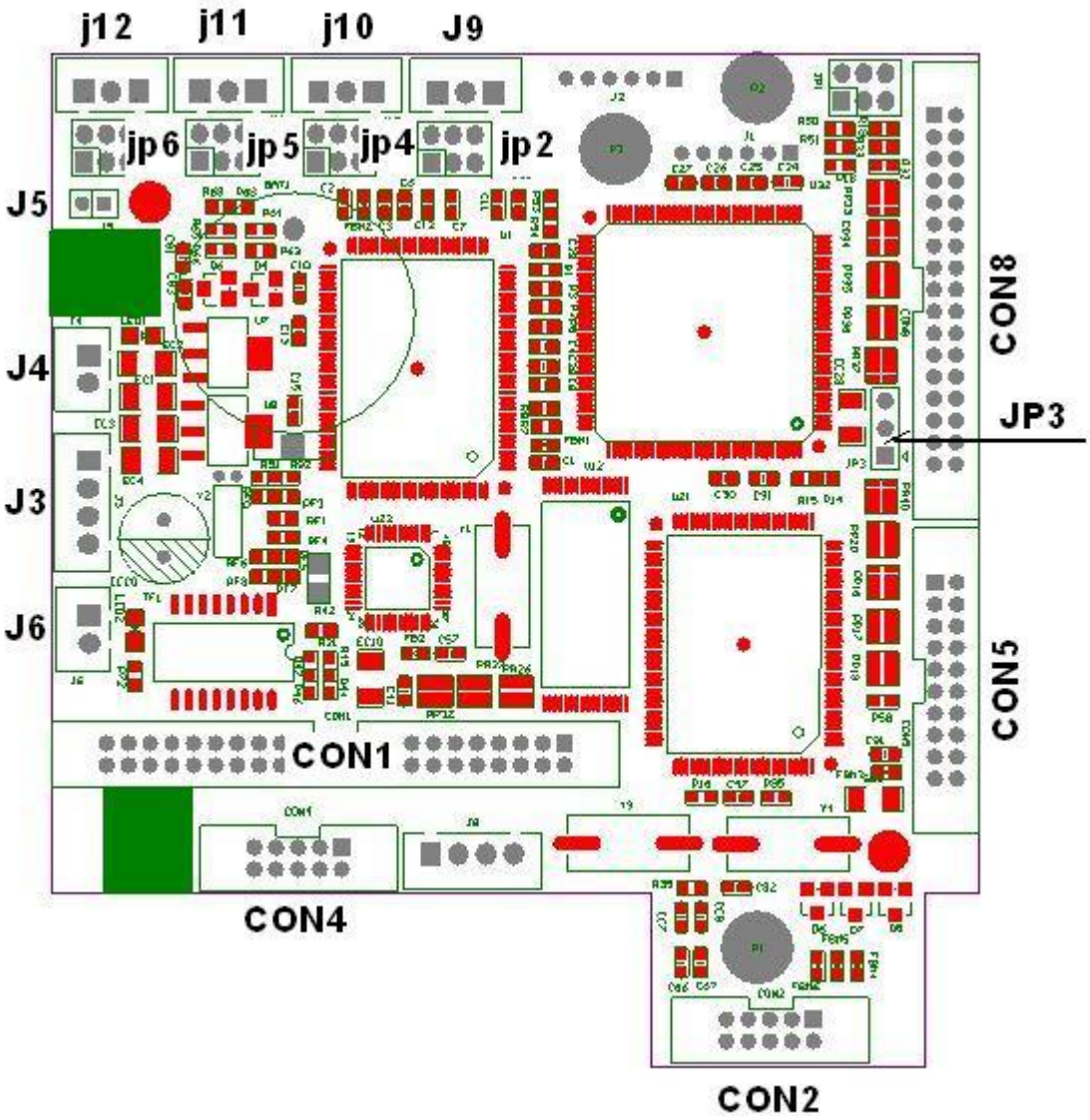


Pin	Name	Definition
1	GND	Ground
2	VIN－1	AD conversion in reverse input
3	VIN＋1	AD conversion in-phrase input
4	VIN－2	AD conversion in reverse input
5	VIN＋2	AD conversion in-phrase input

3.4 Connection Drawing of CSN718 Mainbord

3.4.1 Iintrduction

CSN718 is the special mainboard for 6000DP-M3. The PCB of CSN718 board is as follows:



3.4.2 Port of system

The plug on the board is set for customers to select application functions. These plugs are connected respectively to external connecting equipments, such as: the hardware, serial port and so on.

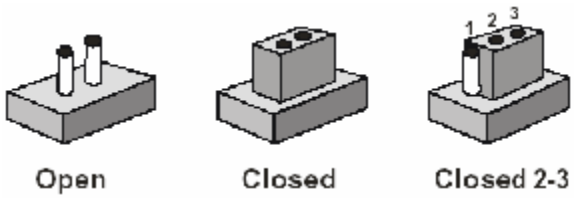
The following table describes the plugs function respectively:

PIN	Function
CON1	IDE /DOM port
CON2	VGA port
CON4	Network port
CON5	Parallel port

CON8	TFT displaying port
J3	Power port
J4	External Power port of RTC real –time clock
J5	External reset port
J6	Speaker port
J8	USB port
J9	COM1 port
J10	COM2 port
J11	COM3 port
J12	COM4 port

3.4.2.1 Jumper setting

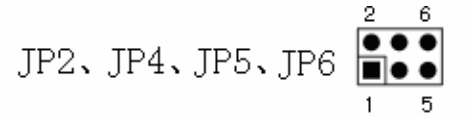
Jumper as a simple electronic switch contains two metal pin and a small sheet metal which in a plastic cover. It realizes the switch function by short circuit the two metal pin through the sheet metal.



3.4.2.2 JP1-Selection jumper of Dummy display, the EMS memory mode, electronic disk write-protect.

Status	JP1	Function
Closed * default status *	1-2	A disk startup
Open	1-2	C disk startup
Closed * default status *	3-4	Allowing dummy display
Open	3-4	Forbidding dummy display
Closed * default status *	5-6	1.44M electronic disk write-protect (System disk symbol is A:)
Open	5-6	A disk is readable and writable

3.4.2.3 COM1\COM2\COM3\COM4 Port (jumper port of TTL and 232)

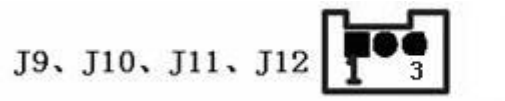


Status		Function
2pin-4pin	Closed*	232 LEV level output
3pin-5pin	Closed*	
1pin-3pin	Closed**	TTL LEV level output
4pin-6pin	Closed*	

3.4.2.4 TFT LCD Port，JP3 -selection jumper of power voltage 5V/3.3V

Status	Function
1-2 Closed *	Default status * LCD power supply is 3.3V
2-3 Closed	LCD power supply is 5V

3.4.2.5 COM1\COM2\COM3\COM4 port (TTL &232 port)

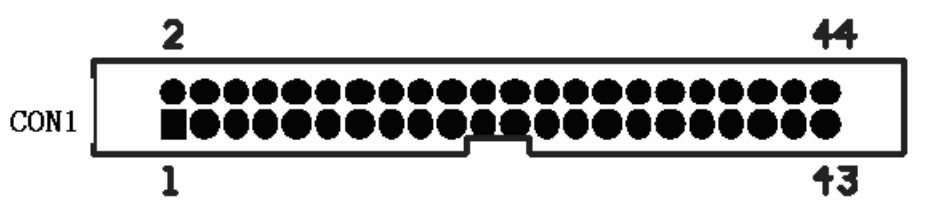


Pin	1	2	3
Definition	GND	TX	RX

3.4.2.6 USB port （U flash disk port）J8

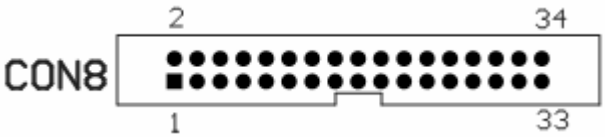
Pin	1	2	3	4
Definition	+5V	DP-	DP+	GND

3.4.2.7 IDE port ,DOM port CON1



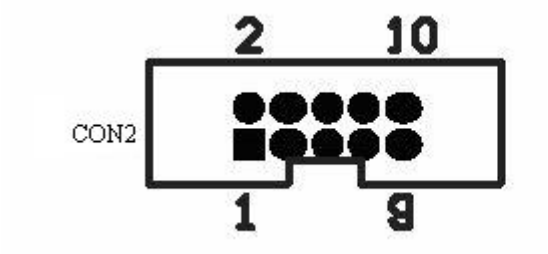
Pin	Name	Dir	Description	Pin	Name	Dir	Description
1	/RESET	→	Reset	23	/DIOW	→	Write Strobe
2	GND	—	Ground	24	GND	—	Ground
3	DD7	↔	Data 7	25	/DIOR	→	Read Strobe
4	DD8	↔	Data 8	26	GND	—	Ground
5	DD6	↔	Data 6	27	NC		
6	DD9	↔	Data 9	28	SPSYNC:CSEL		Spindle Sync or Cable Select
7	DD5	↔	Data 5	29	NC		DMA Acknowledge
8	DD10	↔	Data 10	30	GND	—	Ground
9	DD4	↔	Data 4	31	NC	←	Interrupt Request
10	DD11	↔	Data 11	32	NC		
11	DD3	↔	Data 3	33	DA1	→	Address 1
12	DD12	↔	Data 12	34	NC		Passed Diagnostics
13	DD2	↔	Data 2	35	DA0	→	Address 0
14	DD13	↔	Data 13	36	DA2	→	Address 2
15	DD1	↔	Data 1	37	/IDE_CS0	→	
16	DD14	↔	Data 14	38	/IDE_CS1	→	
17	DD0	↔	Data 0	39	/ACTIVE	→	Led driver
18	DD15	↔	Data 15	40	GND	—	Ground
19	GND	—	Ground	41	+5V	—	VCC
20	NC			42	+5V	—	VCC
21	NC			43	GND	—	Ground
22	GND	—	Ground	44	GND	—	Ground

3.4.2.8 Port of TFT CON8



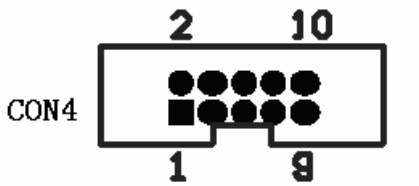
Pin	Definition	Pin	Definition
1	TFT_Vsync (Field synchronization)	2	TFT_CLK(Clock)
3	TFT_Hsync(Line synchronization)	4	TFT_MODE/ENAB(Data enabled signal)
5	TFT_R0(Red Data signal, the lowest bit	6	TFT_R1(Red Data signal)
7	TFT_R2(Red Data signal)	8	TFT_R3(Red Data signal)
9	TFT_R4(Red Data signal)	10	TFT_R5(Red Data signal, the highest bit)
11	GNDTFT_G0(Green Data signal, the lowest bit)	12	TFT_G1(Green Data signal)
13	TFT_G2(Green Data signal)	14	TFT_G3(Green Data signal)
15	TFT_G4(Green Data signal)	16	TFT_G5(Green Data signal, the highest bit)
17	TFT_B0(Blue Data signal the lowest bit)	18	TFT_B1(Blue Data signal)
19	TFT_B2(Blue Data signal)	20	TFT/_B3(Blue Data signal)
21	TFT_B4(Blue Data signal)	22	TFT_B5(Blue Data signal, the highest bit)
23	LCD_POWER(5V/3.3V power is optional)	24	GND
25	LCD_POWER(5V/3.3V power is optional)	26	GND
27	LCD_POWER(5V/3.3V power is optional)	28	GND
29	GND	30	GND
31	GND	32	GND
33	GND	34	GND

3.4.2.9 Port of VGA CON2



Pin	Name	Definition
1	VGA_R	Red
2	GND	Ground
3	VGA_G	Green
4	GND	Ground
5	VGA_B	Blue
6	NC	Open
7	GND	Ground
8	LCD_H	Line synchronization signal
9	GND	Ground
10	LCD_V	Field synchronization signal

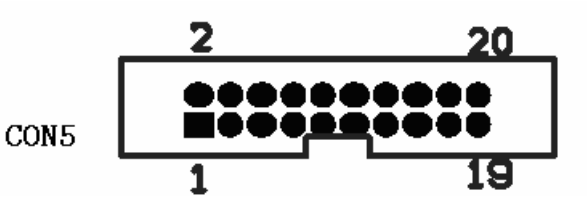
3.4.2.10 Port of network card CON4



Pin	Name	Definition
1	LINK LED	LED1-
2	LINK LED	LED1+
3	100M ACT LED	LED2+
4	100M ACT LED	LED2-
5	RX+	Receive Data+
6	RX-	Receive Data-
7	TX+	Transmit Data+
8	TX-	Transmit Data-

9	AGND
10	AGND

3.4.2.11 Parallel Port CON5



PIN	NAME	DEFINITION
1	STROBE	Strobe
2	D0	Data Bit 0
3	D1	Data Bit 1
4	D2	Data Bit 2
5	D3	Data Bit 3
6	D4	Data Bit 4
7	D5	Data Bit 5
8	D6	Data Bit 6
9	D7	Data Bit 7
10	/ACK	Acknowledge
11	BUSY	Busy
12	PE	Paper End
13	SEL	Select
14	/AUTOFD	Auto-feed
15	/ERROR	Error
16	/INIT	Initialize
17	/SELIN	Select In
18	GND	Signal Ground
19	GND	Signal Ground
20	GND	Signal Ground

3.4.2.12 External power port of RTC real-time clock J4

Pin	1	2
Definition	+3V (connect to external battery anode)	GND (connect to external battery cathode)

3.4.2.13 Port of external RESET J5

Once the pin RESET and pin GND are short circuit, the RESET will be finished.

PIN	1	2
Definition	RESET	GND

3.4.2. 14 Port of speaker J6

Pin	Name	Definition
1	MIC＋	Positive of speaker
2	MIC－	Negative of speaker

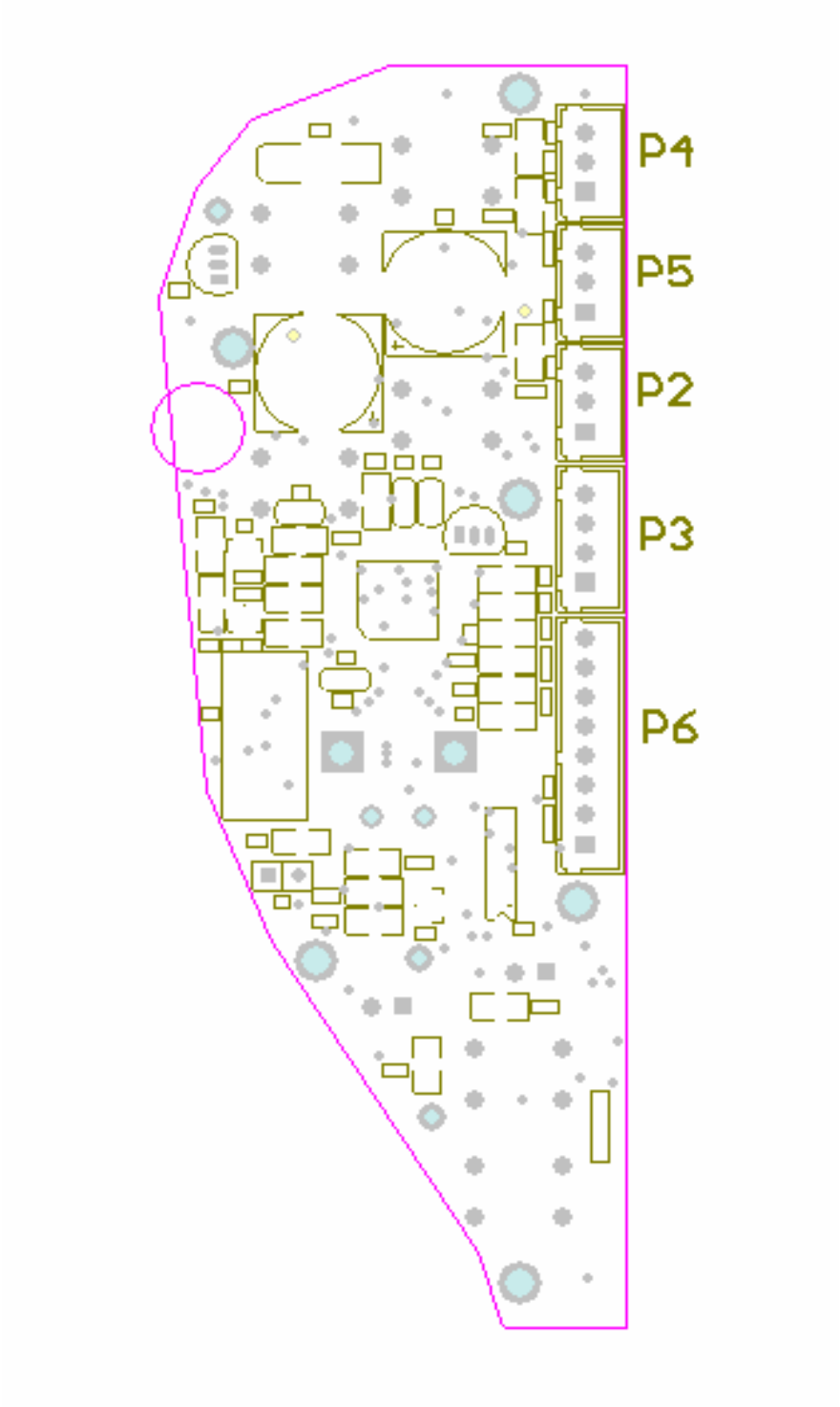
3.4.2.15 Power portJ3

Pin	Name	Definition
1	GND	Power ground input
2	GND	Power ground input
3	＋5V	Power 5V input
4	＋5V	Power 5V input

3.5 Keyboard CSN717 Connection drawing

3.5.1 General Description

CSN717 is special keyboard for 6000DP-M3. The CSN717 PCB is shown as follows：

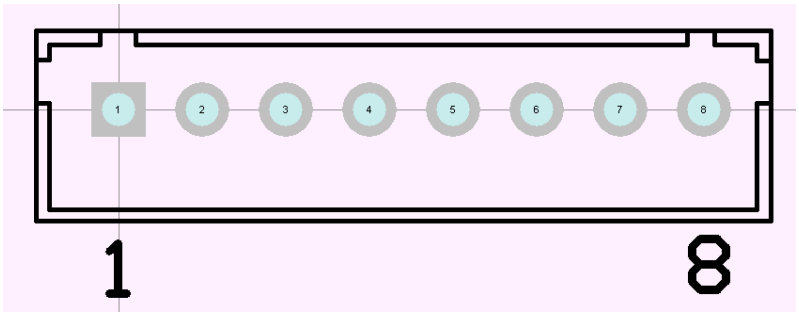


3.5.2 Keyboard ports

CSN717 ports functions are described as follows:

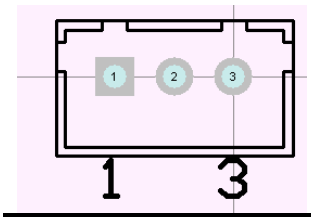
Designator	Function
P2	Panel indicating light
P3	Fan and speaker control port(connect to power board)
P4	Serial port connecting to SN718
P5	Temperature sensor
P6	Port of power board CSN510

3.5.2.1 P6- Power Board CSN510 Port



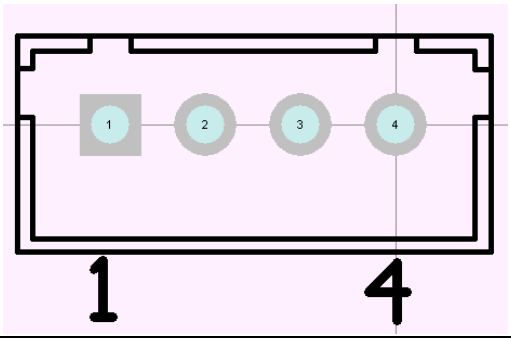
Pin	Name	Definition
1	V-15V	Power output of charge indication light
2	VBatt	Battery power examination output
3	GND	Ground
4	Bett-ST	Control of charge indication light
5	Open/Close	Power switch input
6	Vout-5V	5V output
7	VIS-5V	5V input
8	Vin	15V DC power input

3.5.2.2 P2-Port of Panel Indication Light



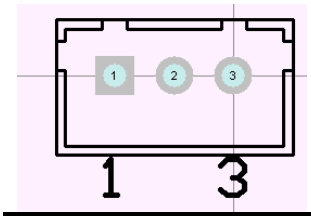
Pin	Name	Definition
1	Signal	signal output of indication light
2	Signal	signal output of indication light
3	GND	Ground

3.5.2.3 P3- Fan and speaker control Port



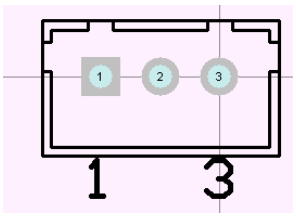
Pin	Name	Definition
1	SPK-CTLA	Speaker volume control output
2	SPK-CTLB	Speaker volume control output
3	SPK-CTLC	Speaker volume control output
4	FAN-CTL	Fan control output

3.5.2.4 P4-Serial port of CSN718 Board



Pin	Name	Definition
1	GND	Ground
2	TXD	Serial input
3	RXD	Serial input

3.5.2.5 P5-Temperature Sensor



Pin	Name	Definition
1	GND	Ground
2	D－TEST	signal output of temperature examination
3	VIS－5V	Power input

CHAPTER 4 COMPONENT and STRUCTURE

4.1 Component

4.1.1 Main components of monitor

(1) Standard:

No.	Production Description	Standard Quantity
1	Main board CSN718	1 piece
2	Cable of LCD	1 piece
3	CSN801 board	1 piece
4	Power board CSN510	1 piece
5	Power inverter	1 piece
6	Build-in power adapter	1 piece
7	Build-in battery	1 piece
8	LCD screen	1 piece
9	Deflation valve	2 piece
10	Inflation pump	1 piece
11	Keyboard CSN717	1 piece
12	Speaker	1 piece
13	Fan	1 piece

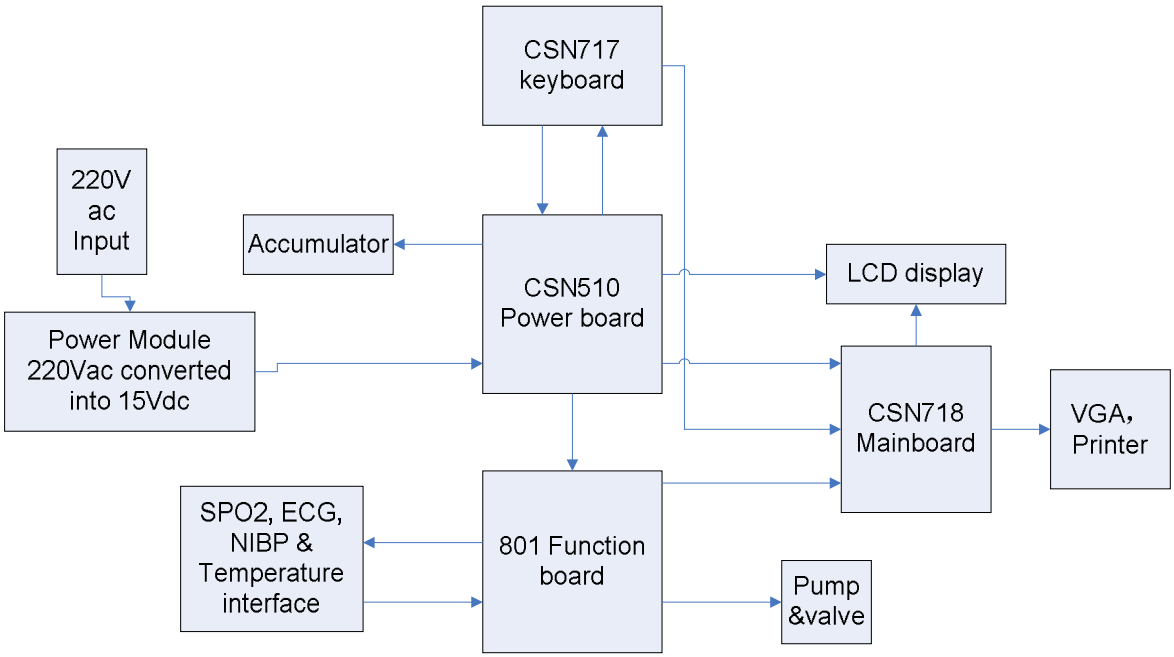
(2) Option:

No.	Production Description	Standard Quantity
1	IBP module	1 piece
2	Et-CO2 module (side-stream)	1 piece
3	Thermal array recorder	1 piece

4.1.2 Standard accessories

No.	Production Description	Standard Quantity
1	MMED6000DP(M3) Portable patient monitor	1 set
2	Choice reusable adult SpO2 sensor with extension cable	1 piece
3	Choice adult NIBP cuff with connector(25~35cm)	1 piece
4	Choice NIBP extension hose with connector (1.5m)	1 piece
5	Choice ECG cable with 5 lead wire and 6PIN connector(AHA)	1 piece
6	Choice TEMP skin probe	1 piece
7	Choice ECG electrodes (10 pieces/ pack)	1 pack
8	Triphase power wire	1 piece
9	Ground wire	1 piece
10	Build-in battery	1 piece
11	Operation manual	1 piece

