



CTI-40 Series

Temperature Controller

User Guide



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WARRANTY

We warrant that this product will be free from defects in materials and workmanship for a period of two (2) years from the date of shipment. If any such product proves defective during this warranty period, we, at our option, either will repair the defective product without charge for parts and labor or will provide a replacement in exchange for the defective product.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. We shall not be obligated to furnish service under this warranty; a) to repair damage resulting from attempts by personnel other than our representatives to repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; or c) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

This warranty excludes replacement of fuses, triac, calibration, contact points and damage to the module from the use of improper styles of fuses. The maximum allowable fuse rating is 15 amps. Lower ratings may be used for improved protection.

SAFETY

Mastip's products are designed to be safe and simple to operate. As with any electronic equipment, you must observe standard safety procedures to protect both yourself and the equipment.

- Read all the instructions before connecting power and turning on the systems.
- Service and installation of this equipment should only be performed by qualified service personnel familiar with high voltage electrical circuits.
- All national and local electrical codes must be followed when connecting this equipment.
- Only people with knowledge of the system's operation and capabilities should operate the system.
- Unless specifically explained in this manual or directed by us, do not attempt to repair the system yourself. Doing so could result in damage to the system, or serious personal injury.
- Do not apply voltage to a terminal that exceeds the range specified for that terminal.
- Do not connect thermocouples to any live areas of the heaters. Lock out and tag the controller and mold and make sure there is electrical insulation between the thermocouple and any live areas.
- Do not operate this product from a power source that applies more than the voltages specified.
- Do not operate this product with covers or panels removed. All unused slots of a mainframe must be covered with appropriately sized blank panels.
- Do not operate this product when wet.
- Do not operate this product in an explosive atmosphere.

CAUTIONS

- When turning on the system, you should turn on all circuit breakers before power on the HMI. You may experience communication issues if you do not obey this sequence.
- After turning on the system, you should make sure that fans are running.
- Never allow the fan inlets or outlets on the unit to become blocked. If these become blocked insufficient airflow can cause damage to the system.
- When switching off the system, you must wait 30 seconds before switching on. You may experience communication issues if you do not wait the required 30 seconds.

Chapter 1 Introduction

1.1 CTI-40 Series Mainframe Configurations

The CTI-40 controller is made up of a mainframe and internal temperature control modules and an I/O module, making configurations up to 12 zones in one mainframe.

Access to all user serviceable parts, including fuses, is performed by removing the outer cover to allow access to the internal control modules.

The connectors for the mold-power and thermocouple cables are located at the rear of the mainframe.

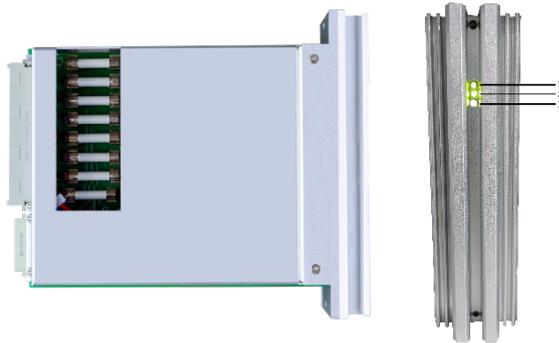


1.2 Control Modules

The main frames are available with 2 styles of control modules depending on the requirements. The modules are fully interchangeable across all mainframe designs. The externally mounted heat sink and integrated design reduce maintenance cost and downtime.

CTI-40 temperature control module comes standard with four (4) zones at 15 amps per zone. The externally mounted heat sink and integrated design reduce maintenance cost and downtime.

CTI-40 Temperature Module



- (1) Power indicator: **green**, lighted when power on.
 (2) & (3) Zone A & Zone B status indicator
green – stop **red** – running
 blink fast – communicating with HMI
green / red alternately: alarm

CTI-40 Signal (I/O) Module



- I/O module
 Remote standby, shutdown
 Alarm output.

1.3 Specifications

Model	CTI-40		
User Interface	Full color LCD touch screen		
Display Size	7"		
Total Zones	4, 8, 12		
Power Supply	3-Ph+E (4 wire) 200-240Vac		
	3-Ph+N+E (5 wire) 380-415Vac		
Working Conditions	0~55°C (32~131°F), 10~80%RH (No condensing)		
Storage Conditions	-20~70°C (-4~158°F), 10~80%RH (No condensing)		
Temperature Control			
Control Mode	Auto-PID / Manual	Measurement Range	0~500°C (32~932°F)
Output Control	Zero Cross / Phase Angle	Setting Range	0~450°C (32~842°F)
Thermocouple	J or K Type software selectable	Temperature Unit	°C or °F software selectable

Temperature controller	CTI-40 Series
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Calibration Accuracy	±0.25% FS	Control Stability	±1 digit-under steady state
Load Capacity	Rated 240Vac, 15A/zone	Overload Protection	Fuses on both heater legs
TC Connector	Varies options available	Soft Start	Using low voltage for heater dehumidify
Mold Power Connector	Varies options available		

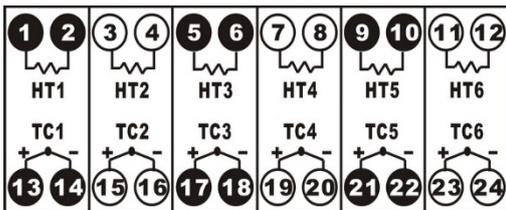
1.4 Features

Cabinet	HMI
Temperature control	Full color LCD touch screen
Max. 12 zones	English / Spanish / French / 中文
CE compliant	Fixed on mainframe or Stand-alone
Control Modules	Alarms & Protection
"All in one" control module	Sensor Broken / Reversed / Error
4-zone per temperature module (15 Amp / zone)	Load broken / Short / Over Current
Interchangeable, easy maintenance	Over Temp / Under Temp
Other Functions	Fuse Blown
Remote stop (optional)	Heating is Invalid
Remote standby (optional)	Triac Breakdown
All zones' temperature in tolerance output	Power Supply Over Voltage
Alarm output (optional)	Mainframe Temperature Over High Alarm Value
Sensor fault solution	Leakage

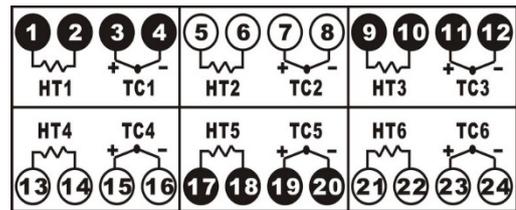
1.5 Typical Thermocouple & Mold Power Output Connector Wiring

The system can be supplied with either European style or US style power and Thermocouple mold connectors, typically wired as follows (Custom wiring available).

