Underwriters Laboratories (UL LLC)
Safety Certification (Manufacturing Factory) Report

Model:	ZX-PCD-C6001-ZF and ZX-PCE-C6000-ZF
Device Description:	Temperature Controller
Applicant:	JIAXING ZHONGXIN MEDICAL INSTRUMENTS CO.,LTD Shendang Industrial Zone Haiyan , Zhejiang 314311 China
Manufacturer:	Same as Applicant
Manufacturing Facility(ies):	Shanghai Peaks Measure&Control Tech Ltd 3F.,No.165 Dakang Road,Baoshan District Shanghai China
Report No.:	E480046-D1000-1/A0/C0-(M)
Report (Re)Issue Date:	2017-9-22
Base Standard(s):	UL 61010-1, 3rd Edition, May 11, 2012, Revised July 15 2015, CAN/CSA-C22.2 No. 61010-1-12, 3rd Edition, Revision dated July 2015
Additional Standards:	N/A
Report Types:	This report consists of the following report types: [Yes] US Certification (UL Listing) [Yes] CAN Certification (cUL Listing)

This report covers the Safety evaluation of the referenced model(s) according to the standard(s) specified above.

This is the Manufacturing Factory report only, which is used as part of the factory FUS inspections.

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APPENDIX A: Enclosures

All Enclosures associated with this report are shown below.

Enclosures

Supplement - (ID)	Description
Diagrams - (01)	Transformer specification PS-13-U(110V)
Diagrams - (02)	Transformer specification PS-13-U(220V)
Manuals - (01)	ZX-PCD-C6001-ZF Product Manual -V06
Manuals - (02)	ZX-PCE-C6000-ZF Product Manual -V06
Marking Label - (01)	label
Photographs - (01)	01.Overall view of ZX-PCE-C6000-ZF
Photographs - (02)	02.Side view of ZX-PCE-C6000-ZF
Photographs - (03)	03.Top view of ZX-PCE-C6000-ZF
Photographs - (04)	04.Bottom view of ZX-PCE-C6000-ZF
Photographs - (05)	05.Internal view of ZX-PCE-C6000-ZF
Photographs - (06)	06.POW board of ZX-PCE-C6000-ZF (side A)
Photographs - (07)	07.POW board of ZX-PCE-C6000-ZF (side B)
Photographs - (08)	08.Main board of ZX-PCE-C6000-ZF (side A)
Photographs - (09)	09.Main board of ZX-PCE-C6000-ZF (side B)
Photographs - (10)	10.Front view of ZX-PCD-C6001-ZF
Photographs - (11)	11.Side view of ZX-PCD-C6001-ZF
Photographs - (12)	12.Rear view of ZX-PCD-C6001-ZF
Photographs - (13)	13.Internal view of ZX-PCD-C6001-ZF
Photographs - (14)	14.Main board of ZX-PCD-C6001-ZF
Schematics + PWB - (01)	PCD-MAIN_Board
Schematics + PWB - (02)	PCD-POW-SSR_Board
Schematics + PWB - (03)	PCE-MAIN_Board
Schematics + PWB - (04)	PCE-POW_Board

Diagrams - (01) Transformer specification PS-13-U(110V)

Diagrams - (01) Transformer specification PS-13-U(110V)

从鑫电子 Congxin Electronics

SPECIFICATION FOR APPROVAL

CUSTOMER: PZ01

PRODUCT NAME:TRANSFORMER

CUSTOMER MODEL:PS-13-U(110V)

CX P/N: CX-41-13228

DATE:Mar.17.17

PREPARED BY	CHECKED BY	ARRPOVED BY	CUSTOMER APPROVAL
Tina Mar.17.17	Glenn Mar.17.17	Glenn Mar.17.17	

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Diagrams - (01) Transformer specification PS-13-U(110V)

CUSTOMER	PZ001	PART NO.	CX 41 13228	REV. : A
CUSTOMER MODEL:	PS-13-U (110V)	DATE:	Mar. 17. 17	SHEET 1 OF 5

1. HISTORY

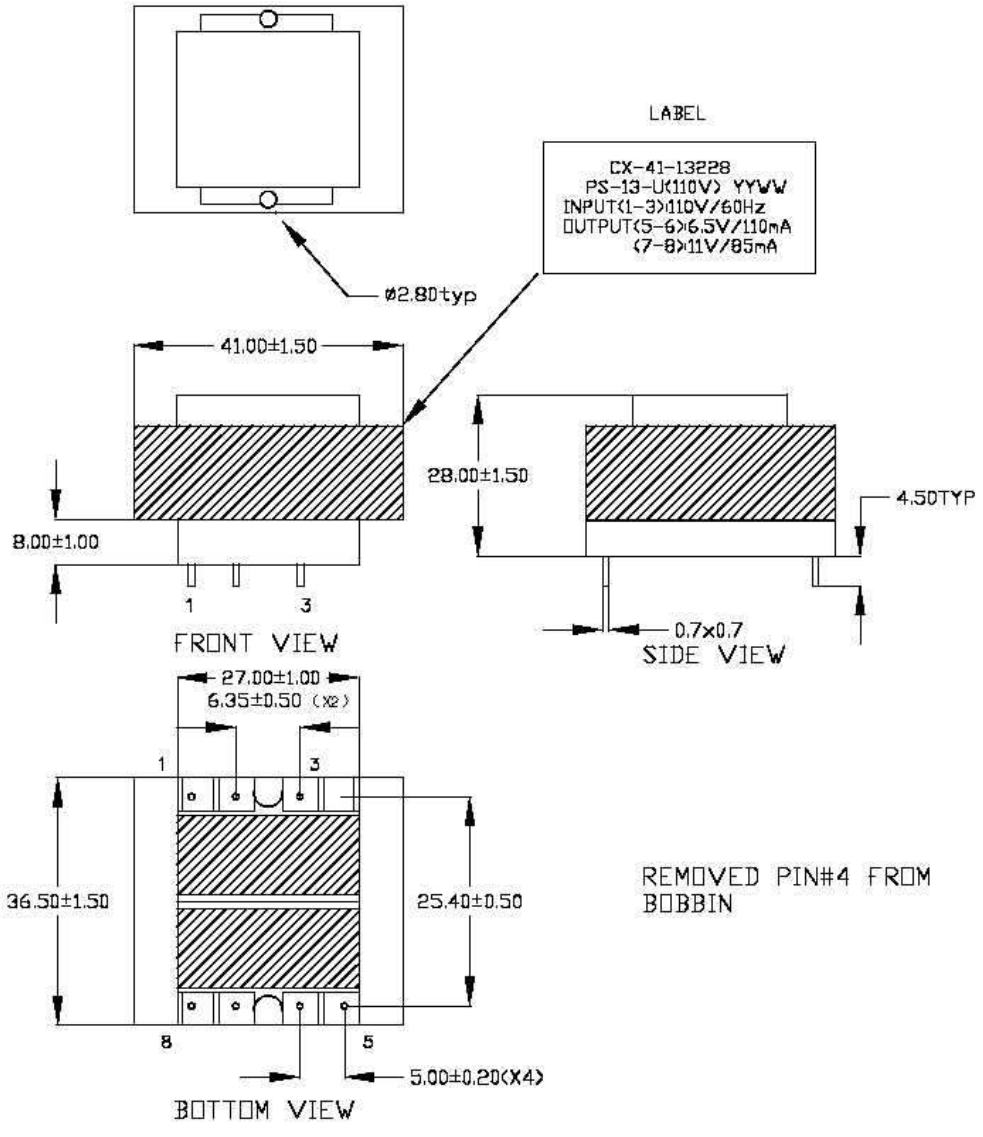
Rev. #	Date	Was	Is	Approved

Diagrams - (01) Transformer specification PS-13-U(110V)

CUSTOMER	PZ001	PART NO.	CX 41 13228	REV. : A
CUSTOMER MODEL:	PS-13-U (110V)	DATE:	Mar. 17. 17	SHEET 2 OF 5

2. OVERALL DRAWING

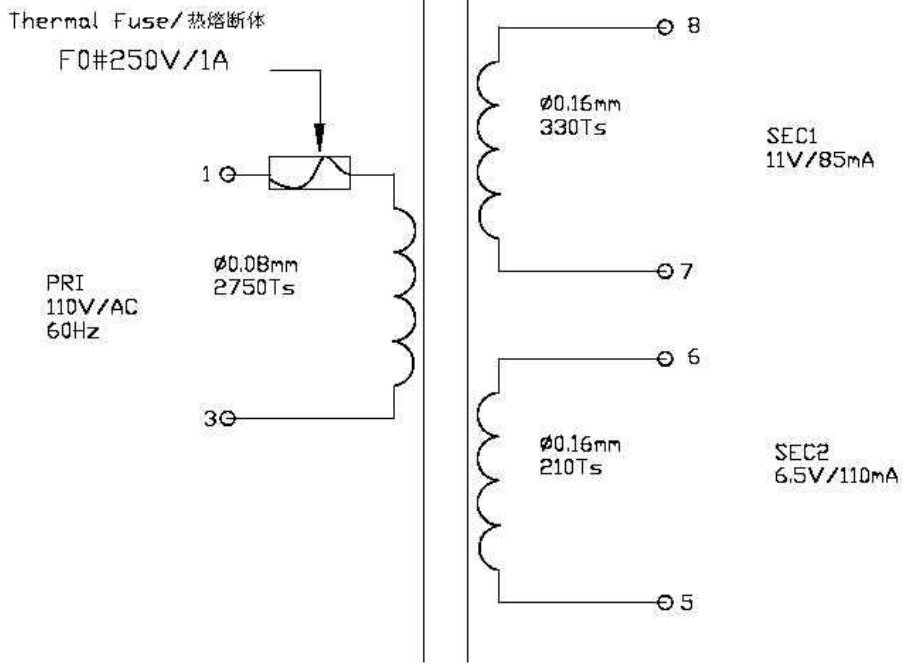
Units: mm

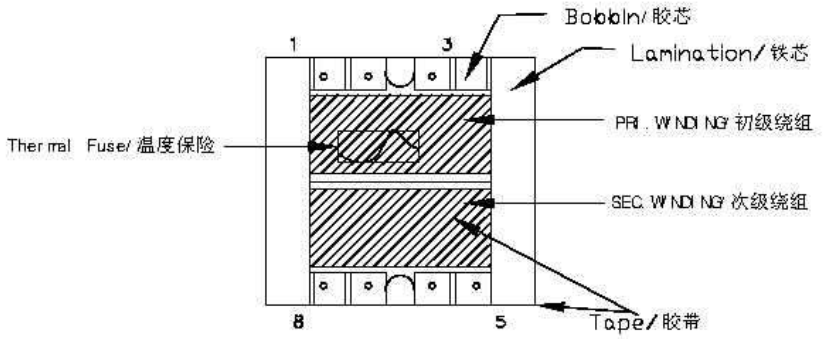


Diagrams - (01) Transformer specification PS-13-U(110V)

CUSTOMER	PZ001	PART NO.	CX 41 13228	REV. : A
CUSTOMER MODEL:	PS-13-U (110V)	DATE:	Mar. 17. 17	SHEET 3 OF 5

3. CIRCUIT DIAGRAM



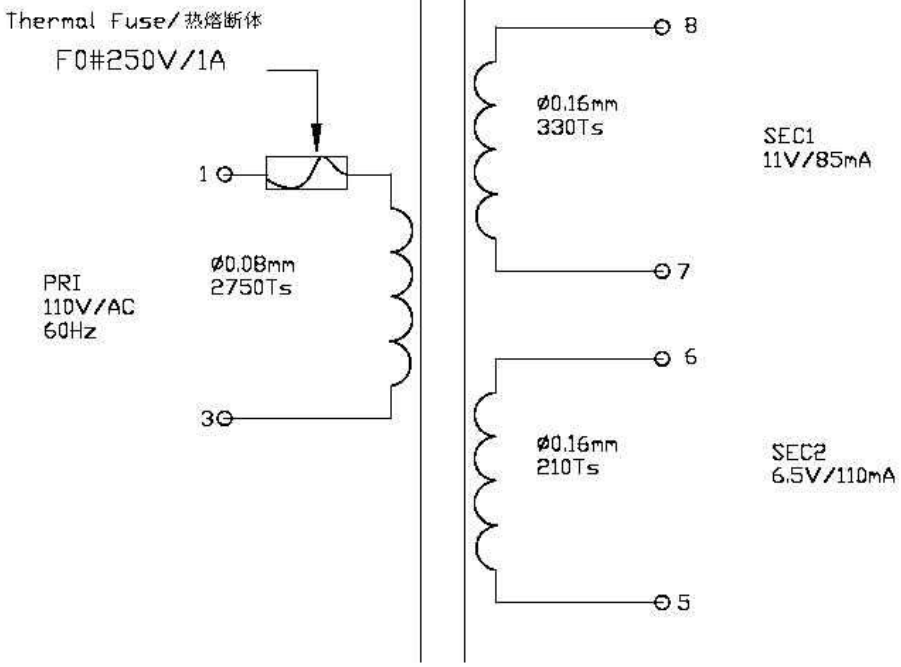


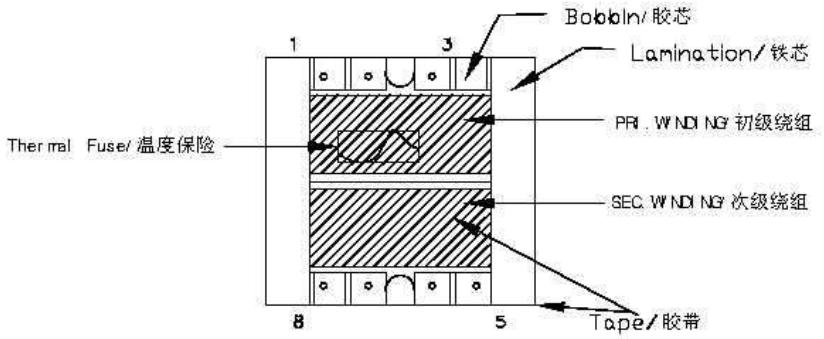
BOTTOM VIEW

Diagrams - (01) Transformer specification PS-13-U(110V)

CUSTOMER	PZ001	PART NO.	CX 41 13228	REV. : A
CUSTOMER MODEL:	PS-13-U (110V)	DATE:	Mar. 17. 17	SHEET 3 OF 5

3. CIRCUIT DIAGRAM





BOTTOM VIEW

Diagrams - (01) Transformer specification PS-13-U(110V)

CUSTOMER	PZ001	PART NO.	CX 41 13228	REV. : A
CUSTOMER MODEL:	PS-13-U (110V)	DATE:	Mar. 17. 17	SHEET 4 OF 5

4. ELECTRICAL CHARACTERISTICS

(ELECTRICAL SPECIFICATIONS AT 23° C)

4.1. EXCITATION CURRENT: 15mA MAX @ 110V/60HZ (PIN#1-3).

4.2. OUTPUT: P7-8=12.8V±5% @ 110V/60HZ NO LOAD

OUTPUT: P7-8=11.0V±0.5V @ 110V/60HZ 85mA LOAD

OUTPUT: P5-6=8.2V±5% @ 110V/60HZ NO LOAD

OUTPUT: P5-6=6.5V±0.5V @ 110V/60HZ 110mA LOAD

4.3. DCR: R1-3=0.55KOHMS±25%

4.4. HI-POT: P-S,C@3000V/AC 1mA 60S , S-C@1500V/AC,1mA,60S,

4.5. INSULATED RESISTANCE:100MOHMS MIN DC500V@PRI TO SEC WINDINGS TO CORE

4.6. Temperature Rise:50C Max

5. NOTE

5.1 ALL WINDINGS CONSTRUCTION AS FIGURE SHOWN.

5.2 UPEND INSULATION WITH 1PCS TAPE, FLASH GUARD WITH 2 LAYERS TAPE.

5.3 WRAP CORE WITH 2 LAYERS TAPE

5.4 THE UNIT MUST BE IMPREGNATE WITH VARNISH.

Diagrams - (01) Transformer specification PS-13-U(110V)

CUSTOMER	PZ001	PART NO.	CX 41 13227	REV. : A
CUSTOMER MODEL:	PS-13-U	DATE:	Mar. 17. 17	SHEET 5 OF 5

6. MATERIALS LIST

No.	Item	Description	Manufacturer	UL FILE No.
1.	LAMINATION	EI41 H5050-N	ZHONG SHAN NAN FANG ELEC CO.,LTD	
2	WIRE	2UEW/130	CHANGZHOU DAYANG WIRE & CABLE CO LTD	E158909
3	BOBBIN&CASE	FR530(L)(+)(f1)	E I DUPONT DE NEMOURS & CO INC	E41938
4	TAPE	JY25-A 0.025mm(T)	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	E246950
5	SOLDER	Sn96.5Ag2.0Cu0.5	FU YANG	
6	VARNISH	ET-90(a)	SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO LTD	E228349
7	LABEL	WATERPROOF 28.00x15.00mm	CCL DESIGN (SUZHOU) CO LTD	MH26214
8	THERMAL FUSE	F0#250V/1A	XIAMEN SET ELECTRONICS CO LTD	E214712
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Diagrams - (02) Transformer specification PS-13-U(220V)

Diagrams - (02) Transformer specification PS-13-U(220V)

从鑫电子 Congxin Electronics

SPECIFICATION FOR APPROVAL

CUSTOMER: PZ01

PRODUCT NAME:TRANSFORMER

CUSTOMER MODEL:PS-13-U(220V)

CX P/N: CX-41-13227

DATE:Mar.17.17

PREPARED BY	CHECKED BY	ARRPOVED BY	CUSTOMER APPROVAL
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Diagrams - (02) Transformer specification PS-13-U(220V)