4.2 General Block Diagram



4.3 Installation

4.3.1 Front Panel Installation

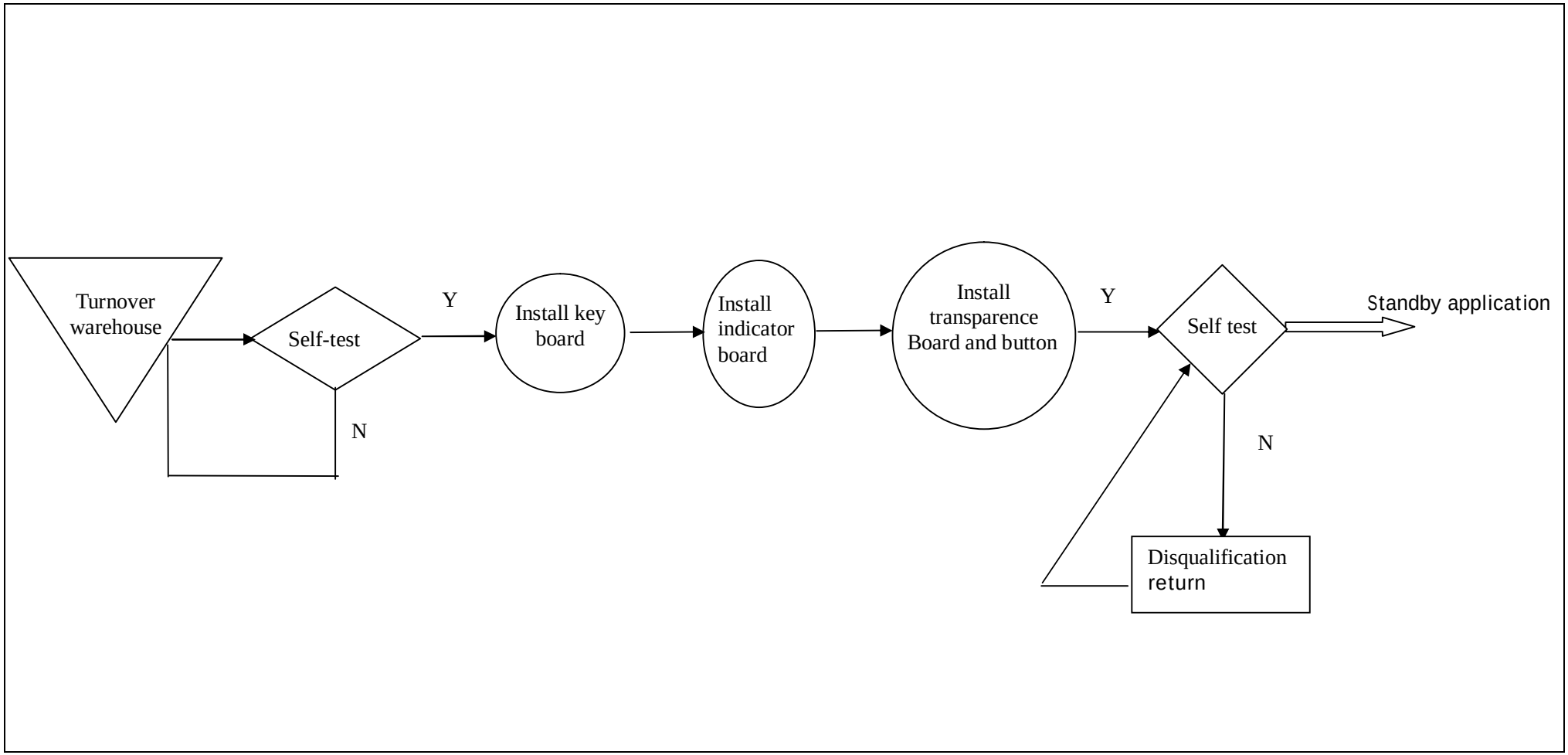
4.3.1.1Catalogue of task instruction

Product Name：**Multi-parameter monitor**

Product Model：**MMED6000DP－M3**

Working procedure	Operation name **(**panel installation**)**	Version	Changing contents
1	Install key boards	A01	
2	Install alarm light board	A01	
3	Install transparence board and button	A01	
4	Self test	A01	

Work Procedure Flow Chart of Front Panel Installation



MMED6000DP — M3 Operation instruction of front panel installation

Operation step：

(1) Install key board： 1.put the panel on the desk，install the rubber key in the position where it should be，then put the key press-board on the rubber key,, tighten it with PA1.7×6 plug screws of self-threading.
(as picture 1)

Rubber key's Installation position

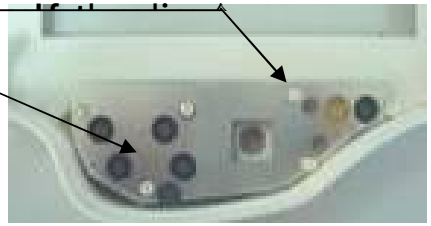
a. part panel sketch map

Put rubber key away

b. sketch map of rubber key's installation position

Four PA1.7×6 **plug screws of self-threading**

Key press-board



Picture 1 sketch map of rubber key complete assemblely

bills of raw and processed material

SN	Material code	Name	description	quantity
1	131548337002A	M3 front rind		1
2	131548337002A	M3 rubber key		5
3	131510811010A	M3 key press-board		1
4	122360PA2305A	plug screws of self-threading	PA1.7×6	4

Bills of use tool

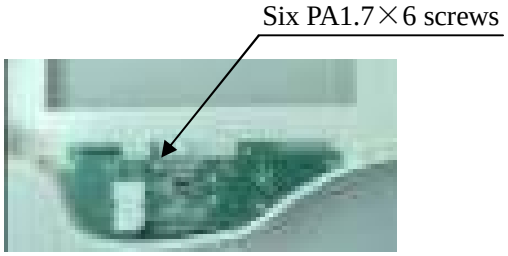
SN	name	Specification type	parameter	quantity
1	Small cross-screwdriver			1
2	protective gloves			

MMED6000DP－M3 Operation instruction of front panel installation

Operation step：

(1) Install key board：2.put key board on the key press-board, after aiming at the fix hole, tighten it with PA1.7×6 plug screws of self-threading, and then tighten the photoelectricity coder with nut on the front panel.

(picture2)



Picture 2 sketch map of key board 's installation

bills of raw and processed material

SN	Material code	Name	description	quantity
1	260022320130B	Key board		1
2	122360PA2306A	plug screw	PA1.7×6	6
3				
4				
5				

bills of use tool

SN	Name	Specification type	parameter	quantity
1	Cross-screwdriver			1
2	protective gloves			

MMED6000DP－M3 Operation instruction of front panel installation

Operation step：

(1) Install alarm indicator board：

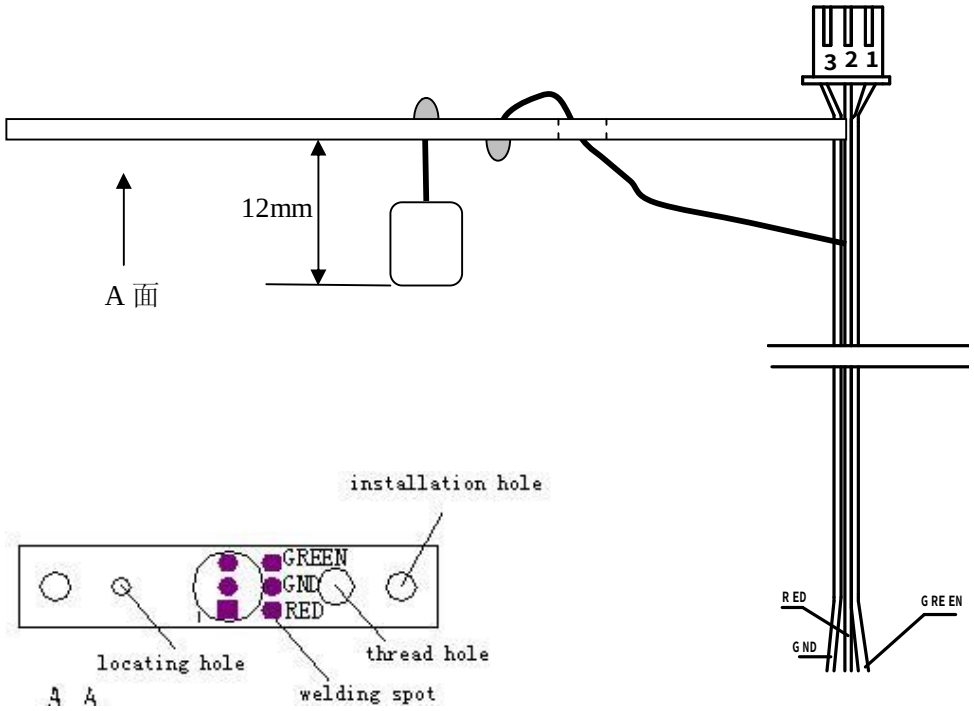
1. pull the alarm indicator cable on the via of the board，weld the lead on the jointing position. As picture , welding pin1 to the GREEN bonding pad ， pin 2 to the RED bonding pad.， pin 3 to the GND bonding pad. After welding, put little hot melt adhesive on the indicator welding spot.

bills of raw and processed material

SN	Material code	Name	description	quantity
1	60002901013A	Alarm indicator board		1
2	3100066441115A	Alarm indicator cable		1
3		soldering tin		
4		hot melt adhesive		

bills of use tool

SN	Name	Specification type	parameter	quantity
1	electric iron	220V-25~30W		1
2				
3				
4				



Picture 3 Definition picture of alarm indicator cable welding pin

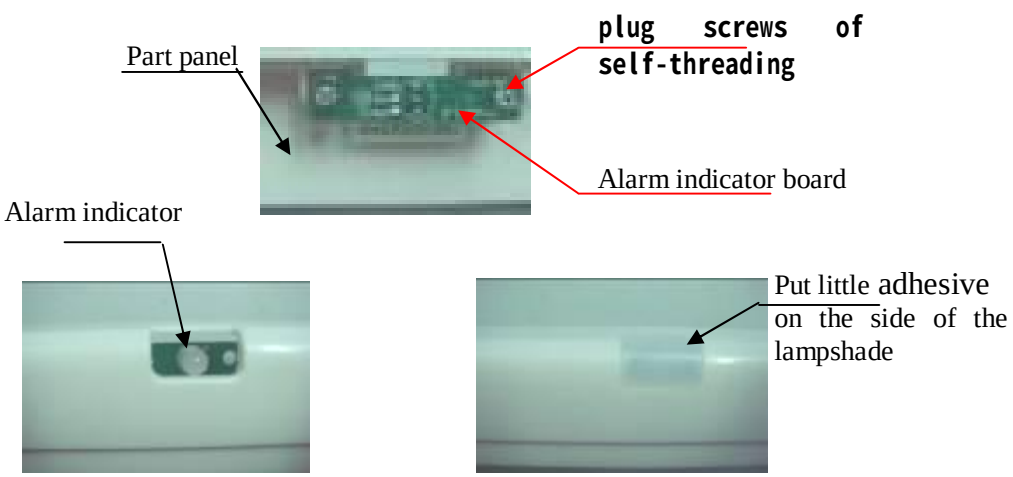
MMED6000DP－M3 Operation instruction of panel installation

Operation step：

(2) Install alarm indicator board：

2.put the alarm indicator on the fix position，tighten it with PA1.7×6 plug screws of self-threading. (as picture 3)

3. install the rotate knob 、top light's lampshade and transparent board，put little hot melt adhesive on the left and right of top light's lampshade，complete the installation of the panel.



Picture 4 sketch map of alarm indicator board 's installation completion

bills of raw and processed material

SN	Material code	Name	description	quantity
1	131536341001A	M3 top light's lampshade		1
2	122360PA2306A	Plug screws of self-threading	PA1.7×6	2
3		hot melt adhesive		

bills of use tool

SN	Name	Specification type	parameter	quantity
1	Cross-screwdriver			1
2	protective gloves			1
3	hot melt gun			1

MED6000DP－M3 Operation instruction of panel installation

)peration step：

(3) install transparent board and rotate knob：

.take off the protective film which is on the transparent board, take off ıe self-adhesive paper around the board，stick it to the board .

. Install the rotate knob to the screw rod of the coder, then circumgyrate it several times, feel smooth is better.

. Stick the panel label to the last cell groove of the panel.

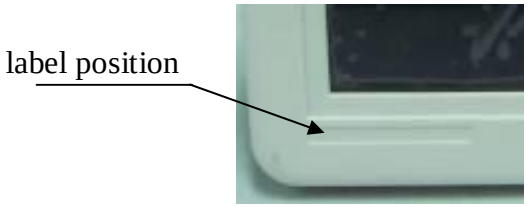


图 5　label position

4)Self-test

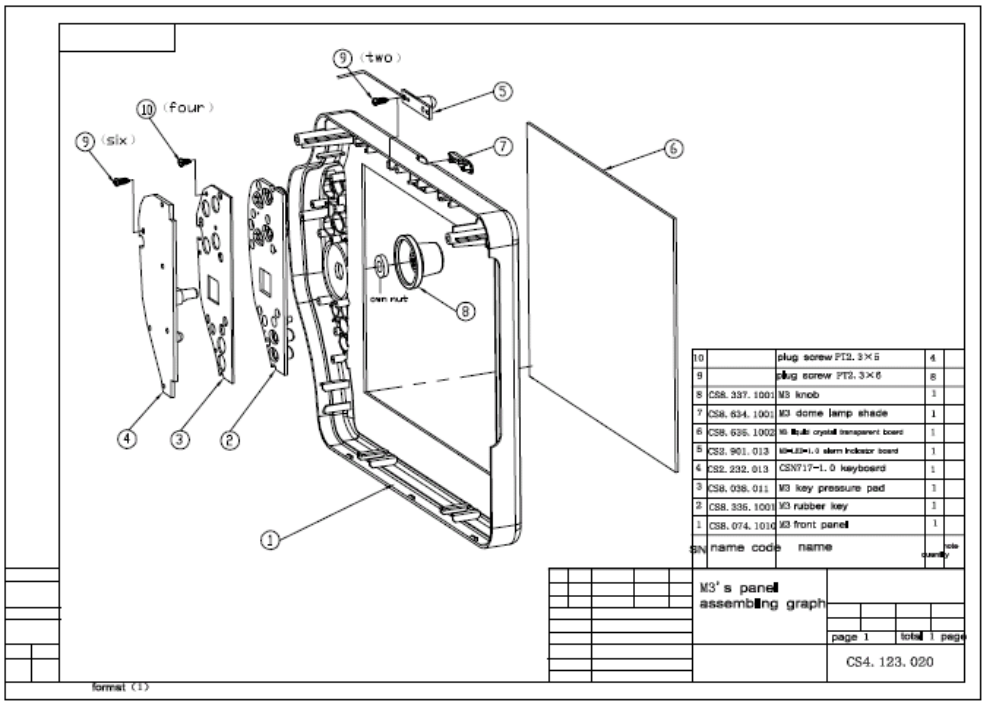
bills of raw and processed material

SN	Material code	Name	description	quantity
1	131536351002A	M3 TFT transparent board		1
2	131543371001A	M3 rotate knob		1
3	330088171029A	M3 panel label		1

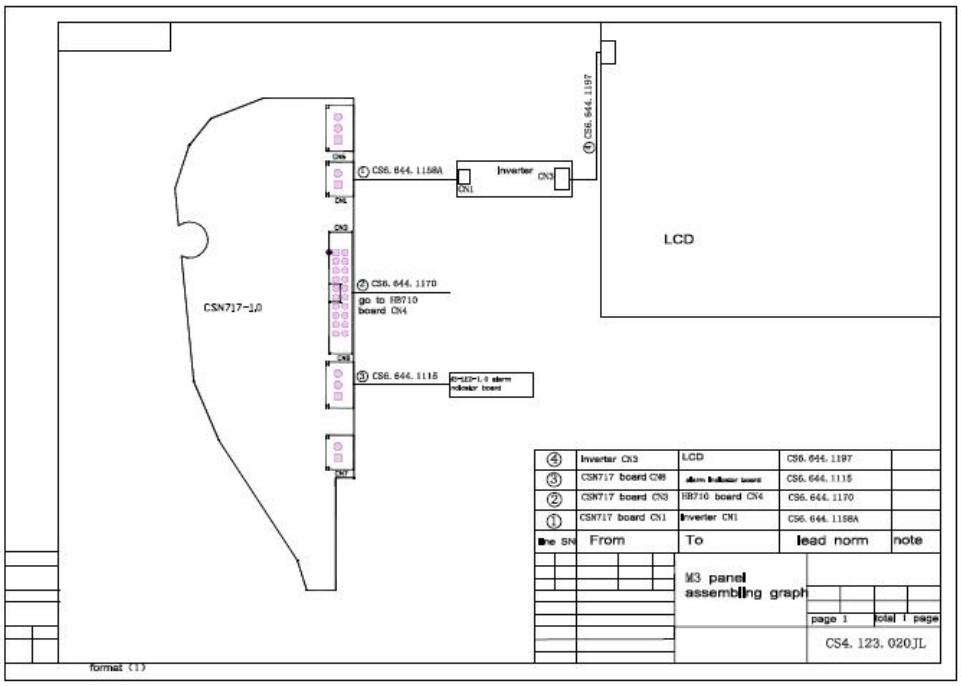
bills of use tool

SN	Name	Specification type	parameter	quantity
1	protective gloves			1
2	test records			
3	technics file			

4.3.1.2 Assemble Drawings of Front Panel



Picture 1



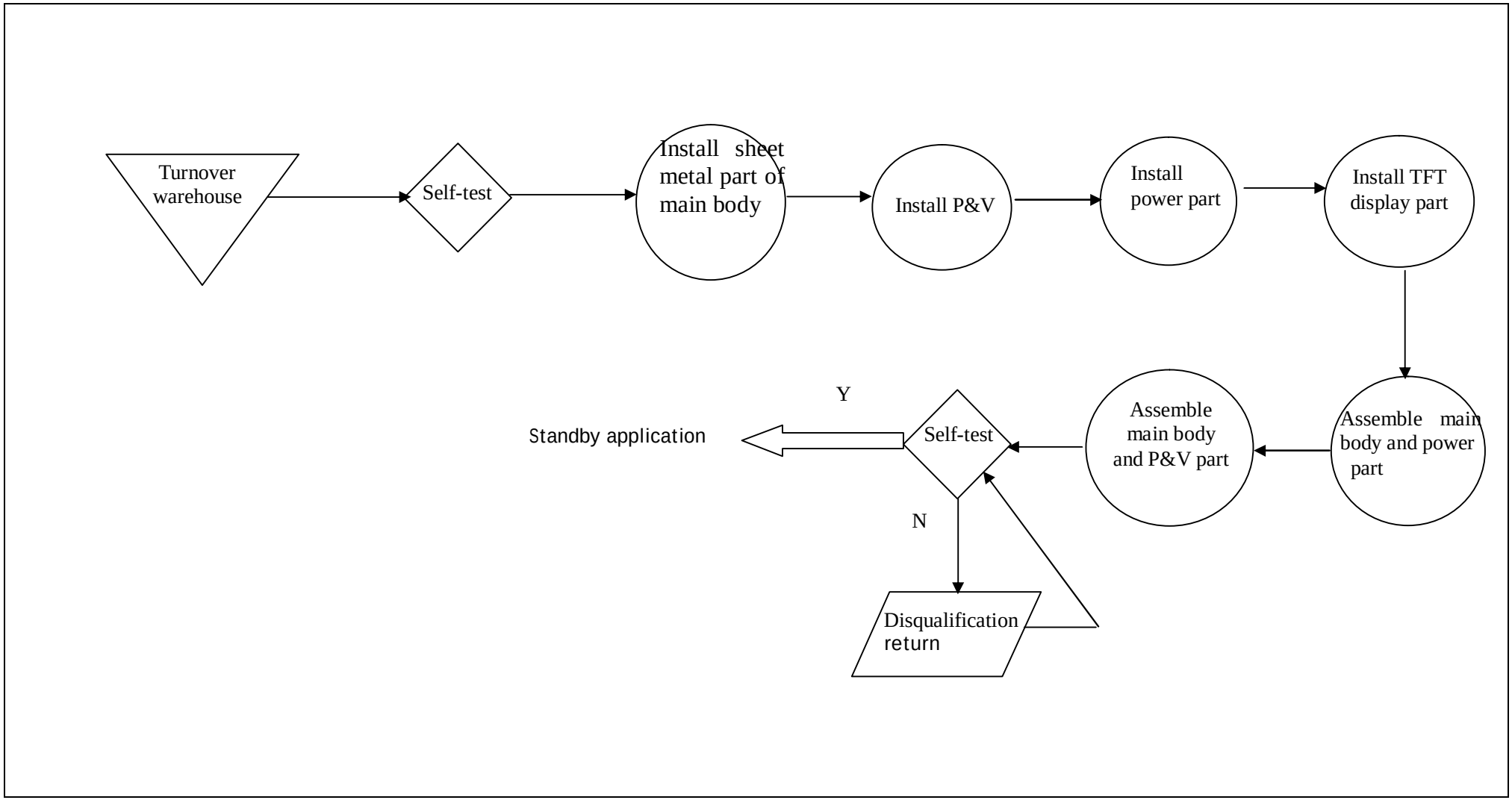
Picture 2

4.3.2 Machine Core Installation

4.3.2.1 Catalogue of task instruction

Product Name：Multi-parameter monitor　Product Model：**MMED6000DP－M3**

Working procedure	Operation name (installation of back cover)	version	Changing contents
1	install sheet metal part of main body	A01	
2	install pump and valve part (P&V)	A01	
3	install power supple part	A01	
4	install TFT display part	A01	
5	Assemble main body and power part	A01	
6	Assemble main body and P&V part	A01	
7	self-test	A01	


Turnover warehouse
Self-test
Install sheet metal part of main body
Install P&V
Install power part
Install TFT display part
Assemble main body and power part
Assemble main body and P&V part
Self-test
Y
Standby application
N
Disqualification return

MMED6000DP－M3 Operation instruction of core

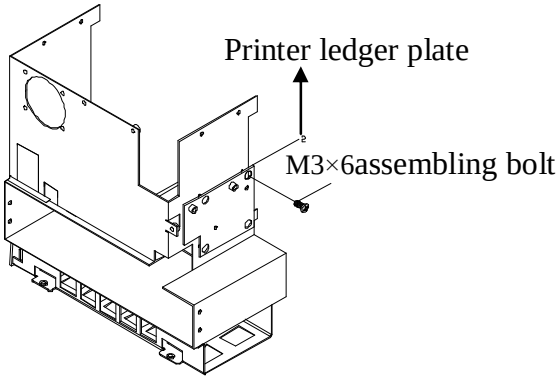
Operation step：

(1). Install sheet metal part of main body：

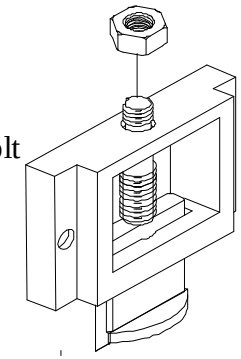
1.install printer ledger plate to the main body sheet metal, tighten it with M3×6 assembling bolt. As picture 1.

2. put in the battery stick harness from square edged orifice of lock tube, pull on spring to the lock pillar though the round orifice of top lock tube, tightening it with M3 nut，dot little fluid sealant in it. As picture 2.

3.install the battery lock tube which is assembled nicely to the main body, tightening it with M3×6 assembling bolt. As picture 3.



picture1 ledger plate and stick harness assemble drawing



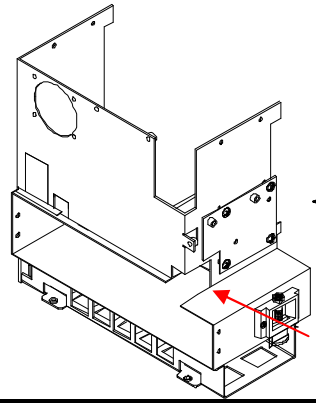
picture2 stick harness module assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	320080370101A	Main body sheet-metal		1
2	122730481012A	Printer ledger plate		1
3	320008008001A	Battery lock tube		1
4	320008009001A	Battery stick harness		1
5	322768382004A	Battery lock spring		1
	1223100M3060A	assembling bolt M3×6		4
	1222200M3000A	Nut M3		1
		gas thread fluid sealant		

Bills of use tool

SN	name	Specification type	parameter	quantity
1	Sleeve screwdriver			1
2	cross-screwdriver			1



Picture 3 ledger plate and stick harness assemble show

dot l fluid sealant

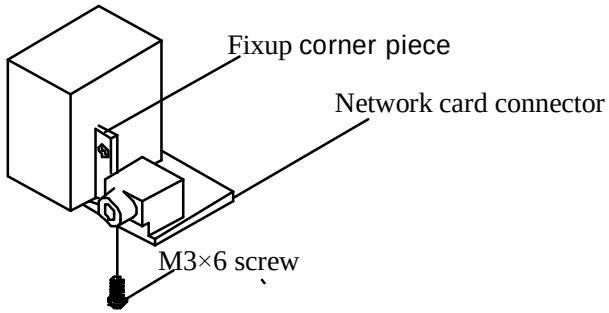
MMED6000DP－M3 Operation instruction of core

Operation step：

(1) Install the sheet metal part of main body：

4.install the Fixup corner piece of network card connector to the network card connector with M3×6 plug screw. (as picture 4)

5.install the network card board to the main body, tightening it with M3×6 plug screw.