Thermocouple & Mold Power Combination Wiring

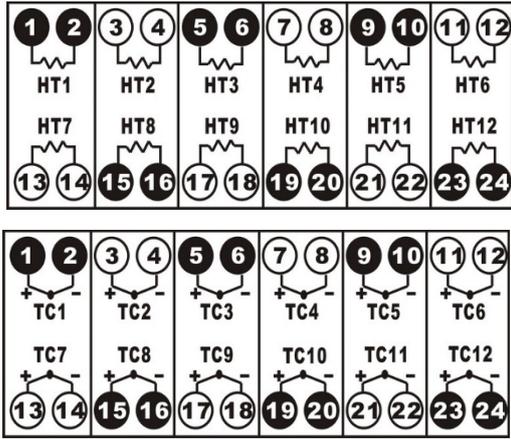


Wiring Mode 1

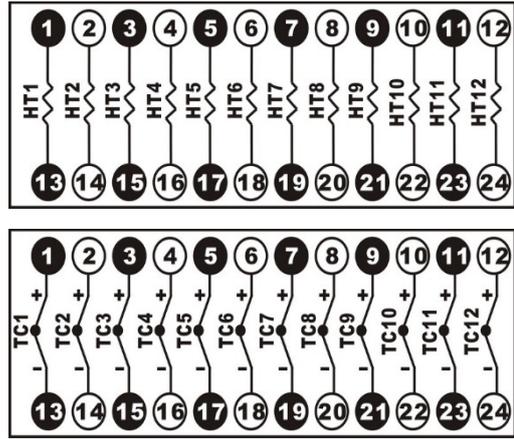


Wiring Mode 2

Thermocouple & Mold Power Separated Wiring



Wiring Mode 3

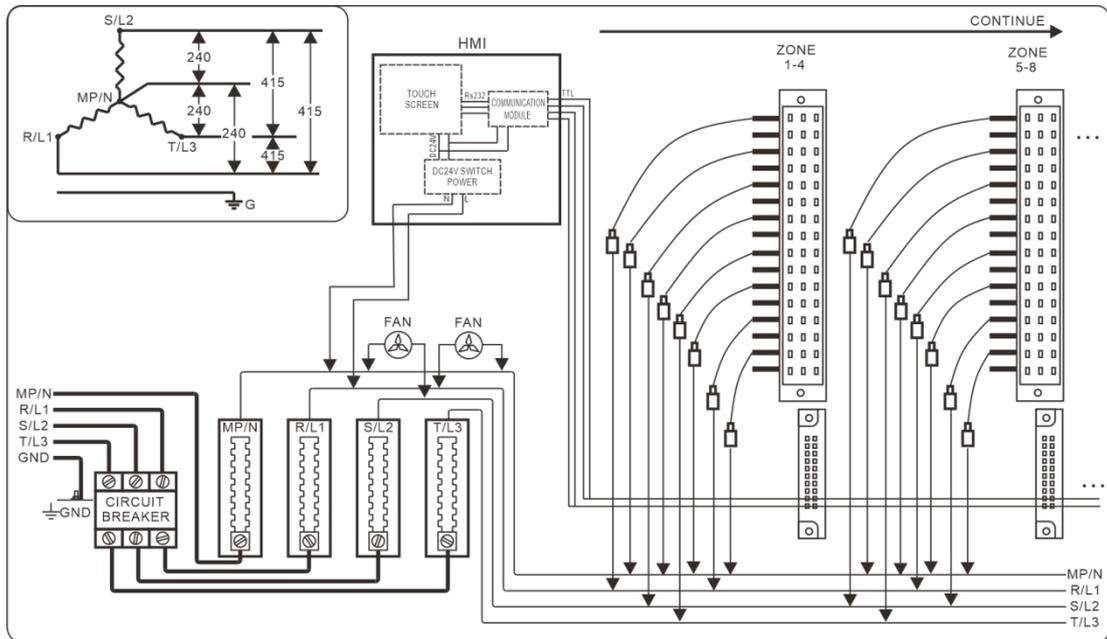


Wiring Mode 4

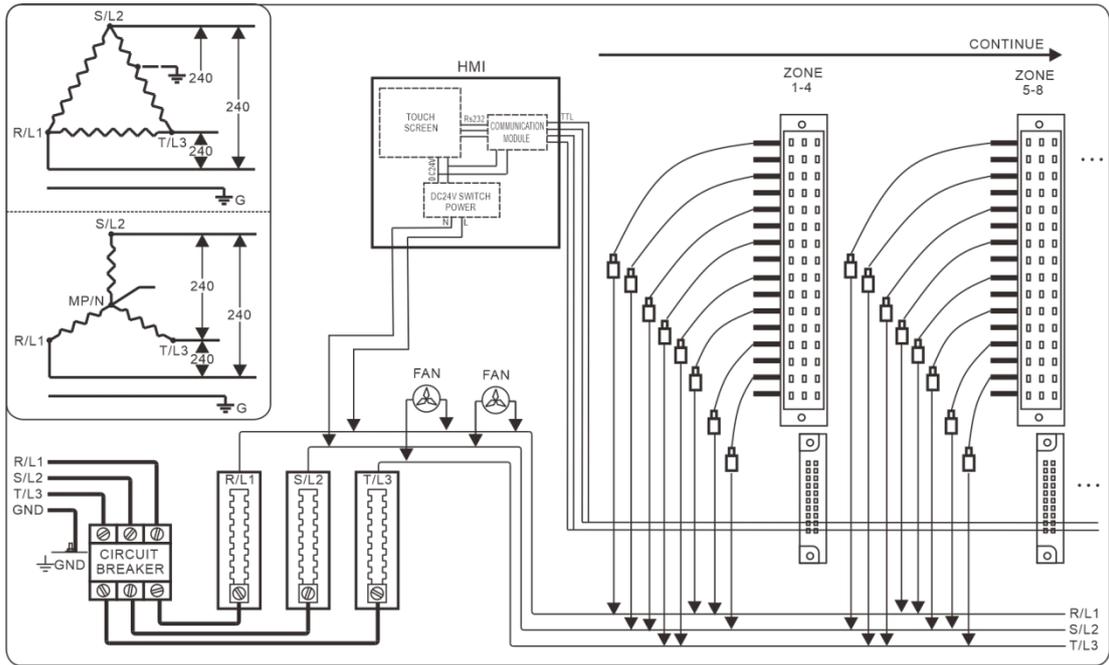
1.6 Power Input Wiring

The CTI Temperature controllers can be connected to either 3-phase 4 wire type (200-240Vac) or 3-phase 5-wire type (380-415Vac) mains power supplies.

3-Ph+N+E (5 wire) 380-415Vac

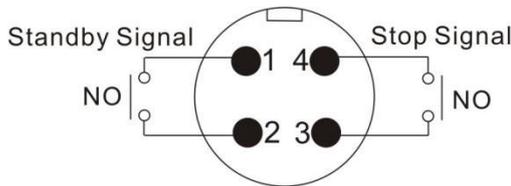


3-Ph+E (4 wire) 200-240Vac

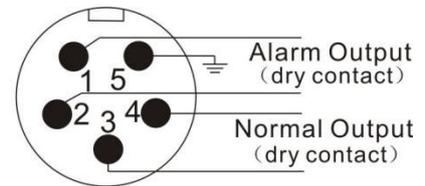


1.7 Remote Input & Alarm Output Connectors Wiring (where specified)

Remote Input Wiring



Alarm & Normal Output Wiring



Signal	Pins	Description	Type
Standby Signal	1 & 2	After a delay time (adjustable) since the contact is closed, the controller will work in standby mode until AUTO button is pressed on HMI.	Normally open dry contact
Stop Signal	3 & 4	When the contact is closed, the controller will stop running, same as pressing STOP button on HMI.	Normally open dry contact
Alarm Output	1 & 2	Contact is closed when any alarm happens, and it will be reset by silence button on the alarm history page.	Normally open dry contact 1A/250Vac
Normal Output	3 & 4	Contact is closed when all the zone temperatures are in normal output tolerance.	Normally open dry contact 1A/250Vac

Chapter 2 Inspection & Installation

2.1 Unpacking and Inspection

1. After unpacking, inspect the mainframe and check for any damage that may have occurred during shipment.
2. Check the circuit breaker disconnect and neon phase voltage indicators for damage.
3. Check for proper operation of circuit breaker by flipping breaker on and off with no voltage applied.
4. Check connectors for any physical damage.
5. Check AC input power specification. The power specification label is located on the back cover of the mainframe's power input terminal block. The label indicates the input voltage configuration that was prewired at the factory. Make sure it matches what you ordered.
6. Inspect the HMI and check for any damage that may have occurred during shipment.
7. Check power connector/cable and communication connector/cable of HMI for any physical damage.

