



# The user's manual of Oven and Temperature Controller



FUJIAN CASTECH CRYSTALS, INC.

(Please read this manual carefully before use the Oven)

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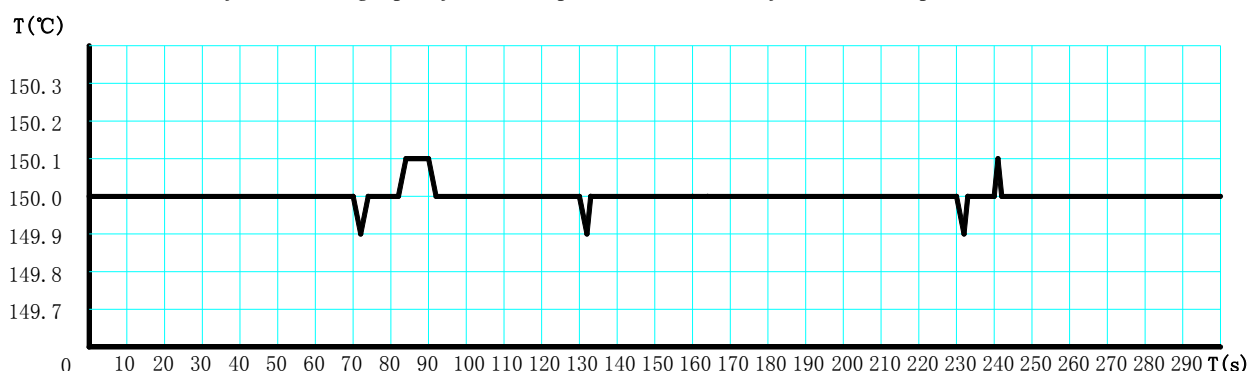
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# 1. Summary

## 1.1 Primary features

- High control accuracy of temperature:  $\pm 0.1^{\circ}\text{C}$  (Heating temperature:  $40\sim 180^{\circ}\text{C}$ )

*The fluctuation graph of oven temperature via time after it heats up to  $150^{\circ}\text{C}$*



Test condition: Test under room temperature with small air flow environment. The real fluctuation may change under different environment, however, the temperature control accuracy will maintain  $\pm 0.1^{\circ}\text{C}$ .

- Uniform oven temperature distribution
- RS-232 connector, could be controlled by programming
- Working voltage: AC 110/220V Two types
- Special oven size applications are on request

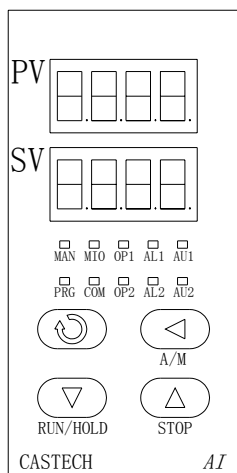
*\* There are two types of applied voltage on oven, one is 110V and another is 220V. Please check the working voltage of it before plug in the power. Burned and other damages, which caused by improper power selection, are not guaranteed to repair.*

## 1.2 Type definition

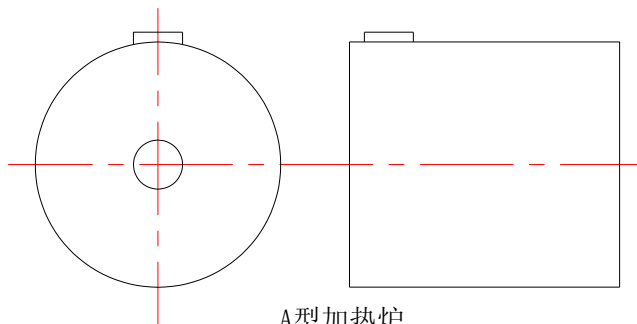
### 1.2.1 Type explanation

One whole set of oven is constituted by one temperature controller and one oven; There are two types for temperature controller: General type AI-708 and mini-type AI-518 are with same performance; Heating stove contains many types, please see section 2.2 for more details about size types. It is interchangeable for temperature controller with different ovens, however, there are a few parameter settings have to be changed for that. Please see section 3.5 for details about parameter change.