Picture 4 network card connector assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	260028980200B	Network card connector	1	1
2	322918044002A	Fixup corner piece		1
3	1223600M3050A	plug screw	M3×6	4

bills of use tool

SN	name	Specification type	parameter	quantity
1	Sleeve and screwdriver			1
2	cross-screwdriver			

MMED6000DP－M3 Operation instruction of core

Operation step：

(1). Install sheet metal part of main body：

6.remove the nut、plain cushion and soldering terminal which are belong to BNC terminal, take terminal nob through the main body where is the position to be installed. Then pull on the plain cushion and soldering terminal to the Terminals. Tightening it with own nut, dot little gas thread fluid sealant to nut.(as picture 5)

7.install DB1 to the main body the same as the sixth step.(as picture 5)

8.install DC fan to the main body, tightening it with M3×25 sunk screw.(as picture 5)

9.check(self-test) if every fix module is assembled in place, screw and accessory are leak or not，take the quality products to the turnover warehouse.

bills of raw and processed material

SN	Material code	Name	description	quantity
1	11X93CQ950J5A	BNC terminal socket		1
2	11B31KD1204PA	DC fan	40×40×20	1
3	11W3600DB150A	DB15 socket	Match Imperia nut	1
4	1223400M3250A	sunk screw	M3×25	4
5	1222200M3000A	nut	M3	4
6		plain cushion	Φ3	

bills of use tool

SN	name	Specification type	parameter	quantity
1	Sleeve and screwdriver			1
2				

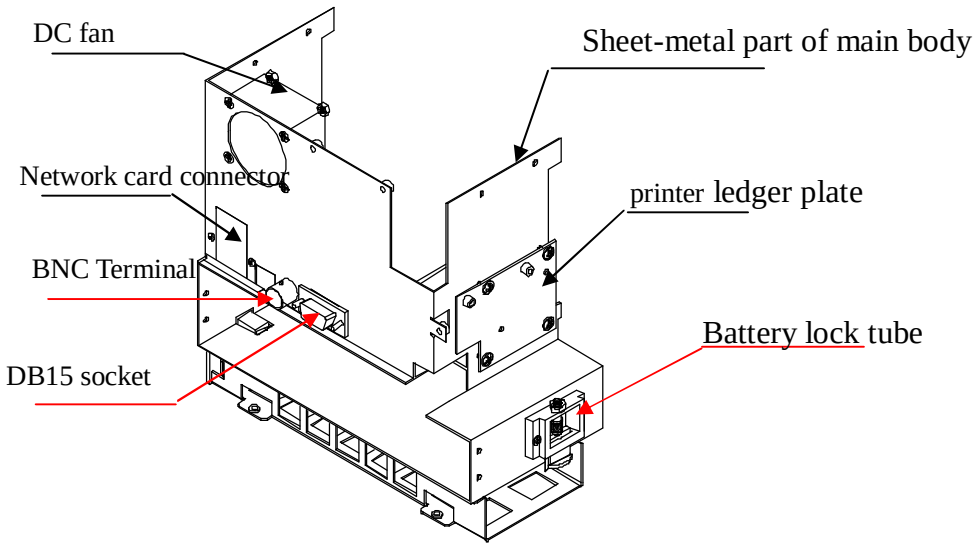


图 5　main body assemble drawing

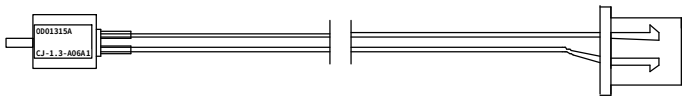
MMED6000DP－M3 Operation instruction of core

Operation step：

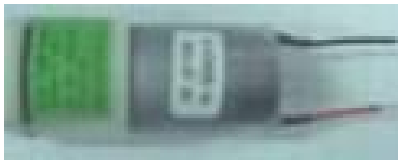
(1). Install pump and valve part：

1.weld the pump valve cable which has plug to the pin of the pump through the heat-shrink tube, then push the heat-shrink tube to the root of the pin and heat it with calorifier，synchronously dot little hot melt adhesive at the root of the pin. (as picture 6 and 7)

2.after setting aside 120mm of valve's own down-lead, shuck off 3~5mm line leather，press terminal ，plug PTK plug，pin up with hot melt adhesive.



picture6 CJ-1.3-A06A1 finishing valve cable drawing



picture 7 valve cable finish welding drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1		Pump cable		3
2	182A1KPM27C6A	Charge valve DC-6V		1
3	182A113A03A1A	Electromagnetic valve(own line)	CJ-1.3-A06A1	2
4	11X1102542P0A	PTK plug-2.54-2P(XH)		2
5		Φ2 heat-shrink tube		
6		hot melt adhesive		

bills of use tool

SN	name	Specification type	parameter	quantity
1	electric iron			1
2	calorifier			1

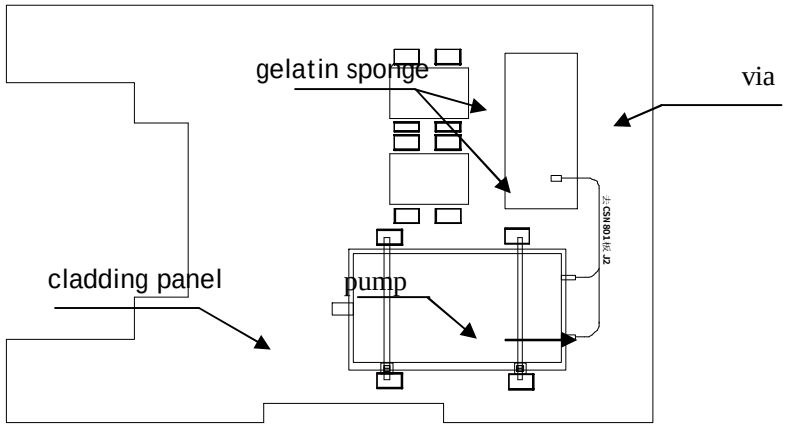
MMED6000DP－M3 Operation instruction of core

Operation step：

(2). Install pump and valve part ：

2. Put the pin of valve that is face to the rectangle via of cladding panel to the right position. Pack it with 4×150 nylon strapping tape.

3. stick it at the installation position with gelatin sponge. (as picture 8)



Picture 8 pump assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1		pump and valve which are weld cable	module	
2	13211CV15036A	nylon strapping tape	4×150	2
3	13211CV10025A	nylon strapping tape	2×100	4
4	133330L20HMJA	gelatin sponge	(wide 20mm)	
5	322918038013A	cladding panel	s	1

bills of use tool

SN	name	Specification type	parameter	quantity
1	long flat nose pliers			1
2	diagonal cutting nippers			1
3	scissors			1

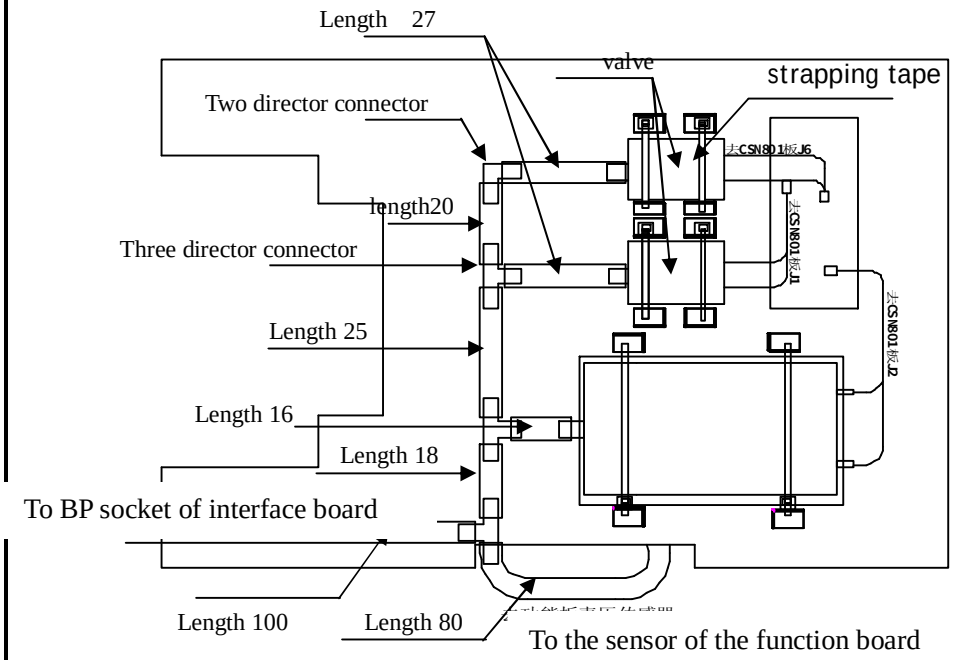
MMED6000DP－M3 Operation instruction of core

Operation step：

(1)Install pump and valve part ：

3. Uncover the protection sheet of the upper layer of the gelatin sponge, paste the valve, pack it with 2×100 nylon strapping tape.

4. according to the left diagram , cut the silicone tube .Plug them as the following position. (as picture 9)



Picture 9 pump and valve part assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	13121000D255A	silicone tube	Φ2.5×5×100	1
2		silicone tube	Φ2.5×5×16	1
3		silicone tube	Φ2.5×5×27	2
4		silicone tube	Φ2.5×5×25	1
5		silicone tube	Φ2.5×5×20	1
6		silicone tube	Φ2.5×5×18	1
7		silicone tube	Φ2.5×5×80	1

bills of use tool

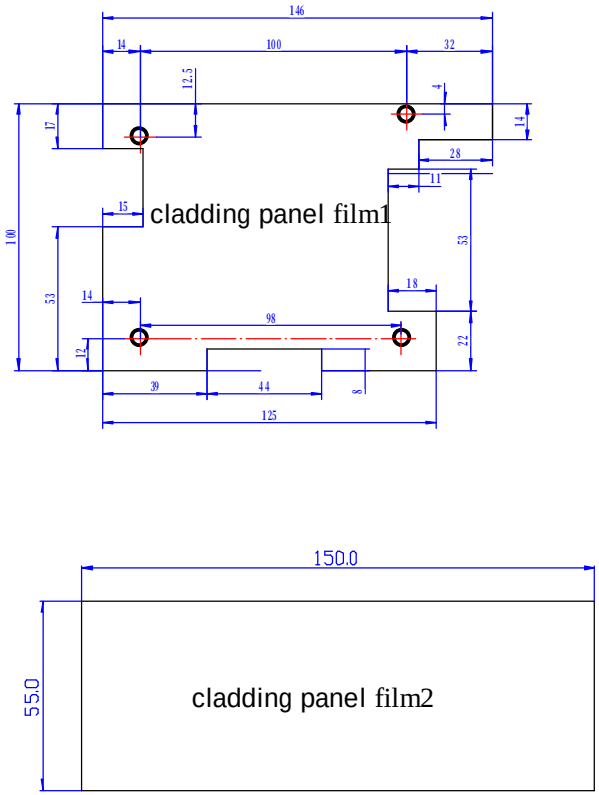
SN	name	Specification type	parameter	quantity
1	stainless steel ruler	150mm		1
2	scissors			1

MMED6000DP－M3 Operation instruction of core

Operation step：

(2) Install pump and valve part：

5. Cut the film to the following figure according to the cladding panel figure.



Picture 10 cladding panel film drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	320008610001A	cladding panel film1		1
2	320008610002A	cladding panel film2		1
3				
4				
5				

bills of use tool

SN	name	Specification type	parameter	quantity
1	stainless steel ruler	150mm		1
2	scissor			1
3				

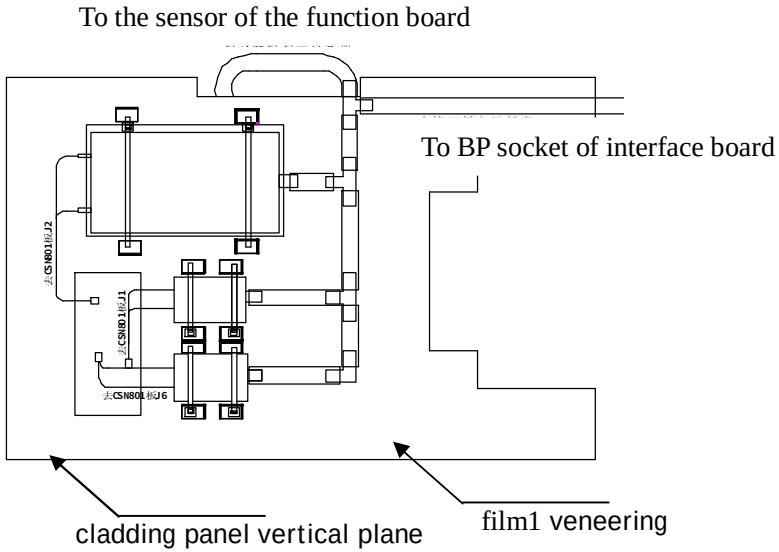
MMED6000DP－M3 Operation instruction of core

Operation step：

(3) Install pump and valve part：

6. Stick the film 1 to the flat roof of the cladding panel(no pump and valve side), stick film 2 to the cladding panel vertical plane.

.



Picture 11 film stickup position drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	320008610001A	cladding panel film1		1
2	320008610002A	cladding panel film2		1
3	1316100W10MMA	double-face tape		

bills of use tool

SN	name	Specification type	parameter	quantity
1	scissor			1
2				
3				

MMED6000DP－M3 Operation instruction of core

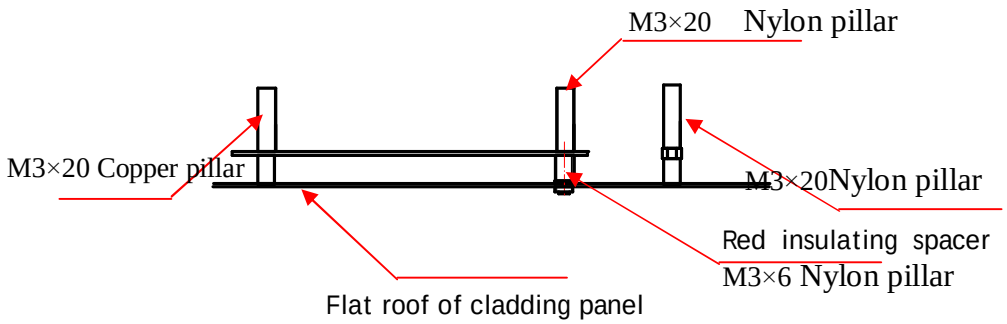
Operation step：

(1) Install pump and valve part：

7.put red insulating spacer in the hole site of embedded pillar, screw M3×6 nylon pillar， then put CSN801 board to the embedded double-screw bolt, tightening it with M3×20 nylon pillar to the installation hole site of CSN801board. Synchronously install the M3×20 copper pillar which has nut to the installation hole site where the right side of the cladding panel is.

8. plug the pump and valve cable to the relevant plug according to the hookup, plug 4P power cable to P11 item of CSN801 board, plug 3Psignal cable to P10 item of CSN801 board.

9.check (self-test)



Picture 12 CSN801board assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	260020831012A	CSN801 board		1
2		Power cable，signal cable	4P，3P	each 1
3	1221200M3200A	Copper pillar	M3×20	4
4	1221200M3201A	Nylon pillar	M3×20	2
5	1221200M3061A	Nylon pillar	M3×6	2
6	1222200M3000A	M3 nut		1
7	1322100000D3A	Red insulating spacer	Φ3	2

bills of use tool

SN	name	Specification type	parameter	quant y
1	static-free wrists trap			1
2	Sleeve and spanner			1

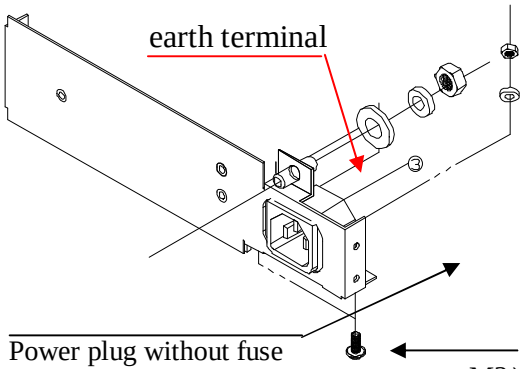
MMED6000DP－M3 Operation instruction of core

Operation step：

(1) Power part：

1.install the power plug with cable to the squareness portiforium of the port sheet-metal, tighten it with M3×8 assembling bolt.

2.install the earth terminal to the right position ,then tighten it withΦ6 spring shim、plain cushion and M6 nut.



picture13 power plug and earth terminal assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	322918038015A	220Vport sheet-metal		1
2	260066441167A	AC power cable	(match FA91-345)	1
	260066441253A	M3 use:AC power cable	(matchFA53D)	1
3	11X710D06000A	earth terminal	Φ6	1
4	1223700M3080A	assembling bolt	M3×10	4
5		nut， plain cushion， spring shim	M3，Φ3	each 2

bills of use tool

SN	name	Specification type	parameter	quantity
1	Sleeve screwdriver			1
2	cross-screwdriver			1

MMED6000DP－M3 Operation instruction of core

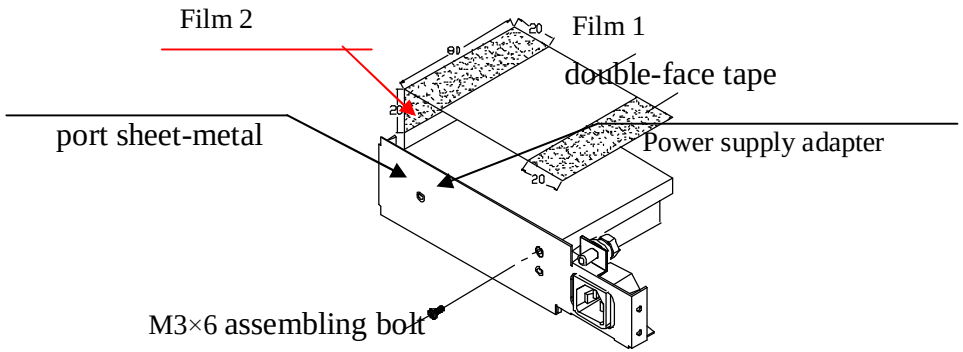
Operation step：

(3) Power part：

3.cut double-face tape to 80mm，uncover one side protection sheet to stick it to the bottom and back part of the adapter(as picture 9)，then uncover the top protection sheet of the double-face tape ,stick the film to the adhesive tape.

4.close the side of the adapter to the port sheet-metal, adjust the hole sit, tighten it with M3×6 assembling bolt (as picture 9)

5. check.(self-test).



Picture 14　power part assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	11A51FA53D00A	Power supply adapter	FA53D	1
2	1316100W10MMA	double-face tape		
3	320008610003A	Adapter film 1		1
4	320008610004A	Adapterfilm 2		1
5	1223100M3050A	assembling bolt	M3×6	3

bills of use tool

SN	name	Specification type	parameter	quantity
1	cross-screwdriver			1
				1

MMED6000DP－M3 Operation instruction of core

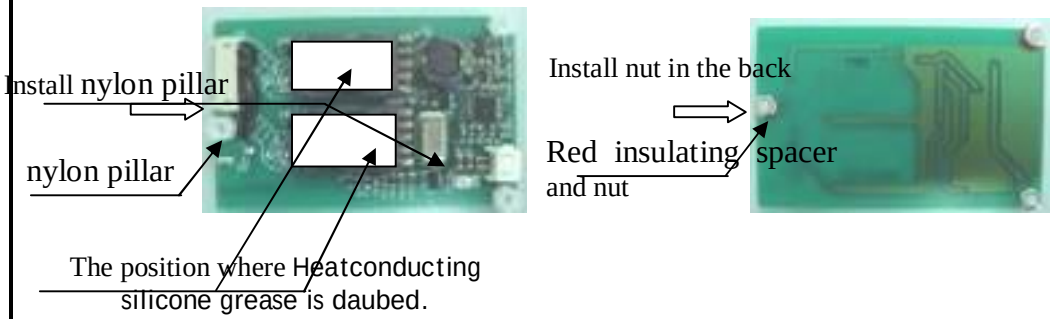
Operation step：

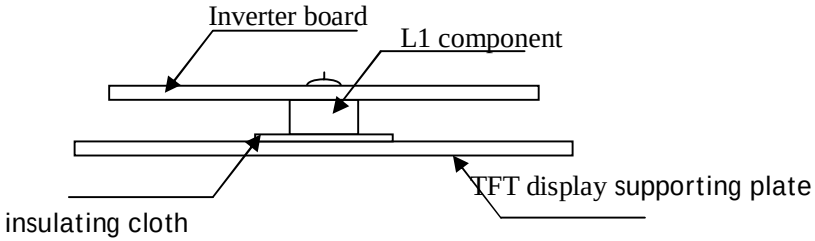
(4) TFT display part：

1.put M3×6 nylon pillar in the installation hole through the component of the inverter, tighten it M3 nut with red insulating space.

2.daub the heatconducting silicone grease to the component of T1、T2 which is in the inverter**(mark with 689D435 writing in the surface) .**

3.put the inverter to the supporting plate's installation position, separate L1 (the component which is marked 101 writing in the surface)from supporting plate with insulating cloth , then tighten it with M3×6 assembling bolt.





Picture 15 inverter assemble process drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	322918038012A	TFT display supporting plate	1	1
2	11U22KQ012A1A	double lighting tube inverter	1	1
3	1221200M3061A	nylon pillar	M3×6	3
4	1222200M3000A	nut	M3	3
5	122510HGZD30A	Red insulating spacer	Φ3	3
6		Heatconducting silicone grease		

bills of use tool

SN	name	Specification type	parameter	quantity
1	cross-screwdriver			1
2			M3×6	1

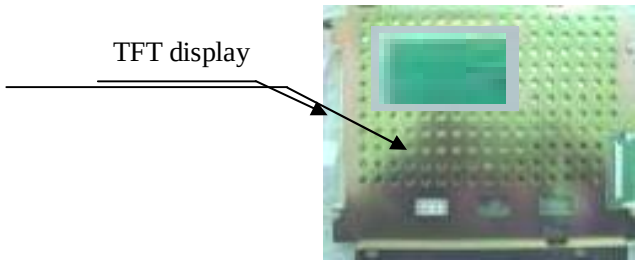
MMED6000DP－M3 Operation instruction of core

Operation step：

(4) TFT display part：

4.after assembling, install four M3×6 two direction copper pillars outside of the supporting plate(no inverter side), tighten it with M3×14 assembling bolt, then, put TFT display in the supporting plate，make M3×14 assembling bolt through the hole site of the screen, tighten it with plain cushion、spring shim and M3 nut.

5. check (self-test)



picture16　TFT display assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	11E3DLT84363A	Toshiba 8.4”TFT display		
2	1223100M3050A	assembling bolt	M3×6	3
3	1223100M3140A	plug screw	M3×14	4
4	1221200M3060A	Two direction	M3×6	4
5		nut、plain cushion，spring shim	M3、Φ3、	each 4

bills of use tool

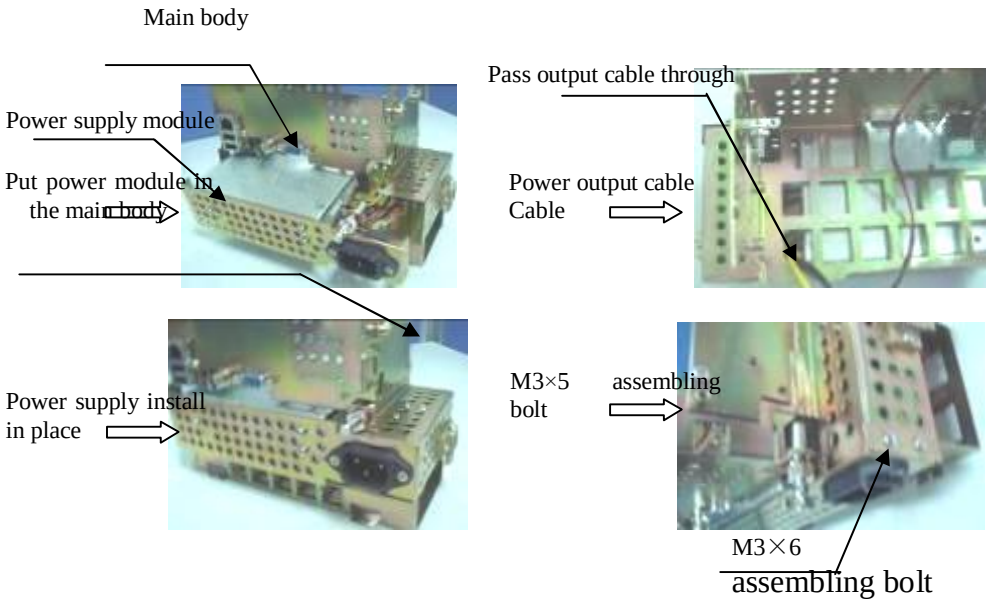
SN	name	Specification type	parameter	quantity
1	cross-screwdriver			1
2				1

MMED6000DP－M3 Operation instruction of core

Operation step：

(5) main body sheet-metal and power supply part assemble：

1.put power supply module to the installation position through main body sheet-metal, pass power supply output cable through the front hole of the main body, tighten it with M3×6 assembling bolt (as picture 17)



Picture 17 main body and power supply assemble process drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1		Main body module		
2		Power supply part module		
3	1223100M3050A	assembling bolt	M3×6	4

bills of use tool

SN	name	Specification type	parameter	quanti
1	cross-screwdriver			1
				1
				1

MMED6000DP－M3 Operation instruction of core

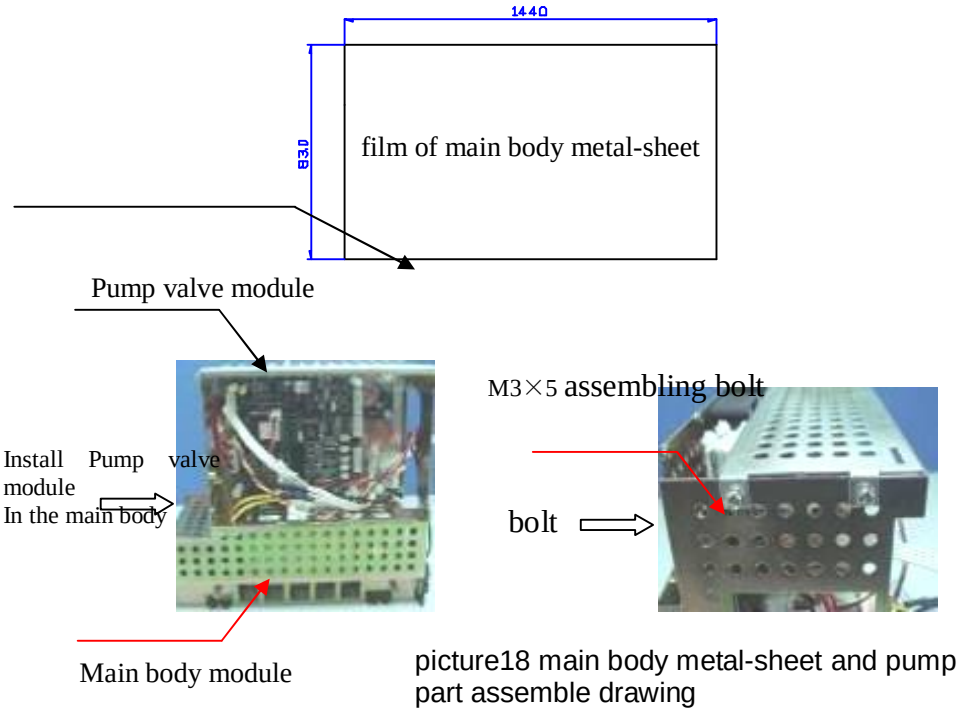
Operation step：

(6) Assemble main body and pump valve part：

1. Cut the film according to the main body figure, then stick it to the flat roof of the metal-sheet.

2. Put pump valve part module in the installation poison where the top main body metal-sheet is, put the lead in the frame of the main body, tighten it with assembling bolt.