Chapter 3 Connecting the System to the Mold

3.1 Prior to Start Up

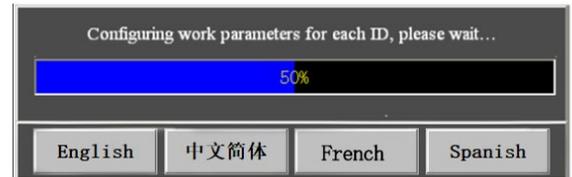
- Check that the system is completely disconnected from the power source.
- Clean up any water, oil, dirt, cleaning fluids etc. that may have spilled during a mold change or since the last production run.
- Check all the cable connections between the system and the mold (if required). Make sure all the cables are free from wear or damage.
- Check that the earth/ground connection is in good condition. Verify the system and the mold have the same ground reference.
- Check the output power and thermocouple wiring configuration on the mainframe and cable is the same as on the mold.

3.2 Verifying the Connection

1. Connect the thermocouple and mold power cables.
2. Connect the remote input and alarm output cables (if applicable).
3. Using an Ohmmeter, touch one test probe to the mold and the other to the mold ground terminal on the system. Resistance must be less than 1 Ω .
4. Check all the circuit breakers and make sure they are in the OFF position prior to connection of the controller to the power source.

3.3 Startup Procedure Checklist

1. Connect mold power & thermocouple cables, sequence control cables between the mold and controller (if required).
2. Connect the controller to the power source.
3. Switch the circuit breakers ON.
4. Select the language.
5. Log into the system (if required).
6. Load a mold setup (if required).
7. Check the mold setup zone by zone on HMI.
8. Correct any faults found during diagnostics.
9. Touch "Run" to start the system.
10. Check that the controller is functioning correctly.



IMPORTANT!

When switching off the system, you must wait 30 seconds before switching on. You may experience communication issues if you turn off and, on the system incorrectly.

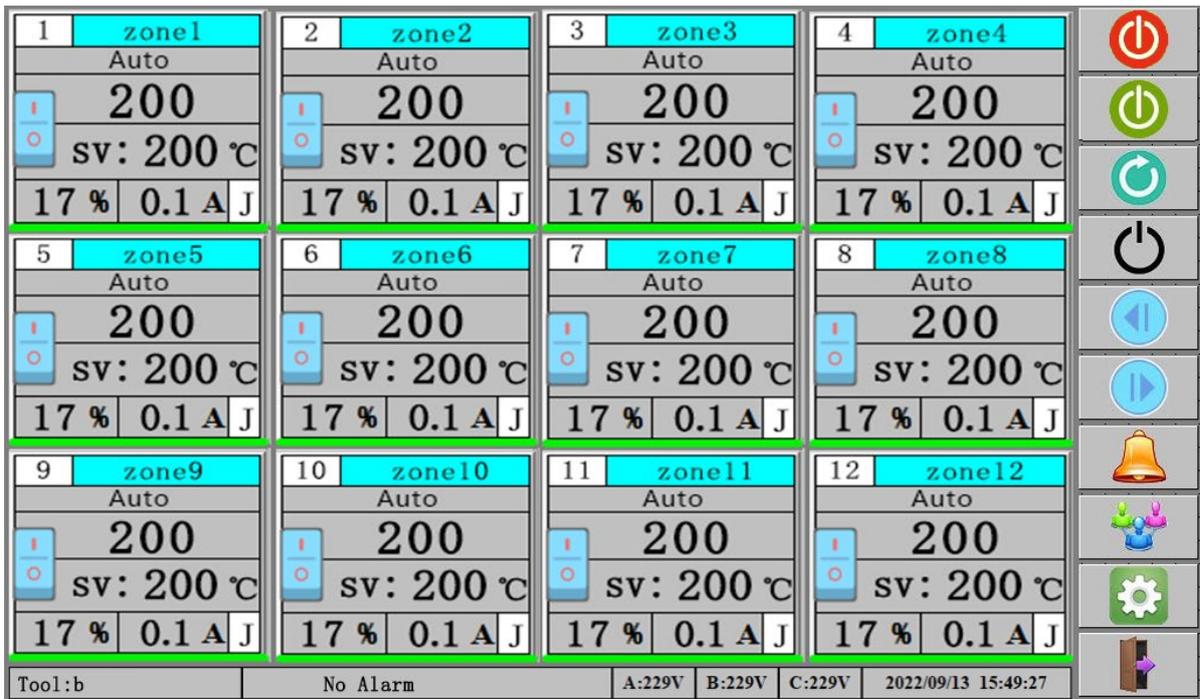
Chapter 4 Operator Interface

4.1 Main Interface

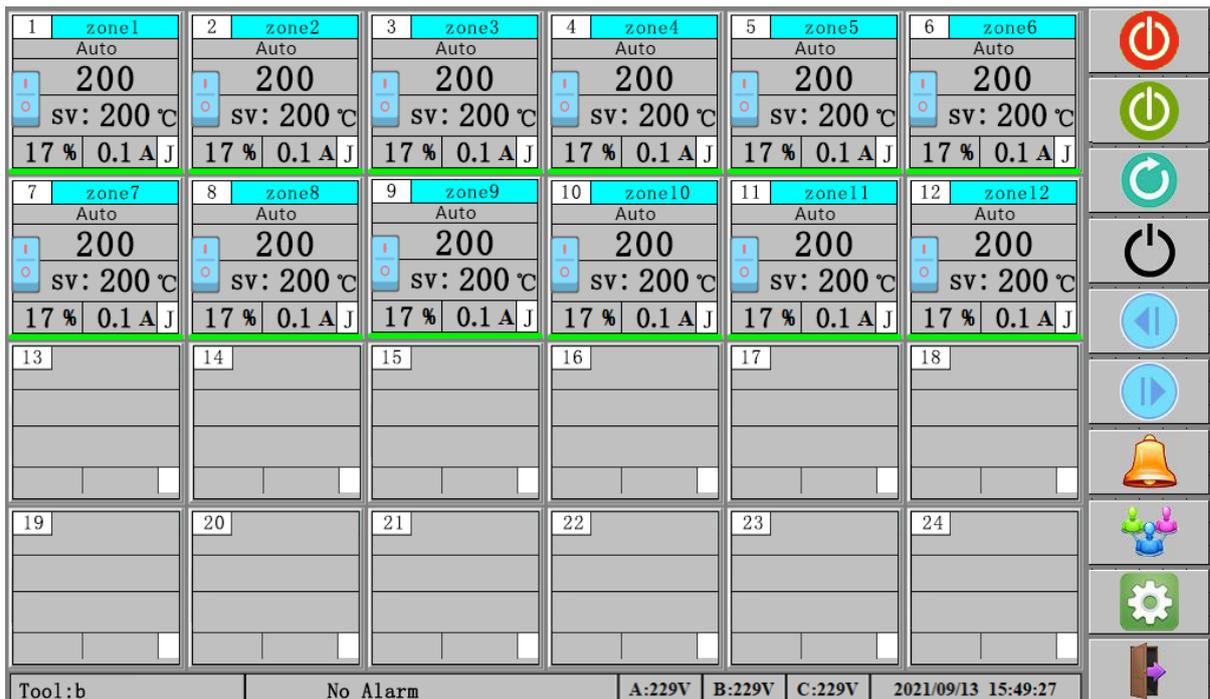
The main interface is used to monitor, log in to the system and general operations.