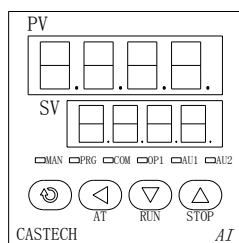
## 1.2.2 Draft of temperature controller and oven



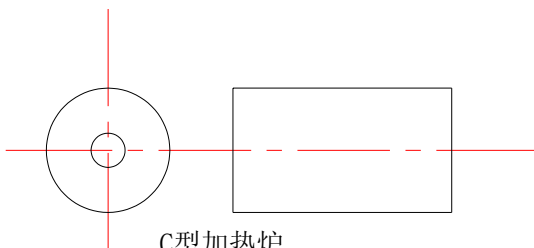
控温仪 AI-708  
Temperature Controller



A型加热炉  
Oven

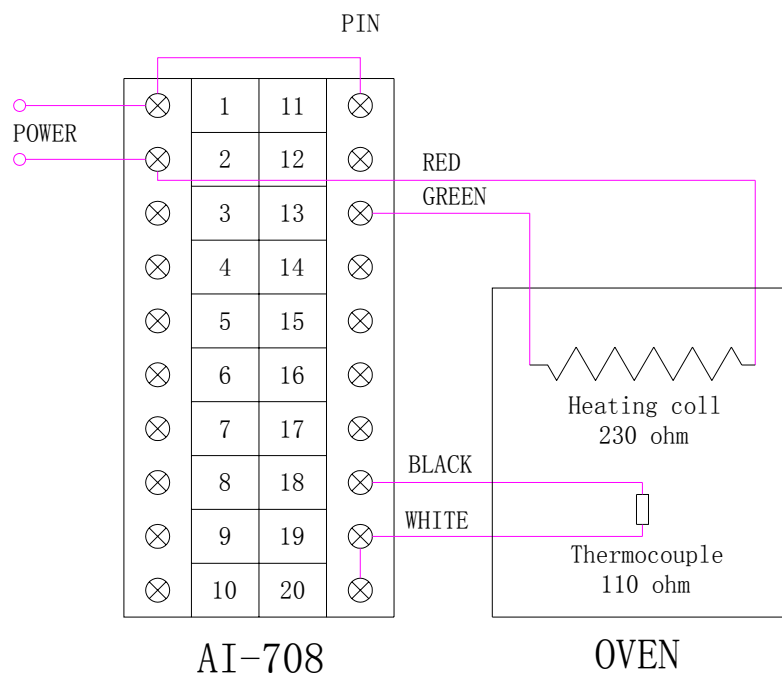


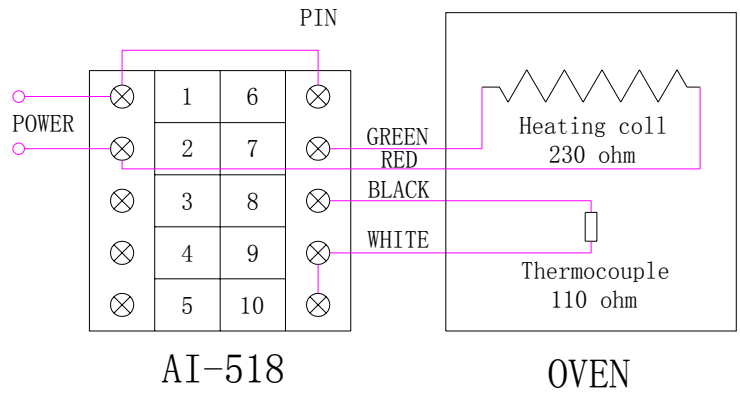
控温仪 AI-518  
Temperature Controller



C型加热炉  
Oven

## 1.2.3 The wiring diagram of temperature controller and oven

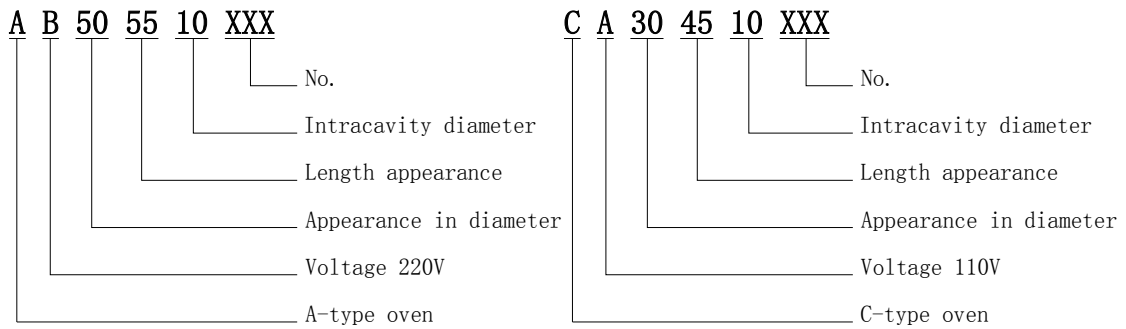




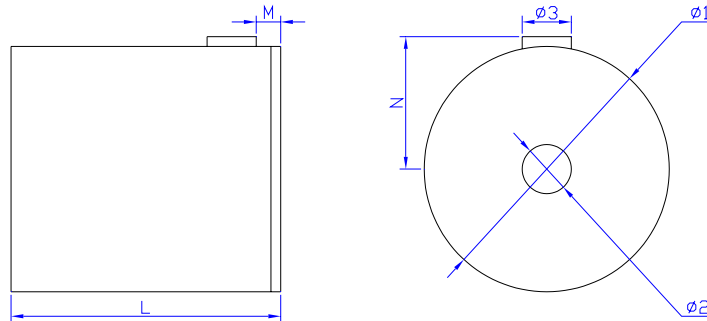
## 2. Oven

### 2.1 Type explanation

There are two types of oven, one is general type A ( $\text{Dim} \geq 45\text{mm}$ ) and another is mini-type C ( $\text{Dim} < 45\text{mm}$ ). A type contains AA model (working voltage is 110V) and AB model (working voltage is 220V) two kinds. Please check out the details of type definition in the table below:

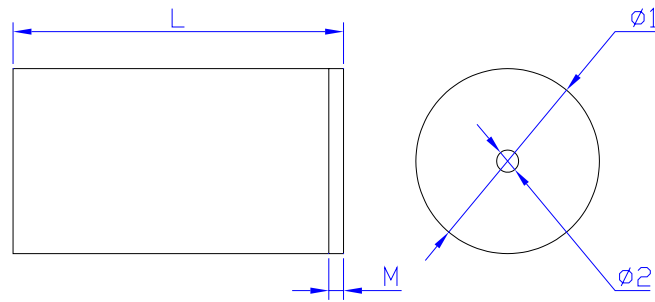


### 2.2 Form size



Model	L	M	N	Φ1	Φ2	Φ3	Maximum length of applied crystal (mm)	Maximum cross-section of applied crystal (mm)	Weight (g)
AA455510	55	5	25	45	10	10	25	5×5	
AA505510	55	5	27	50	10	10	25	5×5	249
AA505514	55	5	27	50	14	10	25	8×8	238
AA505520	55	5	27	50	20	10	25	12×12	211
AA605525	55	5	32	60	25	10	25	16×16	

Note: AA and AB model have same size

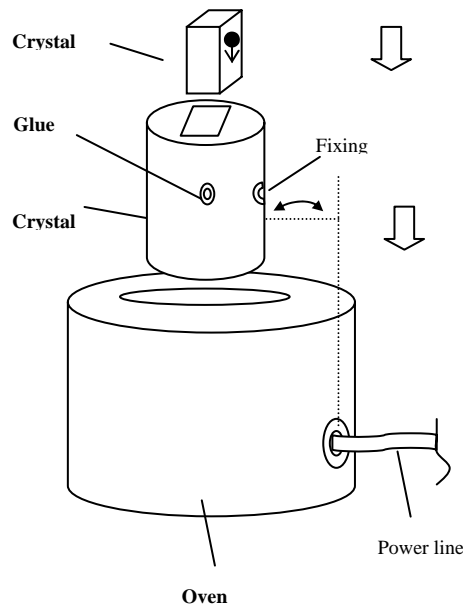


Model	L	M	Φ 1	Φ 2	Maximum length of applied crystal (mm)	Maximum cross-section of applied crystal (mm)	Weight (g)
CA2544510	45	2	25.4	5	20	5×5	97
CA304510	45	2	30	5	20	5×5	94
CA354510	45	2	35	5	20	5×5	
CA3814514	45	2	38.1	8	20	8×8	
CA404514	45	2	40	8	20	8×8	