(as picture 18)



picture18 main body metal-sheet and pump valve part assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	320008610005A	film of main body metal-sheet		1
2	1223100M3050A	assembling bolt	M3×6	4

bills of use tool

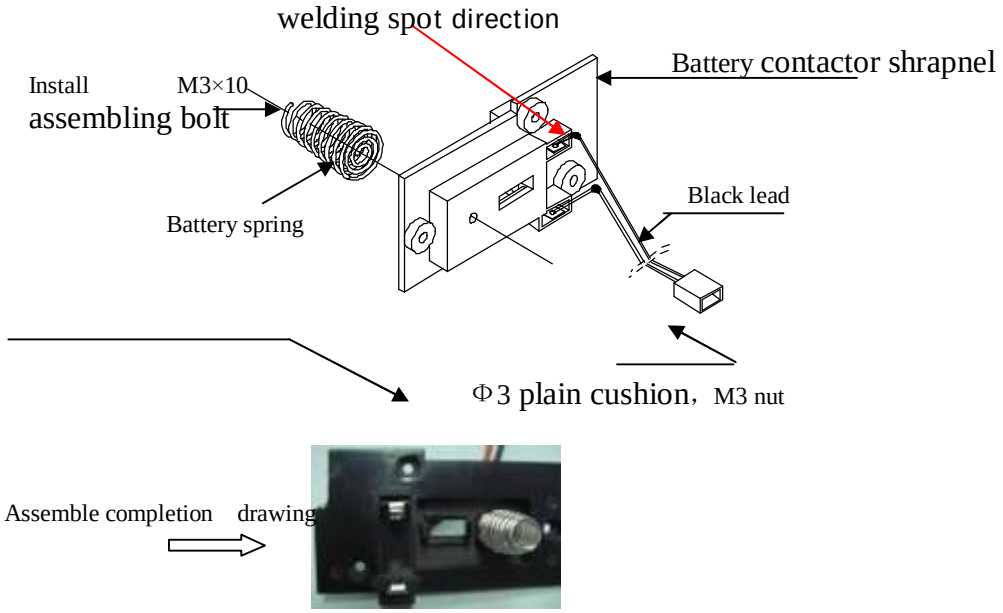
SN	name	Specification type	parameter	quantity
1	cross-screwdriver			1
2	scissor			1
3	stainless steel ruler			1

MMED6000DP－M3 Operation instruction of core

Operation step：

(6) Assemble main body and pump valve part：

3. complete assembling the battery contactor panel, weld the polarity pinout (as picture 19)，then, install the module to the main body.



Picture 19 battery contactor panel assemble drawing

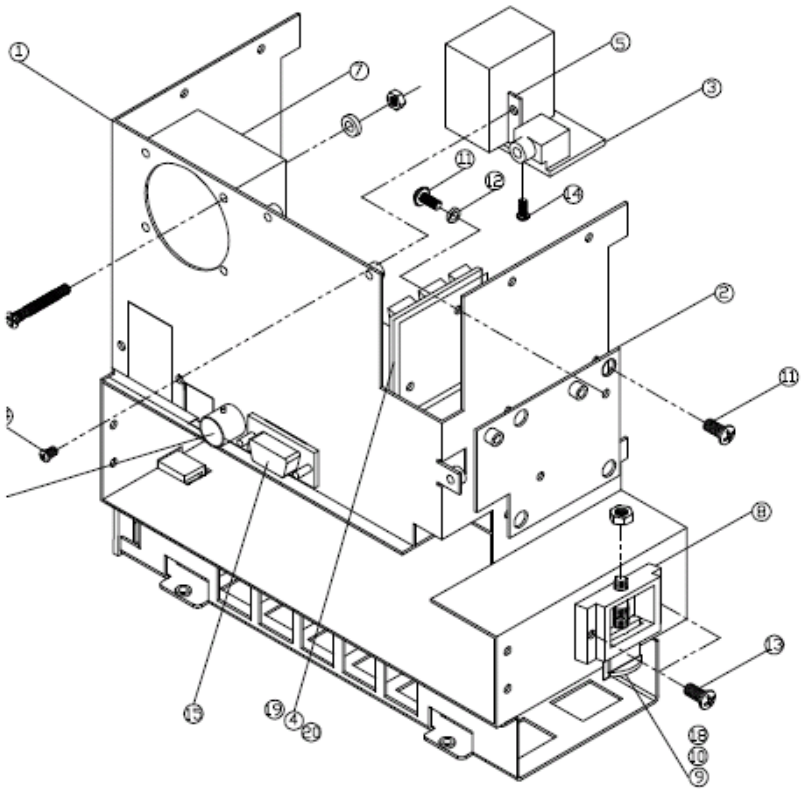
bills of raw and processed material

SN	Material code	Name	description	quantity
1	131530781002A	battery contactor panel		1
2	322768382005A	battery contactor panel		1
3	122730481010A	battery contactor shrapnel		2
4	1223100M3080A	assembling bolt	M3×10	1
5	1223100M3050A	assembling bolt	M3×6	3

bills of use tool

SN	name	Specification type	parameter	quantity
1	cross-screwdriver			1
2	electric iron			1
3	scissor			1

4.3.2.2 Assemble Drawings of core



serial number	code name	name	qua
23			
22			
21	CS8.610.001	main body sheet-metal film	1
20		Insulating tape (40mmx45mm)	1
19	ZEN-100T	serial-port switch network module	1
18		M3 nut	5
17		spring shim Φ3	4
16		sunk screw M3X25	4
15		DB15 pedestal	1
14		cruciform slot screw M2.5×5	4
13		cruciform slot screw M3×5	2
12		Insulating tape Φ3	2
11		assembling screw 3×5	4
10	CS8.382.004	battery lock spring	1
9	CS8.009.001	battery lock stopper	1
8	CS8.008.001	battery lock tube	1
7	KD1204PKB1	DC fan (40X40X20)	1
6	BNCQ9-50-J5	BNC terminal pedestal	1
5	CS8.044.002	corner piece fix CSN907board	2
4	CS3.543.001	CSN909 scaleboard used for serial port to network port	1
3	CS2.898.020	CSN907-L Opatchboard for network port	1
2	CS8.048.1012	ledger plate for printer	1
1	CS8.037.101	main body sheet-metal	1

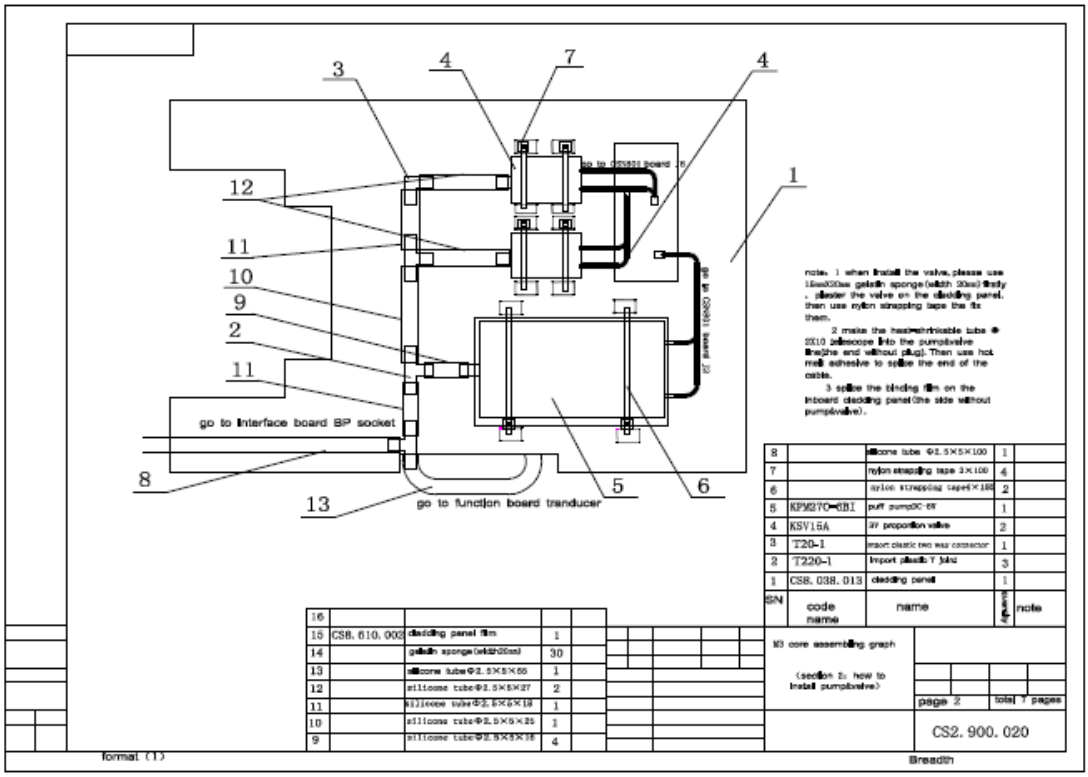
e: Please make the mark forth when install the fan, the offtrack ould be shortest place to the pump.
ase note the direction when install the module which is for switch al port to network port.
e the double face tape to make the binding film on the surface of battery compartment.

M3 core assembling graph (section 1: main body sheet-metal part install sketch map)

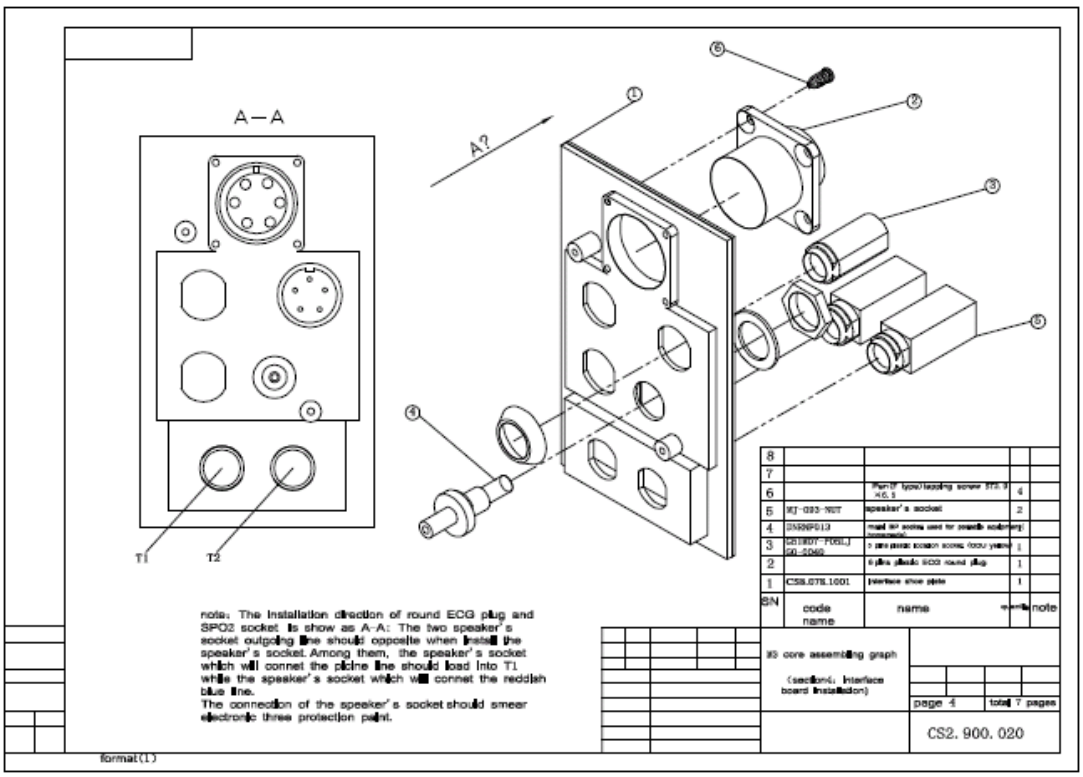
grade	mark	quality

page 1 total 7 1

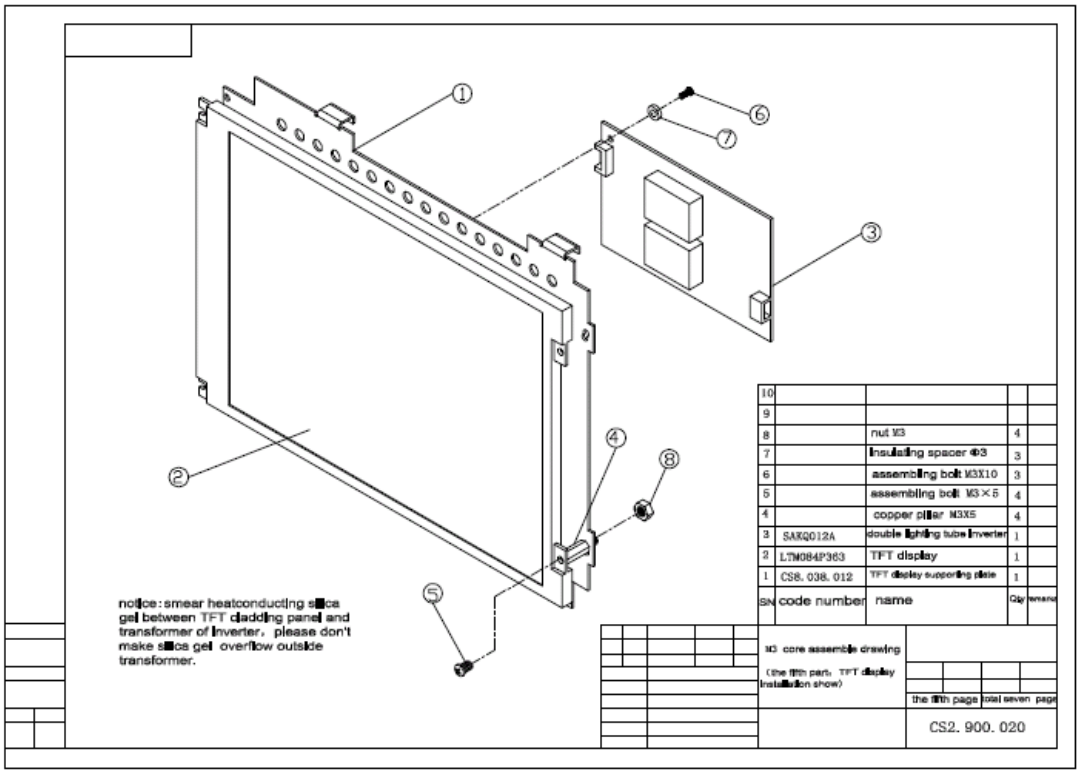
Picture 3



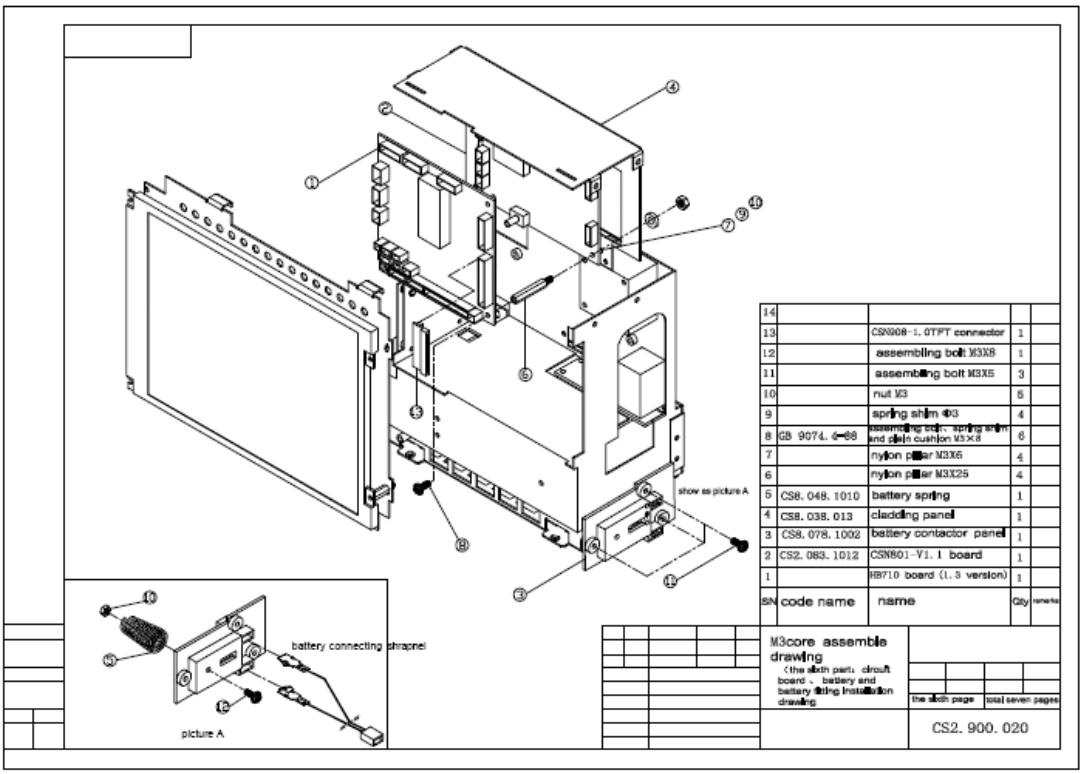
Picture 4



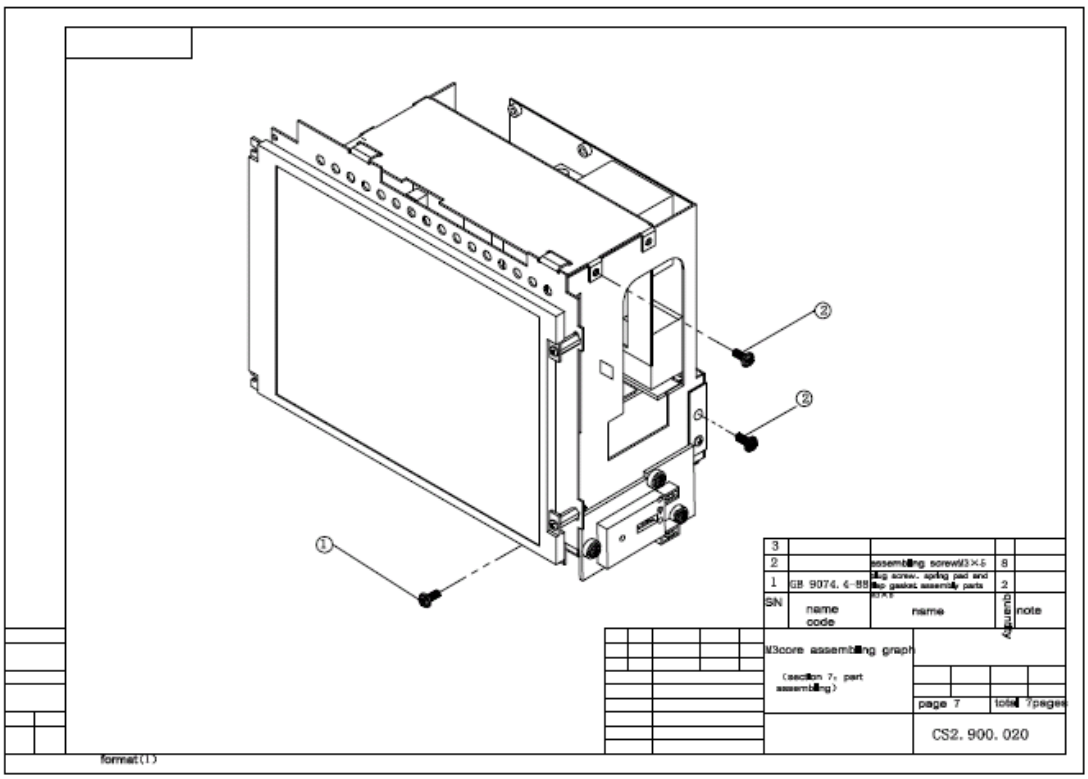
Picture 5



Picture 6



Picture 7



Picture 8

4.3.3 Back Panel Installation

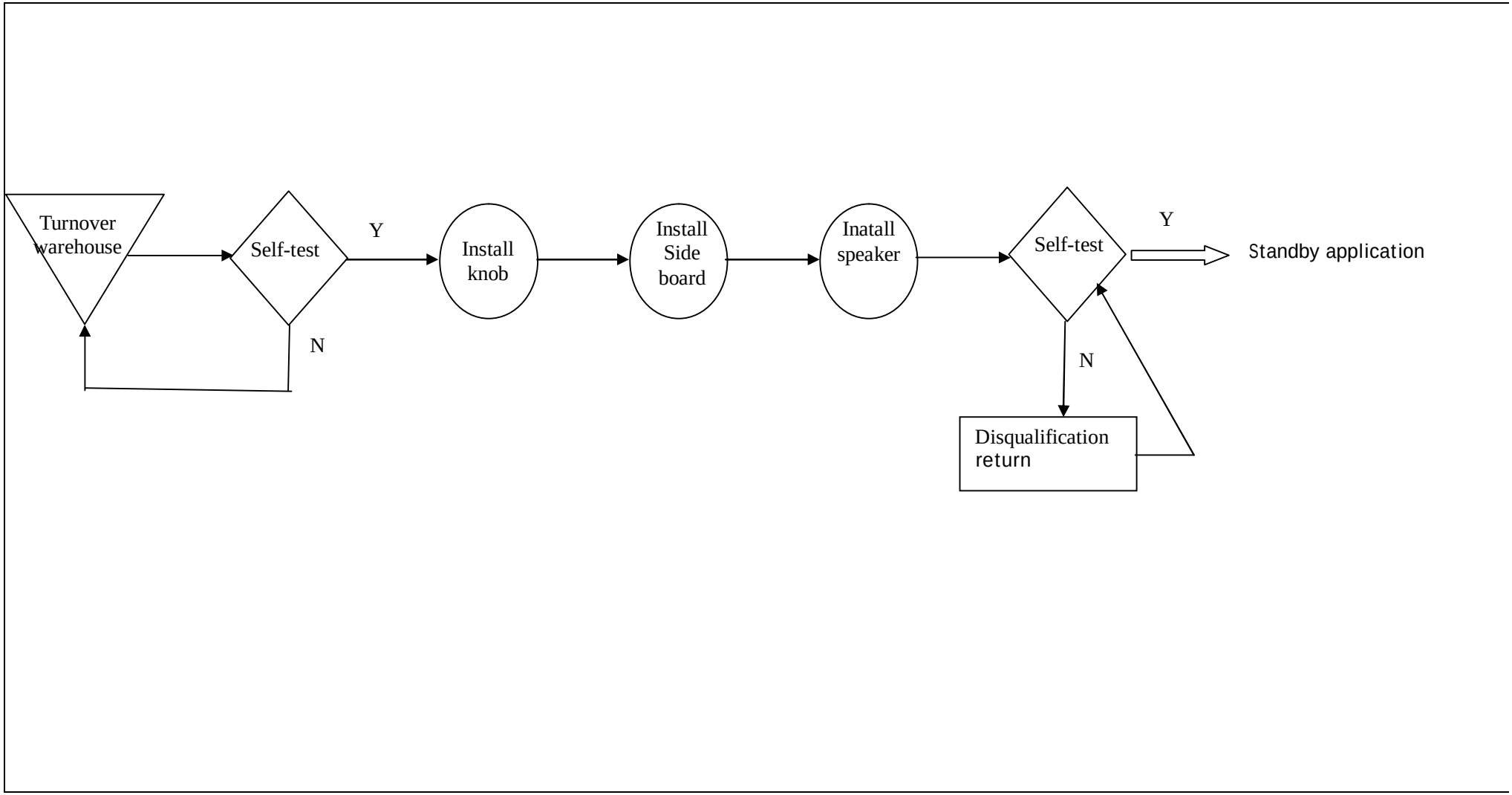
4.3.3.1 Catalogue of task instruction

Product Name：Multi-parameter monitor

Product Model：**MMED6000DP－M3**

Working procedure	Operation name (installation of back cover)	version	Changing contents
1	Install knob	A01	
2	Install side panel	A01	
3	Install speaker	A01	
4	Self-test	A01	

Work Procedure Flow Chart Of back cover installation



MMED6000DP — M3 Operation instruction of back panel installation

Operation step：

(1)、install the knob of the back cover：

1. put the rubber stabilizer to the small square groove of bottom, shake it lightly, if feeling flexible, please stick it with little 502 gluewater.
2. button knob1 and knob2 oppositely，tighten it with PA3.0×8 plug screws of self-threading (as picture 1 a)
3. install the knob to the top of the back cover, tighten it with PA3.5×12 plug screws of self-threading.(as picture1 b)

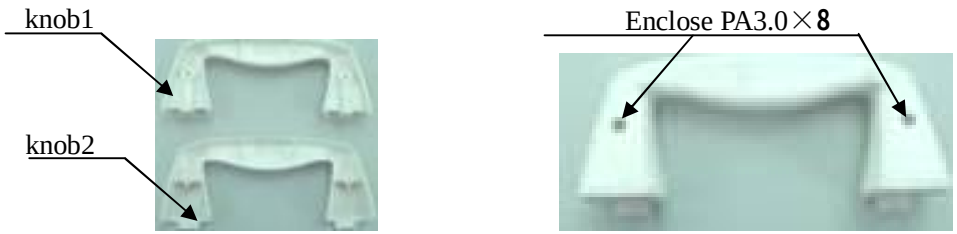


图 1a knob assembled picture

bills of raw and processed material

SN	Material code	Name	description	quantity
1	32291804401A	M3 back cover		1
2	131553331001A	M3 knob 1		1
3	131553331002A	M3 knob 2		1
4	1223600PA3008A	plug screws of self-threading	PA3.0×8	2
5	122360PT3512A	plug screws of self-threading	PA3.5×12	2
6	131110000000A	M3 rubber stabiliser		4

Bills of use tool

SN	name	Specification type	parameter	quantity
1	protective gloves			1
2	Small cross-screwdriver			1
3				

picture1b knob assemble completion picture

MMED6000DP－M3 Operation instruction of back panel

Operation step：

(2). Install side-panel：

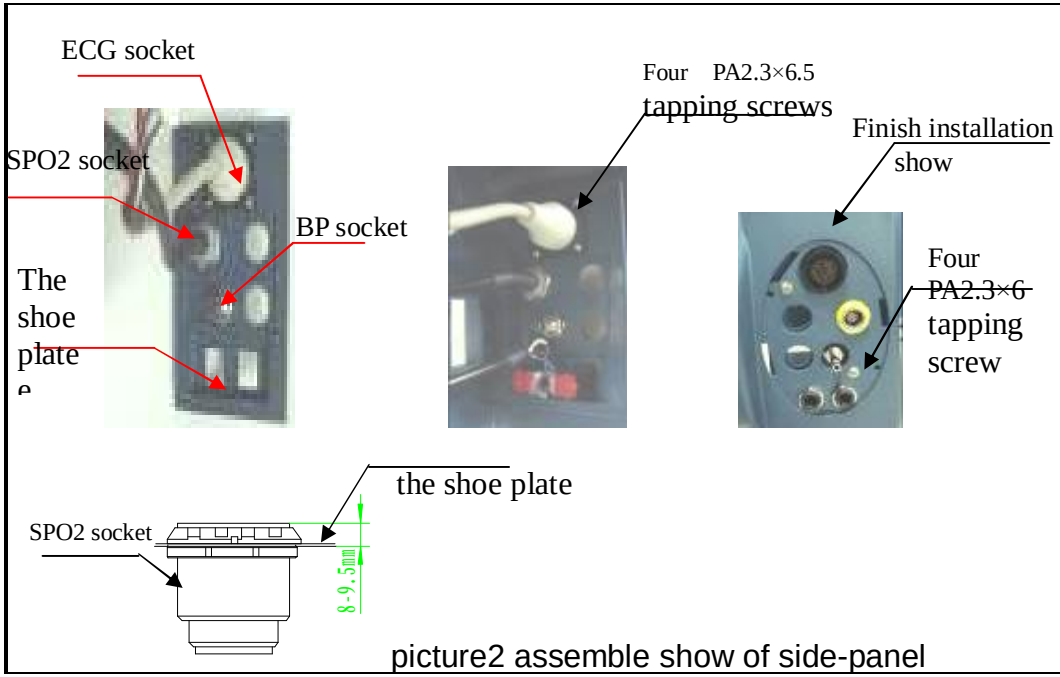
1. Install the six core plastic ECG connector plugs to the shoe plate, then tighten it with PA2.3×6.5 tapping screw.