CUSTOMER	PZ001	PART NO.	CX 41 13227	REV. : A
CUSTOMER MODEL:	PS-13-U	DATE:	Mar. 17. 17	SHEET 1 OF 5

1. HISTORY

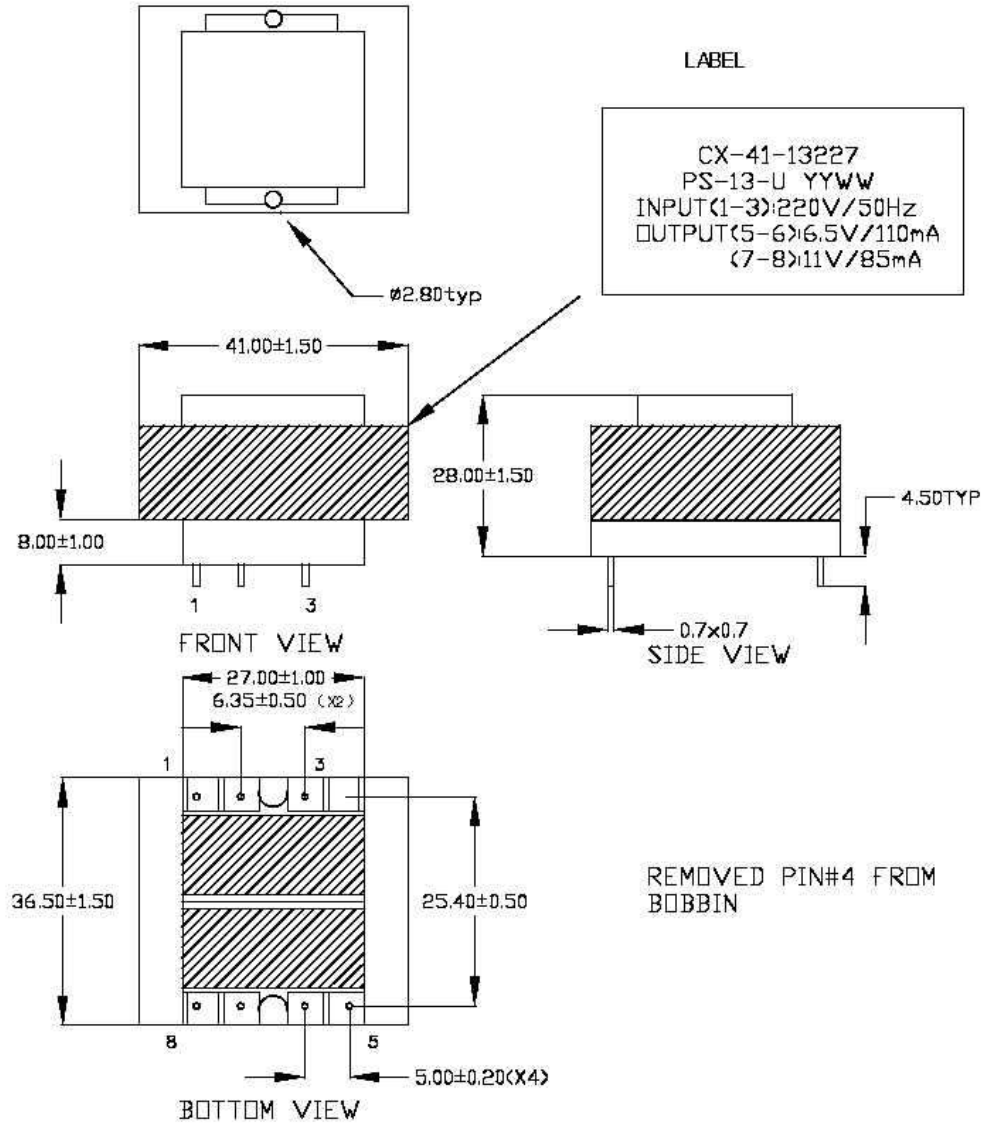
Rev. #	Date	Was	Is	Approved

Diagrams - (02) Transformer specification PS-13-U(220V)

CUSTOMER	PZ001	PART NO.	CX 41 13227	REV. : A
CUSTOMER MODEL:	PS-13-U	DATE:	Mar. 17. 17	SHEET 2 OF 5

2. OVERALL DRAWING

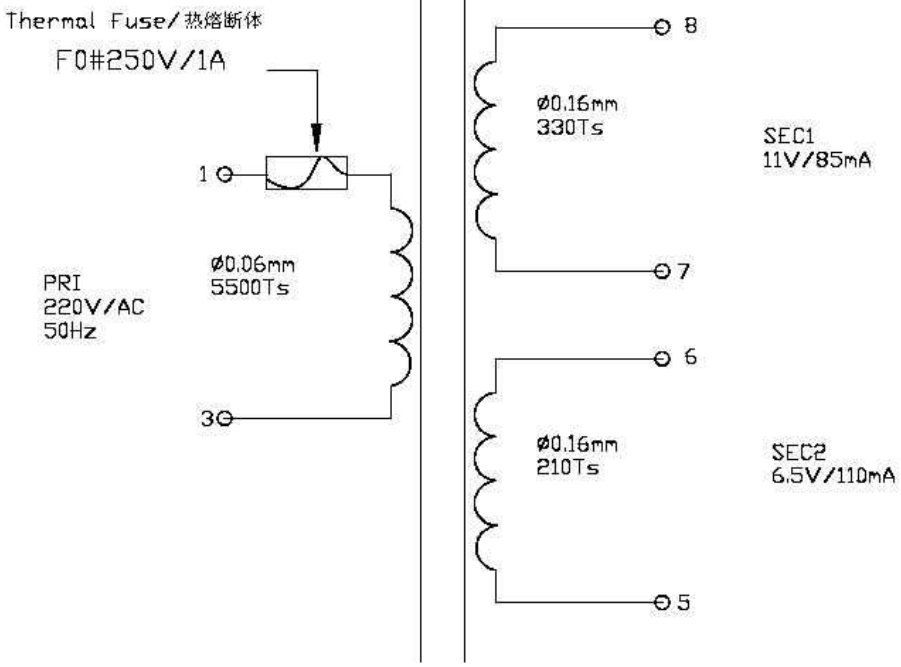
Units: mm

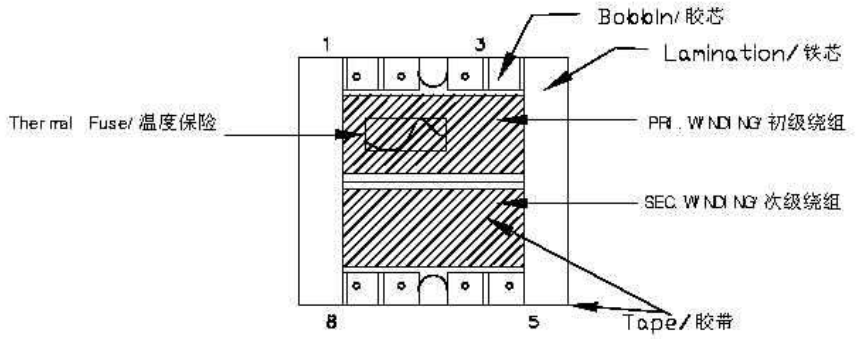


Diagrams - (02) Transformer specification PS-13-U(220V)

CUSTOMER	PZ001	PART NO.	CX 41 13227	REV. : A
CUSTOMER MODEL:	PS-13-U	DATE:	Mar. 17. 17	SHEET 3 OF 5

3. CIRCUIT DIAGRAM





BOTTOM VIEW

Diagrams - (02) Transformer specification PS-13-U(220V)

CUSTOMER	PZ001	PART NO.	CX 41 13227	REV. : A
CUSTOMER MODEL:	PS-13-U	DATE:	Mar. 17. 17	SHEET 4 OF 5

4. ELECTRICAL CHARACTERISTICS

(ELECTRICAL SPECIFICATIONS AT 23° C)

4.1. EXCITATION CURRENT: 15mA MAX @ 220V/50HZ (PIN#1-3).

4.2. OUTPUT: P7-8=12.8V±5% @ 220V/50HZ NO LOAD

OUTPUT: P7-8=11.0V±0.5V @ 220V/50HZ 85mA LOAD

OUTPUT: P5-6=8.2V±5% @ 220V/50HZ NO LOAD

OUTPUT: P5-6=6.5V±0.5V @ 220V/50HZ 110mA LOAD

4.3. DCR: R1-3=2.20KOHMS±25%

4.4. HI-POT: P-S,C@3000V/AC 1mA 60S , S-C@1500V/AC,1mA,60S,

4.5. INSULATED RESISTANCE:100MOHMS MIN DC500V@PRI TO SEC WINDINGS TO CORE

4.6. Temperature Rise:50C Max

5. NOTE

5.1 ALL WINDINGS CONSTRUCTION AS FIGURE SHOWN.

5.2 UPEND INSULATION WITH 1PCS TAPE, FLASH GUARD WITH 2 LAYERS TAPE.

5.3 WRAP CORE WITH 2 LAYERS TAPE

5.4 THE UNIT MUST BE IMPREGNATE WITH VARNISH.

Diagrams - (02) Transformer specification PS-13-U(220V)

CUSTOMER	PZ001	PART NO.	CX 41 13227	REV. : A
CUSTOMER MODEL:	PS-13-U	DATE:	Mar. 17. 17	SHEET 5 OF 5

6. MATERIALS LIST

No.	Item	Description	Manufacturer	UL FILE No.
1.	LAMINATION	EI41 H5050-N	ZHONG SHAN NAN FANG ELEC CO.,LTD	
2	WIRE	2UEW/130	CHANGZHOU DAYANG WIRE & CABLE CO LTD	E158909
3	BOBBIN&CASE	FR530(L)(+)(f1)	E I DUPONT DE NEMOURS & CO INC	E41938
4	TAPE	JY25-A 0.025mm(T)	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	E246950
5	SOLDER	Sn96.5Ag2.0Cu0.5	FU YANG	
6	VARNISH	ET-90(a)	SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO LTD	E228349
7	LABEL	WATERPROOF 28.00x15.00mm	CCL DESIGN (SUZHOU) CO LTD	MH26214
8	THERMAL FUSE	F0#250V/1A	XIAMEN SET ELECTRONICS CO LTD	E214712
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Manuals - (01) ZX-PCD-C6001-ZF Product Manual -V06

Manuals - (01) ZX-PCD-C6001-ZF Product Manual -V06

ZX-PCD-C6001-ZF Series intelligent temperature controller

USER MANUAL

Before you carefully read and fully understand this manual, please do not operate this product.

PREFACE

This manual is written to need the products for wiring, installation, and maintenance personnel, this operating manual contains the operation method, function, connection, and matters needing attention. Therefore, you should keep this manual at hand in the operation and use of this instrument, ensure that have seen all the precautions and follow the manual method.

1. Safety rules

The safety rules related to the equipment damage and preventive measures, see below the title in the additional notes and comments.

⚠ **Warning: If you do not follow the instructions may cause injury or death.**

⚠ **Attention : If you do not comply with the instructions may cause damage to the equipment.**

⚠ Warning

This series product is designed for general industrial equipment to temperature control. You shall take appropriate safety measures and avoid use in the control occasions with a serious effect on life.

- In order to avoid personnel contact, terminal of the controller should be placed on the control box.
- Don't use electricity conductor or any part of the body contact with any components in addition to plastic shell and sticker, otherwise may cause electric shock, death or serious injury.

⚠ Attention

If because the controller failure cause harm to peripheral instruments or equipment, you shall take appropriate safety measures, such as installing fuse or overheating protection device.
The manufacturer should not be responsible for the accident caused by the absence of proper safety.

- Must install the power switch or circuit breaker as the measures to cut off the external power supply circuit that is connected to the controller power supply side.
- The fuse
  This controller has no built-in fuse, users must install a fuse in the power supply.
  The fuse rating: 250V AC, 0.5 A
- Load current and the voltage should be within the rating when connected to the output. Use more than rating load may shorten the life of the controller, could also lead to device failure. About the rating, see "4. Technical specifications".
- Please ensure correct wiring of the sensor input , or may result in equipment failure.
- Using this controller, the ambient temperature are required to no more than 50℃, otherwise may shorten the life of the product or cause equipment failure or fire.
- Users do not use this non-design way to revise the controller or use it.

2. Introduce

2-1. Model code

ZX-PCD-C6001-ZF 110V

Type series — 110V: The power supply voltage is 110V AC
IV: The power supply voltage is 220V AC

2-2. Use attention

Don't use hard or sharp objects to press the front panel of the controller, press gently with your finger tip.

When cleaning, wipe gently with a dry cloth, do not use the solvent of thinner type.

Manuals - (01) ZX-PCD-C6001-ZF Product Manual -V06

3. Installation and wiring

3-1. Installation occasion (environment)

Work environment conditions

- must be used indoors
- The highest elevation: 2000m
- The environment temperature: -10~50℃
- Environmental humidity:
  Max 85 % RH, No condensation
- The surge overvoltage level: II
- Pollution level: 2

⚠ Attention

Don't use the controller in the following occasion, otherwise may cause equipment failure, danger and fire.

- In the place of full of flammable gas, corrosive gases.
- In place of strong vibration or impact.
- Near the large current lines or disturbed by it.
- In the place of water drop and air that is easy to produce the dew.

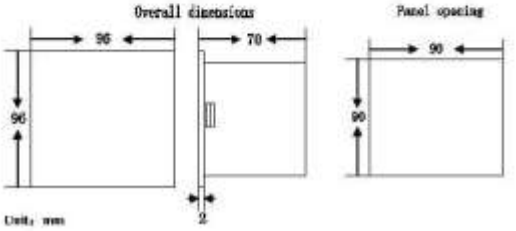
3-2. Installation

⚠ Attention

In order to ensure safety and performance, don't remove the shell of the controller.

- In order to install controller on the equipment, see the overall dimensions and panel opening in section 3-3 .
- The thickness of the equipment panel should be followed: 0.8~1.2mm
- The controller's shell has a clip for assembly. With the display side of controller upward, vertically insert the controller from the front of the equipment panel.
- The equipment using this product should be a ventilation, the controller's environment temperature should be less than 50 ℃.

3-3. Overall dimensions and panel opening



3-4. wiring

⚠ Attention

- Please be sure to cut off the power before wiring, otherwise may cause electric shock.
- Do not touch terminals or other electrically charged components after electrify, otherwise may cause electric shock.
- Please refer to this manual carefully before deciding to choose the conductor temperature of the connection (installation terminal).

Need to adopt the following safety measures when wiring.

- Wiring according to the figure 1 and figure 2 terminal, check and confirm the correct.
- PT100 platinum resistance input, each lead resistance should be less than 5 Ω, three leads should have the same resistance.
- Input signal and high voltage line can't be laid in the same conduit or cable trough.
- The power cord should be used cross-sectional area at least 1 mm^2, wire insulation 600 V.
- Tighten the screw of terminal to make it firm. Terminal torque: 17.5lb-in

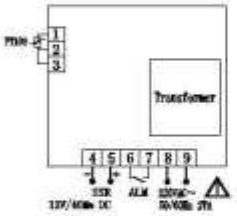


FIG. 1 【PCD-C6001-ZF】

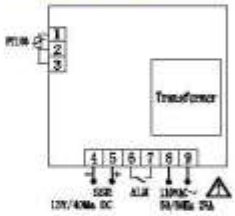
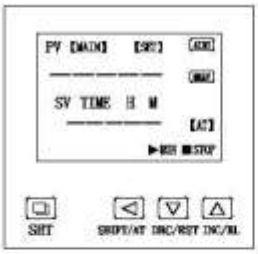


FIG. 2 【PCD-C6001-ZF(110V)】

4. Technical specifications

1) Temperature setting range: -50.0~400.0℃, Measurement error: <0.5%
Temperature measurement range: -39.0~409.0℃,
Time setting range: 0~9999 Min (Hour)
2) Power supply: 220V AC±10% 50Hz/60Hz
or 110V AC±10% 50Hz/60Hz
Power rating: 2.4VA
3) ALM contact capacity: 0~220V(AC) /2A (general use)
4) SSR output type / capacity: Drive external SSR 30mA Max
5) Insulation resistance: Between the input / output terminals and the power supply terminals, use 500V DC, 20MΩ
6) Breakdown strength: Between the input / output terminals and the power supply terminals, 1900V AC, 1Min
Between the input and the output: 1500V AC, 1Min
Between the input and the output: 1500V AC, 1Min

5. Panel indication



Definitions of symbols:

1) 【MAIN】: Only in normal state(not setting mode), this symbol appears
2) 【SET】: Only in setting mode , this symbol appears
3) RUN: This symbol always appear unless the timing program is end.
4) STOP: This symbol appears to show you timing program is over.
5) 【AT】: This symbol twinkles only when you start an Auto-tuning procedure
6) ALM1: This symbol appears to show you over-temperature alarm
7) HEAT: This symbol twinkles or keeps lighting to show you the heater is working.

6. Operation and using

6-1. When the controller is powered on, the up-row of the Display Window show the version number and the value of temperature range, the down-row of the Display Window show the max value of temperature setting, the controller will get into the normal view state after 2 seconds once powered on;

6-2. Temperature and Time Setting

1) Without Timing Function :

Press the "Set" button, get into the Temperature setting state, the display window show the prompt "SP" and the temperature set value, the users can edit the temperature setting value by using the "SHIFT", "DEC" and "INC" buttons; then press the "Set" button again, the controller will return to the normal view state, the setting value will be saved automatically.

2) With Timing Function :

Press the "Set" button, get into the Temperature setting state, the display window show the prompt "SP" and the temperature set value, Re-press the "SET" button, get into the Timing setting state, the display window show the prompt "SP" and the timing set value, Press then "Set" button again, the Controller will return to the normal view state, the setting values will be saved automatically.

When the time is set to "0", it indicates the timer is inoperative, the controller will run continuously, the under window of controller will display temperature setting value; If there is time set, the under window of controller display the running time, the "Time Unit" indicator light is lit on, when the controller begin to time, the "Time Unit" indicator light flashes. Once the time period is over, the under window of controller display the "End" prompt, the buzzer will sound for EST records, it can be muted by pressing any button, press the "RST" button for 3s at this time, the controller will restart.

6-3. Abnormal alarm for temperature measurement

If the up window of the controller show the prompt "---", it indicates that the temperature sensor has some faults or temperature exceeds the measuring range or the controller itself is faulty, the controller will cut off the heat-output automatically, the buzzer will sounds continuously, "ALM1" indicator light is lit on. Please check the temperature sensor and its wiring carefully.

6-4. When Over-temperature alarm, the buzzer beeps continuously, "ALM" warning light is lit, the Heat-Out is cut off. When the Under-temperature alarm, the buzzer beeps continuously, "ALM" warning light is flash. If the Over- temperature alarm is caused by the change of the temperature setting value, "ALM" warning light is lit, but the buzzer does not beep.

6-5. When the buzzer sounds, press any key to mute.

6-6. "SHIFT/AT" button: In the setting state, click the button to shift the set value, In the non-set state, keep pressing on the "AT" button for 3s, the controller will run the auto-tuning program.

6-7. "DEC/RST" button: In the setting state, click the button to reduce the set value. If you keep pressing on the button , the set value will reduce continuously.
In the normal state, when the timing work is over, press the "DEC/RST" button for 3s, the controller will restart to work .

6-8. "INC/BL" button: In the setting state, click the button to increase the set value. If you keep pressing on the button, the set value will increase continuously. In the Normal state, click the button to open or close the backlight lamp.

7. Auto-tuning of PID

In the non-set state, press the "AT" button for 6s, the controller will get into the pre-Auto-tuning state, the up window of the controller show the prompt "AT", the down window of the controller show the prompt "oFF", user can press the "DEC" or "INC" button to choose to show "oFF" of "on" prompt, when it shows the prompt "on", press the "SET" button, the controller will run the auto-tuning program, the "AT" light flashes, after auto-tuning end, the light stops flashing, parameter value is saved automatically. In the auto-tuning process, press the "SHIFT/AT" button for another 6s, the controller will stop the auto-tuning program.

During the Auto-tuning process, if Over-temperature alarm, the buzzer does not beep, "ALM" warning light is not lit, the Heat-Out will be cut off, the "SET" button is invalid, the under window always displays temperature set value.

Note: the Auto-tuning fails if the Auto-tuning process lasts for more than 6 hours, the Buzzer will sound for 1 minute, it will show the symbol "E" on the the left of the window , on the contrary, it will show the symbol "A" if the Auto-tuning complete.

8. Internal parameters settings

In the non-set state, Press the "Set" button for 3s, controller will display the password prompt "Lc". Adjust the password to the required value, then press the "Set" button again, it will run into the internal parameter setting state. If press the "Set" button for another 3s, it will return to the running state, the setting value will be saved automatically.