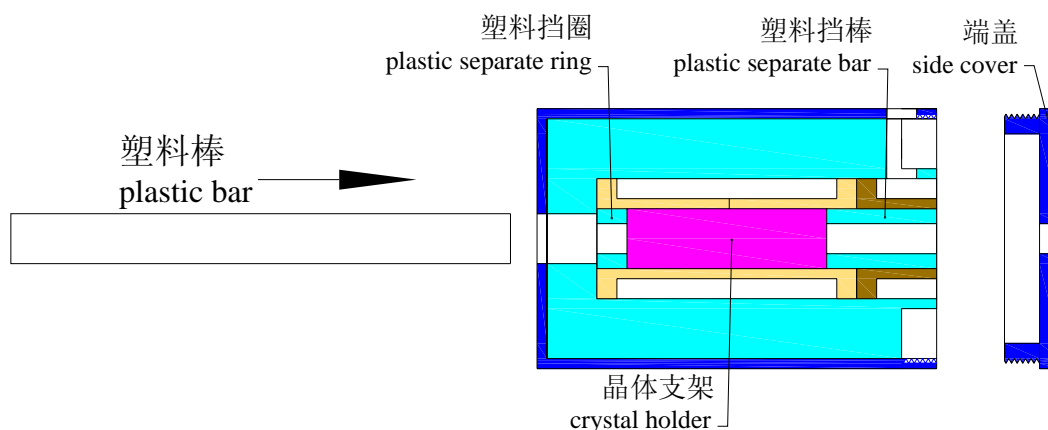
### 2.3 Installation of Crystal and Crystal holder

The marked face of crystal has to be stick with crystal holder fixing notch;

Notice: The crystal holder fixing notch, oven inside fixing block and power line are in the same side.



## 2.4 A method of crystal holder replacement for C-type oven



**While install crystal**, screw off the side cover first, push the plastic bar in the accessories in from the other side of the oven and take out the plastic separate bar and crystal holder. (Warning: Do not overexert, leave the plastic separate ring inside if possible, because it's small and easy to lose.) Fit in the crystal and orderly put the crystal holder with crystal, plastic separate bar back in the oven and screw on the side cover. Finally, connect the plug with the temperature controller and the oven is ready for use.

**While remove crystal**, screw off the side cover first, push the plastic bar in the accessories in from the other side of the oven and take out the plastic separate bar and crystal holder. (Warning: Do not overexert, leave the plastic separate ring inside if possible, because it's small and easy to lose.) Remove the crystal and orderly put the crystal holder with crystal, plastic separate bar back in the oven and screw on the side cover. (Crystal holder, plastic separate ring and bar are all small accessories, which are easy to lose, so please keep them properly.)



## 3. Temperature Controller

### 3.1 Summary

There are two types for temperature controller: General type AI-708 and mini-type AI-518 are with same performance.