2. Install the SPO2 and BP sockets to the hole site of the shoe plate respectively. SPO2 socket must be higher 8~9.5mm than the shoe plate. After finishing these two steps, seal the foreseen hole of the port shoe plate with the sealing joint strip，put them on the installation position where the right side of the back cover is. Adjusting the coaxiality of the hole site in the SPO2 socket and shell, tighten them with PA2.3×6.5 tapping screw which is pulled on plain cushion.

3. Wrapping up two temperature sockets in PVC sealing joint strip, install the temperature socket which is welded yellow line to the left side of the shoe plate, namely the hole site of T1, install the socket which is welded red line to the right side of the shoe plate, namely the hole site of T2.。(picture 2)

bills of raw and processed material

SN	Material code	Name	description	quantity
1	131530781001A	Port facing bar		1
2	3100066441151A	CSN801 ECG Cable		1
3	3100066441150A	CSN801SPO2 cable		1
4	31000664411149A	CSN801 temperature cable		1
5	11X94DNR0130A	metal socket of BP		1



picture2 assemble show of side-panel

6	122360PT2365A	tapping screw	PA2.3×6.5	6
7		sealing joint strip of PVC inflaming retarding		

Bills of use tool

SN	Name	Specification type	parameter	quantity
1	Small cross-screwdriver			1
2	spanner			1

MMED6000DP－M3 Operation instruction of back panel

Operation step：

(3). Install speaker：

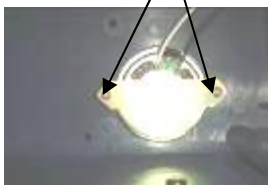
1. Put speaker in the back shell, simultaneity put Speaker built-in fitting in the speaker flat, alignment the hole site of fitting and back panel, tighten them with PA2.9×6.5 tapping screw. Then, tie the lead of the speaker, avoid of hurting the line leather.
2. Install printer cover and battery cover to the left side of the back panel respectively, cover to slot.

Bills of raw and processed material

SN	Material code	Name	description	quantity
1	11B11D40805WA	speaker(welded line)	Φ40 8Ω 0.5W	1
2	320086321002A	Speaker built-in fitting		1
3	1223600PA2305A	tapping screw	PA2.9×6.5	2
4	131538080001A	M3 printer cover		1

3. After finishing the steps above, please check it according to the request of every working procedure, there mustn't be missing bolt and module, put the quality products to thee storage racks, waiting for the next working procedure.

Two PA2.9×6.5 screws



picture3 finishing assemble show

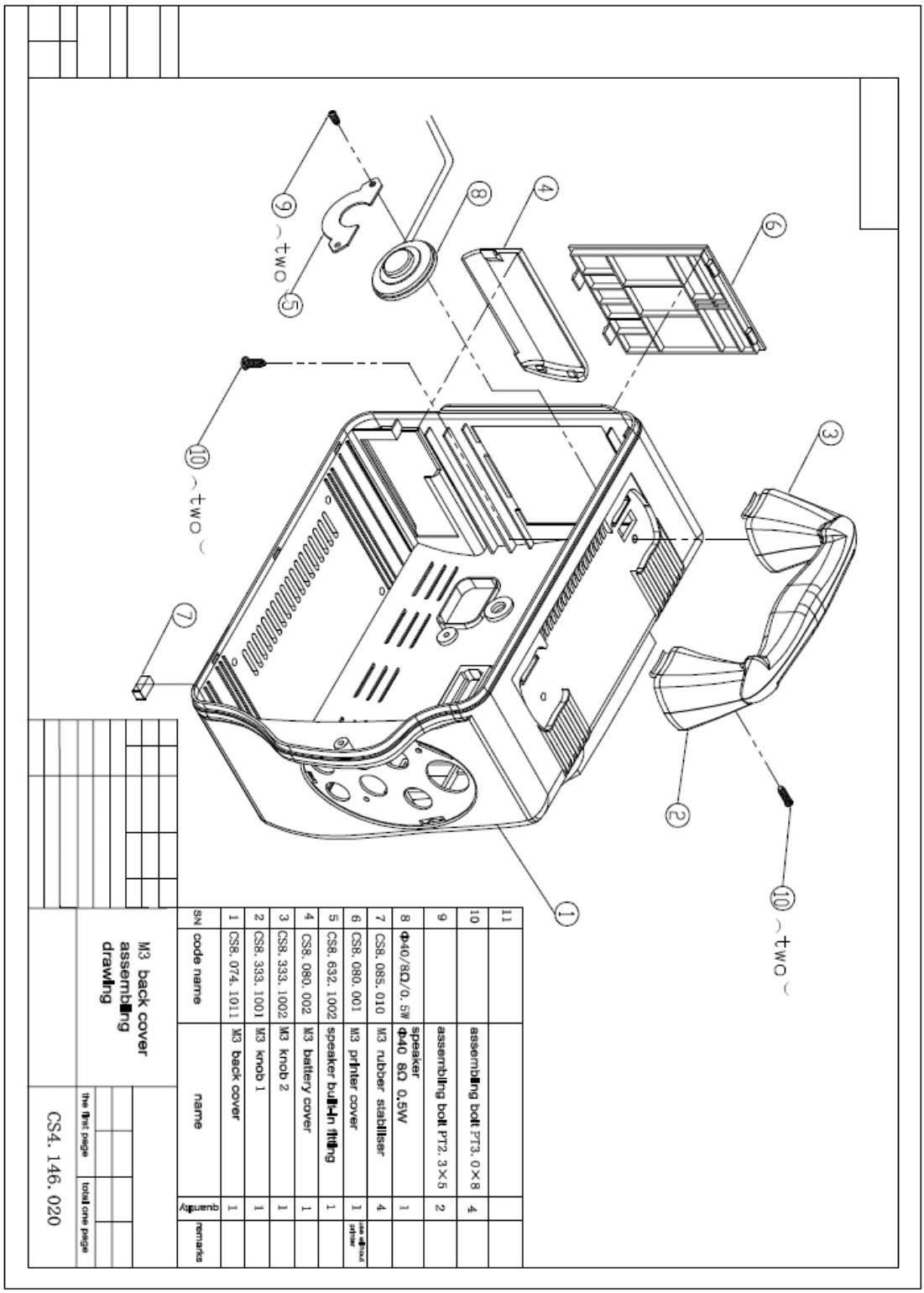
5	131538080002A	M3 battery cover		1

Bills of use tool

SN	Name	Specification type	parameter	quantity
1	cross-screwdriver			1
2				
3				

:			

4.3.3.2 Assembling Drawings of Back Panel



SN	code name	name	Aquenb	remarks
11				
10		assembling bolt PT3.0×8	4	
9		assembling bolt PT2.3×5	2	
8	Φ40/8Ω/0.5W	speaker Φ40 8Ω 0.5W	1	
7	CS8.085.010	M3 rubber stabiliser	4	
6	CS8.080.001	M3 printer cover	1	use optional printer
5	CS8.632.1002	speaker built-in fitting	1	
4	CS8.080.002	M3 battery cover	1	
3	CS8.333.1002	M3 knob 2	1	
2	CS8.333.1001	M3 knob 1	1	
1	CS8.074.1011	M3 back cover	1	

M3 back cover assembling drawing

the first page | total one page

CS4.146.020

Picture 9

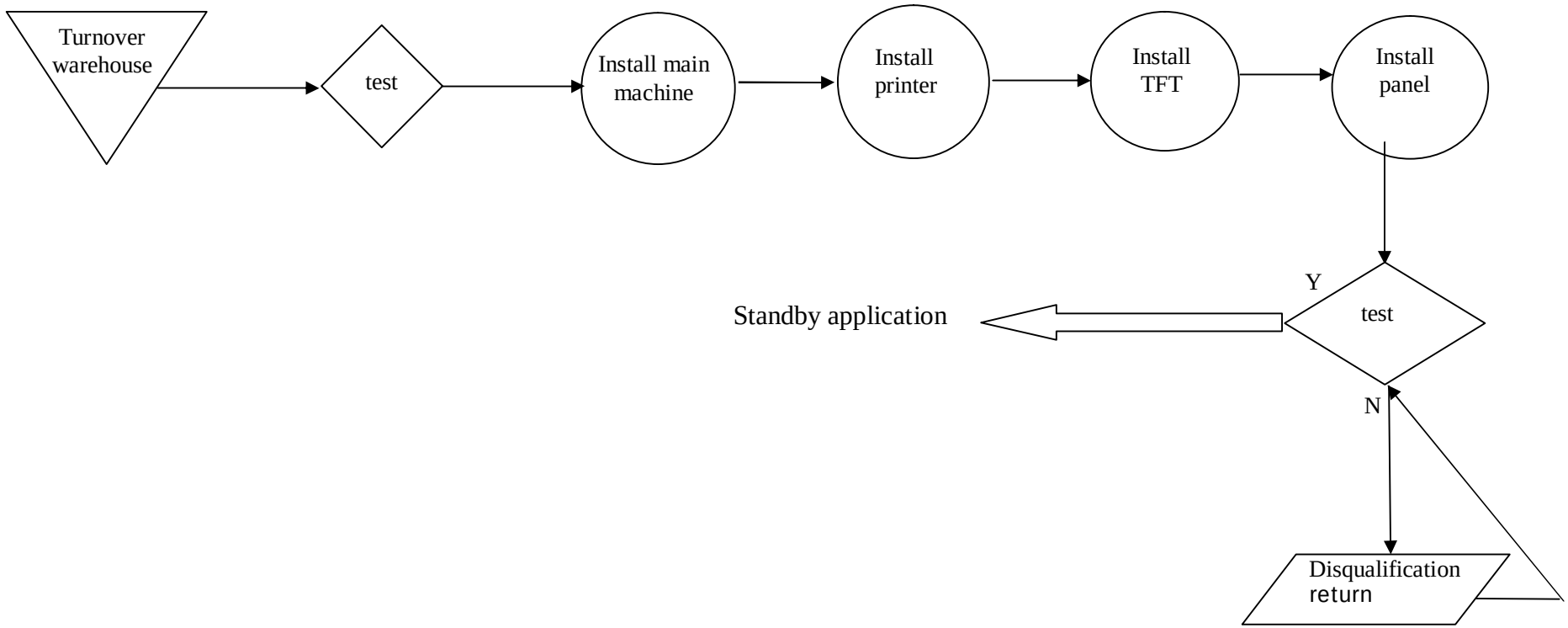
4.3.4 Unit Assembling

4.3.4.1 Catalogue of task instruction

Product Name：Multi-parameter monitor Product Model：**MMED6000DP－M3**

Working procedure	Operation name (installation of unit	version	Changing contents
1	Install the core	A01	
2	Install printer	A01	
3	Install TFT module	A01	
4	install panel module	A01	
5	self-test	A01	

Work Procedure Flow Chart Of installation of the unit



MMED6000DP－M3 Operation instruction of the unit

Operation step：

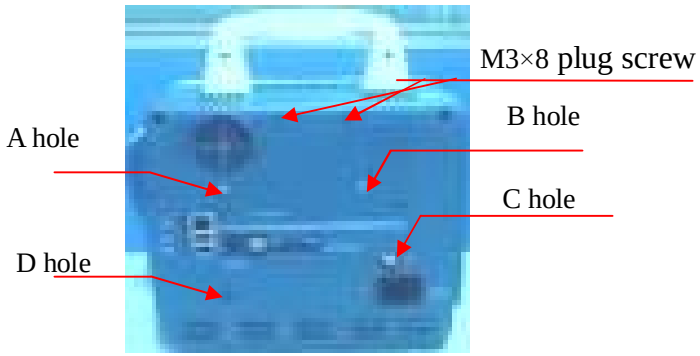
check：

1.each module is eligibility, no leaking.

2.there are no crack and evident damnify in the panel and back cover, no bad lead.

(1). Install core：

1.install the core to the back cover, adjust every port to the portiforium of back cover. Tighten it with M3×8 assembling bolt in the hole site according to the drawing. Then tighten it with assembling bolt in the D hole, at last, install it to the top of the back cover and tighten it with PT3.5×15 plug screw.



picture1 screw installation position drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1		core module		1
2		back cover module		1
3	1223100M3080A	plug screw	M3×8	6
4	122360TA3515A	tapping screw	PA3.5×15	2

Bills of use tool

SN	name	Specification type	parameter	quantity
1	cross-screwdriver			1

MMED6000DP－M3 Operation instruction of the unit

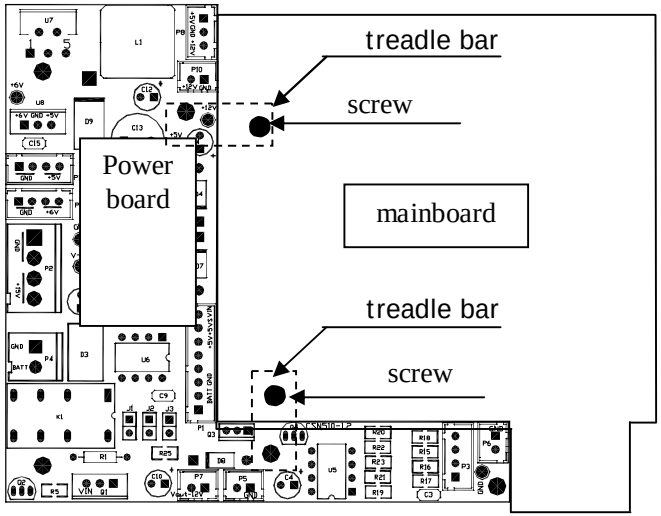
Operation step：

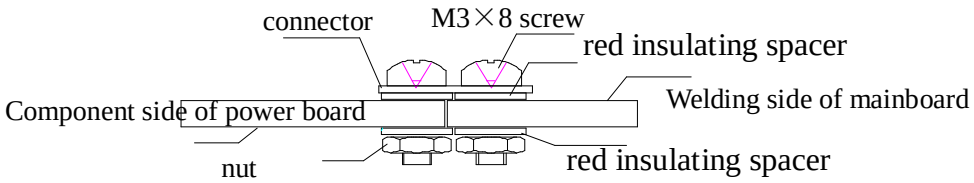
(1) Install core：

2.plug SPO2、T1、T2 and ECG cable plug to P105、P252 and P200 socket of 801 board

pack them.

3.pass the connecting strip with M3×8 nut and red insulating spacer through the component side of two board, through the hole site of the connector, at last , pull on the plain cushion, tighten it with nut, form the two board into a single unit.





picture2 two board assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	260002932021A	510 power board		1
2	11A1244963V0A	mainboard		1
3	182510000000A	M3 board connector		2
4	122360M3080A	screw	M3×8	4
5	1222200M3000A	nut	M3	4
	1322100000D3A	red insulating spacer	Φ3	8

bills of use tool

SN	name	Specification type	parameter	quantity
1	Sleeve screwdriver			1
2	Cross- screwdriver			1
3	anti-static wrist strap			1

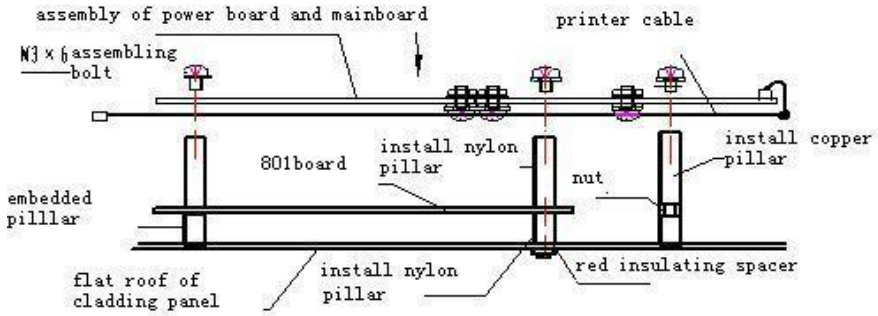
MMED6000DP－M3 Operation instruction of the unit

Operation step：

(1) Install main board core：

4.after assemble, plug printer cable to the relevant position of main board, take them to the printer along the inferior main board **(as the picture),** then install the assembly to the installation pillar of the cladding panel module, tighten them with M3×6 assembling bolt.

5. Plug every cable to the socket in the board according to the hookup, pack them in order.



Picture 3 board assembly drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	1223100M3060A	assembling bolt	M3×6	4
2		nut，red insulating spacer	M3，Φ3	each 4
3		kinds of cable		
4	CS2.900.020JL	M3 hookup		

bills of use tool

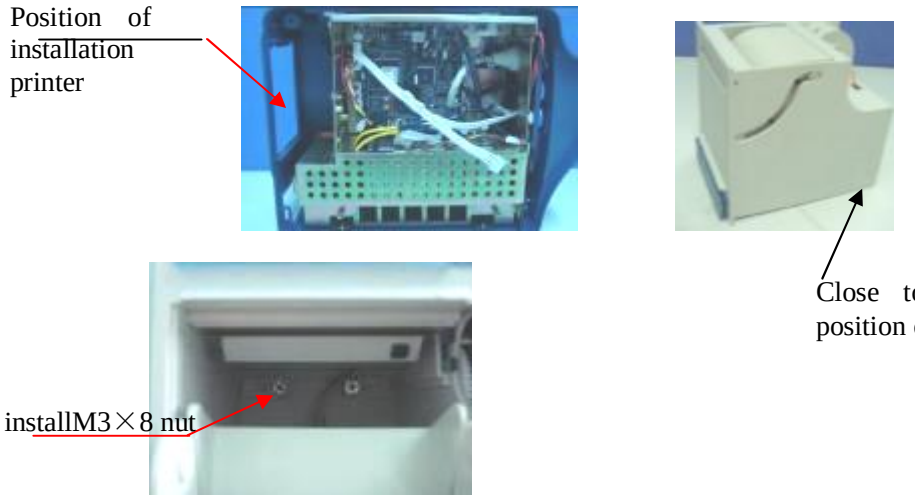
SN	name	Specification type	parameter	quantity
1	sleeve screwdriver			1
2	Cross-screwdriver			1
3	anti-static wrist strap			1

MMED6000DP－M3 Operation instruction of the unit

Operation step：

(2) Install printer：

1. Polish the position where is in the back side of the printer close to the speaker with the file, there is no conflict with the speaker is better.
2. plug the port cable to the printer, install the printer to the left side of the back cover, pass one side of the connector cable to the via of the main body core, then push the printer in place, tighten them with M3×8 nut to the ledger plate.
3. plug the other terminal to the corresponding socket according to the hookup, synchronously plug the other cable, pack the cable in order.



picture5 printer installation drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	11A51FA91354A	printer		1
2	131538080001A	printer cover		1
3	1223100M3050A	screw	M3×8	2
4	CS2.900.020JL	M3 hookup		1
5				

bills of use tool

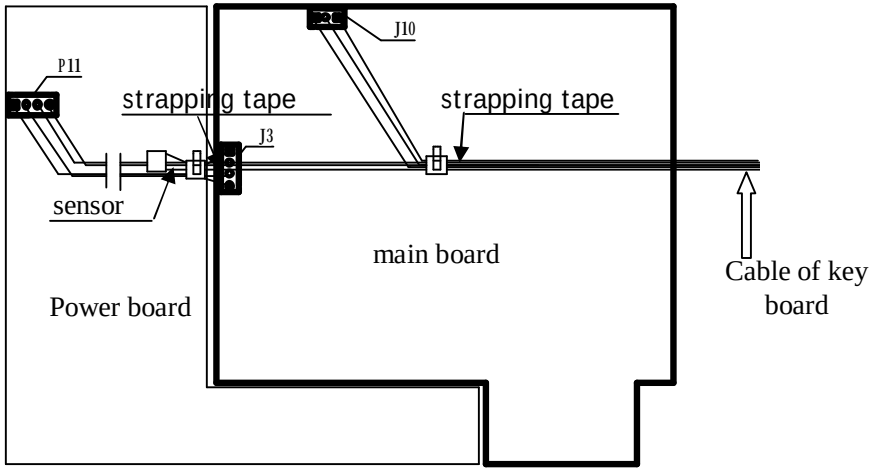
SN	name	Specification type	parameter	quantity
1	Electromotion screwdriver		1	
2	anti-static wrist strap			1

MMED6000DP－M3 Operation instruction of the unit

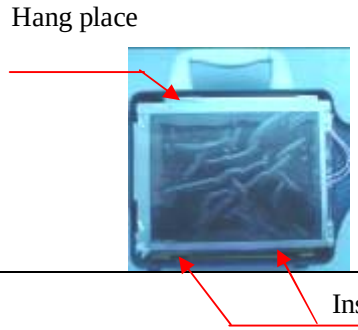
Operation step：

(3) install TFT module：

Pack the sensor cable which is to the key board, according to the drawing, take the other lead to the right side of the shell, plug the soft cable and correlative lead of TFT. Hang TFT module to the stander of main body, adjust the installation hole, then tighten it with M3×8 assembling bolt (as picture 6)



Picture 6　sensor cable packing drawing



Picture 7 TFT module assemble drawing

bills of raw and processed material

SN	Material code	Name	description	quantity
1	1223100M3060A	Assembling bolt with spring shim	M3×8	
2		TFT module		1
3	122360PT3515A	tapping screw	PT3.5×15	2
4	1223100M3080A	Assemble bolt	M3×8	4

bills of use tool

SN	name	Specification type	parameter	quantity
1	Electromotion screwdriver			1
2	anti-static wrist strap			1
3				

MMED6000DP－M3 Operation instruction of the unit

Operation step：

(4) Install panel module：

1.plug the cable of key board in the panel, electrify to test, if the function is normal, install the supporting plate of the core to the core of the main body, (stick one layer gelatin sponge between core and supporting plate), tighten it with M3×8 assembling bolt to the bottom of the shell.

2. plug the plug of the key board to the relevant socket ,button the panel to the front of the unit, tighten it with M3.5×15 bolt which are installed from back of the unit.