Parameter table 1

Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=3, enter the next parameters.	0
ALH	Over-temp alarm	If "SV>(SP+ALH)", the "ALM" light turns on. The buzzer sounds and the heating output turns off.	(0~100.0℃) 20.0
ALL	Under-temp alarm	If "SV<(SP-ALL)", the "ALM" light flashes, the buzzer sounds.	(0~100.0℃) 0
P	Proportional band	Adjustment of proportional function.	(0.1~300.0℃) 35.0
I	Integration time	Adjustment of integration function.	(1~2000) 800
d	Differential time	Adjustment of differential function.	(0~1000) 450
T	Control cycle	The temperature control cycle.	(1~60) 30
Pb	Zero point adjust	When the zero error comparatively larger, to update this value should be needed. Pb= actual value – measure value	(-50.0~50.0℃) 0
PK	Full point adjust	When the full point error also comparatively larger, to update this value should be needed. PK=1000 × (actual value – measure value) / measure value	(-999~999) 0
Addr		null	
Loc	Setting Lock	0: Enable to set temperature and time. 1: Disable to set temperature and time.	(0~1) 0

Parameter table 2

Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=9, enter the next parameters.	0
ndA	Temp alarm mode	0: With over-temp alarm only. 1: With over-temp alarm and under-temp alarm at the same time.	(0~1) 0
ndT	Timer mode	0: No timer function. 1: With timer function, the under window displays the running time when the measured temperature reaches to the setting value. 2: With timer function, the under window always displays the running time.	(0~2) 1
tn	Timer unit	0: Minute. 1: Hour.	(0~1) 0
SPd	Constant temp Deviation	When SP >= (SV – SPd), the Controller get into the Constant-temp State	(0.1~100.0℃) 0.6
SPT	Const-Temp buzzer time	If get into the Const-Temp State, the Buzzer will beep for SPT seconds. Note: If SPT=9999 it mean the buzzer will beep continuously.	(0~99999) 0.
EST	Timing Over Buzzer time	If the timing work is over, the Buzzer will beep for EST seconds. Note: If EST=9999, it means the buzzer will beep continuously.	(0~99999) 60
Hd	Whether to continue to control after timing	0: cut off Heat-Out after timing. 1: continue to control after timing.	(0~1) 0
ndo		null	
SPL	Minimum set point	The minimum temperature set point.	(-50.0~SPH.0℃) 0
SPH	Maximum set point	The maximum temperature set point.	(SPL~400.0℃) 300.0

Parameter table 3

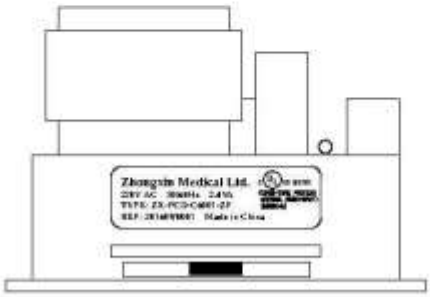
Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=27, enter the next parameters.	0
Fc	Temperature unit	0: Centigrade; 1: Fahrenheit	(0~1) 0

Parameter table 4

Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=567, enter the next parameters.	0
rST	Reset to default values	0: cancel to reset to default value; 1: confirm to reset to default value.	(0~1) 0

9: The Label placement(Shown below)

Jiaxing Zhongxin Medical Instruments Co.,Ltd.
Add: Shendang Industrial Zone, Haiyan County, Zhejiang Province, China
Tel: +86-573-86722300 Fax: +86-573-86722355



Manuals - (02) ZX-PCE-C6000-ZF Product Manual -V06

Manuals - (02) ZX-PCE-C6000-ZF Product Manual -V06

ZX-PCE-C6000-ZF Series intelligent temperature controller

USER MANUAL

Before you carefully read and fully understand this manual, please do not operate this product.

PREFACE

This manual is written to need the products for wiring, installation, and maintenance personnel, this operating manual contains the operation method, function, connection, and matters needing attention. Therefore, you should keep this manual at hand in the operation and use of this instrument, ensure that have seen all the precautions and follow the manual method.

1. Safety rules

The safety rules related to the equipment damage and preventive measures, see below the title in the additional notes and comments.

⚠ **Warning: If you do not follow the instructions may cause injury or death.**

⚠ **Attention : If you do not comply with the instructions may cause damage to the equipment.**

⚠ Warning

This series product is designed for general industrial equipment to temperature control. You shall take appropriate safety measures and avoid use in the control occasions with a serious effect on life.

- In order to avoid personnel contact, terminal of the controller should be placed on the control box.
- Don't use electricity conductor or any part of the body contact with any components in addition to plastic shell and sticker, otherwise may cause electric shock, death or serious injury.

⚠ Attention

If because the controller failure cause harm to peripheral instruments or equipment, you shall take appropriate safety measures, such as installing fuse or overheating protection device.
The manufacturer should not be responsible for the accident caused by the absence of proper safety.

- Must install the power switch or circuit breaker, as the measures to cut off the external power supply circuit that is connected to the controller power supply side.
- The fuse
  This controller has no built-in fuse, users must install a fuse in the power supply.
  The fuse rating: 250V AC, 1.0A
- Load current and the voltage should be within the rating when connected to the output. Use more than rating load may shorten the life of the controller, could also lead to device failure. About the rating, see "4. Technical specifications".
- Please ensure correct wiring of the sensor input , or may result in equipment failure.
- Using this controller, the ambient temperature are required to no more than 50℃, otherwise may shorten the life of the product or cause equipment failure or fire.
- Users do not use this non-design way to revise the controller or use it.

2. Introduce

2-1. Model code

ZX-PCE-C6000-ZF | 110V

- ZX-PCE-C6000-ZF: Type series
- 110V: The power supply voltage is 110V AC
- N: The power supply voltage is 220V AC

2-2. Use attention

Don't use hard or sharp objects to press the front panel of the controller, press gently with your finger tip.

When cleaning, wipe gently with a dry cloth, do not use the solvent of thinner type.

Manuals - (02) ZX-PCE-C6000-ZF Product Manual -V06

3. Installation and wiring

3-1. Installation occasion (environment)

Work environment conditions

- must be used indoors
- The highest elevation: 2000m
- The environment temperature: -10~50℃
- Environmental humidity:
  Max 85 % RH. No condensation
- The surge overvoltage level: II
- Pollution level: 2

⚠ Attention

Don't use the controller in the following occasion, otherwise may cause equipment failure, danger and fire.

- In the place of full of flammable gas, corrosive gases.
- In place of strong vibration or impact.
- Near the large current lines or disturbed by it.
- In the place of water drop and air that is easy to produce the dew.

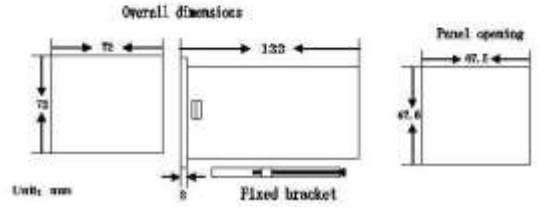
3-2. Installation

⚠ Attention

In order to ensure safety and performance, don't remove the shell of the controller.

- In order to install controller on the equipment, see the overall dimensions and panel opening in section 3-3 .
- The thickness of the equipment panel should be followed: 0.8~1.2mm
- The controller's shell has a clip for assembly, also equipped with a fixed bracket. With the display side of controller upward, vertically insert the controller from the front of the equipment panel, then insert the fixed bracket at the bottom of the controller, tighten the screws on the fixed bracket.
- The equipment using this product should be a ventilation, the controller's environment temperature should be less than 50 ℃.

3-3. Overall dimensions and panel opening



3-4. wiring

⚠ Attention

- Please be sure to cut off the power before wiring, otherwise may cause electric shock.
- Do not touch terminals or other electrically charged components after electrify, otherwise may cause electric shock.
- Please refer to this manual carefully before deciding to choose the conductor temperature of the connection installation terminal.

Need to adopt the following safety measures when wiring.

- Wiring according to the figure 1 and figure 2 terminal, check and confirm the correct.
- PT100 platinum resistance input, each lead resistance should be less than 5 Ω, three leads should have the same resistance.
- Input signal and high voltage line can't be laid in the same conduit or cable trough.
- The power cord should be used cross-sectional area at least 1 mm^2, wire insulation 600 v.
- Tighten the screw of terminal to make it firm. Terminal torque: 17.5lb-in

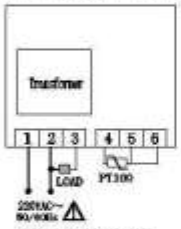


FIG. 1 [PCE-C6000-ZF]

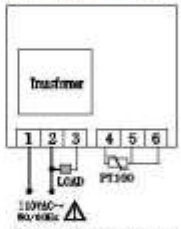


FIG. 2 [PCE-C6000-ZF(110V)]

4. Technical specifications

1) Temperature setting range: -30.0~400.0℃; Measurement error: <0.3%
   Temperature measurement range: -39.0~409.0℃;
   Time setting range: 0~9999 Min (Hour)
2) Power supply: 220V AC±10% 50Hz/60Hz
   or 110V AC±10% 50Hz/60Hz
3) Rated current of controller: ZX-PCE-C6000-ZF 110V 3.5A
   ZX-PCE-C6000-ZF 3.5A
4) Rated current of load: ZX-PCE-C6000-ZF 110V 5.5A
   ZX-PCE-C6000-ZF 5.5A
5) Insulation resistance: Between the input / output terminals and the power supply terminals, min 500V DC, 20MΩ
6) Breakdown strength: Between the input / output terminals and the power supply terminals, 1500V AC, 1Min

Between the input and the output: 1500V AC, 1Min
Between the input and the output: 1500V AC, 1Min

5. Panel Indication

Definitions of symbols:

1) 【MAIN】: Only in normal state(not setting mode), this symbol appears
2) 【SET】: Only in setting mode , this symbol appears
3) RUN: This symbol always appear unless the timing program is end.
4) STOP: This symbol appears to show you timing program is over.
5) 【AT】: This symbol twinkles only when you start an Auto-tuning procedure
6) ALM1: This symbol appears to show you over-temperature alarm
7) HEAT: This symbol twinkles or keeps lighting to show you the heater is working.

6. Operation and using

6-1. When the controller is powered on, the up-row of the Display Window show the version number and the value of temperature range, the down-row of the Display Window show the max value of temperature setting, the controller will get into the normal view state after 2 seconds once powered on;

6-2. Temperature and Time Setting

1) Without Timing Function :

Press the "Set" button, get into the Temperature setting state, the display window show the prompt "SP" and the temperature set value, the users can edit the temperature setting value by using the "SHIFT", "DEC" and "INC" buttons; then press the "Set" button again, the controller will return to the normal view state, the setting value will be saved automatically.

2) With Timing Function :

Press the "Set" button, get into the Temperature setting state, the display window show the prompt "SP" and the temperature set value, Re-press the "SET" button, get into the Timing setting state, the display window show the prompt "SP" and the timing set value. Press then "Set" button again, the Controller will return to the normal view state, the setting values will be saved automatically.

When the time is set to "0", it indicates the timer is inoperative, the controller will run continuously, the under window of controller will display temperature setting value; If there is time set, the under window of controller display the running time, the "Time Unit" indicator light is lit on, when the controller begin to time, the "Time Unit" indicator light flashes. Once the time period is over, the under window of controller display the "End" prompt, the buzzer will sound for EST seconds, it can be muted by pressing any button, press the "RST" button for 3s at this time, the controller will restart.

6-3. Abnormal alarm for temperature measurement

If the up window of the controller show the prompt "---", it indicates that the temperature sensor has some faults or temperature exceeds the measuring range or the controller itself is faulty, the controller will cut off the heat-output automatically, the buzzer will sounds continuously, "ALM1" indicator light is lit on. Please check the temperature sensor and its wiring carefully.

6-4. When Over-temperature alarm, the buzzer beeps continuously, "ALM" warning light is lit, the Heat-Out is cut off. When the Under-temperature alarm, the buzzer beeps continuously, "ALM" warning light is flash. If the Over- temperature alarm is caused by the change of the temperature setting value, "ALM" warning light is lit, but the buzzer does not beep;

6-5. When the buzzer sounds, press any key to mute.

6-6. "SHIFT/AT" button: In the setting state, click the button to shift the set value; In the non-set state, keep pressing on the "AT" button for 3s, the controller will run the auto-tuning program.

6-7. "DEC/RST" button: In the setting state, click the button to reduce the set value. If you keep pressing on the button , the set value will reduce continuously.
In the normal state, when the timing work is over, press the "DEC/RST" button for 3s, the controller will restart to work.

6-8. "INC/BL" button: In the setting state, click the button to increase the set value. If you keep pressing on the button, the set value will increase continuously. In the Normal state, click the button to open or close the backlight lamp.

7. Auto-tuning of PID

In the non-set state, press the "AT" button for 3s, the controller will get into the pre-Auto-tuning state, the up window of the controller show the prompt "AT", the down window of the controller show the prompt "oFF", user can press the "DEC" or "INC" button to choose to show "oFF" of "on" prompt, when it shows the prompt "on", press the "SET" button, the controller will run the auto-tuning program, the "AT" light flashes, after auto-tuning end, the light stops flashing, parameter value is saved automatically. In the auto-tuning process, press the "SHIFT/AT" button for another 3s, the controller will stop the auto-tuning program.

During the Auto-tuning process, if Over-temperature alarms, the buzzer does not beep, "ALM" warning light is not lit, the Heat-Out will be cut off, the "SET" button is invalid, the under window always displays temperature set value.

Notes: the Auto-tuning fails if the Auto-tuning process lasts for more than 6 hours, the Buzzer will sound for 1 minute, it will show the symbol "E" on the the left of the window , on the contrary, it will show the symbol "A" if the Auto-tuning complete.

8. Internal parameters settings

In the non-set state, Press the "Set" button for 3s, controller will display the password prompt "Lc". Adjust the password to the required value, then press the "Set" button again, it will run into the internal parameter setting state. If press the "Set" button for another 3s, it will return to the running state, the setting value will be saved automatically.

Parameter table 1

Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=3, enter the next parameters.	0
ALH	Over-temp alarm	If "SV>(SP+ALH)", the "ALM" light turns on. The buzzer sounds and the heating output turns off.	(0~100.0℃) 30.0
ALL	Under-temp alarm	If "SV<(SP-ALL)", the "ALM" light flashes, the buzzer sounds.	(0~100.0℃) 0
P	Proportional band	Adjustment of proportional function.	(0.1~300.0℃) 35.0
I	Integration time	Adjustment of integration function.	(1~2000) 600
d	Differential time	Adjustment of differential function.	(0~1000) 450
T	Control cycle	The temperature control cycle.	(1~60) 20
Pb	Zero point adjust	When the zero error comparatively larger, to update this value should be needed. Pb= actual value – measure value	(-50.0~50.0℃) 0
PK	Full point adjust	When the full point error also comparatively larger, to update this value should be needed. PK=1000 × (actual value – measure value) / measure value	(-999~999) 0
Addr		null	
Loc	Setting Lock	0: Enable to set temperature and time. 1: Disable to set temperature and time.	(0~1) 0

Parameter table 2

Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=8, enter the next parameters.	0
ndA	Temp alarm mode	0: With over-temp alarm only. 1: With over-temp alarm and under-temp alarm at the same time.	(0~1) 0
ndT	Timer mode	0: No timer function. 1: With timer function, the under window displays the running time when the measured temperature reaches to the setting value. 2: With timer function, the under window always displays the running time.	(0~2) 1
tn	Timer unit	0: Minute. 1: Hour.	(0~1) 0
SPd	Constant temp Deviation	When SP >= (SV – SPd), the Controller get into the Constant-temp State.	(0.1~100.0℃) 0.5
SPT	Const-Temp buzzer time	If get into the Const-Temp State, the Buzzer will beep for SPT seconds. Note: If SPT=9999 it mean the buzzer will beep continuously.	(0~99995) 0
EST	Timing Over Buzzer time	If the timing work is over, the Buzzer will beep for EST seconds. Note: If EST=9999, it means the buzzer will beep continuously.	(0~99995) 60
tE	Whether to continue to control after timing	0: cut off Heat-Out after timing. 1: continue to control after timing.	(0~1) 0
ndo		null	
SPL	Minimum set point	The minimum temperature set point.	(-50.0~50.0℃) 0
SPH	Maximum set point	The maximum temperature set point.	(SPL~400.0℃) 300.0

Parameter table 3

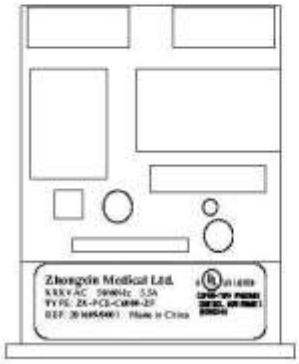
Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=27, enter the next parameters.	0
Fc	Temperature unit	0: Centigrade; 1: Fahrenheit	(0~1) 0

Parameter table 4

Prompt	Name	Instruction of the function	(Setting range) factory set value
Lc	Password key	When Lc=567, enter the next parameters.	0
rST	Reset to default values	0: cancel to reset to default value; 1: confirm to reset to default value.	(0~1) 0

9: The Label placement(Shown below)

Jiaxing Zhongxin Medical Instruments Co.,Ltd.
Add: Shendang Industrial Zone, Haiyan County, Zhejiang Province, China
Tel: +86-573-86722300 Fax: +86-573-86722355