#### 3.1.1 Primary features

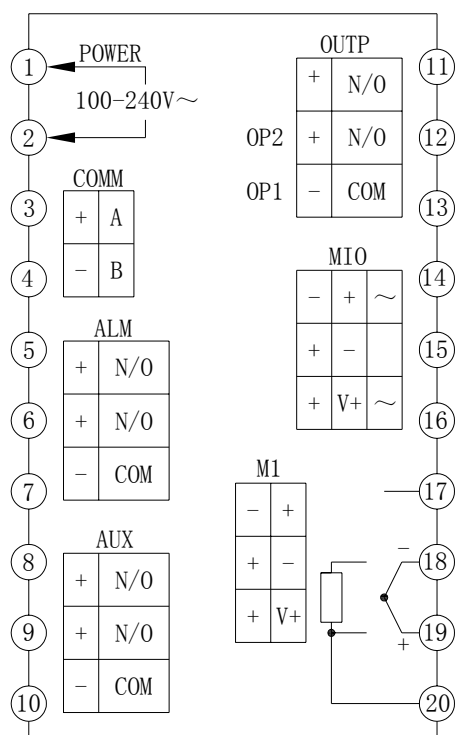
- Input adopts digital emendation system, which contains the nonlinear emendation table of general thermocouple and thermo resistance, to make measure accuracy up to class 0.2.
- Humanized design of operation, easy learn and use.
- Has passed the new 2000 version of ISO9001 quality attestation, stable and qualified.
- Product has passed the third party authority institution's test and had CE mark. Moreover, its anti-jamming capability qualified the request of electromagnetism compatibility (EMC) under inclement work conditions.

#### 3.1.2 Technique specification

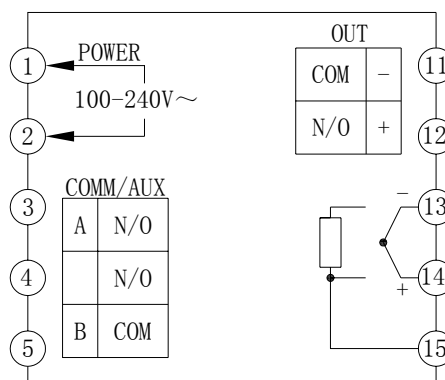
- Input specification  
Thermo resistance: Pt100、Cu50  
Thermocouple: K、S、R、T、E、J、B、N、WRe3-WRe25、WRe5-WRe26
- Measure range  
Pt100 (-200~+800℃)、Cu50 (-50~+150℃)  
K (-100~+1300℃)、S (0~1700℃)、R (0~1700℃)、T (-200~+390℃)、E (0~1000℃)、J (0~1200℃)、B (600~1800℃)、N (0~1300℃)、WRe3-WRe25 (0~2300℃)、WRe5-WRe26 (0~2300℃)。
- Measure accuracy: class 0.2 (0.2%FS±0.1℃)
- Resolution rate: 0.1℃, could choose 1℃ for display
- Power supply: 100~240VAC, -15%, +10% / 50~60Hz
- Power consume: ≤5W
- Environment request: Temperature -10~+60℃; Humidity ≤90%RH
- Form size:  
AI-708: 96×48×124mm  
AI-518: 48×48×116mm
- Weight:  
AI-708: 368g  
AI-518: 222g