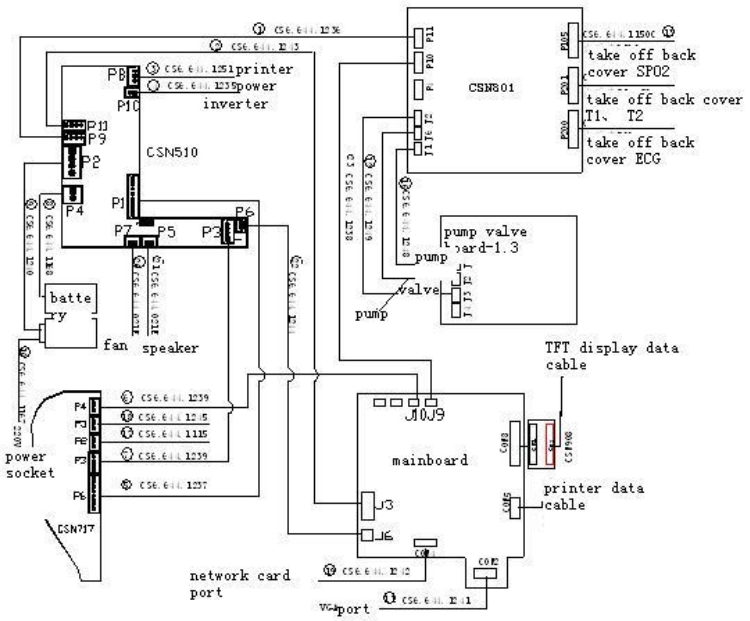
bills of raw and processed material

SN	Material code	Name	description	quantity
1	1223100M3060A	Assembling bolt with spring shim	M3×8	
2		TFT module		1
3	122360PT3515A	tapping screw	PT3.5×15	2
4	1223100M3080A	assembling bolt	M3×8	4
5				

bills of use tool

SN	name	Specification type	parameter	quantity
1	Electromotion screwdriver			1
2	anti-static wrist strap			1

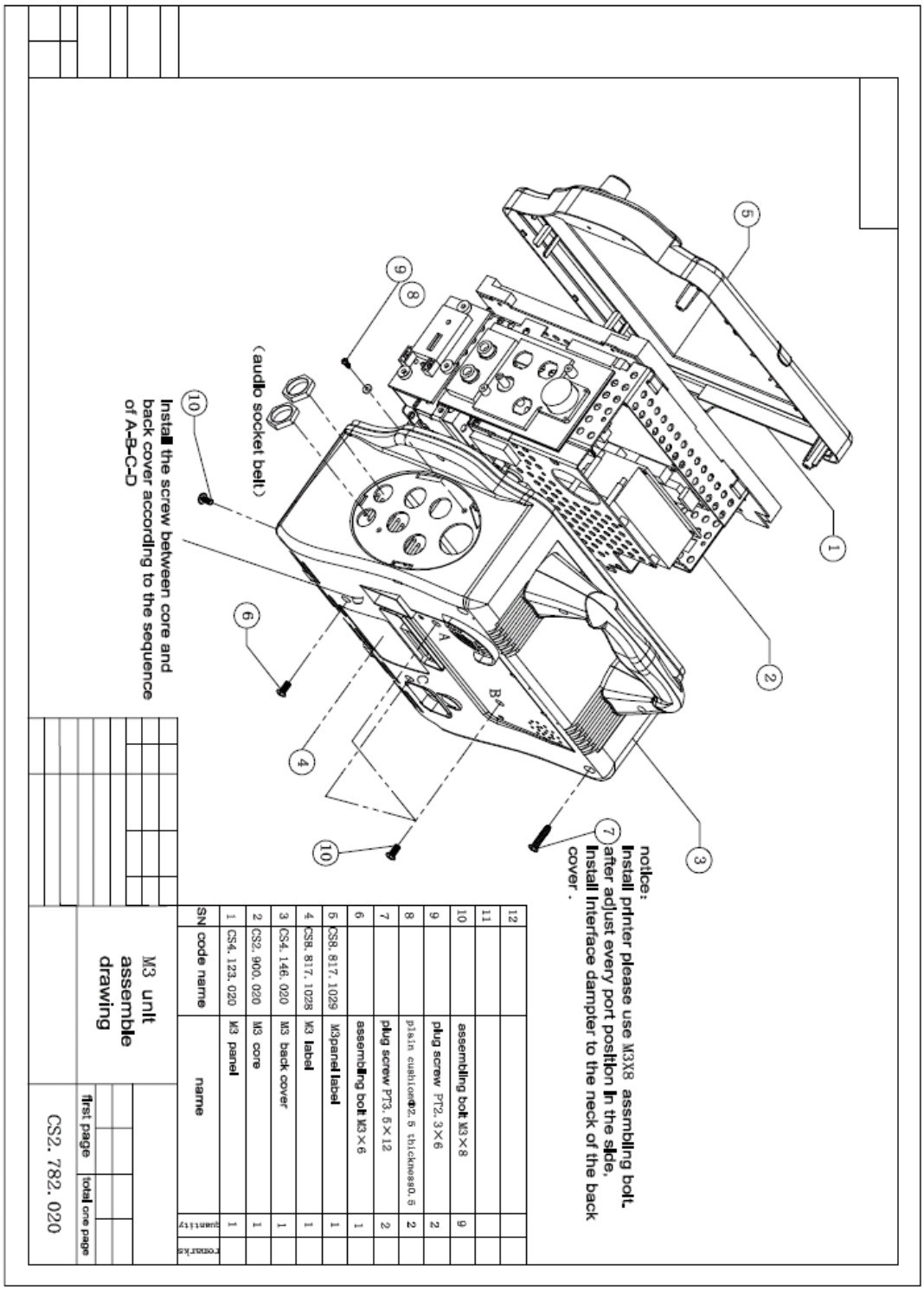
MMED6000DP－M3 Operation instruction of the unit



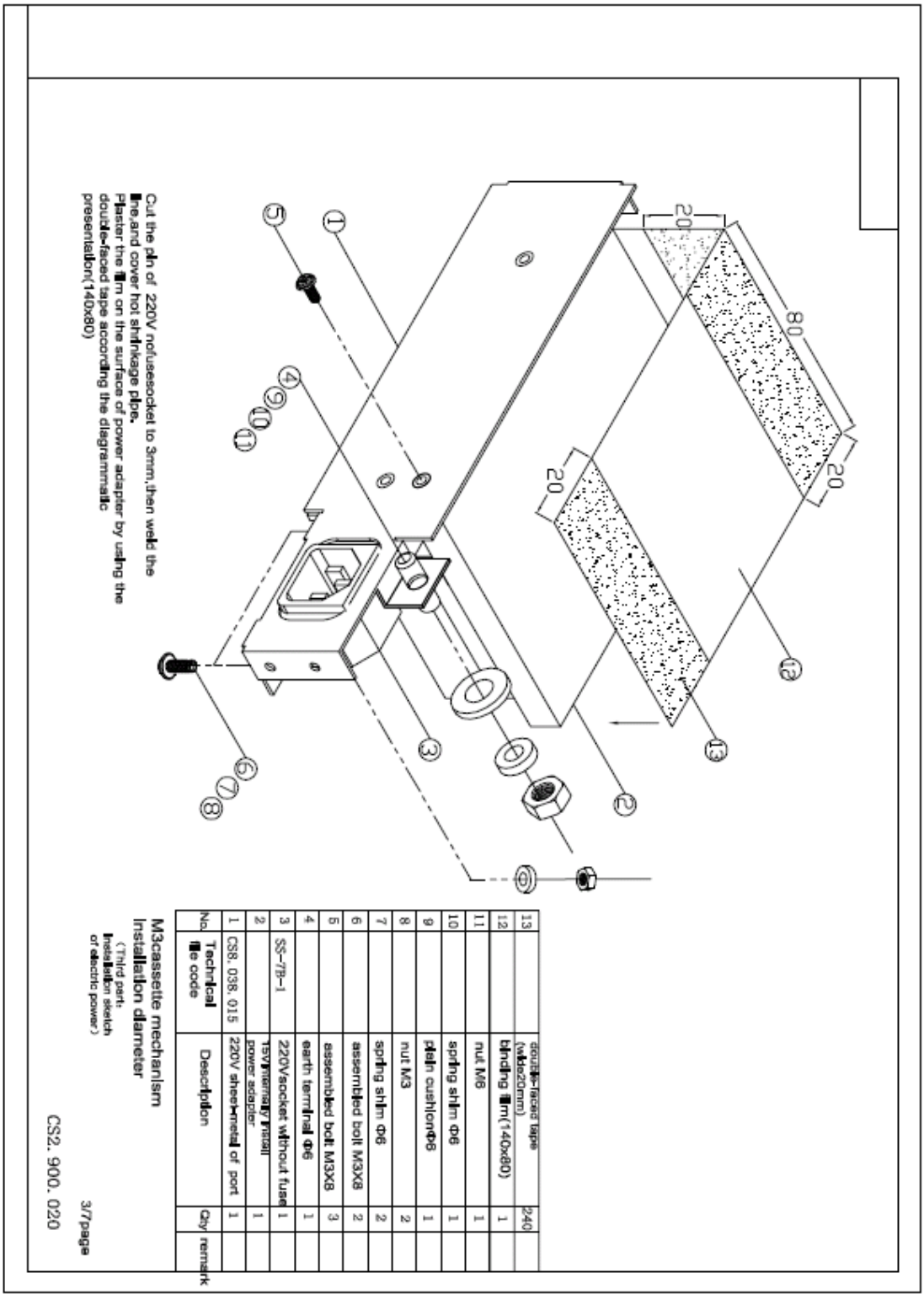
Picture 4 unit hookup and trace table

SN	Cable name	from	To	Descr-yiption	Quant-ity
1	power cable of 801 function board	Power board P9	CSN801board P11	4P	1
2	Main board power supply	Power board P11	Main board power J3	4P	1
3	M3: printerTR50power cable	Power board P8	Printer power	4P	1
4	M3:inverter(SAKQ012A)cable	Power board P10	inverter	2P	1
5	M3:serial port from mainboard to key board	Power board P1	Key board P6	8P	1
6	M3: serial port from mainboard to key board	Power board P4	Mainboard J10	3P	1
7	Fan and speaker control line	Power board P3	Key board P3	4P	1
8	Battery cable	Power board P4	Battery cable	2P-2.96	1
9	Power adapter to CSN510power connecting line	Power board P2	Switch power output	4P	1
10	AC power cable	Socket without fuse	Switch power insput	5P	1
11	VGA port cable	main board CON2	VGA port	BD15	1
12	M3 valve power cable	CSN801board J2	pump pinout plug	2P	1
13	SPO2 cable	801board P105	Side panel SPO2	6P	1
14	Temperature cable	801 board P252	Side panel T1、T2	5P	1
15	ECG cable	801 board P200	Side panel ECG	6P	1
16	M3 valve power cable	801 board J1、J6	Valve pinout plug	2P	2
17	Indicator cable	Power board P2	Indicator pin	3P	1
18	M3 sensor cable	Power board P5	To the sensor	3P	1
19	network card connector cable	Power board CON4	Network car connector		1
20	Fan cable	Power board P7	Fan	2P	1
21	Speaker cable	Power board P5	speaker	2P	1
22	M3 audio output cable	Power board P6	Mainboard J6	2P	1
23	M3 CSNS801 board serial port line	801 board P10	Mainboard J9	3P	1

4.3.4.2 Assembling Drawings of Unit



Picture10



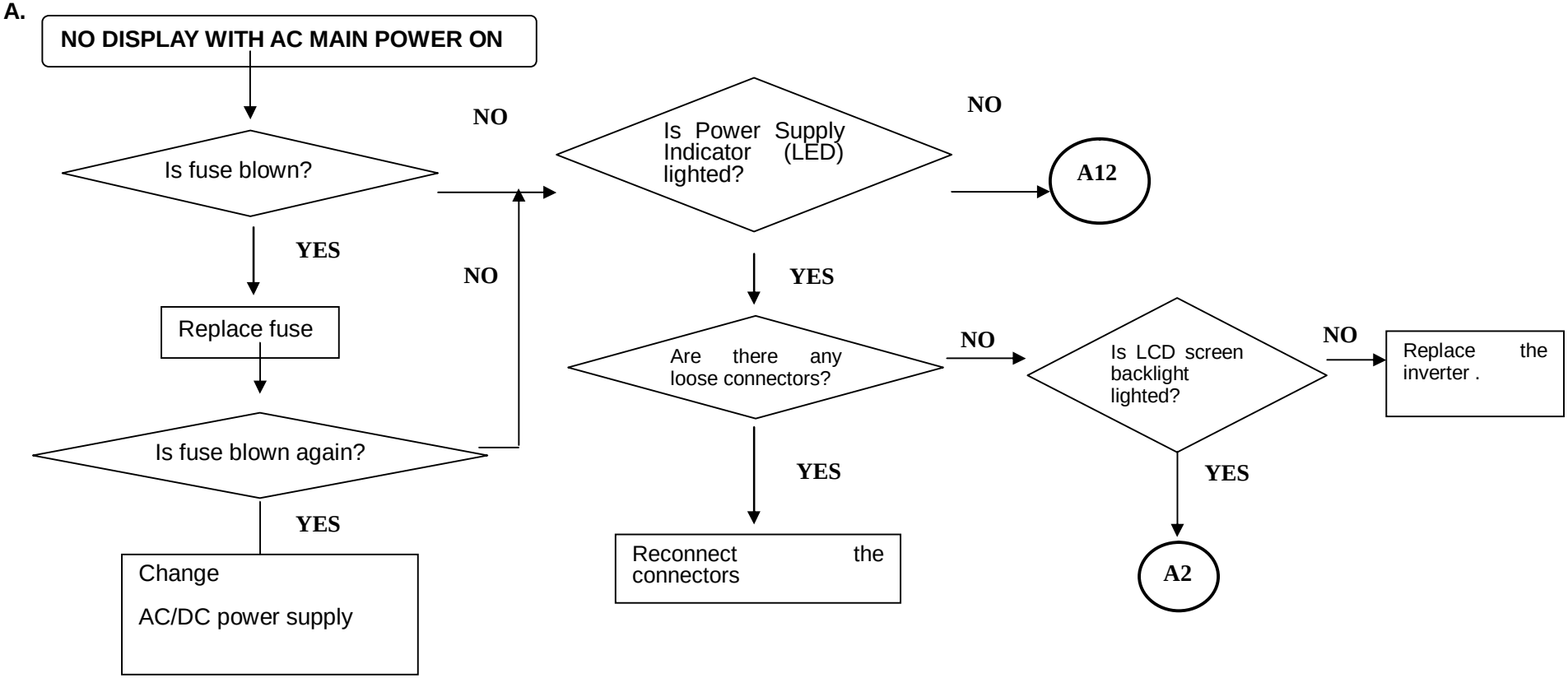
No.	Technical file code	Description	Qty	remark
13		double-faced tape (wide20mm)	240	
12		binding film(140x80)	1	
11		nut M6	1	
10		spring shim Φ8	1	
9		plain cushionΦ6	1	
8		nut M3	2	
7		spring shim Φ6	2	
6		assembled bolt M3X8	2	
5		assembled bolt M3X8	3	
4		earth terminal Φ6	1	
3	SS-7B-1	220Vsocket without fuse	1	
2		15V/internally Install power adapter	1	
1	CS8. 038. 015	220V sheet-metal of port	1	

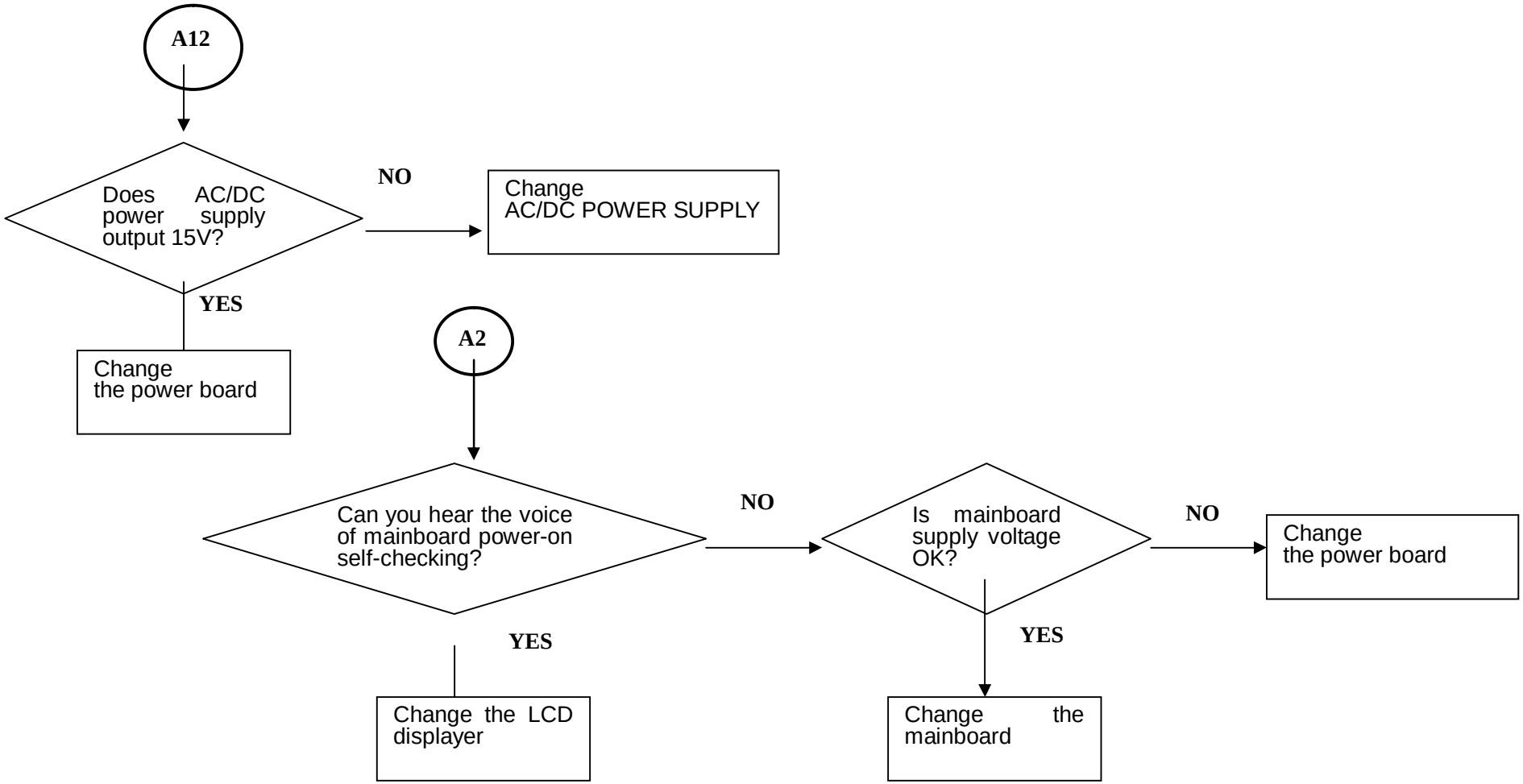
Picture 11

CHAPTER 5 TROUBLESHOOTING

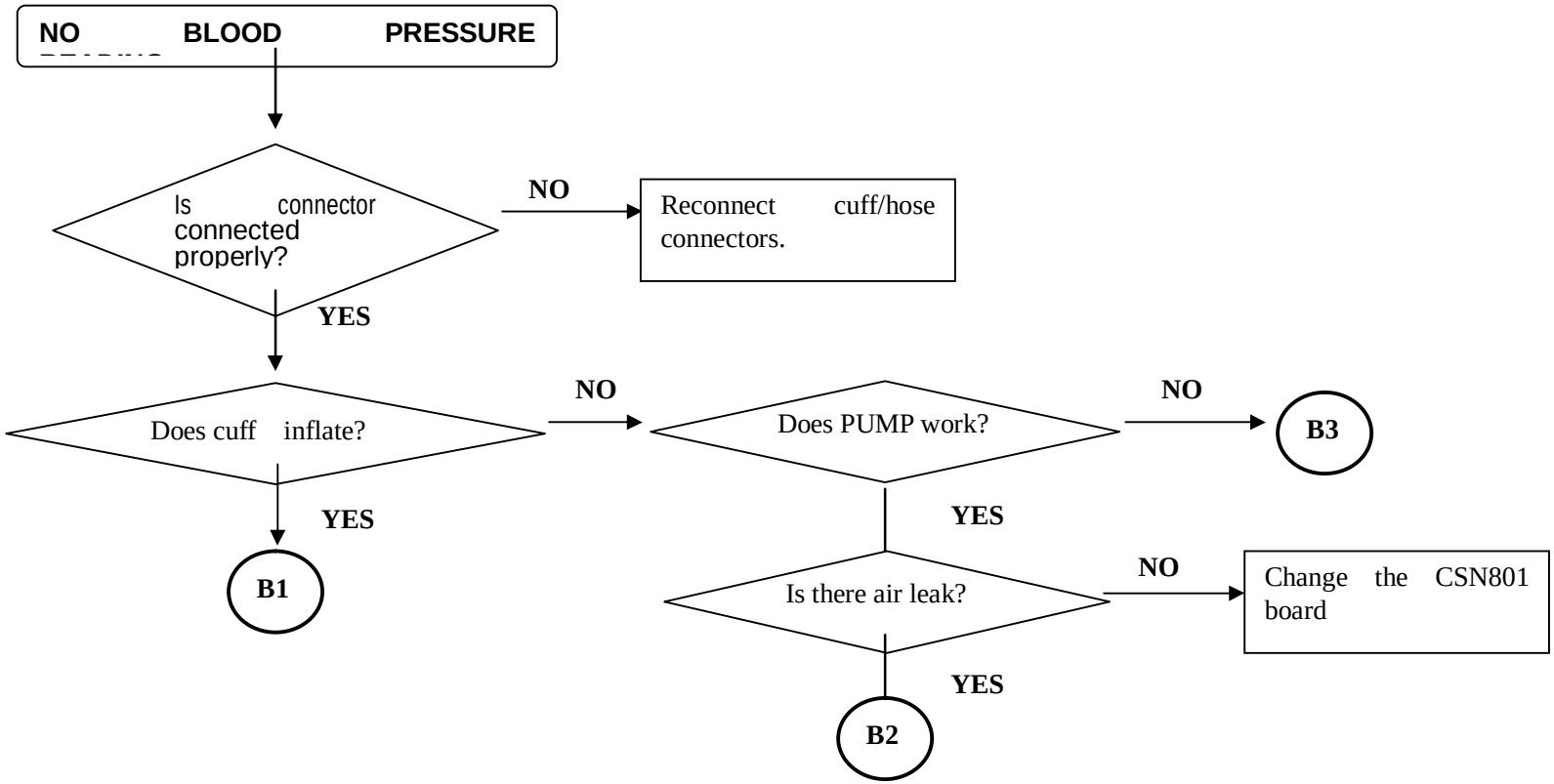
5.1 Diagram of solutions to various troubles

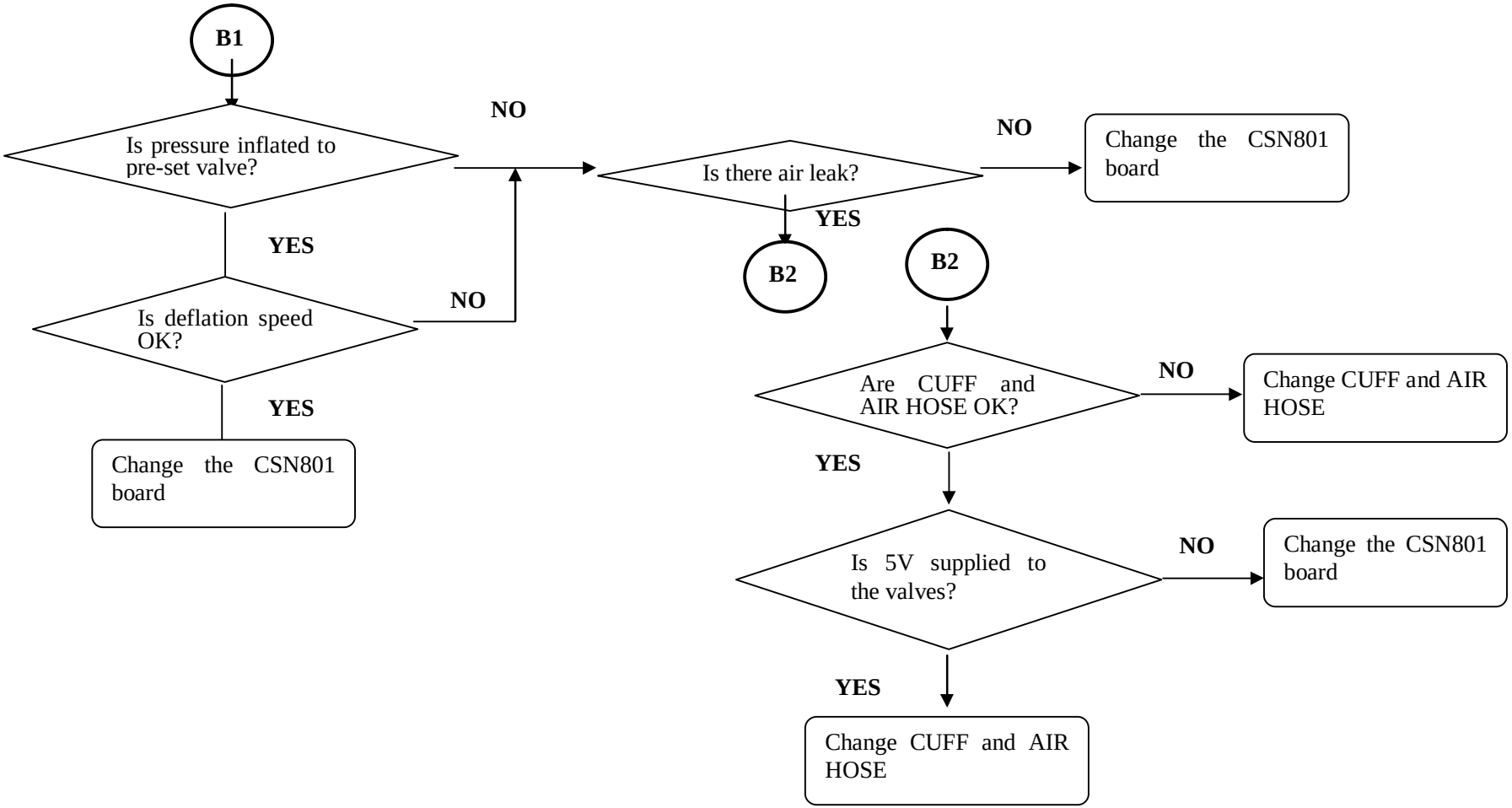
A.