Marking Label - (01) label

Marking Label - (01) label

Photographs - (01) 01.Overall view of ZX-PCE-C6000-ZF

Photographs - (01) 01.Overall view of ZX-PCE-C6000-ZF

Photographs - (02) 02.Side view of ZX-PCE-C6000-ZF

Photographs - (02) 02.Side view of ZX-PCE-C6000-ZF

Photographs - (03) 03.Top view of ZX-PCE-C6000-ZF

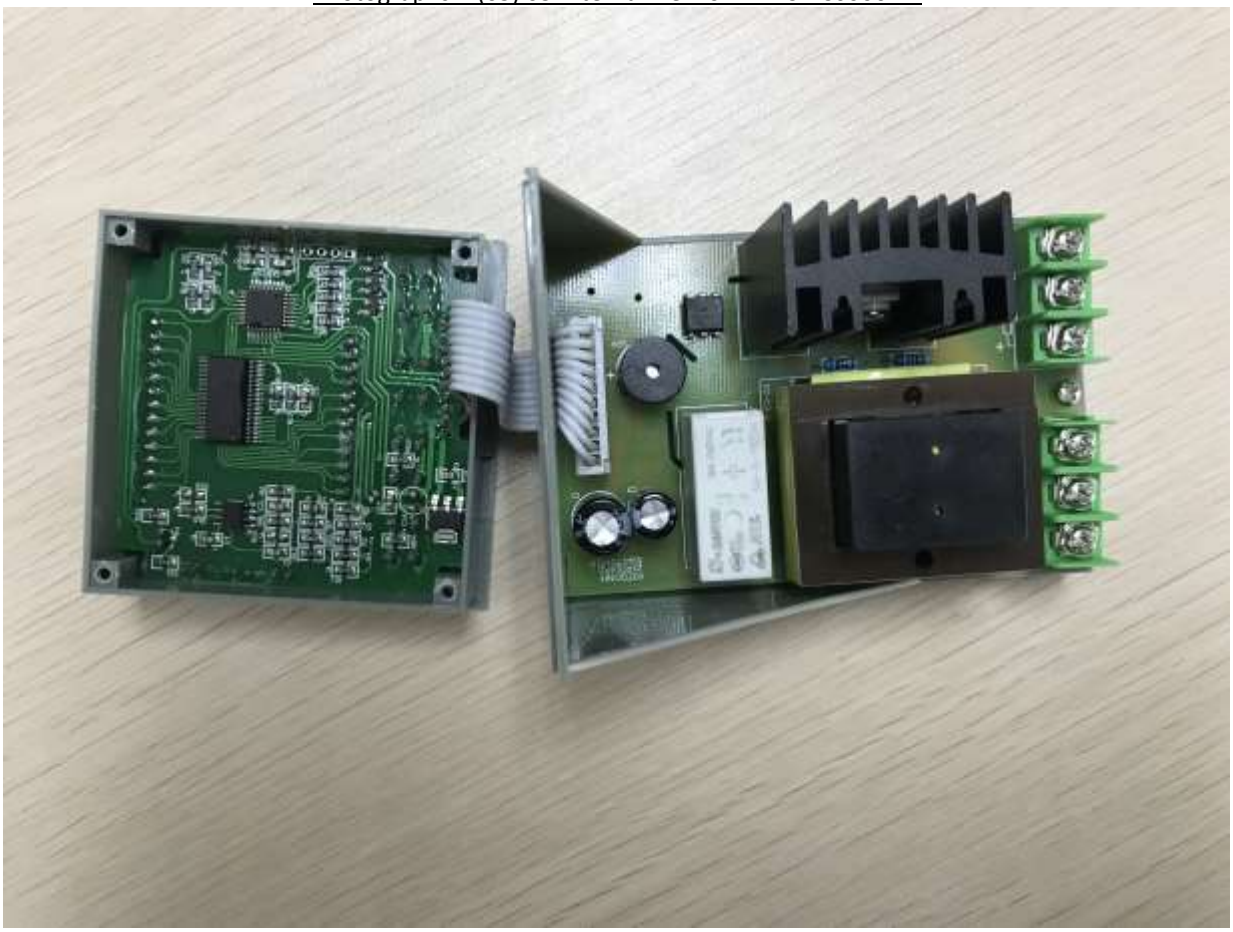
Photographs - (03) 03.Top view of ZX-PCE-C6000-ZF

Photographs - (04) 04.Bottom view of ZX-PCE-C6000-ZF

Photographs - (04) 04.Bottom view of ZX-PCE-C6000-ZF

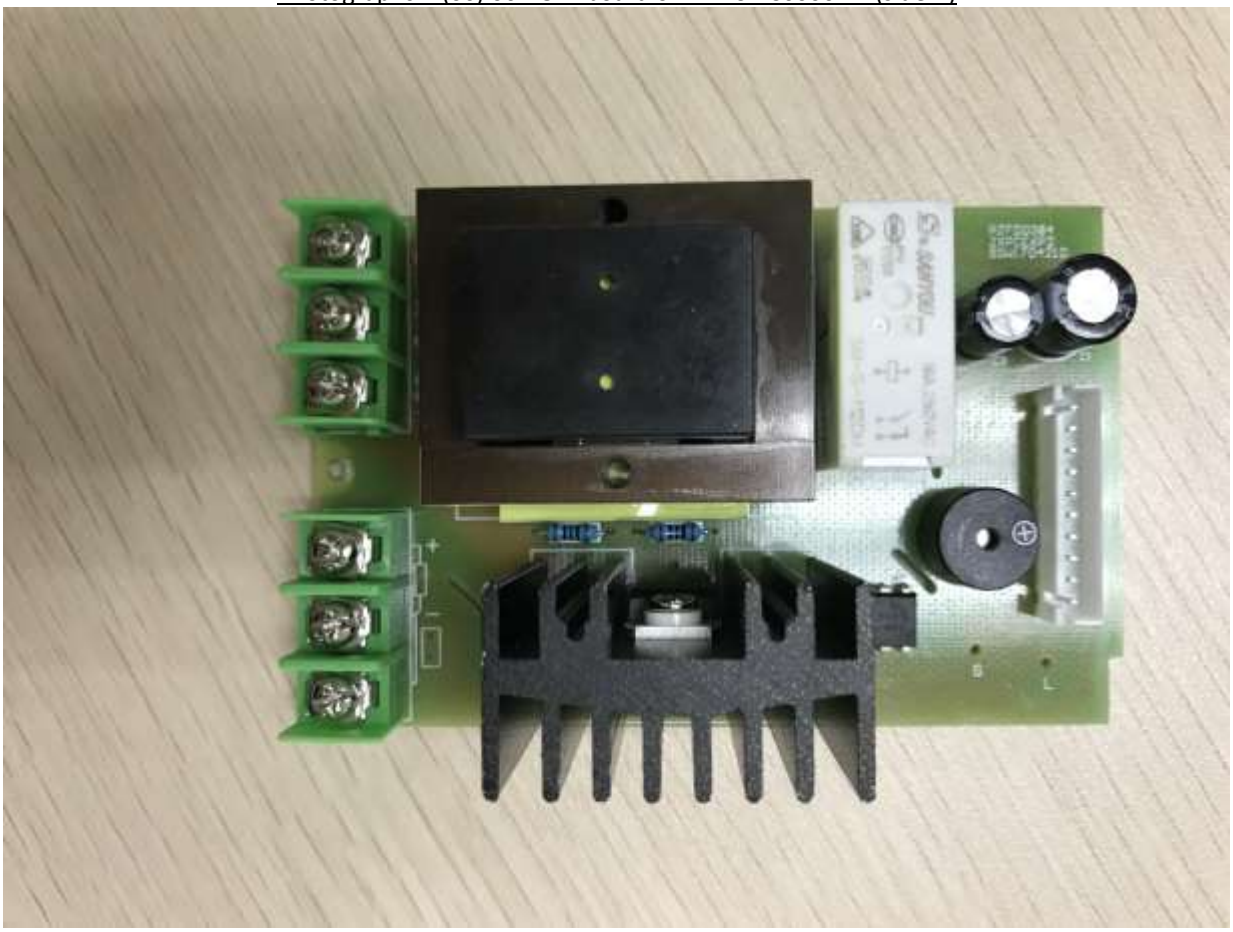
Photographs - (05) 05.Internal view of ZX-PCE-C6000-ZF

Photographs - (05) 05.Internal view of ZX-PCE-C6000-ZF



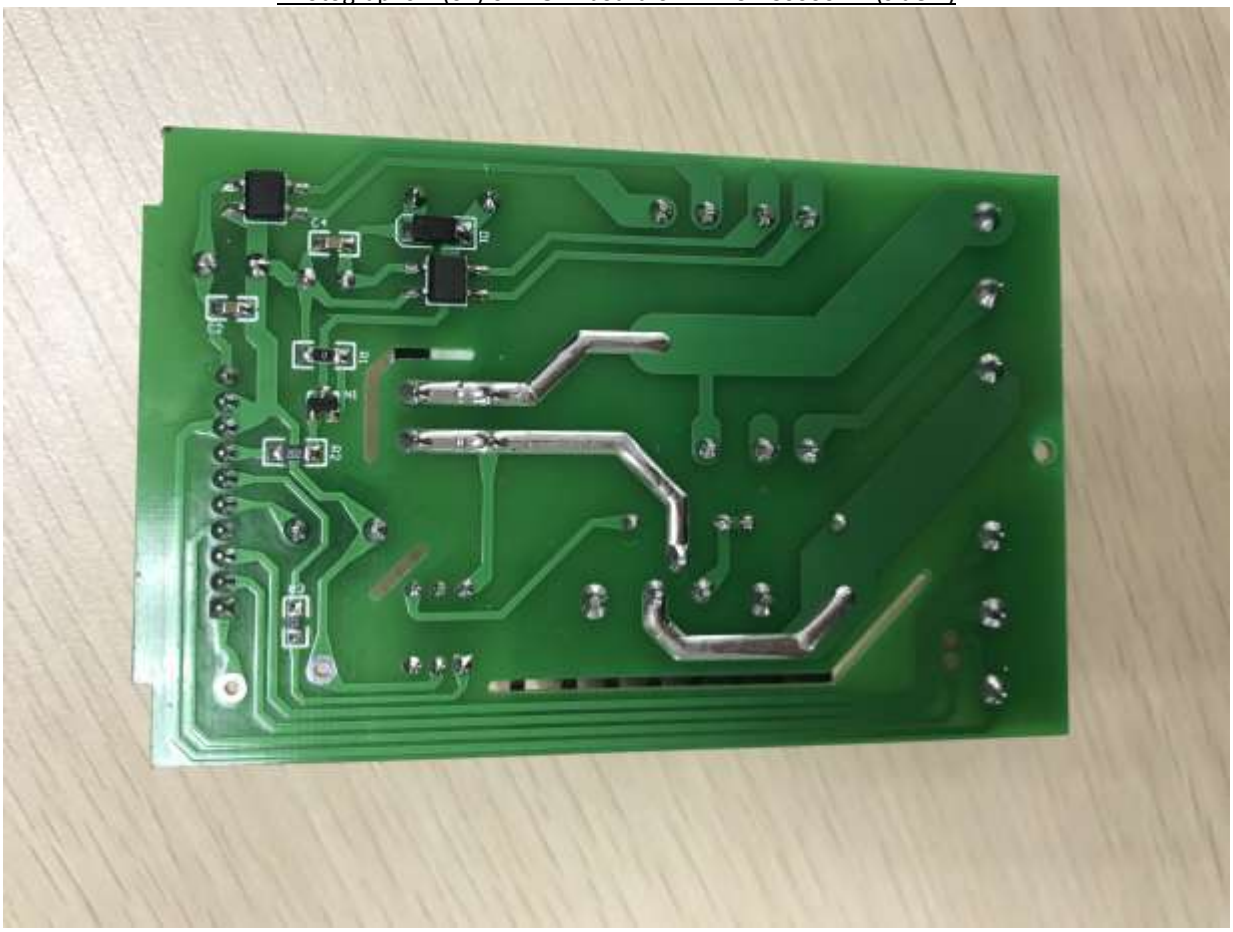
Photographs - (06) 06.POW board of ZX-PCE-C6000-ZF (side A)

Photographs - (06) 06.POW board of ZX-PCE-C6000-ZF (side A)



Photographs - (07) 07.POW board of ZX-PCE-C6000-ZF (side B)

Photographs - (07) 07.POW board of ZX-PCE-C6000-ZF (side B)



Photographs - (08) 08.Main board of ZX-PCE-C6000-ZF (side A)

Photographs - (08) 08.Main board of ZX-PCE-C6000-ZF (side A)

Photographs - (09) 09.Main board of ZX-PCE-C6000-ZF (side B)

Photographs - (09) 09.Main board of ZX-PCE-C6000-ZF (side B)

Photographs - (10) 10.Front view of ZX-PCD-C6001-ZF

Photographs - (10) 10.Front view of ZX-PCD-C6001-ZF

Photographs - (11) 11.Side view of ZX-PCD-C6001-ZF

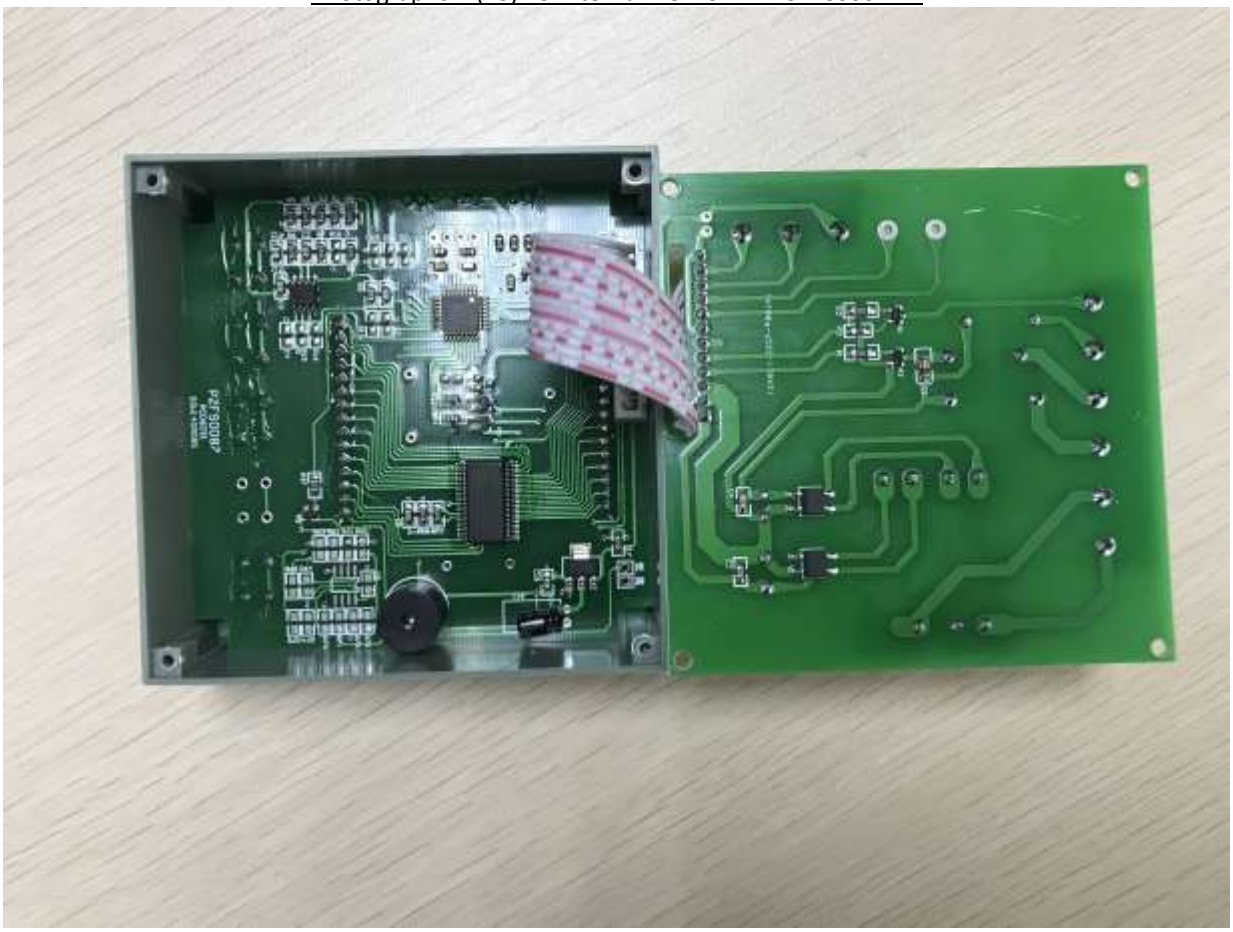
Photographs - (11) 11.Side view of ZX-PCD-C6001-ZF

Photographs - (12) 12.Rear view of ZX-PCD-C6001-ZF

Photographs - (12) 12.Rear view of ZX-PCD-C6001-ZF

Photographs - (13) 13.Internal view of ZX-PCD-C6001-ZF

Photographs - (13) 13.Internal view of ZX-PCD-C6001-ZF

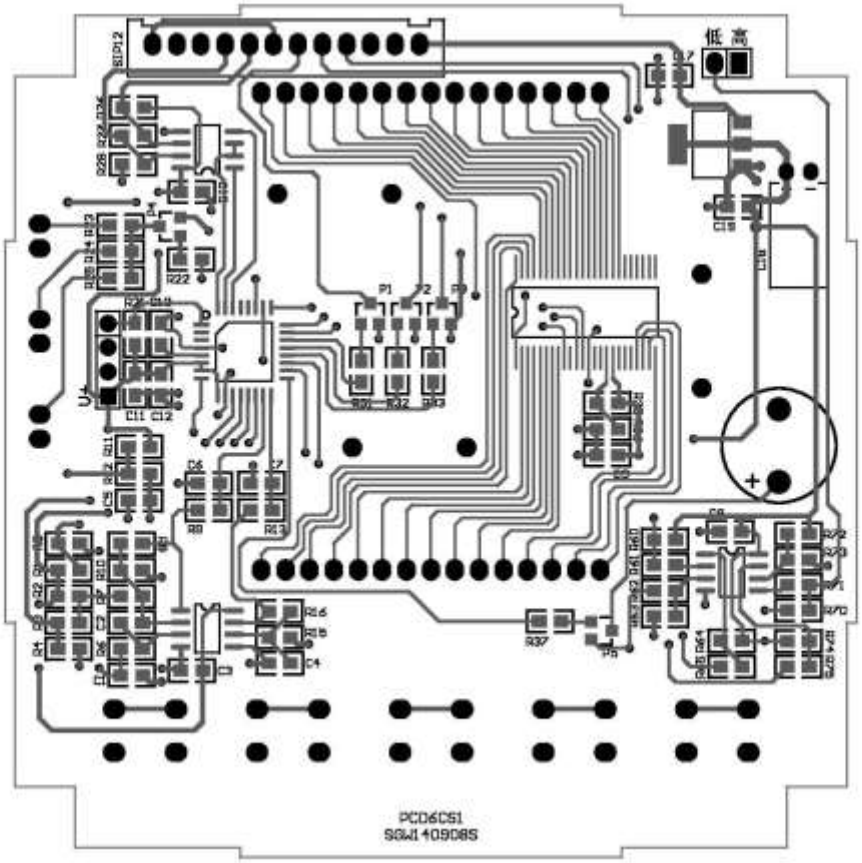


Photographs - (14) 14.Main board of ZX-PCD-C6001-ZF

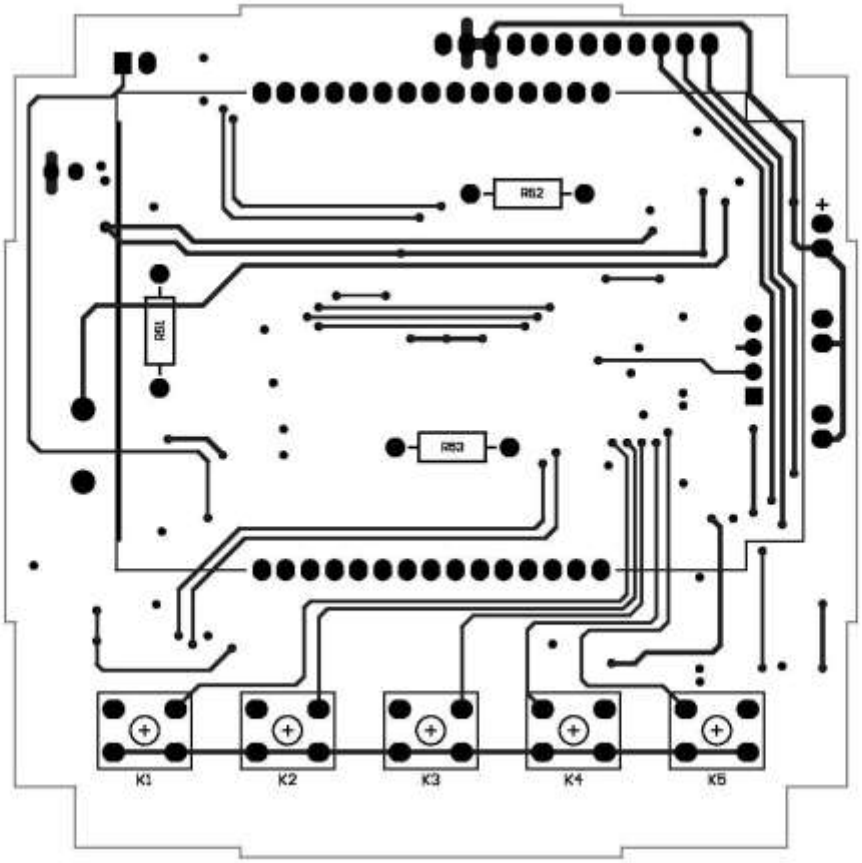
Photographs - (14) 14.Main board of ZX-PCD-C6001-ZF