4.1.1 Temperature Control

Icon Button Mode, 12 zone per page, Resolution 0.1 is not checked.



Icon Button Mode, 24 zone per page, Resolution 0.1 is checked.



- **Function Button:** Icon mode is the default setting. Text mode can be selected on the system setting page.
- **12 or 24 zones per page:** 12 zone is the default setting, can be alternated on system setting page.
- **Resolution:** 1 is the default setting, 0.1 can be selected on system setting page.

 **[Run]:** (green) Run selected zones or all zones (if no zones selected).

 **[Stop]:** (red) Stop selected zones or all zones (if no zones selected).

 **[Auto]:** Place all zones or selected zones run in Auto mode.

 **[Standby]** Place all zones or selected temperature zones in Standby mode. In standby mode, the control target value is 70% of set value.

Note: Currently display set value remains the same.

 **[PgUp]:** Used to view the previous page.

 **[PgDn]:** Used to view the next page.

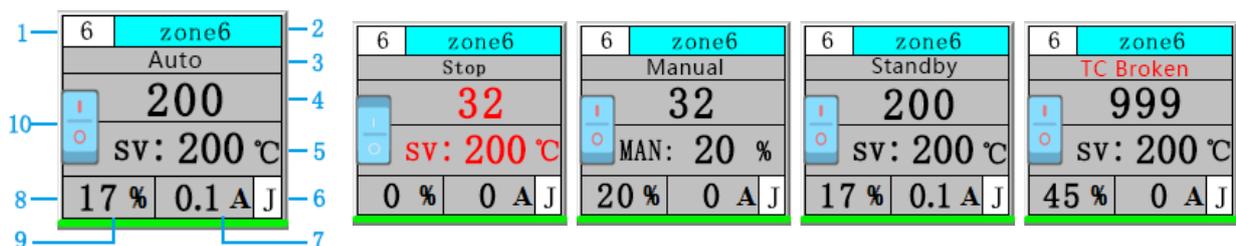
 **[Alarm]:** Used to view the alarm record.

 **[Group]:** Enter the group parameter setting, pattern/mold files management, and language selected.

 **[Setting]:** Used to enter the system setting and working mode setting interface.

 **[Login] / [Logout]:** Used to log in/out the system to achieve the different authority.

4.1.2 Temperature Zone Introduction



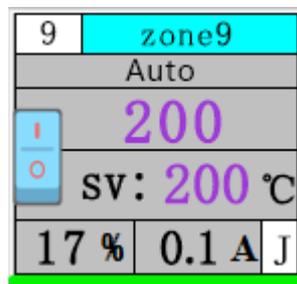
1. **Zone number:** Current temperature zone ID number, cannot be modified.
2. **Zone name:** Current temperature ID name can be customized; default background is blue.
This temperature zone name customization needs supervisor or above authority.
3. **Zone status:** Auto, Stop, Standby, Manual, Alarm (display in red).
4. **Present Temperature Value (PV):**
 - resolution 0.1 can be selected on system setting page.
 - displayed in red color when in stop state.

- if open thermocouple is detected, 999 will be displayed.
- if zone is turned off, **OFF** is displayed in red color.
- blinking when communication fails.
- Touch it to set zone's parameters and operate it.

5. Setpoint (SV):

- temperature unit can be selected between **Celsius and Fahrenheit** (Engineer authority required).
- displayed in **red** color in stop state.
- output percent setting will be displayed in manual mode.
- Touch setting value, output percent and load current can be alternated to show in 42-zone page.

Note: When the PV value reaches the SV value, the values of PV and SV will change to the same color. You need to select [Auxiliary]----"Tolerance Output Signal" Please refer to the picture below.



6. **Sensor type:** can select J-type and K-type in zone setting or group setting.

7. **Load current:** display current real-time output current value.

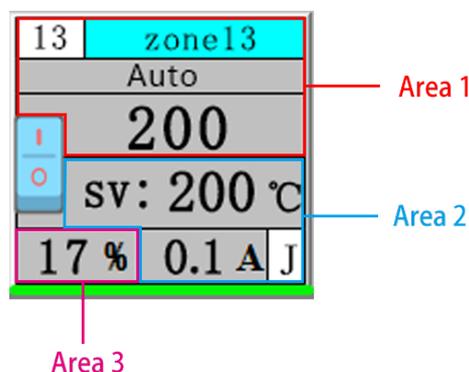
8. **Power output percentage:** display the current real-time power output percentage (%) / output power value (kw) / output voltage (V).

Note: click to display different parameters.

9. **Heater Life Indicator:** Green progress bar shows expected remaining heater life.

10. **Temperature zone on/off button:** control single temperature zone on and off directly.

4.1.3 Multiple Temperature Zone Selection



Touch the different areas of the temperature zone for different actions.

Area 1: Touch the upper half part of the zone, enter temperature zone setting.

- Area 2:**
- Touch the bottom half part of the zone, select current zone (zone blinking).
 - Touch again to cancel selection.
 - Select multi zones, users can execute batch operation of on/Stop/Auto/Standby.
 - And can execute group operation (modify general parameters).

Note: The selected zone will keep blinking all the time if no operation or modify parameters.

- Area 3:** Click the display real-time power output percentage (%) / output power value (kw) / output voltage (V).

4.2 USB Port

The USB port on the CTI-40 series is intended to be used to copy mold setup (pattern) files to and from the system. The screen for importing or exporting mold setups is displayed in the Group Setup Screen.

These mold setup files can be copied to other CTI-40 controllers that support the same file type.

The USB port is also used to export historical data record (in csv format) from the system. The screen for exporting the data record is displayed in the History Data Curve Screen.

CAUTION!

- Never power on the unit with a device in the USB port.
- Never connect a powered USB hub or other device to the USB port.
- Removing the USB disk from the system during read or write operation could cause data corruption to the USB disk contents that could result in bad files or the entire drive from being usable.

The following warnings and restrictions should be observed when using the USB port:

- Only supports USB disks that use a File Allocation Table (FAT or FAT32) format.
- Only supports USB versions 2.0 and 1.1.
- Use an empty USB disk or one that contains as few files as possible.

4.3 RJ45 network port

The RJ45 network port on the CTI-40 series controller is used for Intranet networking, supporting network port networking and MODBUS TCP communication protocol.

It supports remote reading of system operating status and working parameters, remote start/stop of the system, remote single stage start/stop, and remote modification of the temperature target value.