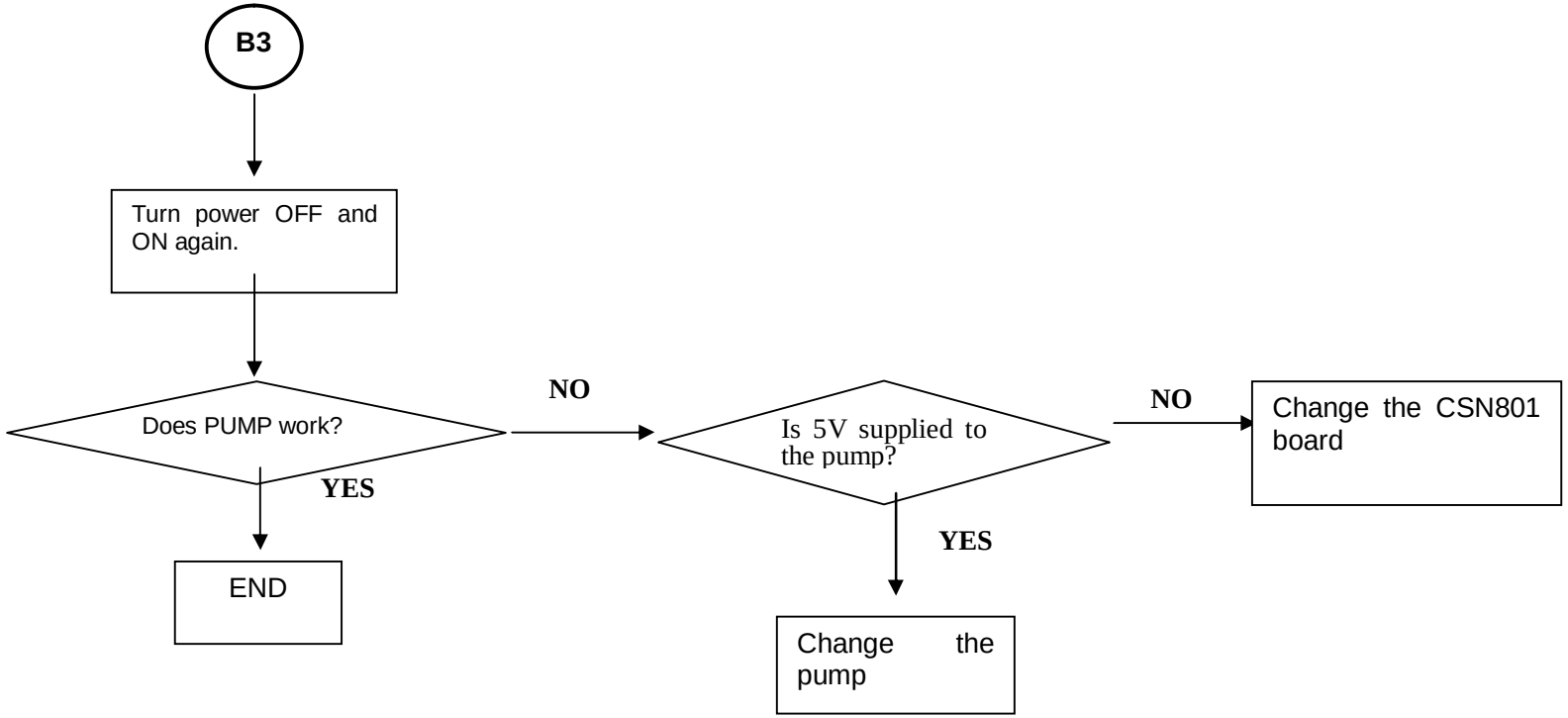



A12
Does AC/DC power supply output 15V?
NO
Change AC/DC POWER SUPPLY
YES
Change the power board
A2
Can you hear the voice of mainboard power-on self-checking?
NO
Is mainboard supply voltage OK?
NO
Change the power board
YES
Change the LCD displayer
YES
Change the mainboard

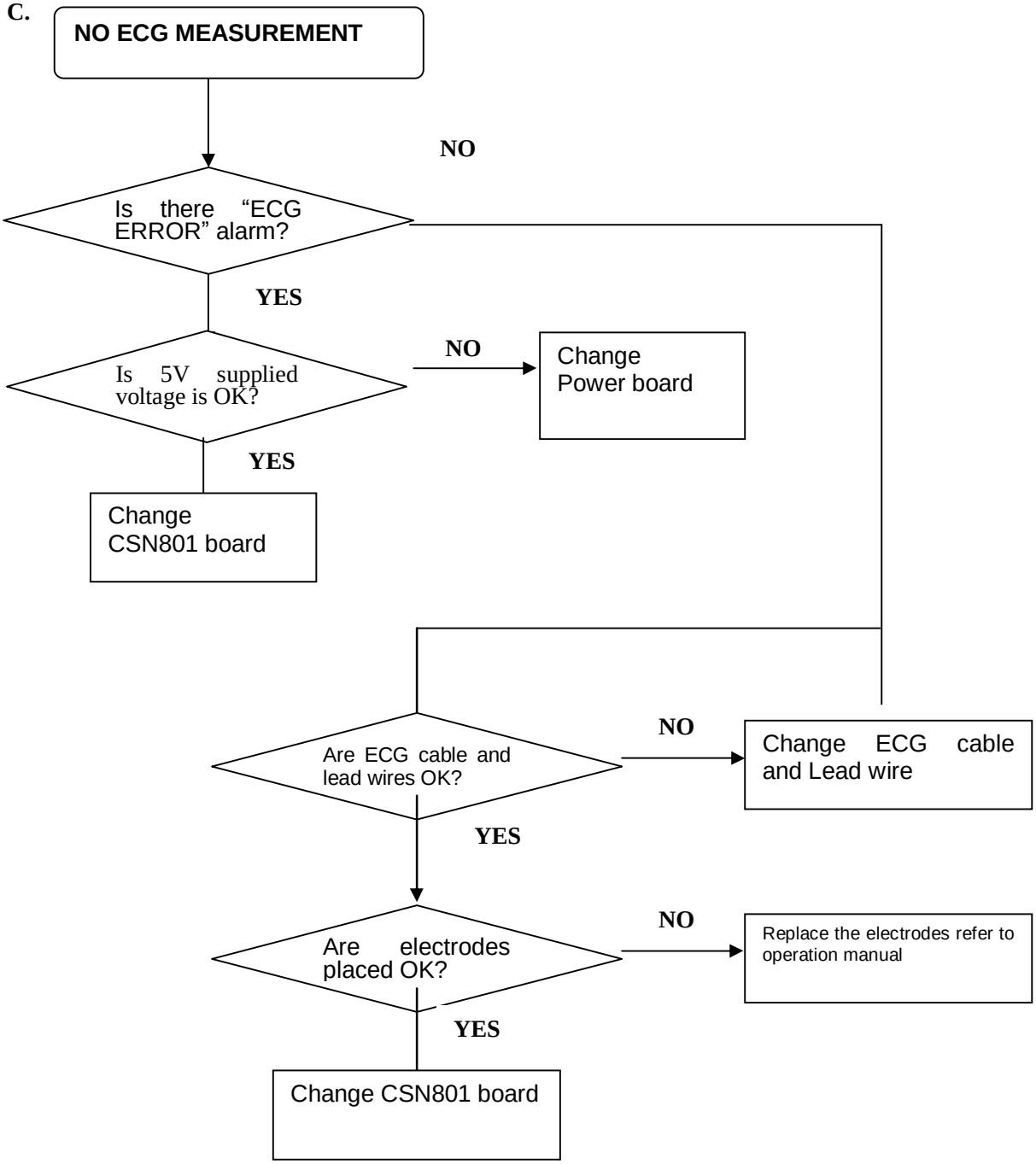
B.


NO BLOOD PRESSURE
Is connector connected properly?
NO
Reconnect cuff/hose connectors.
YES
Does cuff inflate?
NO
Does PUMP work?
NO
B3
YES
B1
YES
Is there air leak?
NO
Change the CSN801 board
YES
B2

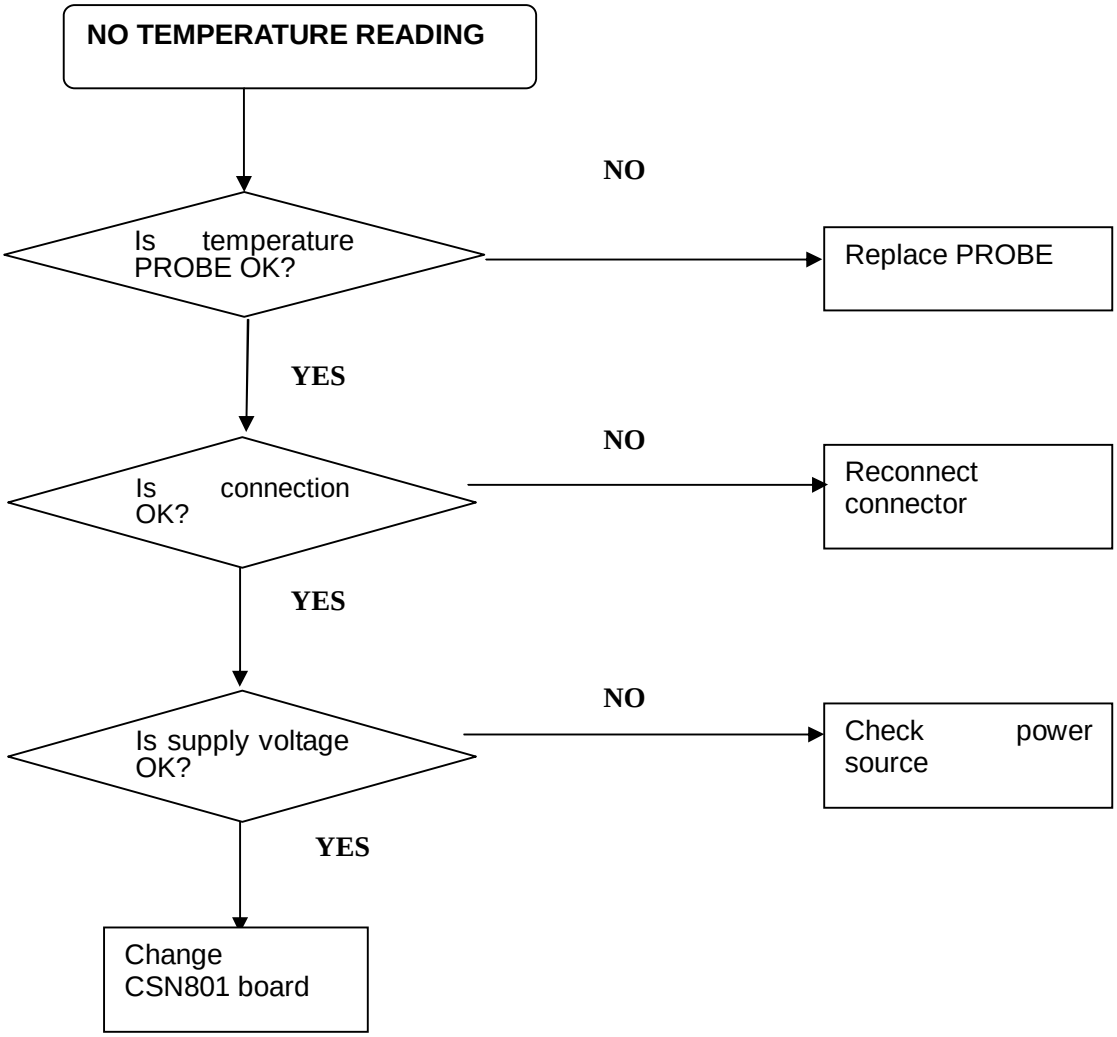

B1
Is pressure inflated to pre-set valve?
NO
YES
Is deflation speed OK?
NO
YES
Change the CSN801 board
Is there air leak?
NO
Change the CSN801 board
YES
B2
B2
Are CUFF and AIR HOSE OK?
NO
Change CUFF and AIR HOSE
YES
Is 5V supplied to the valves?
NO
Change the CSN801 board
YES
Change CUFF and AIR HOSE


B3
Turn power OFF and ON again.
Does PUMP work?
NO
Is 5V supplied to the pump?
NO
Change the CSN801 board
YES
END
YES
Change the pump

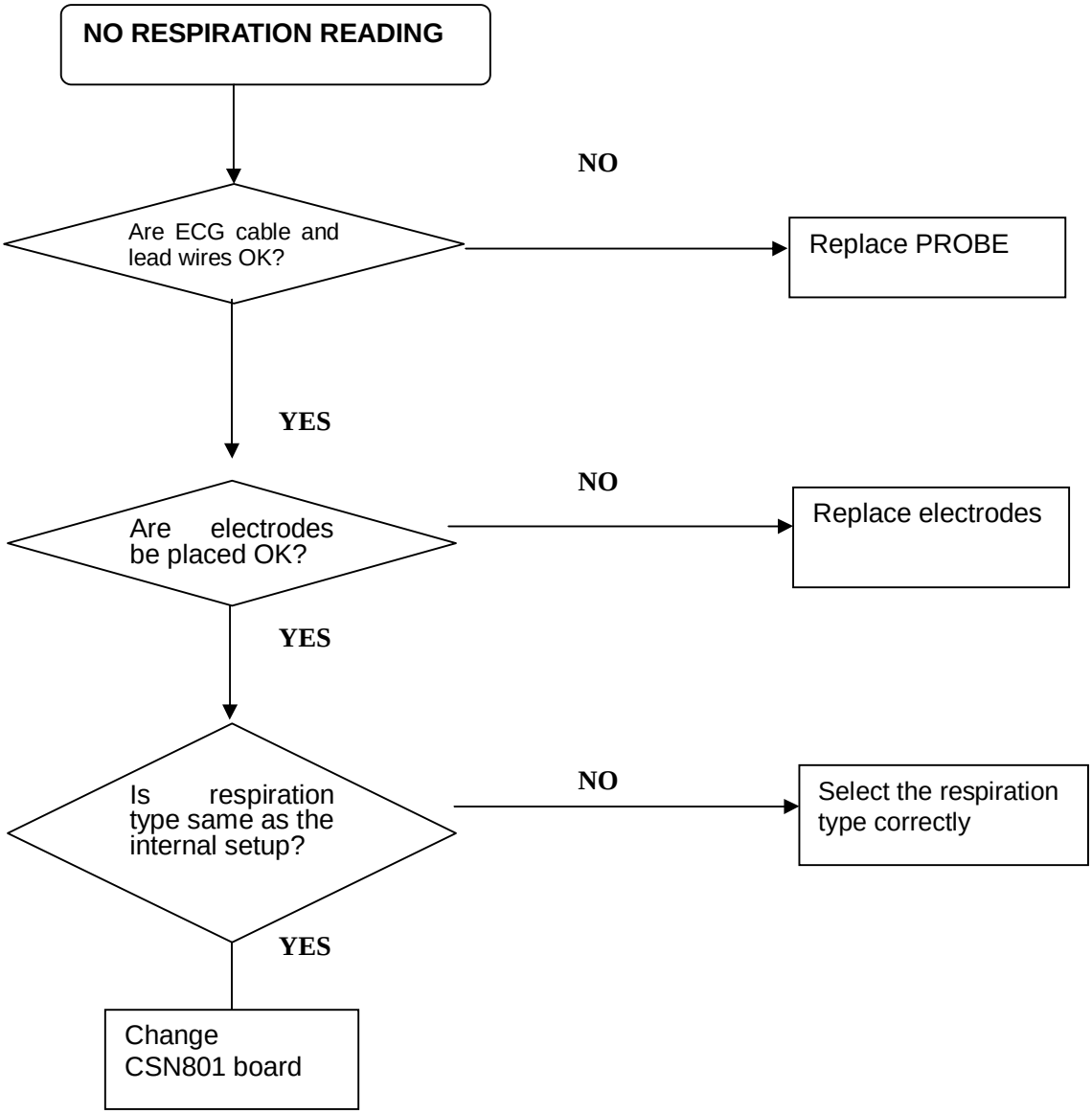
C.


NO ECG MEASUREMENT
NO
Is there "ECG ERROR" alarm?
YES
Is 5V supplied voltage is OK?
NO
Change Power board
YES
Change CSN801 board
Are ECG cable and lead wires OK?
NO
Change ECG cable and Lead wire
YES
Are electrodes placed OK?
NO
Replace the electrodes refer to operation manual
YES
Change CSN801 board

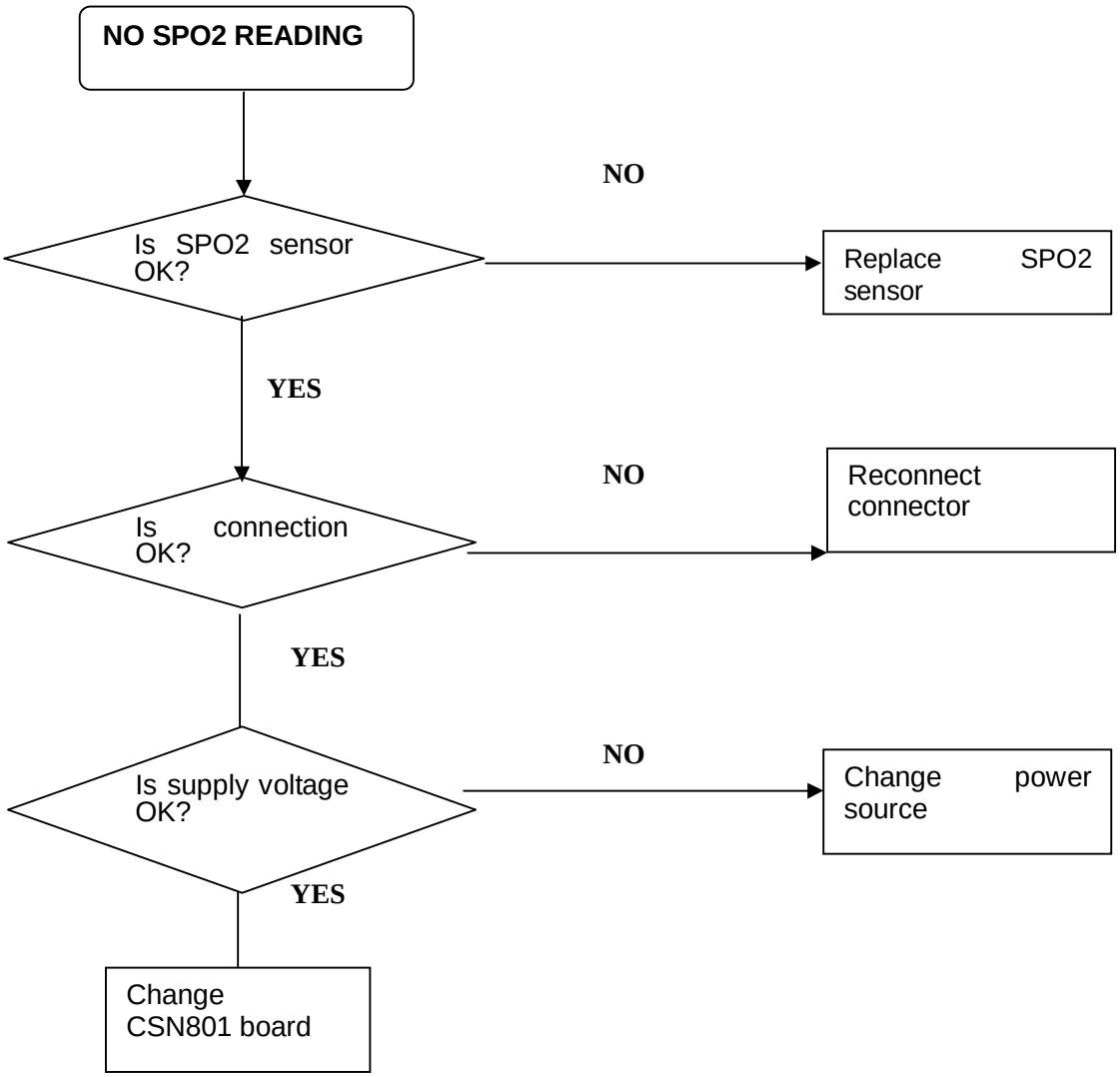
D.


NO TEMPERATURE READING
Is temperature PROBE OK?
NO
Replace PROBE
YES
Is connection OK?
NO
Reconnect connector
YES
Is supply voltage OK?
NO
Check power source
YES
Change CSN801 board

E.


NO RESPIRATION READING
Are ECG cable and lead wires OK?
NO
Replace PROBE
YES
Are electrodes be placed OK?
NO
Replace electrodes
YES
Is respiration type same as the internal setup?
NO
Select the respiration type correctly
YES
Change CSN801 board

F.


NO SPO2 READING
Is SPO2 sensor OK?
NO
Replace SPO2 sensor
YES
Is connection OK?
NO
Reconnect connector
YES
Is supply voltage OK?
NO
Change power source
YES
Change CSN801 board

5.2 Troubleshooting

5.2.1 The main trouble of ECG/HR

Failure	Possible cause	Solution
Display shows "ECG ERROR" when you turn on the equipment	CSN801 board has problem.	Replace the CSN801 board
No ECG waveform	① Poor connection of ECG electrode films ② RL electrode is suspended ③ CSN801 board is damaged. ④ The patient's skin is too dry.	① Use new electrode to ensure good contact. ② Connect RL electrode. ③ Replace it. ④ Note the precondition of skin.
ECG waveform is abnormal or has interference.	①Electrodes are connected incorrectly. ② There is suspending electrode. ③ AC power has no grounding wire. ④ CSN801 board is damaged.	① Correctly connect electrode. ② Remove electrode that are not used. ③ Use 3-wire power ④ Replace it.
Only one or some leads could display waves, some leads display straight lines.	① Some electrodes are not contacted well. ② The lead wires are damaged. ③ The CSN801 board has problem.	Connect the lead with ECG simulator, if the signal is normal, the trouble lies in the electrodes or leads (identify which electrode should be changed) if the signal is abnormal still, change the CSN801 board.
ECG waveform displays disorderly	① Patient is moving constantly. ② Position of electrode ③ The mode of monitor ④ Grounded receptacle	① Keep patient quiet. ② The electrodes should not be too close. ③ Select the right mode of monitor ④ Connected with grounded receptacle
HR data fluctuate remarkably	Patient is moving constantly.	Keep patient quiet.
ECG base line is not smooth	Power supply is inferior	Do not use the same power panel with high power equipment.

5.2.2 The main trouble with RESP

Failure	Possible cause	Solution
No RESP waveform or RESP waveform is abnormal.	① Electrodes are connected incorrectly. ② Patient is moving constantly. ③ CSN801 board is damaged.	① Use RL-LL electrode, connect to the correct position. ② Keep patient quiet ③ Replace it.
The data change	① The dryness of skin	① Note the precondition of

remarkably and have deviation from the real data.	② Inferior quality of electrode ③ The position of electrodes	skin ② Replace the new electrodes. ③ The electrodes should not be too close.
No RESP wave	The mode of RESP is wrong.	Select “Impedance type” in “RESP mode”.

5.2.3 The main trouble with TEMP

Failure	Possible cause	Solution
TEMP value is incorrect.	Measuring sensor is poorly connected.	Connect TEMP sensor stably.
The measuring data is low.	① The measuring time is short. ② The position of probe	① The measuring time should be long. ② Move the position of probe.

5.2.4 The main trouble of Blood pressure

Failure	Possible cause	Solution
NIBP cuff cannot be inflated	1,Air way is folded or has leakage. 2,The keyboard is bad	1,Adjust or repair the air way. 2, check the cable or replace it
Blood pressure cannot be measured occasionally.	Cuff becomes loose or patient is moving.	Keep the patient quiet; bind the cuff correctly and safely.
Error of blood pressure measurement is too great.	Cuff size does not fit the patient.	Use the cuff with appropriate size.
Cuff inflates repeatedly but no data	Pressure board or the deflation valve have trouble, cuff and the inner pipe of monitor have leakage.	Using other cuff check if the cuff is leak. If the cuff is excellent, you should check if the gas pipe is leak. Finally replace the pressure board and deflation valve.

5.2.5 The main trouble of SpO2

Failure	Possible cause	Solution
No SpO2 waveform	Sensor is damaged.	Replace the sensor and confirm the failure.
SpO2 waveform has strong interference.	① Patient is moving. ② Environment light is very intensive.	① Keep the patient quiet. ② Weaken the light intensity in the environment.
SpO2 value is inaccurate.	Coloring agent has been injected into patient body.	Remove the coloring agent before perform measurement.
SpO2 sensor is hot.	SpO2 sensor is damaged.	Replace the SpO2 sensor.
SpO2 wave displays as infill, no SpO2 data.	CSN801 board has problem.	Replace the board.
SpO2 wave displays as zigzag waveform.	The problem of ground wire	Reconnect the ground wire.

5.2.6 Display failures

Failure	Possible cause	Solution
When powering on the	① Backlight board damage	① Connect external VGA

device, power supply is in normal operation, however, screen goes black during normal operation.	② Bad connecting wire of display ③ Damage of main board ④ The battery is undercharge.	display and confirm the failure. ② Repair or replace connecting wire ③ Replace main board ④ Charge the battery.

5.2.7 Operation, recording, network linking failure

Failure	Possible cause	Solution
Key or rotary encoder is disabled.	① Keyboard or rotary encoder is damaged. ② Connecting wire of keyboard is damaged.	① Replace keyboard or rotary encoder. ② Replaced or repair connecting wire of keyboard.
Sound is raucous or there is no sound.	① Keyboard failure ② Speaker or connecting wire failure.	① Replace keyboard. ② Replace speaker or connecting wire.
Recorder cannot execute printing operation.	① Recorder has no paper. ② Recorder failure ③ Connecting wire of the recorder is damaged. ④ The model of printer has been set incorrectly.	① Install paper. ② Replace the recorder. ③ Replace or repair the connecting wire of the recorder. ④ Set the mode of printer correctly.
Record paper goes out skew.	Bad recorder installing or positioning.	Adjust the installation of recorder.
Cannot be linked into network.	① Network linking wire is damaged. ② Main board failure	① Check and repair network-linking wire. ② Replace main board.

5.2.8 Other troubles

Failure	Possible cause	Solution
Rechargeable battery does not charge.	① The battery is exhausted. ② The power board is damaged.	① Charge for over 24 hours. ② Replace the battery and the power board.
Some parameter areas are blank.	The color setup is incorrect.	Reset the color of parameter.
Not enter the monitor status	Password is locked	Pressing “START” twice, “PRINT” once release lock.
Start the monitor, the monitor can check automatically, but it still stays “starting Rom-Dos”	Mainboard’s BIOS” is damaged	rewrite “BIOS” programme or replace the main board
User Limited. Enter password	1,the expire date is earlier than the current date 2, the runtime is over the usetime 3. the mainboard is bad	1,change the setting 2,change the setting 3,replace it
Boot failure Insert disk in unit A	Mainboard is damaged	replace

5.3 Error Message

Message	Cause of Error
ECG ERROR	Cannot communicate with ECG part of CSN801 board
LDOFF	ECG cable or electrodes are off
PLETH ERROR	Cannot communicate with SPO2 part of CSN801 board
PROBE OFF	SPO2 sensor is off

CHAPTER 6 CALIBRATION OF MONITOR

6.1 Required testing tools

The following tools are required to perform calibration and verification on the MMED6000DP monitor.