Schematics + PWB - (01) PCD-MAIN_Board

Schematics + PWB - (01) PCD-MAIN Board

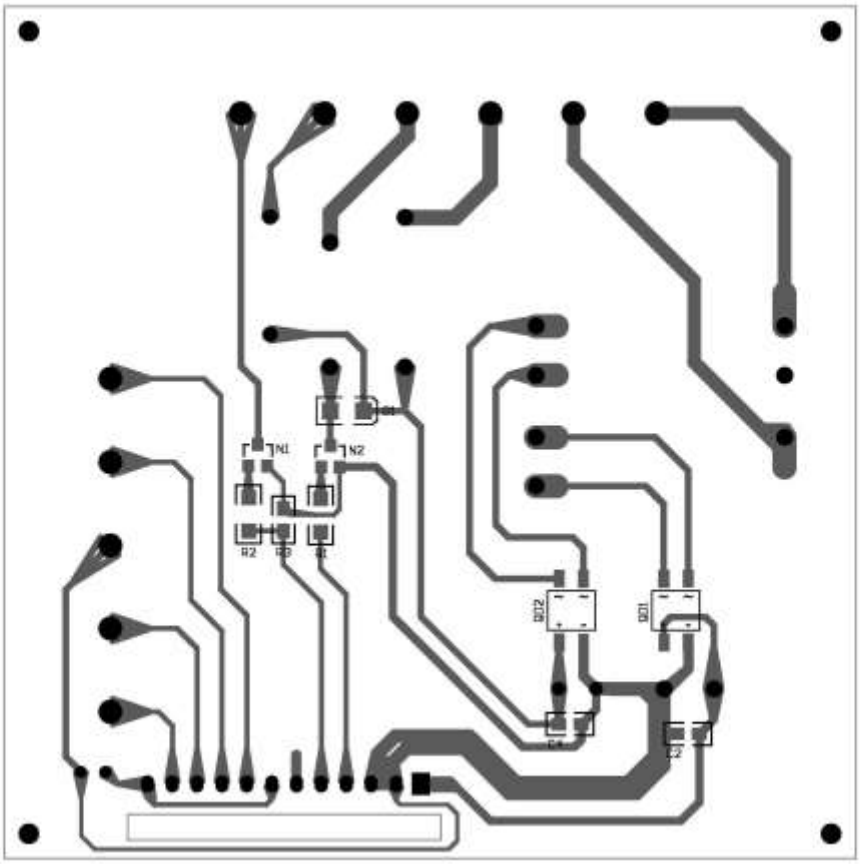


Schematics + PWB - (01) PCD-MAIN Board

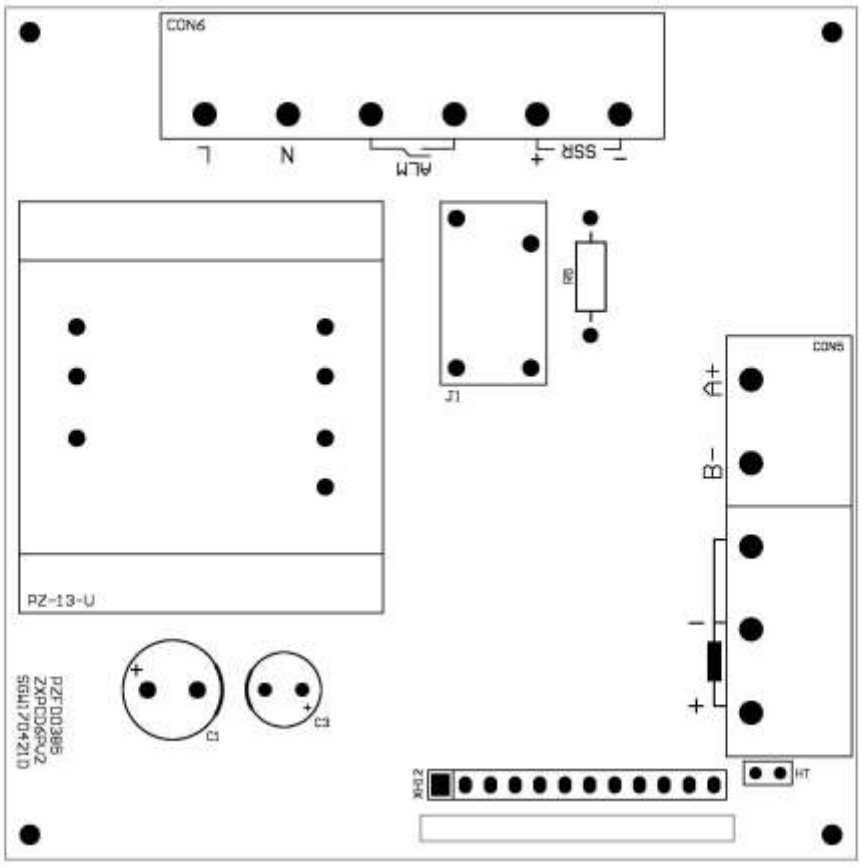


Schematics + PWB - (02) PCD-POW-SSR_Board

Schematics + PWB - (02) PCD-POW-SSR_Board

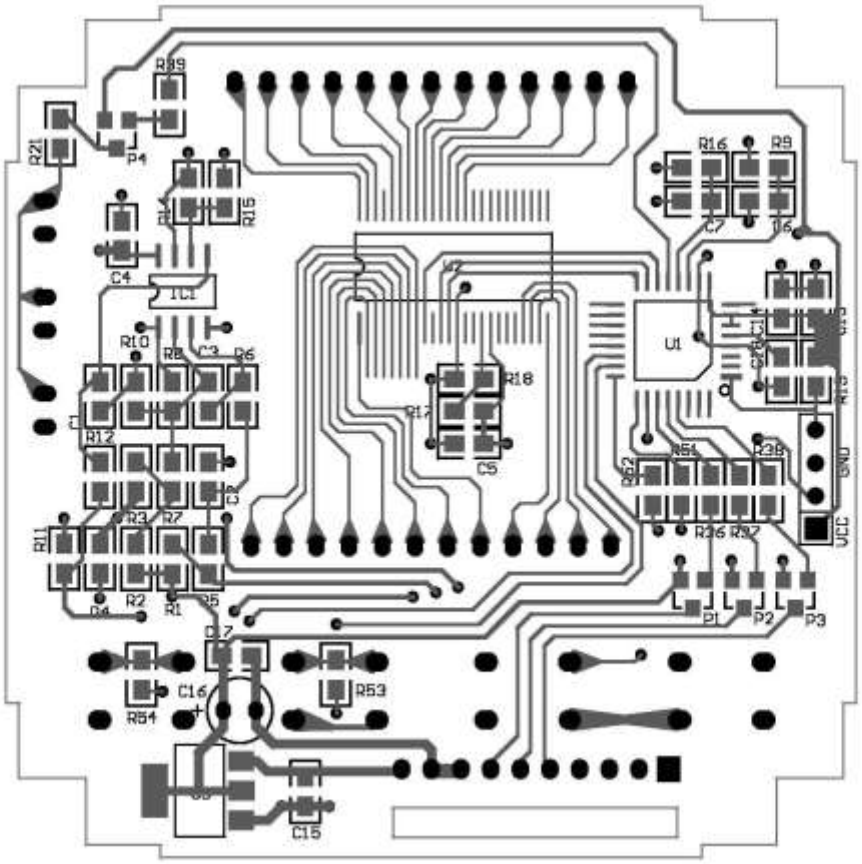


Schematics + PWB - (02) PCD-POW-SSR Board

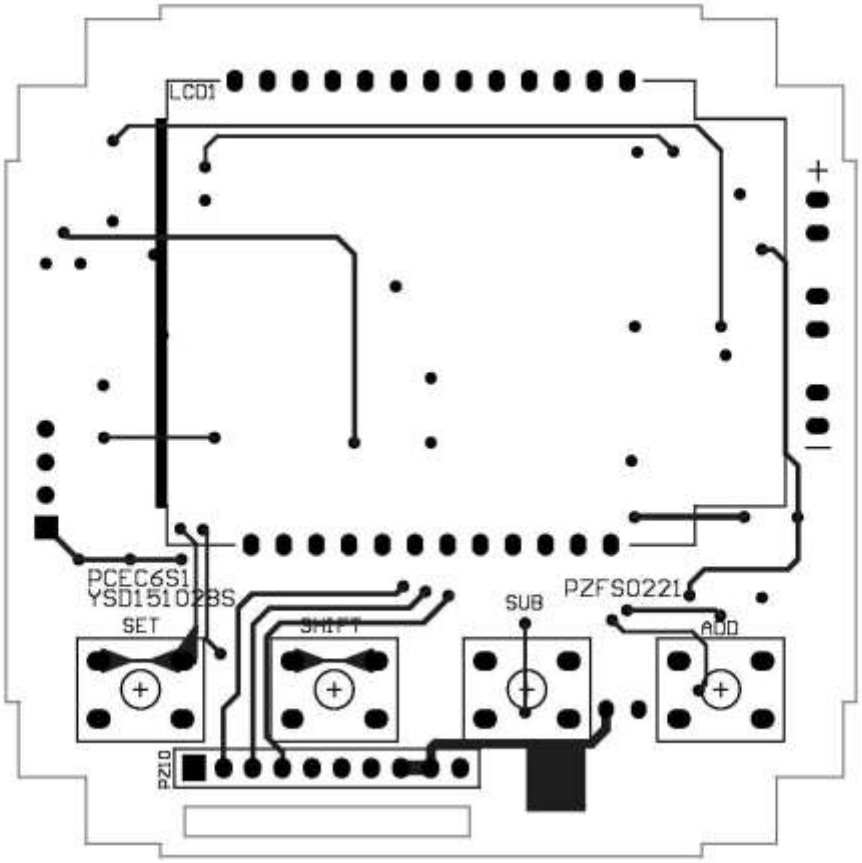


Schematics + PWB - (03) PCE-MAIN_Board

Schematics + PWB - (03) PCE-MAIN Board

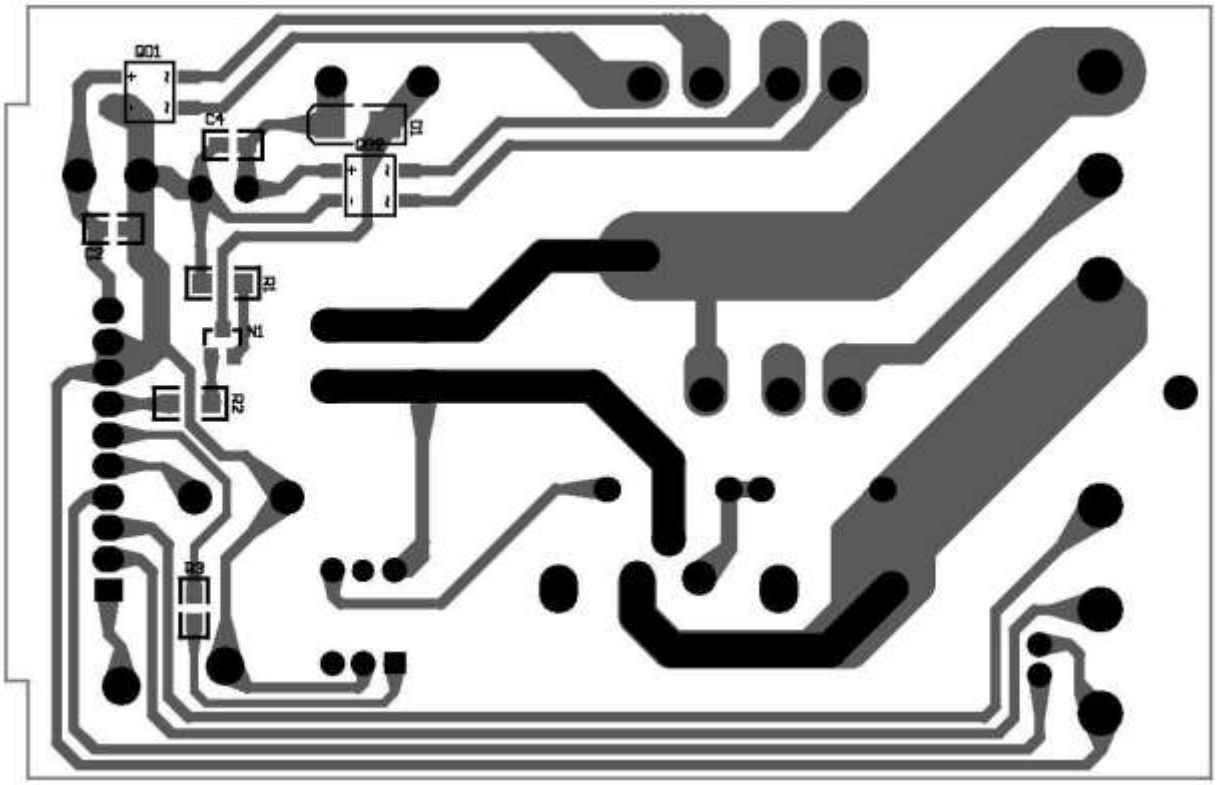


Schematics + PWB - (03) PCE-MAIN Board

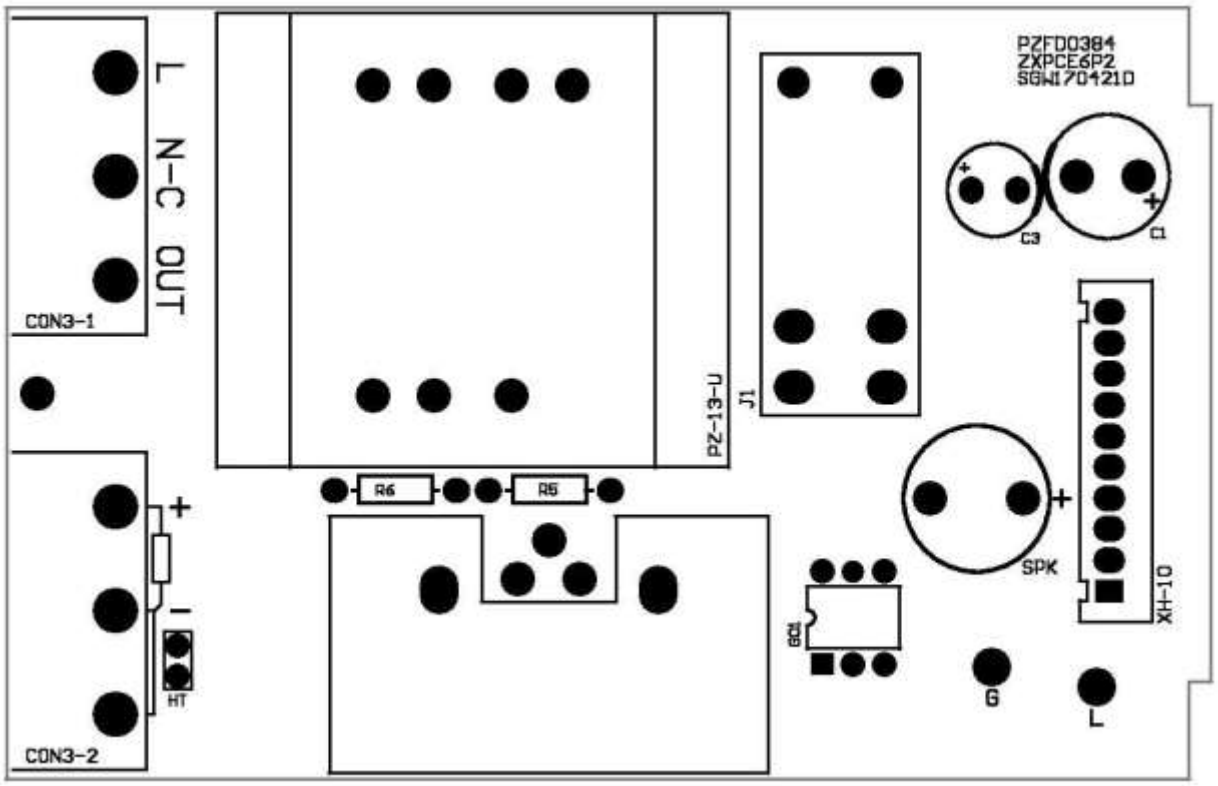


Schematics + PWB - (04) PCE-POW_Board

Schematics + PWB - (04) PCE-POW_Board



Schematics + PWB - (04) PCE-POW Board



----------END OF APPENDIX A----------

APPENDIX C: Follow-Up Service Documentation

Follow-Up Service Procedure

It is important to keep UL Procedures and Test Reports up-to-date as new or revised pages are received. Correct maintenance will decrease the amount of time the UL Representative spends when visiting your facility.

UL LLC offers MyHome @UL, a dedicated website providing secure access to online tools and databases that can help simplify your compliance activities. You can customize your personal MyHome @UL page to include the content needed most, including timely information about certification updates and links to other Web sites you visit regularly. Visit http://my.home.ul.com/ to sign up today!

PAGES (in content order)	FUNCTION	HOW TO UPDATE
Authorization Page	Displays the Product Category, the type of Follow-Up Service (Type R=Reexamination / Type L=Label), the File Number and the Volume Number associated with each Applicant's, Manufacturer's and Listee's company name and address.	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Addendum to Authorization Page*	Lists the additional names and addresses of manufacturing locations, when multiple locations exist	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Listing Mark Data (LMD), Classification Mark Data (CMD) or Recognized Component Mark Data (RCMD) Pages* #	Used only for products covered under Type R Service. Displays the correct LMD, CMD, or RCMD Mark, the Control Number for Listed and Classified categories and additional information regarding minimum size, application, procurement, and any other optional markings, in addition to the UL Mark.	Replace existing page by matching the UL File Number and Volume Number. Discard the older page (refer to "Issued" or "Revised" date).
Multiple Listing (ML) Correlation Sheet*	Correlates product model numbers between those products made by a Manufacturer for the Basic Applicant and those supplied to another company, the Multiple Listee.	Replace, add or delete page(s) with most current "Issued" or "Revised" date.
Index*	Catalogs the contents of the Procedure by some logical means, i.e. Section Number, Report Reference Number, or Issue Date.	Replace present page by matching the UL File Number, Volume Number, Page Number and most current "Revised" date.
Appendices* # (App.)	Contains instructions for the Manufacturer and UL Representative concerning specific responsibilities and required periodic tests. May also outline tests to be conducted on samples to be forwarded to UL's facilities.	Replace present page by matching the UL File Number, Volume Number, Appendix letter (eg. App. A), Page Number and most current "Revised" date.
	Standardized Appendix Pages are the same for all manufacturers within a particular product category.	Replace present page by matching the Appendix letter (eg. App. A), Page Number and most current "Revised" date.
Follow-Up Inspection Instructions (FUII) Pages*	Contains information similar to that in the Appendices. FUII Pages are issued as part of the Procedure when a UL Standard is used in conjunction with the Procedure, and are the same for all manufacturers within a particular category.	Replace present pages by matching the Page Number and most current "Issued" or "Revised" date.
Section General* # (Sec. Gen.)	Contains description, requirements, identifications and/or specifications that are common to all products covered by the entire volume and supplements the information provided in the Description Section.	Replace present page by matching the UL File Number, Volume Number, Page Number and most current "Revised" date.
Description, or Section (Sec.)*	Contains the specific description of one or more products or systems. This includes written text supplemented by photographs, drawings, etc., as necessary, to define features that affect compliance with the applicable requirements.	Replace present page by matching the UL File Number, Volume Number, Section Number, Page Number and most current "Issued" date.