Chapter 5 User Authority & System Setting

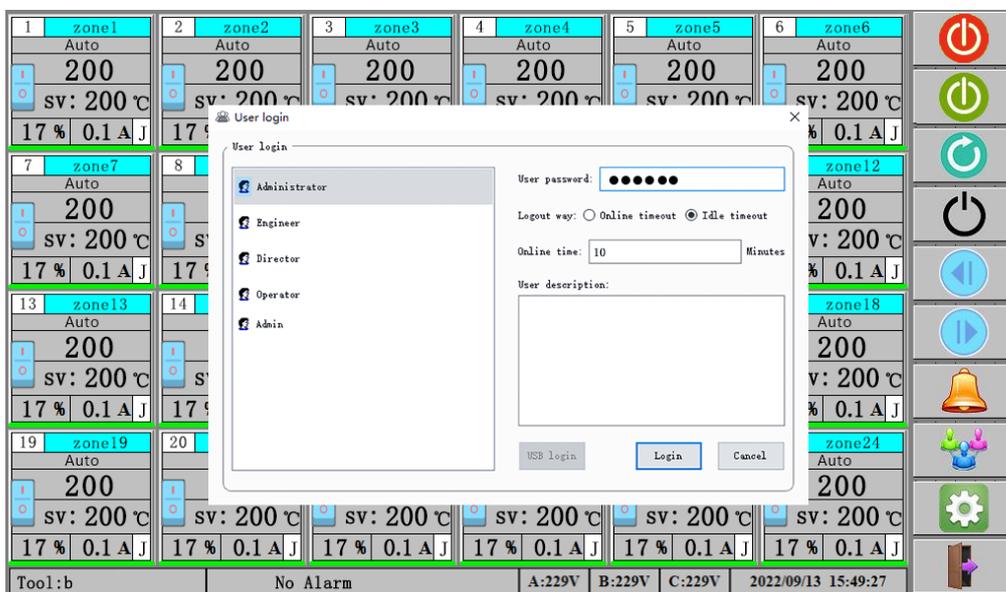
5.1 Login / Logout the System & User Authority

To avoid accidental changes and protect the system data, the controller is set up with different operator levels which have different security authorities.

To achieve the corresponding authority, the operator should login to the system by their security group name and password before operation.

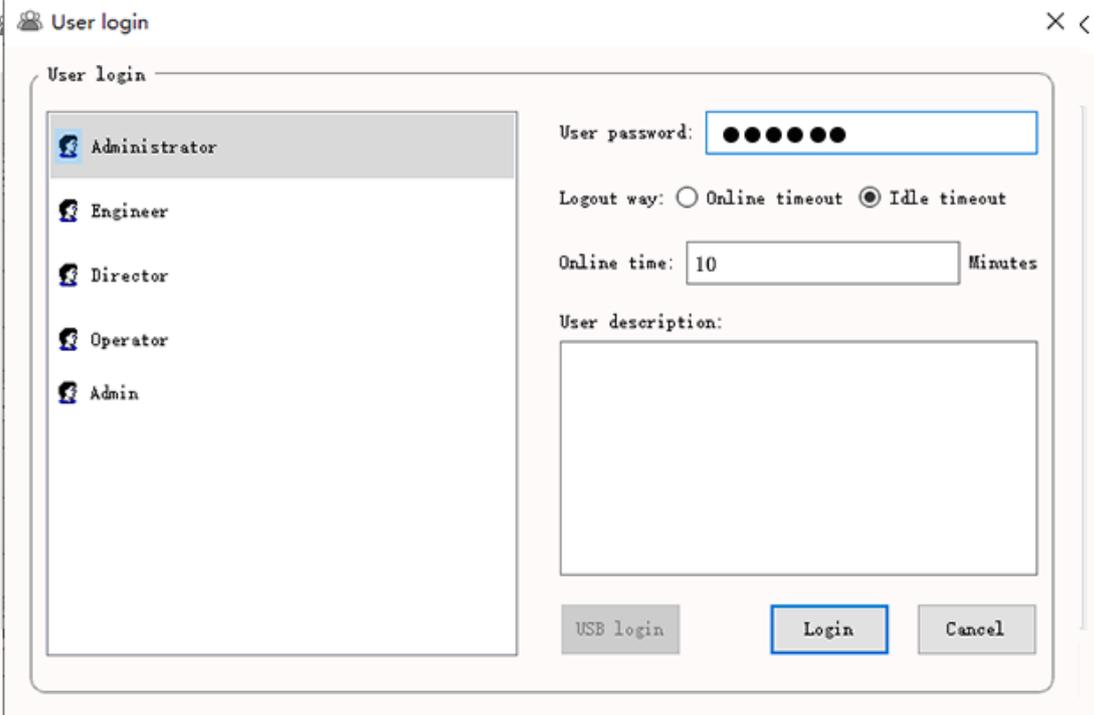
5.1.1 Login / Logout the System

- The main interface displays  [Login] when no user login. Touch the icon and enter the Login interface, select the corresponding username, and input password to login the system.



- The main interface displays  [Logout] when user login. You can touch the icon and choose "Yes" to log out the current user.
- A timeout is set automatically. After inputting password, you can choose Logout type, "Online timeout" and "Idle timeout." For example, you can set the time for 10 minutes. If no operation has occurred after 10 minutes the system will turn to non-login status.

5.1.2 User's Authorities List



User Group	Authorities	Remarks
Non-Login	<ul style="list-style-type: none"> • View data only, cannot operate • Visit alarm records 	
Operator	<ul style="list-style-type: none"> • All authorities of Non-Login • Run, Stop the system • Choose zone, set Auto, Standby mode • Modify temperature set value • Select 12/24 page display • Modify Operator password • View module types, status, help interface 	Username: "Operator" Initial password: 1
Engineer	<ul style="list-style-type: none"> • All authorities of Operators • Manage all operator users • Modify all parameters of all zones • Select system language • Set system time and date • Group management • Choose manual mode, set power output % • Set thermocouple fault solution • Set data storage interval time • Relieve alarm buzzer • View history curve, export data • View system log, operation records 	Username: "Engineer" Initial password: 321
Director	<ul style="list-style-type: none"> • All authorities of Engineers. • Manage operator and engineer users • Modify zone id, set zone color • Select display resolution etc. • Open / close zone • Set PID auto-tuning, Boost • Clear data records • Set auxiliary functions 	Username: "Director" Initial password: 654321
Admin	<ul style="list-style-type: none"> • All authorities of director • Manage operator, engineer, director users • Select OAID display (for maintenance) 	Username: "Admin" Initial password: 87654321
Super Admin	<ul style="list-style-type: none"> • All authorities of admin • Manage all users 	Username: "Administrator" Password kept by Supplier

5.2 System Setting

Touch the icon  [System] on the main interface of temperature control, then enter the System Setting Screen.

System Setting: Cabinet Temp: 20 °C ID: 12

Security:

Users

Password

Login to Run/Stop

Max ID: 120

With SVG/IO 

System:

Data Record:

0 Min

Auto Page:

0 Sec

System Log

Control Modules:

ID	Status	Type
1	online	Temperature
2	online	Temperature
3	online	Temperature
4	online	Temperature
5	online	Temperature
6	online	Temperature
7	online	Temperature
8	online	Temperature
9	online	Temperature
10	online	Temperature

Software version: 5.10S





Aux

24P



T/C Fault Solution

Startup Group





5.2.1 Security

- **Authorization:**

You can manage users, include add, copy and delete users.

You can also check the user's properties.

The User group name can be edited.

There are 4 User Groups: operators, engineers, directors, admins.

Each group has different authorities. You can create more than one user in each group.

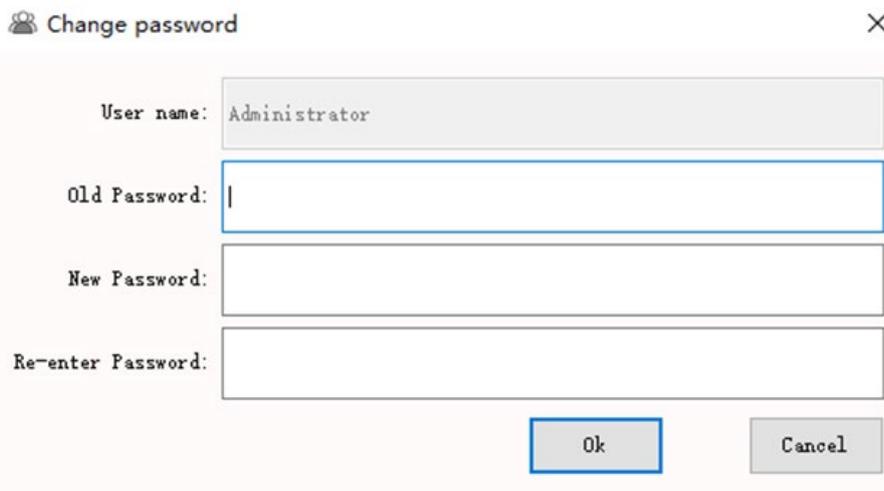
Operator: Authorized to use the functions related to production process.