- Mercury Manometer
- Patient Simulator(ECG: 30 to 300bpm， 0.5-2.0mV amplitude, 1mV square wave at 10Hz)
- Temperature Simulator（25 to 45℃）
- NIBP Simulator (0 to 250 mmHg)
- Respiration testing tool (Respiration: 30bpm, 0.1 to 3.0 Ohm impedance, baseline impedance 500 Ohm).
- SPO2 signal Simulator

6.2 Power on the monitor

- For AC operation, confirm that AC Power wire is plugged in the connector on the rear panel, and LED Power Indicator is lit Orange.
- For internal battery Operation, confirm that the LED Power Indicator is illuminated Green.
- Confirm that the Screen is displayed without any error messages when powering monitor on.

6.3 Front panel test

6.3.1 Rotary knob test

① Rotate the knob in the clockwise direction while verifying that the highlight moves from icon to icon with a clockwise movement.

② Rotate the knob in the counter-clockwise direction while verifying that the highlight moves from icon to icon with a counterclockwise movement.

③ Highlight any parameter icon, rotate the knob clockwise in the parameter area, verify that the movement of cursor is from up to down.

④ Highlight any parameter icon, rotate the knob counter-clockwise in the parameter area, verify that the movement of cursor is from down to up.

⑤ Highlight the **RETURN** menu item, press the knob and verify that the menu is return to the superior menu.

6.3.2 Verification of Keyboard control

① Press **ALARM** key, observe that the alarm icon in frame of menu status will change.

② Press **SILENCE** key, observe the silence icon in frame of menu status will change.

③ Press **FREEZE** key, one channel of the ECG waveform should be frozen,

④ Press **START** key will start NIBP measurement, and press the key again will cancel this measurement.

⑤ Press **PRINT** key, it can print the relevant waveform and measured data if the printer is installed.

⑥ Press **MENU** key, the display is refreshed.

6.4 Audio system test

- Set the simulation item ON, the detailed operation please refer to the *Section 9.5 ECG Menu of Operator's Manual*
- Select "ON" for SOUND in ECG menu, the detailed operation please refer to the *Section 9.5 ECG Menu of Operator's Manual*
- You will hear the simulated heart beep

6.5 Test of automatic storage

- Enter the ECG setup menu.
- Change the lead setup, e.g. select "aVF" for "LEAD".
- Turn off the monitor, and power on it after 5 minutes.
- The lead should be the value you set up just now.

6.6 Alarm test

6.6.1 ECG alarm test

① Connect the ECG Patient Simulator to the ECG input on the monitor side panel.

② Set the Patient Simulator to output a 1mV QRS pulse at 60bpm, set the lead of ECG submenu as II

③ Set the heart rate high limit as 58bpm, low limit as 30bpm.

④ Set the heart rate alarm as on.

⑤ Verify the heart rate visual and auditory alarms, the heart rate data should flash and "dudu" voice should be heard.

⑥ Disconnect the ECG Patient Simulator

6.6.2 NIBP alarm test

① Connect the NIBP Patient Simulator to the NIBP input on the monitor side panel.

② Set the Patient Simulator to output Systolic: 120, Diastolic: 80

③ Set the systolic high limit as 110, low limit as 60.

④ Set the NIBP alarm as on.

⑤ Verify the systolic visual and auditory alarms, the systolic data should flash and "dudu" voice should be heard.

6.6.3 SPO2 alarm verification

① Connect SPO2 Probe to the SPO2 connector on the monitor side panel.
② Insert the operator's finger into the finger sensor, the SPO2 measured value of healthy person should be 96%.

③ Set the SPO2 high limit as 90, low limit as 80.

④ Set the SPO2 alarm as on.

⑤ Verify the SPO2 visual and auditory alarms, the SPO2 data should flash and "du du" voice should be heard.

⑥ Disconnect the ECG Patient Simulator

6.7 ECG test

① Attach the lead to the ECG patient simulator.

② Set the patient simulator to output a 1mV，10Hz sine wave, set the wave of ECG submenu as 10mm/Mv, the ECG waveform should show the sine wave that the height is 10mm.

③ Set the patient simulator to output a 1mV QRS pulse at 60bpm, set the lead of ECG submenu as II.

④ Verify the ECG waveform moving QRS pulses without jittering, the number indicate an ECG count of 60bpm.

⑤ Set the patient simulator to output a 1mV QRS pulse at 120bpm, verify the ECG waveform moving QRS pulses without jittering and the number indicate an ECG count of 120bpm.

⑥ Set the patient simulator to output a 1mV QRS pulse at 240bpm, verify the ECG waveform moving QRS pulses without jittering and the number indicate an ECG count of 240bpm.

⑦ Set the patient simulator to output a 0.5mV QRS pulse at 30bpm, verify the ECG waveform moving QRS pulses without jittering and the number indicate an ECG count of 30bpm.

⑧ Set the patient simulator to output a 2mV QRS pulse at 240bpm, verify the ECG waveform moving QRS pulses without jittering and the number indicate an ECG count of 240bpm.

6.7.1 ECG LEAD OFF test

Perform the following procedure to verify if the function of ECG Lead Off works orderly.

① Attach the lead to the ECG patient simulator.

② Set the patient Simulator to output a 1.0mV QRS pulse at 60BPM.

③ Select ECG Lead for “Ⅰ”

④ Remove one lead from simulator in turn (that pertains to the selected lead) until all the leads have been tested. In this situation, verify that “LEADOFF” message appears in ECG displaying frame of parameter area in 12S.

⑤ Disconnect the Patient Simulator from the monitor front panel, the “LEADOFF” message appears.

6.7.2 ST segment test

Perform the following procedure to verify if ST segment program works orderly.

① Rotate and press the knob to enter ECG menu.

② Rotate knob to select the lead Ⅱ item.

③ Set Patient Simulator to 1mV, 60bpm, POS at 0.8 setting.

④ Verify ST reading of +0.8 (±0.05).

⑤ Set Patient Simulator to 1mV, 60bpm, POS at -0.8 setting.

⑥ Verify ST reading of -0.8 (±0.05).

6.8 Respiration test

① Attach the lead to the ECG patient simulator.

② Rotate and press the knob to enter RESP menu.

④ Select “INDEP” for “RESPTYPE” item in the RESP submenu.

⑤ Set the Respiration Simulator to 0.5 Ohms impedance with baseline impedance of 1000 Ohms

⑥ Set the Respiration Simulator to 15bpm, verify the RESP waveform correct and the number indicate an RESP count of 15bpm.

⑦ Set the Respiration Simulator to 30bpm, verify the RESP waveform correct and the number indicate an RESP count of 30bpm.

⑧ Set the Respiration Simulator to 60bpm, verify the RESP waveform correct and the number indicate an RESP count of 60bpm.

6.9 Temperature test

① Connect a Temperature Simulator to the T1 input on the monitor side panel.
② Verify the following readings:
1) 30℃±0.1℃
2) 35±0.1℃
3) 40±0.℃

③ Connect a Temperature Simulator to the T1 input on the monitor side panel.
④ Verify the following readings:
1) 30℃±0.1℃
2) 35±0.1℃
3) 40±0.℃

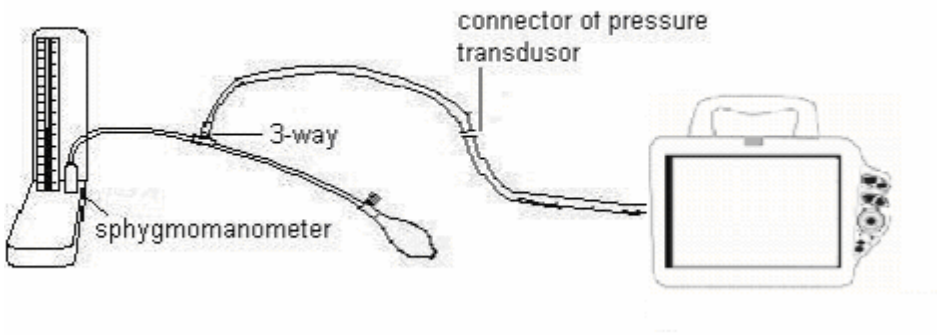
6.10 NIBP test

① Connect the manual mercury manometer to the NIBP socket.
② Set the CAL ON at the NIBP submenu of the monitor.
③ Inflate the cuff pressure manually to 50mmHg according to the reading of the manual mercury manometer, then the cuff reading of the monitor should be 50±3mmHg.
④ Verify the following points
Reading of the manual mercury manometer: 100mmHg
Cuff reading of the monitor : 100±3mmHg
Reading of the manual mercury manometer: 150mmHg
Cuff reading of the monitor : 150±3mmHg
Reading of the manual mercury manometer: 250mmHg
Cuff reading of the monitor : 250±3mmHg
⑤ If an NIBP Simulator is available, test the NIBP range and accuracy as follows:
Adult range and accuracy verification:

Systolic	Diastolic	Tolerance
60	30	±5mmHg
80	50	±5mmHg
120	80	±5mmHg
150	100	±10mmHg
200	150	±10mmHg

NOTE: the uncertainty specifications of the NIBP Simulator must be added to the monitor tolerances for proper accuracy verification.

⑥ Test of over pressure:
1) Connect a sphygmomanometer to the NIBP inflate port as following figure.



2) If the patient selection is NEONATTE (located under the NIBP icon), perform the following to select ADULT:
a) Turn the Rotary Knob to highlight NIBP icon.
b) Press the Rotary Knob to select NIBP menu.
c) Turn the Rotary Knob to highlight MODE selection
d) Press the Rotary Knob and select AUTO selection.

3) Perform the following to set CAL ON:
   a) Turn the Rotary Knob to highlight NIBP icon.
   b) Press the Rotary Knob to select NIBP menu.
   c) Turn the Rotary Knob to highlight ALARM selection
   d) Press the Rotary Knob to select ALARM selection.
   e) Turn the Rotary Knob to highlight CAL selection
   f) Press the Rotary Knob to select CAL selection.
   g) Turn the Rotary Knob to select ON selection.

4) Inflating the cuff manually by pressing the rubber ballonet. With the pressure rising, the reading of sphygmomanometer is higher. When the pressure over 280mmHg, the valve should deflate.

6.11 SPO2 test

① Connect SPO2 Probe to the SPO2 connector on the monitor side panel.
② Insert the operator's finger into the finger sensor, the SPO2 measured value of healthy person should be from 95% to 99%, and the pulse rate is same as heart rate, the waveform of the SPO2 is smooth with no step.
③ If SPO2 Simulator is available, verify the accuracy of Oxygen Saturation Value with BCI probes as follows:

Oxygen Saturation	Tolerance
96%	±2%
86%	±2%
76%	±3%

CHAPTER 7 ADJUSTMENT PROCEDURE

NOTE
The MMED6000DP Monitor contains a great number of Static Sensitive circuits. All service procedures must be done by grounded personnel.

7.1 ECG adjustment

ECG gain is fixed. User cannot adjust it. If ECG gain dose not meet the standard demand. Please contact the service person of Choice Co.

7.2 NIBP adjustment

7.2.1 Cuff pressure calibration
Perform cuff pressure calibration as follows:

① Connect a manometer with the NIBP inflating port as Fig. 7-1

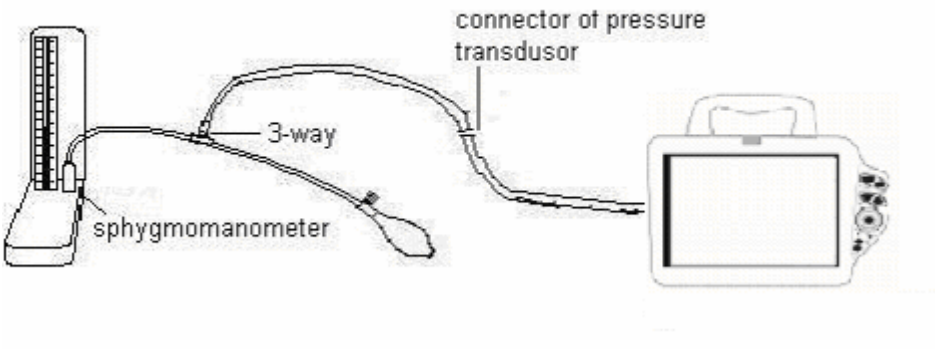


Fig. 7-1

② Perform the following to set CAL ON:
   a) Rotate and press the knob to enter NIBP menu.
   b) Then highlight “ALARM” to select the submenu.
   c) Select “ON” for “CAL”.

③ Inflate the cuff manually by pressing the rubber ballonet.

④ Inflate the cuff to 200mmHg and observe the NIBP value displayed on the monitor, if which equals to the value displayed on the manometer.

⑤ If the error exceeds 3mmHg, adjust the VR1 on the CSN801 board shown as Fig. 7-2.

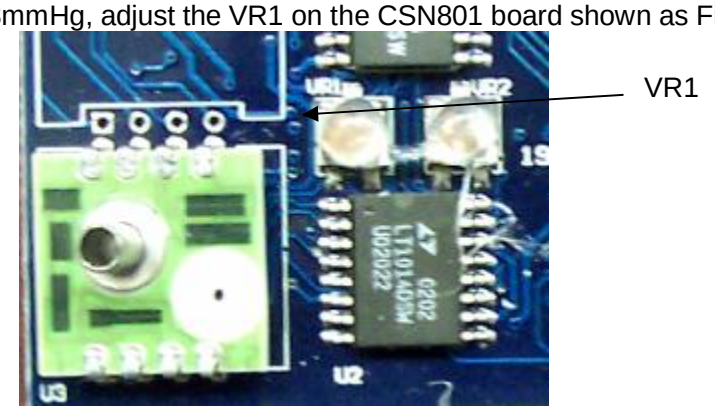


Fig. 7-2

1.2.2 Setup of deflection and offset
Rotate the knob to call up “ALARM” submenu of NIBP, set the high limit and low limit to maximum. For example, if you want to adjust systolic, set the high limit of systolic to 255, low limit to 220, then press RETURN to return the superior menu, next press RETURN of the

superior menu again back the main menu, at that time, you will find NIBP menu has changed as Fig.7-3:

Fig.7-3

SYSQUTY: quotiety of diastolic and systolic value
SYSOFFS: offset of diastolic and systolic value

7.3 SpO2 adjustment

① Rotate the knob to highlight the SPO2 icon in the displaying area, pick the SpO2 icon to call up the SpO2 setup menu as Fig. 7-4

Fig.7-4

② Then press ALARM icon to enter ALARM submenu, set the high limit to 100(maximum), and low limit to 99(maximum).

Fig.7-5

③ Press RETURN to enter the SpO2 main menu, which has changed as Fig.7-6, “OFFSET” item displays on the screen. You can adjust the value in this item. For Example, if the SpO2 value is 3 lower than standard, you can adjust OFFSET value as “3” (Figure 4); If the value is higher than standard, you can adjust value as “–2”.

Fig.7-6

CHAPTER 8 DISASSEMBLY PROCEDURE

8.1 Battery disassembly

① Remove AC power wire from monitor rear panel.

②Open the cover of battery and then press baffle. The battery can be pushed out automatically.

Fig. 8-1

Fig. 8-2

8.2 Monitor disassembly

NOTE

The disassembly procedures should be performed by qualified person.

Perform the following procedure to open external cabinet:

① Unscrew the fixing screws from the rear panel of monitor.

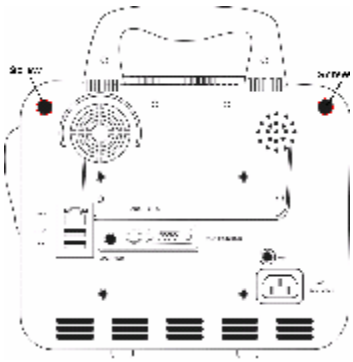


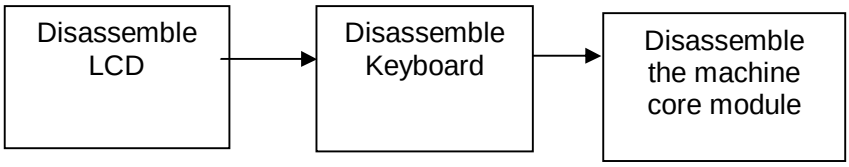
Fig.8-3

②After opening the front panel, the inside components are exposed.

Fig.8-4

8.3 Other parts disassemble order

After disassembling the battery, disassemble other parts according to the following order.



8.3.1 Remove the cables from key board.

Fig.8-5

8.3.2 Use screwdriver to remove the screw and remove the TFT

Fig.8-6

8.3.3 Use screwdriver to remove the main board and power board. Then you could see the picture of Fig.8-7.

Fig.8-7

8.3.4 Remove the four screws from the back panel. Then the machine core could be removed out from the panel.

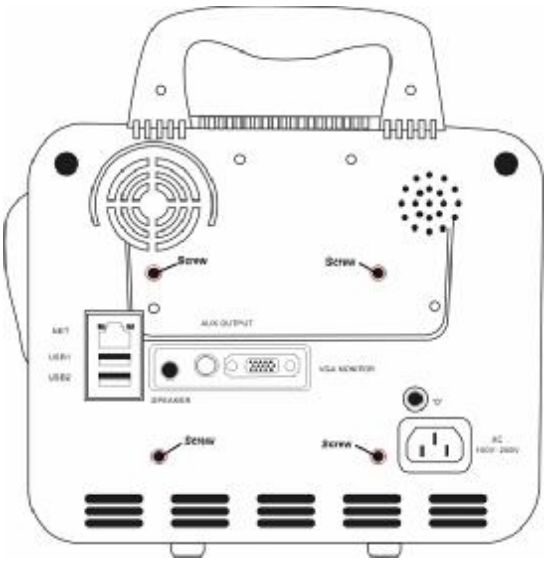


Fig.8-8

CHAPTER 9 CLEANING AND DISINFECTION

NOTE

Before cleaning the monitor or the sensor, make sure to turn off the power and disconnect the AC power.

9.1 Maintenance checks

Before using the monitor, do the following:

1. Check if there is any mechanical damage;
2. Check all the outer cables, inserted modules and accessories;
3. Check all the functions of the monitor to make sure that the monitor is in good condition.

If finding any damage on the monitor, stop using the monitor on patient. The overall check of the monitor, including the safety check, should be performed only by qualified person once every 6 to 12 month and each time after fix up.

9.2 General cleaning

1. MMED6000DP Patient Monitor must be kept dust-free.

2. It is recommended to regularly cleaning the monitor shell and the screen. Use only non-caustic detergents such as soap and water.

NOTE

Please pay special attention to the following items to avoid damaging MMED6000DP:

1. **Avoid using ammonia-based or acetone-based cleaners such as acetone.**
2. **Most cleaning agents must be diluted before use. Follow the manufacturer's directions carefully for dilution.**
3. **Do not use the grinding material, such as steel wool etc.**
4. **Do not let the cleaning agent enter into the chassis of the system. Do not emerge any part of the device into any liquid.**
5. **Do not leave the cleaning agents on any part of the device surface.**
6. **Except for those cleaning agents listed in "NOTE" part, following disinfectants can be used on the instrument:**

- **Diluted Ammonia Water**

- **Diluted Sodium Hyoichlo (Bleaching agent).**

NOTE

The diluted sodium hyoichlo from 500ppm(1:100 diluted bleaching agent) to 5000ppm (1:10 bleaching agents) is very effective. The concentration of the diluted sodium hyocihlo depends on how many organisms (blood, mucus) on the surface of the chassis to be cleaned.

- **Diluted Mindrayhylene Oxide 35% -- 37%**
- **Hydrogen Peroxide 3%**
- **Alcohol**
- **Isopropanol**

NOTE

- **MMED6000DP monitor and sensor surface can be cleaned with hospital-grade ethanol and dried in air or with soft and clean cloth.**
- **Choice Co. has no responsibility for the effectiveness of controlling infectious disease using these chemical agents. Please contact infectious disease experts in your hospital for details.**

9.3 Sterilization

To avoid extended damage to the equipment, sterilization is only recommended when stipulated as necessary in the Hospital Maintenance Schedule. Sterilization facilities should be cleaned first.

Recommended sterilization material: Ethylate, and Acetaldehyde.

CAUTION

1. **Follow the manufacturer's instruction to dilute the solution, or adopt the lowest possible density.**
2. **Do not let liquid enter the monitor.**
3. **No part of this monitor can be subjected to immersion in liquid.**
4. **Do not pour liquid onto the monitor during sterilization.**
5. **Use a moistened cloth to wipe off any agent remained on the monitor.**
6. **To avoid extended damage to the equipment, disinfecting is only recommended when stipulated as necessary in the Hospital Maintenance Schedule. Disinfecting facilities should be cleaned first.**
7. **Appropriate disinfecting materials for ECG lead, SpO2 sensor, blood pressure cuff, TEMP probe, IBP sensor are introduced *Operator's Manual* respectively.**
8. **Do not use EtO gas or formaldehyde to disinfect the monitor.**

9.4 Precondition and cleaning

NOTE

Before cleaning the monitor or the sensor, make sure to turn off the power and disconnect the AC power.

If ECG cable is damaged or aged, replace with a new ECG cable.

1 Cleaning

MMED6000DP monitor and sensor surface can be cleaned with hospital-grade ethanol and dried in air or with soft and clean cloth.

2 Sterilization

To avoid extended damage to the equipment, sterilization is only recommended when stipulated as necessary in the Hospital Maintenance Schedule. Sterilization facilities should be cleaned first.

3 Materials recommended for use in sterilization

Ethylate: 70%
ethanol: 70%
Acetaldehyde

4 Disinfection

To avoid extended damage to the equipment, disinfection is only recommended when stipulated as necessary in the Hospital Maintenance Schedule. Disinfection facilities should be cleaned first.

9.5 TEMP sensor cleaning and disinfection

1. The TEMP probe should not be heated above 100℃ (212℉). It should only be subjected briefly to temperatures between 80℃ (176℉) and 100℃ (212℉).
2. The probe must not be sterilized in steam.
3. Only detergents containing no alcohol can be used for disaffection.
4. The rectal probes should be used, if possible, in conjunction with a protective rubber cover.
5. To clean the probe, hold the tip with one hand and with the other hand rubbing the probe down in the direction of the connector using a moist lint-free cloth.

NOTE

- **Disposable TEMP probe must not be re-sterilized or reused.**
- **For protecting environment, the disposable TEMP probe must be recycled or disposed of properly.**

9.6 SpO2 sensor cleaning and disinfection

NOTE

Do not subject the sensor to autoclaving.
Do not immerse the sensor into any liquid.
Do not use any sensor or cable that may be damaged or deteriorated.

1. Use a cotton ball or a soft mull moistened with hospital-grade ethanol to wipe the surface of the sensor, and then dry it with a cloth. This cleaning method can also be applied to the luminotron and receiving unit.

2. The cable can be cleaned with 3% hydrogen dioxide, 7% isopropanol, or other active reagent. However, connector of the sensor shall not be subjected to such solution.

CHAPTER 10 WARRANTY

10.1 Warranty and repair

⑴Repair response time: AM9:00 to PM17: 30 on Monday to Friday except legal holiday.
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⑵Repair service: Including telephone support, field inspecting, fittings replacement.

- Telephone support: we can give guidance to customer's engineer to inspecting the instrument when you dial our service line (**86-10-86863551**). Professional repair engineer online provides technical support.
- Field inspecting: we will send engineers to repair the instrument if necessary. Certified engineers of our company or local repair team trained by our company provide this service.
- Fittings replacement: if necessary, we will replace the damaged fittings according to contract. The damaged fittings should be returned to us expect for special reason.

⑶ Spare machine for repair: it is used to replace the damaged machine for customer using, customer should send the damaged machine to us to repair.

⑷ Repair for sponsoring and contributing machine: customer should send the machine to us to repair.

⑸ Updating software is free.

10.2 Exemption and restriction

⑴ Warranty does not apply to the damage or loss sustained due to well-known act of god, such as fire, earthquake, flood, thunder, cyclone, hail, electrical storm, blast, building collapse, commotion, etc.

⑵ Non-service items:

① The cost and insurance of dismantling and testing, overhauling, reinstall, transfer, moving the instrument or parts.

② Damage or loss sustained due to inspected or repaired by other institute that is not certified

③ Damage or alteration by anyone other than our company authorized service personnel.

⑶ The damage or lose sustained due to connection to peripheral equipment (such as printer, computer etc.), that are not provided by our company are not covered by the warranty.

⑷Obligation restriction: In the duration of warranty, if the operators use other fittings that are not provided by us, we reserve the right to cancel warranty.

10.3 Customer guarantee

⑴ Read the user manual in details before operation.

⑵ Operation and maintenance according to the user manual, and guarantee the requests of power and environment.

10.4 Non-warranty and non-replacement policy

- The work environment is not eligible. For example, if the relative humidity exceeds 70%, circuit boards of the instrument may be damaged due to condensate.
- If voltage of power supply is fluctuant and exceeds 240VAC, the power adapter may

be damaged.

- There is smear or marks that are not belong to the instrument and cannot be removed from the outside surface of the instrument.
- The instrument or its fittings are mechanically damaged.
- The circuit is short and damaged due to liquor or other stuff flow in the instrument or its fittings.
- All probe and its accessories are not free replacement.
- Leakage of air cell of blood pressure sleeve due to improper storage or operation is not free replacement.
- The malfunction with result form improper repair by anyone other than our company authorized service personnel.
- The malfunction with result from improper use.

10.5 Customer special warranty period

Due to we stipulate the warranty period according to the relevant electronic regulation of country, which we stipulate is on year, accessory is three months. When customer requires to extending the warranty period, you should consider whether it is reasonable. Because electronic product quickly replace, as to the warranty period over three years, purchased accessories may be out of stock. In this case, we will adopt to entirely upgrade or replace the old, you should pay the minimum acceptable cost of renewed device.

10.6 Repackaging

Remove all the detectors, leads and accessories and put them into the plastic bag.

Try to use the original packaging case and materials. Any damage due to the improper packaging during the transportation shall be responsible by the user.

If you are still within the period of warranty, please present the warranty card and one copy of the invoice or receipt.

Please present a written note detailing all the troubles when repairing the instrument.