***** The above page(s) may not appear in all UL Follow-Up Service Procedures; UL's Conformity Assessment Services staff determines their inclusion.

These pages are combined in the **Generic Inspection Instructions** for International Style Reports, identified, as example by Vol. X1, X2, etc.

PLEASE NOTIFY YOUR LOCAL UL OFFICE OF ANY CHANGES IN CONTACT NAME, COMPANY NAME OR ADDRESS, SO THIS MATERIAL AND IMPORTANT INFORMATION CONTINUES TO BE DELIVERED TO YOUR FACILITY WITHOUT INTERRUPTION.

UL Authorization Page

UL File Number: E480046 Volume: D1 Issue Date: 2017-9-22

FOLLOW-UP SERVICE PROCEDURE

(TYPE R)

PRODUCT CATEGORY NAME
(QUYX / QUYX7)

Manufacturer: SEE ADDENDUM FOR MANUFACTURING LOCATIONS

Applicant: 1461159 (Party Site)
JIAXING ZHONGXIN MEDICAL INSTRUMENTS CO.,LTD
Shendang Industrial Zone
Haiyan , Zhejiang 314311 China

Listee/Classified/ Recognized Co.: Same as Applicant (unless specified differently below)

Same as Applicant

This Follow-Up Service Procedure authorizes the above Manufacturer(s) to use the marking specified by UL LLC, or any authorized licensee of UL LLC, including the UL Contracting Party, only on products when constructed, tested and found to be in compliance with the requirements of this Follow-Up Service Procedure and in accordance with the terms of the applicable service agreement with UL Contracting Party. The UL Contracting Party for Follow-Up Services is listed on addendum to this Follow-Up Service Procedure ("UL Contracting Party"). UL Contracting Party and UL LLC are referred to jointly herein as "UL."

UL further defines responsibilities, duties and requirements for both Manufacturers and UL representatives in the document titled, "UL Mark Surveillance Requirements" that can be located at the following web-site: http://www.ul.com/fus. Manufacturers without Internet access may obtain the current version of this document from their local UL customer service representative or UL field representative. For assistance, or to obtain a paper copy of this document or the Follow-Up Service Terms referenced below, please contact UL's Customer Service at http://ul.com/aboutul/locations/, select a location and enter your request, or call the number listed for that location.

The Applicant, the specified Manufacturer(s) and any Listee/Classified/Recognized Company in this Follow-Up Service Procedure must agree to receive Follow-Up Services from UL Contracting Party. If your applicable service agreement is a Global Services Agreement ("GSA"), the Applicant, the specified Manufacturer(s) and any Listee/Classified/Recognized Company will be bound to a Service Agreement for Follow-Up Services upon the earliest by any Subscriber of use of the prescribed UL Mark, acceptance of the factory inspection, or payment of the Follow-Up Service fees which will incorporate such GSA, this Follow-Up Service Procedure and the Follow-Up Service Terms which can be accessed by clicking here: http://services.ul.com/fus-service-terms. In all other events, Follow-Up Services will be governed by and incorporate the terms of your applicable service agreement and this Follow-Up Service Procedure.

It is the responsibility of the Listee/Classified/Recognized Company to make sure that only the products meeting the aforementioned requirements bear the authorized Marks of UL LLC, or any authorized licensee of UL LLC.

This Follow-Up Service Procedure contains information for the use of the above Manufacturer(s) and representatives of UL and is not to be used for any other purpose. It is provided to the Manufacturer with the understanding that it will be returned upon request and is not to be copied in whole or in part.

This Follow-Up Service Procedure, and any subsequent revisions, is the property of UL and is not transferable. This Follow-Up Service Procedure contains confidential information for use only by the above named Manufacturer(s) and representatives of UL and is not to be used for any other purpose. It is provided to the Subscribers with the understanding that it is not to be copied, either wholly or in part unless specifically allowed, and that it will be returned to UL, upon request.

Capitalized terms used but not defined herein have the meanings set forth in the GSA and the applicable Service Terms or any other applicable UL service agreement.

UL shall not incur any obligation or liability for any loss, expense or damages, including incidental, consequential or punitive damages arising out of or in connection with the use or reliance upon this Follow-Up Service Procedure to anyone other than the above Manufacturer(s) as provided in the agreement between UL LLC or an authorized licensee of UL LLC, including UL Contracting Party, and the Manufacturer(s).

UL LLC has signed below solely in its capacity as the accredited entity to indicate that this Follow-Up Service Procedure is in compliance with the accreditation requirements.

Bruce A. Mahrenholz
Director
Conformity Assessment Programs (CPO)
UL LLC

Addendum to Authorization Page

LOCATION

Manufacturing Factory(ies) Information:

Shanghai Peaks Measure&Control Tech Ltd
3F.,No.165 Dakang Road,Baoshan District
Shanghai China

Party Site: 1461161
Subscriber No.:
Factory ID:
UL Contracting Party:

Party Site:
Subscriber No.:
Factory ID:
UL Contracting Party:

Party Site:
Subscriber No.:
Factory ID:
UL Contracting Party:

Party Site:
Subscriber No.:
Factory ID:
UL Contracting Party:

Party Site:
Subscriber No.:
Factory ID:
UL Contracting Party:

Party Site:
Subscriber No.:
Factory ID:
UL Contracting Party:

UL Appendix:

GENERIC INSPECTION INSTRUCTIONS

Product Category	Product Category CCN
Process Control Equipment, Electrical	QUYX

These instructions consist of the following Parts:

Part	Description
AA	Instructions and Responsibilities for UL Representative
AB	Instructions for Follow-Up Tests at UL
AC	Responsibilities and Requirements for Manufacturer
AD	General Terminology
AE	General Product Construction Requirements
AF	UL Certification Marks

PART AA

INSTRUCTIONS AND DUTIES FOR UL REPRESENTATIVE

AA1.0	**UL REPRESENTATIVE'S DUTIES**
AA1.1	The UL Representative's duties include, but are not limited to: A. Examining the construction of production intended to bear the UL Mark or Marking to determine compliance with the description of the product and any other requirements expressed in this Procedure. B. Where so specified in each Test Report, forwarding samples to UL for Follow-Up tests. C. Where so specified by Part AC, inspecting the test records and facilities of the manufacturer to ensure that: 1. The proper number of samples are undergoing the required tests, and 2. The required tests are being performed correctly, and 3. The proper information is being recorded and is up-to-date, and 4. The instruments being used for the tests have been calibrated at the prescribed interval and are in good working order.

AA2.0	**PROCEDURE IN CASE OF NONCONFORMANCE**
AA2.1	Report to the manufacturer and UL LLC by means of a Variation Notice (VN) if: A. Variations in construction are found, or B. The manufacturer's method and/or frequency of testing is not as described, or C. The test records maintained by the manufacturer are not as described, or D. The manufacturer's inspection program is not being performed as described, or E. Nonconforming test results are witnessed during tests conducted specifically for the UL Representative.
AA2.2	Explain to the manufacturer that a VN is a means of communication with the manufacturer and applicant and forms a record of those items where nonconformance to the Procedure has been found. Reference is to be made to "Information for Manufacturer's Variation Notices" on the back of the VN.
AA2.3	When a product does not conform with the Procedure, require that the manufacturer: A. Remove any markings referencing UL from the product, or obliterate these markings where the marking is imprinted, die-stamped, molded, etc., or B. Suitably modify all products that do not comply with the Procedure, or C. Hold shipment pending further instructions from UL LLC D. Demonstrate that one of the conditions shown below exist and be able to provide any of the referenced information or documentation. Under the following conditions, variations from Procedure described constructions shall be noted on a Variation Notice, however, the manufacturer is not required to remove UL markings, rework the product or hold shipment. 1. A part is called out as Listed and the manufacturer or part number is not as described and the alternate part being used is Listed and all other attributes for the part are met. 2. A part is called out as a Recognized Component (R/C) and the manufacturer or part number is not as described and the alternate part being used is Recognized under the described category and all other attributes for the part are met.

	3. Internal wiring is identified by UL Style Number and the manufacturer is using (R/C) Appliance Wiring Material (AWM) with Style Numbers not referenced in the Procedure description. The manufacturer must be able to provide documentation that the voltage and temperature ratings of the alternate Style Number are equal to or greater than the ratings of the Style Numbers specified in the Procedure. AWM with Style Numbers not specified in the Procedure must be rated VW-1.
AA2.4	It is the manufacturer's responsibility to forward a copy of the Variation Notice to the Applicant.
AA2.5	If the manufacturer or Applicant question the rejection of the product, the material may be held at the point of inspection, typically at the factory, pending an appeal. The manufacturer has the right to appeal a decision with which they disagree. Provide the name of the UL engineer to whom the appeal is to be made. To resolve issues involving variations in construction, the manufacturer and Applicant may also be offered the option of contacting their New Work assignment engineer. Held shipment appeals involving Follow-Up Services issues (e.g. -improper labeling, etc.) should be directed to an appropriate staff member designated by the Reviewing Office for the product category. Should UL grant temporary authorization for the continued use of the UL Mark, such temporary authorization shall only be for the time needed to review and/or process the Procedure revisions, or as otherwise specified to cover a particular lot or production run. The manufacturer shall satisfy the UL Representative that all marks referencing UL are removed from the rejected material. Those marks referencing UL not destroyed during their removal from the product shall be turned over to the UL Representative for destruction.

AA3.0	**EXAMINATIONS TO BE WITNESSED BY UL REPRESENTATIVE**
AA3.1	**Inspection of Printed Wiring Boards and Printed Wiring Board Assemblies**
AA3.1.1	The UL Representative shall determine that the printed wiring board is as specified in the Procedure.
AA3.1.2	If the soldering operation is performed at the Original Equipment Manufacturer's factory (OEM) and the soldering temperature and dwell time are given in the Procedure, the temperature and dwell time shall also be checked to determine that they do not exceed the limits specified.
AA3.1.3	The UL Representative shall determine that the printed wiring board is as specified in the Procedure. The UL Representative then shall make a visual inspection of the printed wiring board assemblies for any mechanical damage or evidence of exposure to excessive temperatures that may have occurred during the soldering operation. The base material and the conductors shall be examined for nonconforming features as indicated below: A. Conductors, Terminal Pads, and Tabs 1. Reduction in cross-section, such as scratches, nicks, pin holes, tearing. 2. Loosening or lifting of printed wiring conductor, pad, or tab from the base material. 3. Sections missing or damaged. 4. Blistering 5. Breaks B. Base Material 1. Warping 2. Cracking 3. Charring, blistering, or other heat damage due to solder process 4. Delamination

AA3.1.4	Samples shall be selected at random as shown in Table AA1 in accordance with the size of the incoming lot. The lot is to be rejected in accordance with the fifth column of the table.
AA3.1.5	With respect to printed wiring boards using Surface Mounted Technology (SMT), if the SMT assembly process is done at temperatures and times below the soldering limits, the UL Representative will accept the boards. If the assembly process is conducted on-site with temperatures/times in excess of soldering limits or if the process is conducted off-site and the temperatures/times cannot be verified, a visual inspection will be conducted by the UL Representative in accordance with the guidelines shown above. If any instructions for SMT components are specified in the Procedure, then these SMT instructions are superseded.

TABLE AA1
PRINTED WIRING BOARD SAMPLE SELECTION

Size of incoming lot# for each type##	Initial number of samples taken	Number of nonconforming samples requiring additional samples	Additional number of samples to retest lot	Cumulative number of nonconforming samples to reject lot
1 - 500	8	1	13	2
501 – 3200	13	1	20	2
3201 - 35000	20	1	32	2
Above 35000	32	1	50	2

Notes:

\# A lot is considered to comprise all printed wiring board assemblies of the same type at the manufacturer's factory at the time of the UL Representative's visit, which have not been previously checked by the UL Representative.

A type is considered a printed wiring board assembly meeting all the following:

1. Same vendor who mounts and solders the components.
2. Same board manufacturer and type or catalog number.
3. Same size
4. Same pattern
5. Same components

AA4.0	**SAMPLE SELECTION FOR TESTS CONDUCTED AT MANUFACTURER AND UL**
AA4.1	**Standard Follow-Up Tests for Plastic Enclosures and Parts**
AA4.1.1	Each Test Report indicates the plastics enclosures or parts that may require Follow-Up Service testing. The UL Representative shall consult Table AA2 to determine which tests are required.
AA4.1.2	With respect to Table AA2, Access to Molding Operation shall be determined in accordance with the following:
	A. UL is considered to have access to the plastic molding operation if the molding takes place in the end-product assembly location and the operation complies with the requirements below.
	B. The UL Representative shall have free, unannounced, and immediate access to the factory and the storage facility during all business hours of the factory or storage facility. The UL Representative shall also have access to the records required below.
	C. The manufacturer shall mark each enclosure, cartons containing enclosures, or a tag accompanying the enclosure in a manner such that the UL Representative can trace the origin of each enclosure to a specific batch.
	D. The manufacturer shall keep records for each batch of plastic enclosures molded, in accordance with the below requirements.
	E. The records shall be thorough, so that the UL Representative may determine the composition of the enclosure. The records shall be maintained for at least six months from the date of production, and shall be accurate. All of the following items are to be covered:
	1. The records shall indicate the base material. The manufacturer may not blend resins. *Exception: The manufacturer may blend resins provided it is specifically stated in the Procedure.*
	2. The records shall include the amount of regrind used. Thermoplastic regrind shall not exceed 25 percent by weight. UL does not authorize the use of thermoset regrind. *Exception: Thermoplastic regrind may exceed 25 percent provided it is specifically stated in the Procedure and does not exceed the percent stated in the Procedure.*
	3. The composition of the enclosures shall not include recycled plastics, color concentrates, flame retardants, or mold release lubricants. *Exception: One or more of the elements indicated in 3) may be included, provided the Procedure specifically acknowledges its use.*
	F. However, if a minor discrepancy (such as a mathematical error or a bookkeeping oversight) occurs, the manufacturer shall discuss the error with the responsible individual. If necessary, the manufacturer shall correct the error on the records. To prevent recurrence of the error, the error shall be documented on a Variation Notice, and the UL Representative shall pay particular attention to this area during future inspections.
	G. If a major discrepancy appears in the records, or if the records are not complete, or UL no longer has access to the molding operation, the UL Representative shall issue a Variation Notice so that the Procedure will be modified accordingly
AA4.1.3	Where testing is required, samples are to be selected no less than once per year in accordance with each Test Report. All samples are to be handled in accordance with the requirements of this section.
AA4.1.4	Enclosure samples shall be chosen in a manner such that each enclosure material in use by the manufacturer is represented by tests no less than once over a two-year period. Enclosure materials that are used infrequently (i.e. less than once in a two year period) shall be selected whenever they are used.

TABLE AA2
FOLLOW-UP TESTING FOR PLASTIC ENCLOSURES AND PARTS

Enclosure plastic	Molding location		
	Recognized Component molder or evaluated component molder other than Recognized [a]	Not evaluated molding	
		UL has access to molding operation [b]	UL does not have access to molding operation [b]
Recognized Component	No tests required	Annual Impact Test at Mfg. OR Annual ID Tests at UL [c, d]	Annual Impact and ID Tests at UL
Unlisted Component [e]	Annual Impact Test at Mfg. [d] AND Annual ID and Flame Tests at UL	Annual Impact Test at Mfg. [d] AND Annual ID and Flame Tests at UL	Bi-annual Impact and ID Tests at UL

[a] The reference to evaluated component molder other than Recognized is in regard to a molder of plastic fabricated parts which has been authorized by UL to mold plastic for the end-use product, but for which no Recognition has been established.

[b] Access to molding operation means the molding takes place in the end-product assembly location and the manufacturer follows the requirements in AA4.1.2.

[c] The manufacturer may elect either an Impact Test or ID Tests. The UL Representative shall act accordingly.

[d] If the manufacturer does not have the ability to perform the Impact Test in accordance with AA4.1.5, the required test samples are to be forwarded to UL for testing.

[e] The reference to Unlisted component plastic is in regard to a component plastic used in a Listed or Recognized product which is separately investigated in accordance with applicable requirements for the end-use product, and for which no coverage has been requested or established.

AA4.1.5	**Impact Test at Manufacturer**
AA4.1.5.1	Where indicated in Table AA2, the UL Representative shall conduct the Impact Test as part of the product inspection at the manufacturer's facility and shall determine if the manufacturer records the test data in compliance with the requirements of this document *Exception: As noted in Table AA2 footnote (d), the Impact Test shall be conducted at UL if the manufacturer does not have the ability to conduct the test.*
AA4.1.5.2	Each enclosure sample fabricated with the material specified in the Test Report shall be subjected to a single impact. The impact shall be directed onto the surface most likely to demonstrate a nonconformance when the Basis of Acceptability of AA4.1.5.3 is applied. The impact is to be produced by dropping a steel sphere 2 inches (50.8 mm) in diameter and weighing 1.18 pounds (0.536 kg mass) a height of 50.85 in. (129.2 cm). For surfaces other than the top of an enclosure the steel sphere is to be suspended by a cord and swung as a pendulum, dropping through the 50.85 in. (129.2 cm) vertical distance before striking the surface
AA4.1.5.3	Each sample shall withstand the impact of AA4.1.5.2 without being affected to the extent that: A. Uninsulated, live parts are accessible to contact, or B. The mechanical performance of the product is adversely affected so as to create a risk of injury to persons, or C. A condition is produced that can cause a risk of electric shock.
AA4.1.5.4	To determine compliance with AA4.1.5.3 (A), the UL Representative shall apply the articulate probe to verify that the probe cannot contact an uninsulated, live part. It is the manufacturer's

	responsibility to order and purchase the probe through UL's Corporate Standards Department, at the Northbrook Office.
AA4.1.5.5	To determine compliance with AA4.1.5.3 (B), the UL Representative shall give consideration to the functioning of safety devices and constructional features (such as thermostats, overload protective devices and strain relief). Cracking or denting of the enclosure shall not result in the exposure of moving parts that could cause a risk of injury to persons.
AA4.1.5.6	To determine compliance with AA4.1.5.3 (C), the product shall be subjected to a Dielectric Voltage-Withstand Test as described in AC2.3 without dielectric breakdown.
AA4.1.5.7	If the Impact Test sample produces any one of the conditions specified in AA4.1.5.3, the test is to be repeated on three previously untested samples from the same lot. The results are considered acceptable if all three samples comply with the requirements. If a nonconformance occurs on any one of the additional samples, then the lot shall be considered rejected.
AA4.1.6	**ID and Flammability Tests**
AA4.1.6.1	Samples selected in accordance with Table AA2 shall be tagged with all the following information, and the manufacturer shall forward them to the Reviewing Office: A. Material B. Manufacturer C. Model number D. Follow-Up Test(s) required E. Test parameters (if any)

PART AB

INSTRUCTIONS FOR FOLLOW-UP TESTS AT UL

AB1.0	**GENERAL**
AB1.1	The samples forwarded by the UL Representative shall be subjected to the tests indicated on the sample tags in accordance with any indicated test specifics (e.g. oven temperature).
AB1.2	Unless otherwise notes, all references are to the Generic Inspection Instructions.