Engineer: Authorized to use all functions except auxiliary functions.

Director: Authorized to use all functions except OAID display for maintenance.

Admin: All authorities (admin cannot be deleted).

- **Change Password:** You can change the password for the current user by "Edit user."



- **Authorized to Change Login to Run/Stop System/ Everyone Run/Stop System:** Touch it to change the authority setting for operators' login.

Display **Login to Run/Stop System**

Current setting is everyone can run or stop the system.

Operators can run/stop the system and change the set value without login.

Display **Everyone Run/Stop System**

Current setting is authorized to run or stop the system.

Only the operator's login to the system can run/stop the system and change the set value.

5.2.2 Time

For the system time initialization, the setting method is:

- 1) Touch the parameters required to set, then input the value on the screen keyboard.
- 2) Touch the **[OK]** to finish the modification.

NOTE: If there is no response after you touch the parameter values, it indicates that this parameter cannot be modified.

5.2.3 Cabinet Temperature & ID

Display the current max. cold-junction temperature (ambient temperature in the cabinet) of all modules, and its zone number.

5.2.4 System

- **Data Record Interval:** After setting, the system will save the data automatically.
0 min. means not to save the data, and you cannot see the history curve.
- **Auto Pager Time:** After setting, the main interface displays the next page automatically.
0 sec. means not to auto pager.
- **System Log:** By Touching it, you can check the system operation log.

SN	Time	Operation	Operator
1	2021-10-13 16:33:20	System is powered on, start to run.	Not Login

5.2.5 Language

- Touch the corresponding language button, to change the system language. (Restart required).

5.2.6 Control Modules

Display the communication status of each module and its type.

- **Software version:** View the current system software version.

5.2.7 Auxiliary Functions

Touch **Aux** , to enter Auxiliary function configuration page.

Remark: (red = unchecked, green = checked)

<p>Aux-function:</p> <p>Ua ID: <input type="text" value="0"/></p> <p>Ub ID: <input type="text" value="0"/></p> <p>Uc ID: <input type="text" value="0"/></p> <p><input type="radio"/> Over-voltage</p> <p><input type="radio"/> Remote Stop</p> <p><input type="radio"/> Remote Standby</p> <p>Standby: <input type="text" value="0"/> Min</p>	<p>Alarm Output:</p> <p><input type="radio"/> T/C Broken</p> <p><input type="radio"/> T/C Error</p> <p><input type="radio"/> Load Shorted</p> <p><input type="radio"/> Over-high</p> <p><input type="radio"/> Over-low</p> <p><input type="radio"/> Load Broken</p> <p><input type="radio"/> T/C Reversed</p> <p><input type="radio"/> GND Fault</p>	<p><input type="radio"/> Leakage</p> <p><input type="radio"/> Triac</p> <p><input type="radio"/> Overload</p> <p><input type="radio"/> Fuse Blown</p> <p><input type="radio"/> No Response</p> <p><input type="radio"/> Over voltage</p> <p><input type="radio"/> CC Over Temp</p> <p><input type="radio"/> CC Comm Failed</p>	<p>Other:</p> <p><input type="radio"/> Save Status</p> <p><input type="radio"/> Text Button</p> <p><input type="radio"/> OAID Monitor</p> <p><input type="radio"/> Resolution:0.1</p> <p><input type="radio"/> Pro</p> <p><input type="radio"/> Uniform Temp Control</p> <p><input type="radio"/> Remote Tool Load</p>
<p>Communication Protocol:</p> <p><input checked="" type="radio"/> Disable</p> <p><input type="radio"/> MODBUS-TCP/IP</p> <p><input type="radio"/> MQTT</p> <p><input type="radio"/> OPC-UA</p>	<p>Temp-OK Tolerance:</p> <p><input type="text" value="0"/></p> <p><input checked="" type="radio"/> Temp-OK Output</p>	<p>SVG pro:</p> <p><input type="radio"/></p> <p>SVG Time Display</p>	<p>EasyView Config</p> <p>Mold test</p> <p>Quit</p>

- **A/B/C Phase Voltage ID**

The module's power voltage will be displayed in the status bar on the bottom of main interface.

- **Over Voltage**

When the power supply is over voltage, the system will alarm and stop running.

- **Remote Stop**

When the system receives an external stop signal, it will stop running.

- **Remote Standby**

When the controller receives an external standby signal, it will enter standby mode after a delay of 1 min (by default). It will keep on standby mode until the external signal stops. (standby time =0 min).

When the controller does not receive external signal, you can also select standby mode. The controller will turn to standby mode after a delay of 1 min (factory default) when it does not receive injection signal. It will remain on standby mode until the injection signal returns.

- **Delay**

Set a delay time for entering standby mode.

- **Alarm Output Setting**

For 16 common faults (T/C Broken, Load Shorted, Over Temp, Over Voltage, etc.), customers can choose to connect some or all the faults to an external alarm output device. When the selected fault occurs, the system will give a relay output signal to drive the external alarm device.

- **Other Parameters**

- ◆ **Save Status:** Zones' work state will be the same as before when re-start the system.
- ◆ **Text Button:** Function button be shown in **character** instead of ICON.
- ◆ **OAID Monitor:** Zone's original ID value is displayed, used for maintenance.
- ◆ **Resolution 0.1:** Present temperature's display resolution is 0.1.
- ◆ **Pro:** This can enter to simple working mode (refer to Chapter 6.8).
- ◆ **Uniform Temp Control:** Synchronous heating can be selected when starting system or selected temperature zone to reduce temperature difference.

- **Easy View Configuration**

You can choose to configure the displayed mold picture and mark the corresponding temperature zone on the mold picture.

- **Communication Protocol**

Three communication protocols can be selected, MODBUS-TCP/IP, MQTT, OPC-UA. It can remotely read the system working status and working parameters, support remote start/stop of the system and single segment start and stop, and support remote modification of temperature setting value.

- **Temp-OK Tolerance:**

When the temperature of all zones is within the maximum tolerance range of the setting value (target temperature \pm maximum tolerance value), the normal output contact is closed. And the values of PV and SV will change to the same color.

- **Mold Test**

You can do mold testing on multiple heating zones of the mold one by one before working. Set the start ID and end ID (maximum 100) to determine the scope of the test. Set the maximum working temperature to limit the temperature rise and prevent accidents. After testing, 10 kinds of faults can be predicted (such as heater broken, heater shorted, sensor reverse connection, T/C broken, etc.) to warn the user. Please contact the manufacturer for more information.