#### 3.1.3 Panel connection

### The wiring diagram in the back of the temperature controller

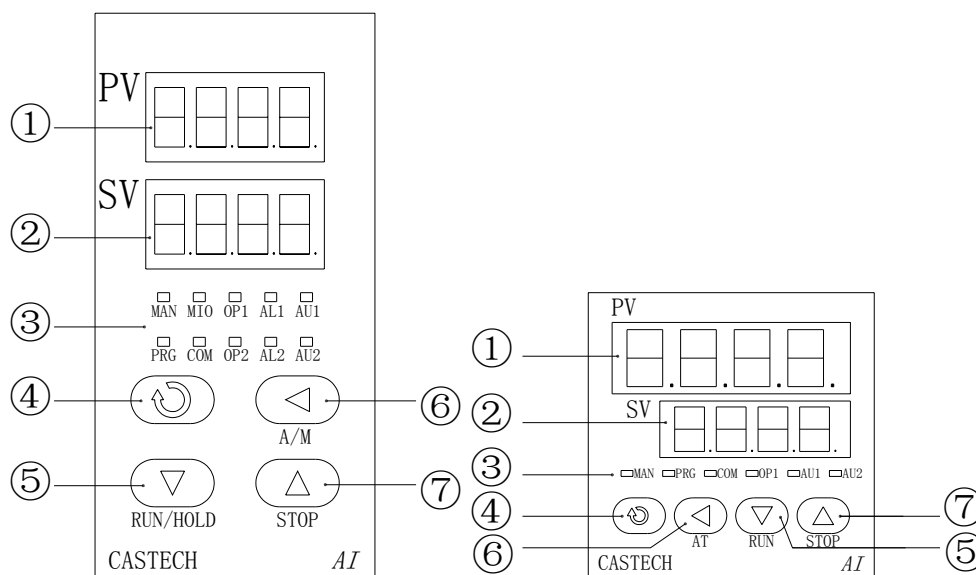


AI-708











AI-518













### 3.2 Panel explain



- ① Upper display window
- ② Lower display window
- ③ 10 (5) LED lights, when OP1 blinking means the oven is working.
- ④ Setting button
- ⑤ Value decrease button
- ⑥ Digits moving button
- ⑦ Value increase button

### 3.3 Basic operations

**Change value:** The value shows on the lower display window could be changed by using 、 or  button. Press button  or  to decrease or increase the value, and move the digits by using button . Holding press  or  button, the value could be changed faster.

**Setting parameters:** To unlock the default parameter settings, you could press button  for over one second and you would see “HIAL”(upper limit alarm) value shows on the PV display window; Press button  again, you would see “dF”(restore balance); Press button  for one more time, you would see “Loc”(parameter lock) while SV display window shows value“0”. Use button  and  to change the value from “0” to “808”. Then you can see all the parameters by continuous pressing button . Use button 、 and  to change the parameter values. Keeping on press button , it could return to display previous parameter. Keeping on press button  and press button  at the same time, it could exit parameter setting state. If without any touches in 30 seconds, it would automatically exit parameter setting state too.

### 3.4 Parameter table and function

Parameter code	Parameter meaning	Description	Default setting
HIAL	Upper limit alarm	It would alarm at when the measure value is greater than HIAL value. The alarm will go off at when the measure value is smaller than HIAL-dF value.	200
LoAL	Lower limit alarm	It would alarm at when the measure value is smaller than LoAL	1

		value. The alarm will go off at when the measure value is greater than LoAL+dF value.	
dHAL	+ windage alarm	Secondary upper limit alarm	20.0
dLAL	- windage alarm	Secondary lower limit alarm	999.9
dF	<b>Restore balance</b>		5.0
Ctrl	Control mode	Adopt AI artificial intelligence adjustment	3
M5	Holding parameter		13.1
P	Speed parameter		28
t	Lag time		17
Ct1	Output cycle	Shows the operation adjustment speed of the instrument	1
Sn	Input specification	Pt100 (21)、Cu50 (20)、WRe5-WRe26 ( 9 ) 、WRe3-WRe25 (8)、N (7)、B (6)、J(5)、E(4)、T (3)、R (2)、S(1)、K (0)	21
dIP	Decimal point position	The resolution ratio of temperature display is 0.1℃	1
dIL	Input lower limit display value		0
dIH	Input upper limit display value		1000
Sc	Major input even correction		0.0
OPt	Output mode		0
<b>oPL</b>	Output lower limit		<b>0</b>
<b>oPH</b>	Output upper limit	Limits the adjustment of the maximum output power percentage	<b>60</b>
ALP	Output alarm program		0
<b>CF</b>	System function choice		<b>0</b>
Addr	Communication		1

	address		
bAud	Communication baud rate		9600
dL	Input digital filter		2
run	Run and electron signal process	Automatically adjust state	1
Loc	Parameter lock	0: lock 808 : unlock , could change all the parameter' s values	0
EP1	Scene parameter		HIAL
EP2	Scene parameter		dF
EP3~EP8	Scene parameter		nonE

### 3. 5 Parameter setting and change

Under the default settings where the parameter “CF” is 0, oven needs about 30 minutes to rise from room temperature to 150 degree centigrade. (The rising time might be a little different by different environment effect). The table in below shows you the parameter settings in detail for different oven types:

Oven type	LoAL	oPL	oPH	CF
<b>AA505510</b>	1	0	35	0
<b>AA505514</b>	1	0	45	0
<b>AA505520</b>	1	0	70	0
<b>AB505510</b>	1	0	10	0
<b>AB505514</b>	1	0	13	0
<b>AB505520</b>	1	0	15	0
<b>CA304510</b>	1	0	27	0
<b>CA2544510</b>	1	0	25	0

● If you want to speed up the heating or the temperature could not reach your setting value, you could increase the oPH value properly.