TABLE AB1
TEST PARAMETERS

Test	Method	Basis for Acceptability
Impact	AA4.1.5.2	AA4.1.5.3 – AA4.1.5.7
Identification		
Qualitative Infrared Analysis (IR)	UL 746A	Compare to original spectrum in Test Report
Differential Scanning Calorimetry (DSC)	UL 746A	Compare to original thermogram in Test Report
Thermogravimetry (TGA)	UL 746A	Compare to original thermogram in Test Report
Flammability		
3/4 Inch Flame	UL 746C	UL 746C
5 Inch Flame	UL 746C	UL 746C

PART AC

RESPONSIBILITIES AND REQUIREMENTS FOR MANUFACTURER

AC1.0	**MANUFACTURER'S RESPONSIBILITIES (INCLUDING BUT NOT LIMITED TO)**
AC1.1	Control of UL Mark - Restrict the use of markings that reference UL (either directly or by use of the name, an abbreviation of it, or the UL symbol or Classification Mark, or indirectly by means of agreed-upon markings that are understood to indicate acceptance by UL) to those products that are found by the manufacturer's own inspection to comply with the Procedure description. Such restrictions apply to packaging, brochures or other means of advertising that reference UL. Use of such markings is further limited by the agreements that have been executed by the subscriber and UL. Markings shall be confined to the locations authorized in these Generic Inspection Instructions or in individual Test Reports.
AC1.2	Access to Factory - During hours in which the factory is in operation, provide the UL Representative with free access to any portion of the premises where the product or components thereof are being fabricated, processed, finished or stored, and to the test area assigned for the UL Representative's use. The UL Representative shall be permitted to inspect and subject to prescribed tests, prior to shipment, any product bearing or intended to bear markings referencing UL.
AC1.3	Production-Line Tests - Conduct the tests detailed in Part AC2.0.
AC1.4	Required Records - Maintain records of test performance. The records shall include the model or catalog designation of the product, the date of production, the tests performed, number of units tested, test results and action taken on rejections. Records for test performance shall be retained for six (6) months and shall be readily available for review by the UL Representative. Exception - Records of test results need not be maintained for 100% Production-Line Tests.
AC1.5	Test Equipment and Personnel - Provide, at a convenient location, all required test equipment and facilities and any required personnel for conducting all tests that are to be performed at the factory. These shall be available when needed so that the inspection work can proceed without undue delay.
AC1.6	Test Equipment Calibration - Determine that the test equipment is functioning properly daily, and have it calibrated at least annually, or whenever it has been subject to abuse (such as being dropped or struck with an object) or its accuracy is questionable. The test equipment and instruments shall be calibrated either by the manufacturer or by an outside laboratory. In either case, it shall be calibrated by comparison with a standard that is traceable to the applicable U.S. or foreign National Standard. A letter from the outside laboratory or from an off-site manufacturer's calibration lab stating that their lab standards are directly traceable to their country's National Standard and outlining their traceability pathway is considered adequate proof of traceability. For in-house calibrations, the Standard (weight and gauge blocks, etc.) used shall be calibrated every three years, or whenever the Standard has been subject to some form of abuse that may affect the Standard's fitness for use. The Standard shall be stored to protect it from damage or deterioration per the Standard manufacturer's recommendations. Records of the calibration of the test equipment and Standard(s) shall be maintained until the next required calibration is completed and recorded, and shall be readily available for review by the UL Representative.

AC2.0	**REQUIREMENTS FOR PRODUCTION-LINE TESTS**
AC2.1	The following Production-Line Tests shall be conducted on the products covered by this Procedure. During production, the test equipment shall be checked for proper operation at least once during each shift. When the tests are not performed concurrently, it is preferred that the Grounding Continuity Test be performed before either Dielectric Voltage-Withstand Test.
AC2.2	**Production-Line Grounding Continuity Test**
AC2.2.1	General - Except as may be noted under "Exceptions" in each Test Report, the manufacturer shall subject 100 percent of production of all of the following products to a routine Production-Line Grounding Continuity Test as described in section AC2.2.3: A. Products that are provided with a grounding type power supply cord, or B. Fixed products that are for permanent connection to the branch circuit. Exception: This test is not required for permanent connection to the branch circuit by fixed wiring if the design does not employ bonding jumpers or grounding wiring to remote units.
AC2.2.2	Test Equipment - Any suitable continuity-indicating device (such as an ohmmeter, a battery and buzzer combination, or the like) may be used to determine compliance with the Grounding Continuity Test requirements.
AC2.2.3	Method - Continuity shall be determined between the grounding conductor of the attachment plug cap, and/or the designated main grounding point, and accessible dead-metal parts of the product, using the test equipment indicated above. A single test is sufficient if the accessible metal selected is conductively connected by design to all other accessible metal.
AC2.2.4	Basis for Acceptability - There shall be grounding continuity between the parts specified.
AC2.3	**Production-Line Dielectric Voltage-Withstand Test**
AC2.3.1	General - Except as may be noted under "Exceptions" in each Test Report, the manufacturer shall subject 100 percent of production of all products to a routine Production-Line Dielectric Voltage-Withstand Test as described in section AC2.3.3.
AC2.3.2	Test Equipment - The test equipment shall include a means of indicating the test potential, an audible or visual indicator of electrical breakdown, and either a manually operated reset device to restore the equipment after electrical breakdown or an automatic feature that rejects any unacceptable unit. If an ac test potential is applied, the test equipment shall also include a transformer having an essentially sinusoidal output. If the output of the test-equipment transformer is less than 500 volt-amperes, the equipment shall include a voltmeter in the output circuit to indicate the test potential directly. If the output of the test-equipment transformer is 500 volt-amperes or more, the test potential may be indicated (1) by a voltmeter in the primary circuit or in a tertiary-winding circuit, (2) by a selector switch marked to indicate the test potential, or (3), in the case of equipment having a single test-potential output, by a marking in a readily visible location to indicate the test potential. When marking is used without an indicating voltmeter, the equipment shall include a positive means, such as an indicator lamp, to indicate that the manually operated reset switch has been reset following a dielectric breakdown. Test equipment other than that described above may be used when it can be shown that UL has previously confirmed in writing that the equipment complies with the above requirements and is deemed suitable for use for this test.
AC2.3.3	Method - Each product shall withstand without electrical breakdown, as a routine production-line test, the application of an ac potential at a frequency within the range of 40-70 Hz or DC potential between the primary wiring, including connected components, and accessible dead metal parts that are likely to become energized. The test potential shall be in accordance with Table AC1. The durartion at the given potential shall be min. 2 s. The manufacturer's test conditions may be higher than those shown in Table AC1 when necessary to comply with other international product safety certifications. If a transient limiting device is provided, see individual description for details and values. Floating circuits which can be hazardous life to accessible conductive parts shall be tested with 1.5 times the max. rated voltage (min. 350Vac or 500Vdc). The product may be in a heated or unheated condition for the test. The test shall be conducted when the product is complete (fully assembled), and it is not intended that the product be unwired, modified, or disassembled for the test, unless otherwise permitted below: A. A part, such as a snap cover or a friction-fit knob, that would interfere with conducting the test need not be in place. B. The test may be conducted before final assembly if the test parameters represent that for the completed product. During the test, the primary switch is to be in the on position, both sides of the primary circuit of the product are to be connected together and to one terminal of the test equipment, and the second test-equipment terminal is to be connected to accessible dead metal. Electromagnetic interference filter capacitors connected to the primary circuit shall not be disconnected during the test.
AC2.3.4	Basis for Acceptability - All products shall withstand the applied potential without an indication of electrical breakdown.

TABLE AC1
DIELECTRIC VOLTAGE-WITHSTAND TEST CONDITIONS

Nominal line-toneutral voltage of MAINS supply	OVERVOLTAGE CATEGORY II			OVERVOLTAGE CATEGORY III			OVERVOLTAGE CATEGORY IV		
a.c. r.m.s. or d.c.	a.c.	d.c.	1,2/50 µs impulse	a.c.	d.c.	1,2/50 µs impulse	a.c.	d.c.	1,2/50 µs impulse
V	V r.m.s.	V	V peak	V r.m.s.	V	V peak	V r.m.s.	V	V peak
≤150	840	1 200	1 200	1 400	2 000	2 000	2 200	3 100	3 100
>150 ≤ 300	1 400	2 000	2 000	2 200	3 100	3 100	3 300	4 700	4 700
>300 ≤ 600	2 200	3 100	3 100	3 300	4 700	4 700	4 300	6 000	6 000
>600 ≤ 1 000	3 300	4 700	4 700	4 300	6 000	6 000	5 300	7 500	7 500

PART AD

GENERAL TERMINOLOGY

AD1.0	**ABBREVIATIONS / DEFINITIONS**	
AD1.1	IEC	Component provided with a testing agency's mark as indicated in Table II
AD1.2	PRI	Primary circuit (mains)
AD1.3	PWB	Printed wiring board
AD1.4	SEC	Secondary circuit
AD1.5	CN	Component provided with CSA or CUL Marking
AD1.6	LC	Supplied by source limited to the values specified Table 17 (see below)

Table 17 – Limits of maximum available current

Open-circuit output voltage (U or $\hat{U}$) V			Maximum available current A
a.c. r.m.s.	d.c.	Peak[a]	a.c. r.m.s. or d.c.
$U \leq 2$	$U \leq 2$	$\hat{U} \leq 2{,}8$	50
$2 < U \leq 12{,}5$	$2 < U \leq 12{,}5$	$2{,}8 < \hat{U} \leq 17{,}6$	$100 / U$
$12{,}5 < U \leq 18{,}7$	$12{,}5 < U \leq 18{,}7$	$17{,}6 < \hat{U} \leq 26{,}4$	8
$18{,}7 < U \leq 30$	$18{,}7 < U \leq 60$	$26{,}4 < \hat{U} \leq 42{,}4$	$150 / U$

[a] The peak value ($\hat{U}$) applies to non-sinusoidal a.c. and to d.c. with ripple exceeding 10 %, and is provided for convenience. The r.m.s. value of the maximum available current shall be determined as that value is related to heating.

PART AE

GENERAL PRODUCT CONSTRUCTION REQUIREMENTS

AE1.0	**CONSTRUCTION DETAILS**
AE1.1	Unless otherwise described or supplemented in individual Test Reports, the following requirements apply to all equipment included in this Procedure. It is the manufacturer's responsibility to assure the compliance of production with these requirements.
AE1.1.1	Accessories Parts and Accessories - Such items packaged with the product shall be specifically described in a Test Report.
AE1.1.2	Adapters – Three or two wire grounding type adapters shall not be furnished with the product unless specifically authorized by a Test Report.
AE1.1.3	Not Applicable
AE1.1.4	Bonding - Except where specifically noted in a Test Report, bonding of internal dead-metal parts to the enclosure for grounding purposes shall be accomplished by a positive means such as clamping, riveting, bolting or screwed connection. The bonding connection shall reliably penetrate any nonconductive coatings such as paint or vitreous enamel.
AE1.1.5	Casualty Considerations - Except as described, or as necessary for normal operation of the equipment, there shall be no sharp edges, burrs, points, or spikes inside or outside the device that may cause injury during use or during cleaning operations.
AE1.1.6	Connectors - Connectors shall be applied so as to ensure that all bare strands are contained and insulated.
AE1.1.7	Grounding - The following guidelines shall be observed: A. Non-Detachable Cord Connected Appliance - The equipment-grounding conductor of the flexible cord: 1. Shall be connected to the grounding member of the attachment-plug cap. Note: The grounding member of the attachment-plug shall be fixed in position with respect to the cap. 2. Shall be conductively connected to all dead-metal parts of the product that are specified in the description as being connected to the grounding conductor. The grounding-conductor shall be connected by either (1) a screw or other reliable means which serves no other purpose and which is not liable to be removed during any servicing operation, or (2) a threaded grounding stud on which a closed ring connector secured to the ground conductor is the first conductor mounted and secured by a nut and split ring lockwasher. Solder alone shall not be used for securing this conductor. Note: The screw or stud and nut shall: (1) be provided with a means to penetrate nonconductive coatings, such as paint or enamel; (2) be of a corrosion-resistant metal or shall be protected against corrosion; and (3) be marked on or adjacent with a grounding symbol or the IEC417 Grounding Symbol 5019 " ⏚ ". The installation instructions shall identify the meaning of the symbol.

	B. Detachable Cord Connected Appliance - Polarization shall be maintained through the load fitting of the cord (appliance coupler) and the mating connector (appliance inlet) on the product. The load fitting shall be a three wire ANSI configuration. Exception: The load fitting need not be an ANSI configuration provided it is wired as follows (the description applies when viewing the face of the connector on the product, with the center contact down): 1. The right contact shall be connected to the grounded conductor (neutral) of the cord. 2. The center contact shall be connected to the grounding conductor of the cord. C. Permanently-Connected Products - In a permanently connected product (1) all exposed metal parts, and (2) all dead-metal parts within the enclosure, which are specified in the description as being connected (see "Bonding") to the grounding conductor, shall be conductively connected to: 1. The point of the enclosure at which the metal raceway of the power supply circuit will be connected, and 2. The equipment-grounding field-wiring terminal or lead. The equipment-grounding terminal or grounding lead shall be connected to the frame or enclosure by a positive means, such as by a bolted or screwed connection. The grounding connection shall reliably penetrate nonconductive coatings, such as paint or vitreous enamel. The grounding point shall be so located that it is unlikely that the grounding means will be removed during normal servicing. A wire-binding screw intended for the connection of an equipment-grounding conductor shall be identified by the protective earth symbol. The head shall be either hexagonal shaped or slotted, or both. A pressure wire connector intended for connection of an equipment grounding conductor shall be identified by the protective earth symbol " ⏚ ". The wire-binding screw or pressure wire connector shall be so located that it is unlikely to be removed during normal servicing of the unit. D. Grounding Terminal:- The grounding conductor shall be the first conductor terminated on a grounding terminal and secured by a separate nut. Other grounding conductors may be secured to this terminal if they are secured on top of the first nut by a second nut.
AE1.1.8	Indicators - Indicator lights shall be clearly visible to the equipment operator.
AE1.1.9	Internal Plastic Parts - For each type of plastic material the manufacturer shall review the Recognized Component Directory and Supplement or UL Online Certification Directory (http://www.ul.com/database) in order to insure that the plastic material in question meets all the material characteristics specified (i.e. flammability rating, Relative Thermal Index (RTI), and color) at the thickness specified. Alternatively, a copy of the Plastic Manufacturer's Component Recognition Report or Recognition Card may be used as a traceability pathway only if these materials were issued after the latest publication of the Recognized Component Directory.
AE1.1.10	Internal Wiring - Conductors shall be routed away or protected from sharp edges and moving parts. Exception: LC that are reliably separated from PRI and SEC circuits need not be Recognized AWM.
AE1.1.11	Lampholder Connections - All screw shells of lampholders shall be connected to the same conductor of the supply circuit.
AE1.1.12	Loose Strands - Ends of stranded conductors shall have all strands contained to prevent contacting of, or reduction of spacing to, other live parts and dead metal. This can be accomplished by: A. Tinning

	B. Inserting properly into suitable wire connectors. C. Crimped connectors and/or eyelets with the crimp containing all strands D. Solder lugs.
AE1.1.13	Markings - Required information shall be legibly marked on the product, in the manner and minimum height specified.
AE1.1.14	Multiple Voltage - Cord-connected multiple voltage products shall be provided with an attachment plug that is suitable for the voltage for which the product is set.
AE1.1.15	Polarity - An appliance intended for permanent connection to the source of supply and having an identified terminal or lead; and an appliance employing a power supply cord with a polarized attachment plug cap (excluding 250 volt, 2-pole and 250 volt, 3-pole, 3-phase), utilizing the components indicated, shall have the components wired as follows: A. Lampholders and Receptacles - The screw shell or identified terminal or lead of a lampholder and the identified terminal or lead of a receptacle, shall be connected to the identified grounded conductor or terminal within the product. B. Switches (Single Pole) - Unless otherwise specified in the Procedure, a manual single pole switch, and an automatic control with a marked "off" position, shall not be connected to the identified grounded conductor.
AE1.1.16	Power Supply Cords A. Non-Detachable Power Supply Cord – A non-detachable power supply cord as described in each Test Report must be provided and shipped with the unit in all cases. The power supply cord and any alternatives must be described in each Test Report. Each conductor of a non-detachable power supply cord shall have only one color, except the conductor identified by a combination of green and yellow. B. Detachable Power Supply Cord – The detachable power supply cord as described in each Test Report may or may not be shipped with the unit. Follow the guidelines in Table AE1 to apply the alternatives under each of the situations described in the notes to Table AE1. Table AE1 also includes alternative detachable power supply cords that may be shipped with units intended for use outside the USA.
AE1.1.17	Printed Wiring Boards (PWBs) - PWBs shall show no burning, bubbling or other visible evidence of damage to their conductors or substrate material as a result of the fabrication process. With respect to PWBs using Surface Mounted Technology (SMT), it is acceptable if the SMT assembly process is done at temperatures and times below the soldering limits. If the SMT assembly process is conducted on-site with temperatures/times in excess of soldering limits or if the process is conducted off-site and the temperatures/times cannot be verified, a visual inspection shall be conducted by the UL Representative. The PWBs shall be inspected by the manufacturer for mechanical damage or evidence of exposure to excessive temperatures that may have occurred during the soldering operation. If any nonconforming features (defined below) are found after visual inspection, the manufacturer shall reject the lot (as defined in Table AA1). Otherwise, the use of PWBs may continue without any interruption. The base material and the conductors shall be examined for nonconforming features as indicated below. A. Conductors, Terminal Pads, and Tabs 1. Reduction in cross-section, such as scratches, nicks, pin holes, tearing. 2. Loosening or lifting of printed wiring conductor, pad, or tab from the base material.

	3. Sections missing or damaged. 4. Blistering 5. Breaks B. Base Material 1. Warping 2. Cracking 3. Charring, blistering, or other heat damage due to solder process 4. Delamination
AE1.1.18	Protection of Wiring - All wire and wire insulation in the product shall be protected from damage. This is commonly achieved by securement, segregation, and routing to keep the wire away from parts or assemblies which can damage the wire or insulation. Internal wiring that might make contact with metal parts shall be protected from sharp metal edges. This can be accomplished by rounding or deburring the metal, using a Recognized Component bushing, or through other construction features described in the Test Report. If the wiring is located where it may be in proximity to combustible material, it shall be protected by the method(s) described in the individual Test Report. Conductors shall be examined for evidence of damage. Faulty practices which can cause damage to conductors and/or insulation include: A. Improper application of crimped connectors, including but not limited to, use of crimping tool and dies not recommended by the manufacturer of the connector. B. Improper insulation removal. C. Overheating of conductor insulation because of routing or contact with hot surfaces during or after installation. D. Use of wire in which the insulation has been cut, cracked, crushed, abraded, etc. Constructions which may cause damage to conductors and/or insulation include: A. Moving parts such as rotating or reciprocating cams, shafts, and the like, as well as removable or sliding covers, hinged doors. B. Sharp edges and corners (including screw threads, burrs, points, stamped metal edges). C. Heat sources (including lamps, heating elements, etc.). D. Assemblies that clamp or squeeze wire insulation, unless described in the Test Report.