ID	Watt	Heat ID	SensorID	Status	Fault	Start ID
1	NO	1	0	NO	NO	1
2	NO	2	0	NO	NO	
3	NO	3	0	NO	NO	
4	NO	4	0	NO	NO	
5	NO	5	0	NO	NO	End ID
6	NO	6	0	NO	NO	20
7	NO	7	0	NO	NO	
8	NO	8	0	NO	NO	
9	NO	9	0	NO	NO	
10	NO	10	0	NO	NO	Maximum operating temperature
11	NO	11	0	NO	NO	0
12	NO	12	0	NO	NO	
13	NO	13	0	NO	NO	
14	NO	14	0	NO	NO	Run
15	NO	15	0	NO	NO	
16	NO	16	0	NO	NO	
17	NO	17	0	NO	NO	
18	NO	18	0	NO	NO	
19	NO	19	0	NO	NO	
20	NO	20	0	NO	NO	

when not in voltage regulation mode | Die self check stop. | 2021/10/13 16:43:31

5.2.8 12-zone / 24-zone Display Shifting

Touch  , you can switch between 12 zone and 24 zone display in one page.

5.2.9 Clear Operation Log & Historical Data

Touch  **[Clear]**, you can clear all operation logs and historical curve data. **(Caution!)**

5.2.10 Sensor Fault Solution

In case of sensor failure, you can copy a zone as another zone's reference to allow you to finish the production run. Typically, the sensors of these two zones should be a similar mold position and of the same wattage as each other, such as 2 similar hot runner nozzles. When the sensor of the zone (Fault ID) fails the controller will use the temperature of the other zone (Related ID) to simulate the fault one.

This function can be enabled or disabled according to requirements.

- 1) Touch the **[T/C Fault Solution]** to enter the setting interface.
- 2) Set Fault ID and Related ID. You can set 12 groups at most.
- 3) Touch the **[Enable]** or **[Disable]** to start or stop this function.

Remark: ( red = unchecked,  green = checked)

- 4) Touch **[Quit]**, exit this interface.

Sensor Fault Solution:

No.1 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.2 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.3 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.4 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>
No.5 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.6 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.7 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.8 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>
No.9 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.10 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.11 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>	No.12 Fault ID: <input type="text" value="0"/> Related ID: <input type="text" value="0"/>

Reference T/C
 Automatic Manual Control
 Sampling tolerance: ±
 Quit

● Auto-Manual Mode Shifting

When this function is selected, the system will automatically switch to manual control mode once the sensor is damaged. System will take the steady-state output value before disconnection as the initial value of the manual output.

Chapter 6 Temperature Control Operations

6.1 Control Modes

[Auto]:

This type of control is a “closed loop” system and requires a thermocouple feedback signal. The controller uses a PID algorithm to determine the required output power to hold the actual temperature value equal to the set value.

This mode is applied to all zones when the system starts to run.

[Standby]:

This type of control operates like Auto mode. It is a “closed loop” system and requires a thermocouple feedback signal. The controller uses a PID algorithm to determine the required output power to hold the actual temperature value equal to standby temperature value (70% of set value).

[Manual]:

This type of control is an “open loop” system and requires no thermocouple feedback signal.

The controller regulates output power according to the manual setting.

This mode only can be selected by zone setting.

Auto Tune function:

This function is for obtaining the optimal PID value in a system.

It is a “closed loop” system and requires a thermocouple feedback signal.

Typically, AT function only needs to be executed when PID factory setting cannot meet the system requirements. After auto tuning has finished the optimal PID value will be saved, and the controller returns to Auto mode.

This function only can be selected by zone setting.

Note: To start PID auto-tuning function, present temperature [PV] value should be lower than set value [SV].

6.2 Soft Start (Dehumidify) Function

To avoid humidity making the heater burn out prematurely, the soft start function heats the system slowly to remove excess moisture from the heater.

During soft start, the output power steps up from 0% until the temperature rises to 100°C (212°F) and holds it for a set time. When the soft start time is over, the controller will return to normal work mode.

Soft start condition:

- a) The soft start function is on (parameter Soft Start = 1~10).
- b) The process temperature is less than 100°C (212°F).

6.3 Detailed Parameters for Each Zone

Parameter	Description
Setpoint	Target temperature value, full scale
Alarm High	High deviation alarm value When actual value > Setpoint + Alarm High, zone alarms and shut off output
Alarm Low	Low deviation alarm value When actual value < Setpoint + Alarm Low, zone alarms
Sensor Type	J - J type thermocouple K - K type thermocouple
Temp Unit	Temperature unit: °C or °F
Soft Start	0 - Off 1~10: On, soft start time = (1~10)×80s
Control Cycle	0 - Phase control 1~10 - Zero-cross control, cycle = 1~10s
T/C Error Detection	Misconnection of heater & sensor diagnostic 0 - Off 1 - Detect the heater after power on, if it is judged as sensor, controller will alarm and cut off output to protect it 2 - Detect the heater and sensor impedance 3 - Detect the heater and sensor impedance, sensor short 4 - Detect the sensor impedance 5 - Detect the sensor impedance, sensor short
Self-adaption	0 - Off 1 - Automatically identify the heating speed and use the corresponding PID value (Factory default) 2 - Self-adaption PID 3 - AI deep learning, optimizing system parameters 4 - AI deep learning, optimizing special parameters 5 - Fuzzy self-adaption 6 - Single run fuzzy self-adaption
P	Control proportional band, 1 to span
I	Integral time, 1~999s
D	Differential time, 1~999s
T/C Offset	Sensor correction is made by adding it to measured value
CC Max Temp	Temperature of control card in the mainframe high alarm value, unit is same as parameter C/F setting. (0 = Off)
Max Output	High limit of output power percentage, 0~99%. (0 = Off)

Rated Current	Rated load current (Amps) Alarms when the actual load current is over the set value.
Load Check	Diagnostic function for heater broken. 0 - Off 1~10 - Checking the load current when output is setting×10%, if the controller judges the heater fault, it will alarm and cut off output. Recommended setting is 3~5
Max. Current	Max. limit of load current (Amps) When load current is higher than setting, controller will limit it by decreasing the power output
Filter	To reduce the influence of interference The larger the value is, the slower the controller responses When it is too large, the controller may be out of control
Load-short Detection	Diagnostic sensitivity for load shorted, 0~100 The greater the value is, the lower the sensitivity. Recommended setting is 0
Reset	After inputting password, restart power and system resets to default. NO - Off YES - On
No Response	Diagnostic function for heating is invalid. 0: Off 1~999: When output percent is 100%, if the temperature does not rise in setting time (unit: minutes), the controller will alarm and adjust output percent to 0%
Over-Voltage	Supply voltage high alarm setting, 6~30 When the power supply voltage is over about (setting×4.5+210) V, the controller will alarm and cut off output. Recommended setting is VoL=13 (over-voltage is about 270Vac)
Normal Power (%)	Steady-state output power percentage value 0: Automatically generated by system after normal working 1~100: Set by manual
Power Deviation (%)	Leakage detection 0: Off 1~100: When output percent exceeds (Normal Power + Leakage detection) %, the controller will alarm and show "leakage"
Leak Alarm	Leakage alarm function 0: Off 1: ON
T/C Offset @200°C	Setting range -1000~1000 Only for the curve correction of Celsius, corresponds to 200°C, and Fahrenheit is converted after the correction of Celsius