**Notice: The crystal might get damage if the heating speed is too fast.**

● If you want to speed down the heating, you could decrease the oPH value properly. However, if the oPH value is too small, the temperature might not be reaching your setting value.

● If it still could not get to the heating speed that you want by decreasing the oPH setting value, there are two steps of heating procedure could be done as follow:

① Set parameter “LoAL” to be the ending temperature of the first heating segment.

- ②Set parameter “oPL” to be the output efficiency of the first heating segment.
- ③Set parameter “oPH” to be the output efficiency of the second heating segment.
- ④Set “CF” to 16.

Here is the reference value of two segment heating efficiency parameter settings for different types of oven in below:

<b>Oven type</b>	<b>LoAL</b>	<b>oPL</b>	<b>oPH</b>	<b>CF</b>
<b>AA505510</b>	90	20	35	16
<b>AA505514</b>	90	25	45	16
<b>AA505520</b>	90	30	70	16
<b>AB505510</b>	90	5	10	16
<b>AB505514</b>	90	7	13	16
<b>AB505520</b>	90	10	15	16
<b>CA304510</b>	90	15	25	16
<b>CA2544510</b>	90	15	25	16

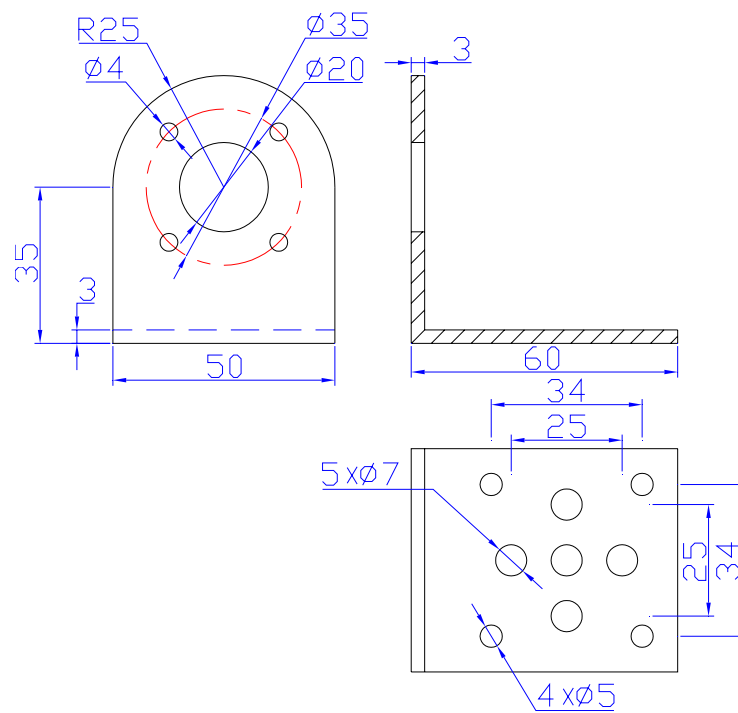
## 4. Optional Accessories

### 4.1 Crystal holder

Holder type	External size	Applied crystal size	Applied oven external size
A1012	External Dia. 10mm , length 12mm	Cross-section $\leq 5 \times 5$ mm, Length $\leq 10$ mm	$\Phi 50 \times 40$
A1017	External Dia. 10mm , length 17mm	Cross-section $\leq 5 \times 5$ mm, Length $\leq 15$ mm	$\Phi 50 \times 45$
A1027	External Dia. 10mm, length 27mm	Cross-section $\leq 5 \times 5$ mm, Length $\leq 25$ mm	$\Phi 50 \times 55$
A1032	External Dia. 10mm, length 32mm	Cross-section $\leq 5 \times 5$ mm, Length $\leq 30$ mm	$\Phi 50 \times 55$
A1427	External Dia. 14mm, length 27mm	$5 \times 5$ mm < Cross-section $\leq 9 \times 9$ mm, Length $\leq 25$ mm	$\Phi 50 \times 55$
A1432	External Dia. 14mm, length 32mm	$5 \times 5$ mm < Cross-section $\leq 9 \times 9$ mm, Length $\leq 30$ mm	$\Phi 50 \times 55$
A2027	External Dia. 20mm, length 27mm	$9 \times 9$ mm < Cross-section $\leq 13 \times 13$ mm, Length $\leq 25$ mm	$\Phi 50 \times 55$
A2032	External Dia. 20mm, length 32mm	$9 \times 9$ mm < Cross-section $\leq 13 \times 13$ mm, Length $\leq 30$ mm	$\Phi 50 \times 55$
C1022	External Dia. 10mm , length 22mm	Cross-section $\leq 5 \times 5$ mm, Length $\leq 20$ mm	$\Phi 25.4 \times 45$ $\Phi 30 \times 45$
C1422	External Dia. 14mm , length 22mm	$5 \times 5$ mm < Cross-section $\leq 9 \times 9$ mm, Length $\leq 20$ mm	$\Phi 35 \times 45$
C2022	External Dia. 20mm , length 22mm	$9 \times 9$ mm < Cross-section $\leq 13 \times 13$ mm, Length $\leq 20$ mm	$\Phi 38.1 \times 45$ $\Phi 40 \times 45$

*If you have special request of crystal holder, which is not listed on the upper table, please contact our technicians.*

## 4.2 Right-angle support setting





## 5. Problem describes and solves

Problem	Check	Solve
The display window of temperature controller doesn't show things	Did you plug in the power line well?	Please plug in the power line correctly