AE1.1.19	Securement of Parts - Screws or other fastenings used to mount or support small, fragile, insulating parts shall not be tight enough to cause cracking or breaking of these parts. Uninsulated live parts, components which support live parts, and dead metal parts, that are normally intended to remain stationary, shall be prevented from rotating or shifting if movement will result in twisting or stress of internal wiring or connections, or spacings being reduced below that specified in the Test Report. Similar parts that are normally intended to move or rotate shall be prevented from excessive movement if such movement will result in twisting or stress of internal wiring or connections, or spacings being reduced below that specified in the Test Report. A switch, lampholder, attachment plug receptacle, motor attachment plug cap, or other components subject to handling by the user shall be mounted securely and prevented from rotating. Exception: Based on engineering considerations certain constructions of securely mounted push button or plunger type switches, and lampholders of the type in which the lamp cannot be replaced (such as a neon pilot or indicator light in which the lamp is sealed in a non-removable jewel) may be excluded from the above. These constructions are described in the Procedure. However, in no case will nonconforming spacings be allowed. Some means commonly used to prevent rotation are: A. Lock washer. B. Matched keying of the component and its mounting. C. Two or more fasteners (screws, rivets, pins, etc.). D. Strap, clip, or pin fitted into an adjacent part. E. Physical barrier (molded boss, side of enclosure, adjacent component, etc.) that bears against the component.
AE1.1.20	Solder Connections - All solder connections shall be made mechanically secure before soldering. Some typical examples of mechanical securement are: A. Twisting wire around a solder post that has a change in dimension or restriction so unsoldered wire will not slip off post. B. Inserting wire through an opening, and bending over the free end.
AE1.1.21	Strain Relief - Strain Relief methods such as tying the supply cord into a knot or tying the ends of the cord with string shall not be used.
AE1.1.22	Usage Markings - There shall be no marking in the instruction manual, or on the carton or package that is, or could be construed to be, in conflict with or an extension of the use covered in the Test Report.
AE1.1.23	Documentation - Handling of hazardous substances and correct disposal procedure, field-installed devices, explanation of warning symbols.
	A. Documentation such as an instruction manual shall be provided with these products. No attachments or accessories are mentioned in the instruction manual unless specifically mentioned in a particular section.
	B. For products where attachments are specifically mentioned in a particular section, which are packaged and sold separately, the instruction manual packaged with the basic appliance identifies each separately available attachment by attachment name and model number. In addition, the manual packaged with the attachment indicates by name and model number the basic appliance with which it is to be used.

	C. Documentation shall also include the complete electrical rating of the device as described in the electrical rating section of the Procedure; a description of all input/output connections; assembly, location and mounting requirements; supply connection and earthing requirements, ventilation requirements; identification of operating controls, instructions for cleaning, replacement of consumable materials, interconnecting accessories, indication of suitable accessories, instructions for use, technical specifications, name and address of manufacturer or supplier and as statement of range of environmental conditions as noted below.
	- Indoor use or outdoor use;
	- Altitude up to 2000 m or above 2000 m if specified by the manufacturer
	- Temperature 0 to 40°C, or outside this range if specified by the manufacturer.
	- Maximum relative humidity 80 percent for temperatures up to 31°C decreasing linearly to 50 percent relative humidity at 40°C;
	- Mains supply voltage fluctuations not to exceed ± 10 percent of the nominal voltage;
	- Temporary Overvoltages as stated by the manufacturer;
	- Transient overvoltages according to INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) I, II, III and IV. For mains supply the minimum and normal category is II;
	- POLLUTION DEGREE 1 2, 3 or 4.

TABLE AE1
DETACHABLE POWER SUPPLY CORD REQUIREMENTS

Detachable Power Supply Cord	
Provided	Not Provided
A or B	(C and D) or (C and E)
A. The power supply cord should be as described in the Test Report.	
B. The detachable power supply cord is either: 1. Certified by one of the agencies listed in Table AE3; or 2. Comprised of cordage marked with an agency marking per Table AE3 or marked per Table AE4. The fittings are to be marked with at least one of the agencies listed in Table AE3. Units provided with detachable power supply cords, which are certified by one of the agencies listed in Table AE3 or AE4, shall be considered to be intended for use outside of the USA.	
C. A marking must be provided adjacent to the appliance coupler or at an equivalent location either to inform the user on proper selection of the power supply cord or to see the instruction manual for this information. This marking may be in the form of a tag, nonpermanent label, or product insert that is provided on or packaged with the product so that the marking is visible at the time of installation.	
D. The marking (tag, label, or product insert) or instruction manual must contain complete instructions concerning selection of the power supply cord. It shall include either Option 1, 2, or 3 as follows: 1. Reference to a power supply cord must be as a UL Listed detachable power supply cord consisting of the specific configuration of appliance coupler, the cord type, and the electrical rating of the power supply cord as described in each Test Report. Refer to Table AE2 for equivalent cord types. 2. Reference to a power supply cord may be made to a Listed field installed accessory kit containing a suitable Listed power supply cord. Authorization for use of a Listed field installed accessory kit must be included in the individual Test Reports. 3. Reference to a power supply cord may be made to a cord that is not Listed and not intended for use in the United States or Canada. In this case, the manufacturer is to supply the UL Representative with information to verify that the referenced cord is certified or similarly appropriate for use in the destination country.	
E. The reference to the power supply cord (see Note C) shall include instruction for selection of the proper power supply cord as described in Note B above.	

TABLE AE2
EQUIVALENT CORDS

Basis Cord Type	Equivalent Types
SP-2	SPE-2, SPT-2
SP-3	SPE-3, SPT-3
SV	SVE, SVO, SVOO, SVT, SVTO, SVTOO
SJ	SJE, SJO, SJOO, SJT, SJTO, SJTOO
S	SE, SO, SOO, ST, STO, STOO

TABLE AE3
CERTIFICATION MARKINGS

Country	Cert. Agency	Mark	Country	Cert. Agency	Mark
Argentina	IRAM		Ireland	NSAI	
Australia	SAA		Italy	IMQ	
Austria	OVE		Japan	JET, JQA	
Belgium	CEBEC		Netherlands	KEMA	
Canada	CSA		Norway	NEMKO	
China	CCC		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA	
Germany	VDE			BSI	

TABLE AE4
HAR FLEXIBLE CORDS
APPROVAL ORGANIZATIONS AND CORDAGE HARMONIZATION MARKING METHODS

Approval Organization	Printed or Embossed Harmonization Marking (May be Located On Jacket or Insulation of Internal Wiring)		Alternative Marking Utilizing Black-Red Yellow Thread (Length of color Section, mm)		
Comite Electrotechnique Belge (CEBEC)	CEBEC	<HAR>	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prufstelle	<VDE>	<HAR>	30	10	10
Union technique de l'Electricite (UTE)	UTE	<HAR>	30	10	30
Instituto Italiano del Marchio di Qualita (IMQ)	IEMMEQU	<HAR>	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	<HAR>	10	10	30
N.V. KEMA	KEMA-KEUR	<HAR>	10	30	30
SEMKO AB Svenska Elektriska materielkontrollanstalter	SEMKO	<HAR>	10	10	50
Österreichischer Verband fur Elektrotechnik (ÖVE)	<ÖVE>	<HAR>	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	<DEMKO>	<HAR>	30	10	30
National Standards Authority of Ireland (NSAI)	<NSAI>	<HAR>	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO	<HAR>	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	<UNED>	<HAR>	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	<HAR>	30	30	70
Instituto Portages da Qualidade (IPQ)	np	<HAR>	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	<HAR>	10	30	90
Elektriska Inspektoratet	SETI	<HAR>	10	30	90

PART AF
UL CERTIFICATION MARK

Product Category:	Process Control Equipment, Electrical
Product Category CCN:	QUYX / QUYX7
Product Identity:	"PROCESS CONTROL EQUIPMENT", "OPEN-TYPE PROCESS CONTROL EQUIPMENT", "PROCESS CONTROL ENCLOSURES", "PROCESS CONTROL ENCLOSURE PART", "PROCESS CONTROL SUBASSEMBLY" or "PROCESS CONTROL ACCESSORY", or another appropriate product identity as shown in the individual Test Reports.

UL Listing Mark:

AF1.1	The Test Report covering each product must be consulted to determine which Listing Marks are authorized for use in conjunction with that product.
AF1.1.1	The following Listing Mark is authorized for use on products that are Listed only to the requirements for Canada: 
AF1.1.1	The following Listing Mark is authorized for use on products which are Listed only to the requirements for the United States: 
AF1.1.2	Either of the following Listing Marks is authorized for use on products that are Listed to the requirements of both the United States and Canada:  
AF1.2	The Listing Mark consists of several elements that are placed in close proximity to each other and shall appear on Listed products only.
AF1.2.1	Element 1 - UL Symbol. There is no required minimum height for the UL Symbol, as long as it is legible. The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Symbol is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye. Information on downloading electronic versions or receiving camera-ready artwork of the UL Symbols may be obtained at www.ul.com.
AF1.2.2	Element 2 - The word "LISTED"
AF1.2.3	Element 3 - A product identity
AF1.2.3.1	*<product identity details are provided above this table>*
AF1.2.3.2	The product identity may be omitted if the Listing Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate that includes the rating or the catalog or model designation.
AF1.2.4	Element 4 - A control number represented above by XXXX is to be replaced with the Applicant's or Listee's file number.
AF1.3	A separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) must include all elements.
AF1.4	The manufacturer may reproduce the Listing Mark or obtain it from a UL authorized supplier.

Description

UL TEST REPORT AND PROCEDURE

Standard:	UL 61010-1, 3rd Edition, May 11, 2012, Revised July 15 2015, CAN/CSA-C22.2 No. 61010-1-12, 3rd Edition, Revision dated July 2015
Certification Type:	Listing
CCN:	QUYX / QUYX7
Product:	Temperature Controller
Model:	ZX-PCD-C6001-ZF and ZX-PCE-C6000-ZF
Rating:	Model: ZX-PCD-C6001-ZF Input: 110 V ac(-10% to +10%), 50/60 Hz, 2.4 VA PT input: PT100 platinum resistance ALM Output: 0-220 V ac, 2 A, general use SSR control output: 30 mA max Or Input: 220 V ac(-10% to +10%), 50/60 Hz, 2.4 VA PT input: PT100 platinum resistance ALM Output: 0-220 V ac, 2 A, general use SSR control output: 30 mA max Model: ZX-PCE-C6000-ZF Input: 110 V ac(-10% to +10%), 50/60 Hz, 5.5 A PT input: PT100 platinum resistance Heater Output: 110 V ac, 5.5 A Or Input: 220 V ac(-10% to +10%), 50/60 Hz, 5.5 A PT input: PT100 platinum resistance Heater Output: 220 V ac, 5.5 A
Applicant Name and Address:	JIAXING ZHONGXIN MEDICAL INSTRUMENTS CO.,LTD Shendang Industrial Zone Haiyan , Zhejiang 314311, China

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Pauline Wu Reviewed by: Hiroyuki Tsukakoshi

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

A. Authorization - The Authorization page may include additional Factory Identification Code markings.

B. Generic Inspection Instructions -

i. **Part AC** details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.

ii. **Part AE** details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.

iii. **Part AF** details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

Models ZX-PCE-C6000-ZF and ZX-PCD-C6001-ZF are Panel Mounted temperature controller. Both of them could connect thermal couple to measure temperature and ZX-PCE-C6000-ZF could provide 110 V ac, 600 Watt or 220 V ac, 1.2k Watt output for heater and ZX-PCD-C6001-ZF provide alarm port, and SSR output port to control field solid state relay. Overcurrent protection device (fuse) rated 250 V ac, 0.5 A for Model ZX-PCD-C6001-ZF, and rated 250 V ac, 10 A for Model ZX-PCE-C6000-ZF is installed before the equipment in accordance with the manufacturer's instruction.
Refer to the Report Modifications for any modifications made to this report.

Model Differences

Model ZX-PCE-C6000-ZF rated 110 V ac input is similar with Model ZX-PCE-C6000-ZF rated 220 V ac input except for using different transformer.
Model ZX-PCD-C6001-ZF rated 110 V ac input is similar with Model ZX-PCD-C6001-ZF rated 220 V ac input except for using different transformer.

Additional Information

N/A

Technical Considerations

- The product was investigated to the following additional standards: N/A
- The following additional investigations were conducted: N/A
- The product was not investigated to the following standards or clauses: Annex DVE
- The following accessories were investigated for use with the product: N/A
- N/A

Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- None

Markings and instructions	
Clause Title	Marking or Instruction Details
Company	Listee's or Recognized company's name, Trade name, Trademark or File
Model identification	Model number
Nature and ratings of mains supply (ac)	 ac
Nature and ratings of mains supply	Frequency or frequency range, power in watts or VA or input current in amperes

Special Instructions to UL Representative

None

Production-Line Testing Requirements

Test Exemptions - The following models are exempt from the indicated test

Test	Exemption Specifics	Details
Grounding Continuity	This test is not required for the following models:	All the models
Dielectric Strength	This test is not required for the following models:	N/A
Dielectric Strength Test Component	The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:	N/A

Sample and Test Specifics for Follow-Up Tests at UL

The following tests shall be conducted in accordance with the Generic Inspection Instructions

Plastic Enclosure or Part	Test	Sample(s)	Test Specifics
None	NA	NA	NA

TABLE: List of critical components

Component/ Part No.	Manufacturer/ Trademark	Type No./model No./	Technical data	Standard No.[1]	Required Mark(s) & Certificates of Conformity
1.Case	SHANGHAI KUMHO SUNNY PLASTICS CO LTD	ABSHFA700	Rated V-0, min. 60 Deg C, minimum thickness 1.5 mm	UL746C	UL / E254819 (QMFZ2)
2.Terminal Block	CIXI KEFA ELECTRONICS CO LTD	KF8500-8.5	Rated 300 V, 20 A, CU, FW=2, 22-12 AWG (Sol, Str), UG=C, 17.5 Lb-in, 105ºC	UL1059	UL, cUL / E306245 (XCFR2/8)
3.Label	ZHONGSHAN ZHANTU PRINTING FACTORY	ZT969-2	Rated 80ºC.	UL969	UL,cUL / MH47528 (PGDQ2/8)
4.PWB	Interchangeable	Interchangeable	Minimum V-1, 105ºC, CTI >= 175	UL796	UL / (ZPMV2)
For Model ZX-PCE-C6000-ZF	--	--	--	--	--
5.Transformer	Kunshan Congxing Electronics Equipment Co Ltd	PS-13-U (220V) for 220 V inputPS-13-U (110V) for 110 V input	--	--	--
5-1. Core	--	--	Laminated sheet steel, varnished, EI Type, measured overall 41 by 33 by 10.5 mm. Window dimension 8 by 21 mm	--	--
5-2. Bobbin and case	E I DUPONT DE NEMOURS & CO INC	FR530	Rated V-0, min. 155 Deg C, CTI=2, minimum thickness 0.6 mm	UL746C	UL / E41938 (QMFZ2)
5-3. Magnet wire	Interchangeable	Interchangeable	130 ºC	UL1446	UL / (OBMW2)
5-4. Insulation Tape	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	JY25-A	Rated 130 ºC.	UL510	UL / E246950 (OANZ2)
5-5. Thermal Link	XIAMEN SET ELECTRONICS CO LTD	F0	Rated 250 V ac, 1 A, 76 ºC	UL60691	UL, cUL / E214712 (XCMQ2/8)
6. Optical Isolator (G01)	EVERLIGHT ELECTRONICS CO LTD	EL3063	Isolating voltage 5000 Vac, 100 ºC	UL1577	UL, cUL / E214129 (FPQU2/8)
7. Triac (BTA16)	ST	BTA16	Rated 600 V, 16 A	--	--
8. Heatsink for Triac	--	--	Aluminum, overall measured 35 by 20 by 35 mm	--	--
9. Relay (J1)	DONGGUAN SANYOU ELECTRICAL APPLIANCES CO LTD	SM-S-112DM	Rated 16 A, 250 Vac, resistive, 85 Deg.C.	UL508	UL,cUL / E190598 (NLDX2/8)VDE certification No. 40031353
10. Connector (XH-10)	ZHEJIANG LIANHE ELECTRONIC CO LTD	XH-10A	Rated 250 V ac/dc, 3 A, 85ºC	UL1977	UL, cUL / E364711 (ECBT2/8)
11. Internal Wire	Interchangeable	Interchangeable	Rated minimum 300 V, 80ºC, VW-1	UL758	UL, cUL / (AVLV2/8)
For Model ZX-PCD-C6001-ZF	--	--	--	--	--
12.Transformer	Kunshan Congxing Electronics Equipment	PS-13-U (220V) for 220 V inputPS-13-U (110V) for	--	--	--

TABLE: List of critical components

Component/ Part No.	Manufacturer/ Trademark	Type No./model No./	Technical data	Standard No. [1]	Required Mark(s) & Certificates of Conformity
	Co Ltd	110 V input			
12-1. Core	--	--	Laminated sheet steel, varnished, EI Type, measured overall 41 by 33 by 10.5 mm. Window dimension 8 by 21 mm	--	--
12-2. Bobbin	E I DUPONT DE NEMOURS & CO INC	FR530	Rated V-0, min. 155 Deg C, CTI=2, minimum thickness 0.6 mm	U746C	UL / E41938 (QMFZ2)
12-3. Magnet wire	Interchangeable	Interchangeable	130 ºC	UL1446	UL / (OBMW2)
12-4. Insulation Tape	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	JY25-A	Rated 130 ºC.	UL510	UL / E246950 (OANZ2)
12-5. Thermal Link	XIAMEN SET ELECTRONICS CO LTD	F0	Rated 250 V ac, 1 A, 76 ºC	UL60691	UL / E214712 (XCMQ2/8)
13. Relay (J1)	DONGGUAN SANYOU ELECTRICAL APPLIANCES CO LTD	SJ-S-112DM	Rated 5 A, 250 Vac, general use, 105 Deg.C.	UL508	UL,cUL / E190598 (NLDX2/8)VDE certification No. 40002146
14. Connector (XH-10)	ZHEJIANG LIANHE ELECTRONIC CO LTD	XH-10A	Rated 250 V ac/dc, 3 A, 85ºC	UL1977	UL, cUL / E364711 (ECBT2/8)
15. Internal Wire	Interchangeable	Interchangeable	Rated minimum 300 V, 80ºC, VW-1	UL758	UL, cUL / (AVLV2/8)

Supplementary information:

The (CB) Test Laboratory has verified the component information.

1) Anything specified within brackets "( )" is for reference purposes only and can be used to specify the UL Product Category CCN(s)/File Number if the component includes an UL Certification. This can be useful for the UL Follow-Up Service Inspection associated with the UL Mark; however if in brackets, should not be a required element of the UL Inspection.

---------- END OF APPENDIX C ----------