	Is it power cut?	Resume power supply
Oven doesn't heat up	Does the controller properly connect with the oven?	Well connect them
	Do the S connector's pins bend or go down?	Use a forceps to unbend those curved pins or pull up them to the same height.
	Wire break?	Contact with us
Oven can heat up but couldn't reach up to the setting temperature point	Does the input voltage match with the oven?	Ensure the input voltage
	Does the setting point exceed the oven temperature limit?	Decrease the setting temperature
	Does the oPL or oPH value set too small?	Increase the oPL or oPH value Please check reference 3.3、3.5 for details
Oven heats up too fast	Does the input voltage match with the oven?	Ensure the input voltage
	Does the oPL or oPH value set too large?	Decrease the oPL or oPH value Please check reference 3.3、3.5 for details
Oven has large temperature fluctuation after get to the setting point	Big air flow environment?	Improve the using environment

# Warranty

## 1. Announcement

This warranty contains oven with its serial number, date of sold, warranty period, as well as user names and other necessary items such as warranty card. The warranty comes into effect right after it is filled out and stamped by our company. We will no longer reissue the warranty card if you lost it, so please keep it carefully.

## 2. Warranty period

See the table in below to learn “the warranty period for three main items” in detail:

Temperature controller	Warranty within one year
Oven	Warranty within three years
Transformer	Warranty within six months

## 3. Qualification and procedure for warranty

- (1) The consumer must sent the oven and warranty card to our company for service;  
If you cannot produce our warranty card, the service would not be admissible.
- (2) If the content of warranty card was arbitrarily changed, it would be avoid.
- (3) If you have more questions about warranty, please contact our sales.

## 4. Warranty void:

- (1) Did not follow the operations from the user’s manual;
- (2) Improper keeping; Oven surface paint fade or shedding, which caused by collision or chemical corrosion;
- (3) Damage caused by overload voltage or improper using, which by putting the oven into water or fire;
- (4) The quality label or the insulated glue on the oven break off, which caused by taking apart the oven without any permissions;
- (5) Earthquake, lighting strike, fire, flood or other disasters that cannot dispute by manpower.

**5. This warranty book bases on clear time limit and conditions to actualize warranty. The company abides the warranty or not for consumers is not restricted by law.**

**6. If you want to get repair after the warranty period, please contact our company directly.**

**7. The recordation column of repair.**

**Warranty card records service contents.**

**155 Yangqiao West Road P.O.Box 143,**

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### The service and warranty card of oven

Code		Day of Sell	
Controller Num.		Expire Date	
Oven Num.		Color	
User Name			
Contact Tel.			
Contact Add.			
Service Note			