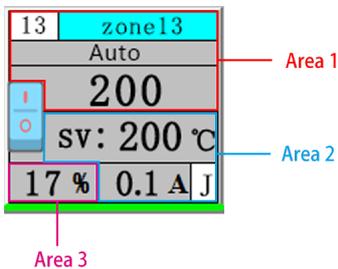
T/C Offset @100°C	Setting range -1000~1000 Only for the curve correction of Celsius, corresponds to 100°C, and Fahrenheit is converted after the correction of Celsius.
Zero-crossing Control	When Phase control is not working, it will automatically switch from Phase control to zero crossing. 0: Off 1: ON
Relay Control	When the triac is broken, it will automatically switch from triac control to relay control. 0: Off 1: ON
Temp/Volt	Switch the module to temperature control mode (target value is temperature) or voltage control mode (target value is voltage)
Boost Temp (°C)	Sets the temperature increased by Boost mode. Boost mode setting value = (SV+ BOOST temperature)
Boost Time (sec)	Sets Boost mode duration
Speed (unit/min)	Preset temperature zone heating rate 0 - turn off the temperature rise limit and heat up at full speed.
Standby Temp (%)	Sets the output power percentage in standby mode
Standby Time (min)	Sets standby mode duration
GND Fault Tolerance	Sets the current leakage alarm value. System will start to alarm when the detected current leakage is greater than this value. 0 - Turns off the leakage alarm (note: even if it is set to 0, when the leakage current is greater than 100mA, it will still alarm)
GND Fault	The current leakage detected by the system, cannot be set
GND Fault Protection	When the current leakage alarms, system will cut off output
Load rated power	_____W (the rated power of the heater) Set load rated power, compared with actual power, turn out heater life %
Actual power	_____W (the actual power of the heater) System calculates automatically, cannot be set by manual
Heater Life (%)	_____W (the remaining life of the heater) System calculates automatically, cannot be set by manual
Alarm 1-10	Displays the latest 10 alarm records. It will not affect the record when module reset to factory default
Max Current Record	Displays the maximum current during operation

Max Voltage	Displays the maximum voltage during operation
Load Short Record	Displays the short circuit times during operation
Standby 2 Temp (%)	Sets the SV percentage of the second stage standby mode. After the first stage of standby time ends, the second stage of standby temperature can start. Standby temperature = SV * standby percentage (%) Set to 0 to turn off this function
Standby 2 Time (min)	Sets the duration of the second stage standby mode
Setpoint Min	The target temperature value cannot be less than the lower limit
Setpoint Max	The target temperature value cannot exceed the upper limit value
Device Number	Number of the current module, cannot be modified

6.4 Zone Setting

Touch the upper part of each zone to enter the zone's parameters setting interface.

Note: different users can see different parameters.



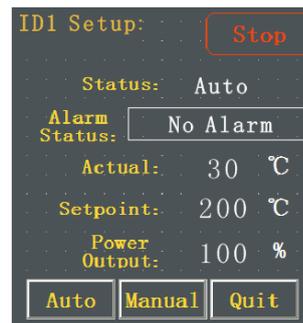
6.4.1 Operator Login Status

- **Change Set Value:** Touch [\ll] [\wedge] [\vee]
- **Save Set Value:** Touch [SET]
- **Run or Stop this zone:** Touch [Run] / [Stop]



6.4.2 Engineer Login Status

- **Change Set value:** Touch it to call up small keyboard.
- **Run or Stop this zone:** Touch [Run]/[Stop].
- **Change Control mode of this zone:**
Touch [Auto] or [Manual], then confirm it.



- **Set power output percent in Manual mode:**
Touch it to call up small keyboard.
- **Back to main interface:** Touch [Quit]

6.4.3 Director / Administrator Login Status

Zone's Setting & Status: Alarm: No Alarm

<p>Current Status:</p> <p>ID Name: zone16</p> <p>Actual: 32 °C</p> <p>Output: 100 %</p> <p>Manual: 30</p> <p>CC Temp: 32 °C</p> <p>Status: Auto</p>	<p>Advanced Parameters:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Sensor Type</td><td>J(J/K)</td><td>Max Output</td><td>0</td></tr> <tr><td>Temp Unit</td><td>°C(°C/°F)</td><td>Rated Current</td><td>15</td></tr> <tr><td>Soft Start</td><td>2</td><td>T/C Error Detection</td><td>1</td></tr> <tr><td>Control Cycle</td><td>0</td><td>Load Check</td><td>4</td></tr> <tr><td>Self-adaption</td><td>0</td><td>Max Current</td><td>18</td></tr> <tr><td>P</td><td>42</td><td>Filter</td><td>5</td></tr> <tr><td>I</td><td>100</td><td>Load-shorted Detection</td><td>0</td></tr> <tr><td>D</td><td>20</td><td>Reset</td><td>NO</td></tr> <tr><td>T/C Offset</td><td>0</td><td>No Response</td><td>0</td></tr> <tr><td>CC Max Temp</td><td>0</td><td>Over-Voltage</td><td>13</td></tr> </table>	Sensor Type	J(J/K)	Max Output	0	Temp Unit	°C(°C/°F)	Rated Current	15	Soft Start	2	T/C Error Detection	1	Control Cycle	0	Load Check	4	Self-adaption	0	Max Current	18	P	42	Filter	5	I	100	Load-shorted Detection	0	D	20	Reset	NO	T/C Offset	0	No Response	0	CC Max Temp	0	Over-Voltage	13
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<p>Advanced Parameters:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Normal Power (%)</td><td>0</td><td>Speed (unit/min)</td><td></td></tr> <tr><td>Power Deviation(%)</td><td>10</td><td></td><td>0</td></tr> <tr><td>Leak Alarm</td><td>0</td><td>Standby Temp(%)</td><td>60</td></tr> <tr><td>T/C Offset @200°C</td><td>0</td><td>Standby Time(min)</td><td>0</td></tr> <tr><td>T/C Offset @100°C</td><td>0</td><td>GND Fault Tolerance</td><td>0 mA</td></tr> <tr><td>Zero-crossing Control</td><td>1</td><td>GND Fault</td><td>0 mA</td></tr> <tr><td>Relay Control</td><td>0</td><td>GND Fault Protection</td><td>NO</td></tr> <tr><td>Temp/Volt</td><td>TEMP</td><td>Load rated power</td><td>0 W</td></tr> <tr><td>Boost Temp (%)</td><td>20</td><td>Actual Power</td><td>0 W</td></tr> <tr><td>Boost time(sec)</td><td>20</td><td>Heater Life</td><td>100 %</td></tr> </table>	Normal Power (%)	0	Speed (unit/min)		Power Deviation(%)	10		0	Leak Alarm	0	Standby Temp(%)	60	T/C Offset @200°C	0	Standby Time(min)	0	T/C Offset @100°C	0	GND Fault Tolerance	0 mA	Zero-crossing Control	1	GND Fault	0 mA	Relay Control	0	GND Fault Protection	NO	Temp/Volt	TEMP	Load rated power	0 W	Boost Temp (%)	20	Actual Power	0 W	Boost time(sec)	20	Heater Life	100 %	<p>Advanced Parameters:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Alarm 1</td><td>Load Broken</td><td>Max Current Record</td><td>0 A</td></tr> <tr><td>Alarm 2</td><td>Nop</td><td>Max Voltage</td><td>255 V</td></tr> <tr><td>Alarm 3</td><td>Nop</td><td>Load-shorted Record</td><td>0</td></tr> <tr><td>Alarm 4</td><td>Nop</td><td></td><td></td></tr> <tr><td>Alarm 5</td><td>Nop</td><td></td><td></td></tr> <tr><td>Alarm 6</td><td>Nop</td><td></td><td></td></tr> <tr><td>Alarm 7</td><td>Nop</td><td>Setpoint Min</td><td>0</td></tr> <tr><td>Alarm 8</td><td>Nop</td><td>Setpoint Max</td><td>0</td></tr> <tr><td>Alarm 9</td><td>Nop</td><td>Device Number</td><td></td></tr> <tr><td>Alarm 10</td><td>Nop</td><td></td><td>2147483647</td></tr> </table>	Alarm 1	Load Broken	Max Current Record	0 A	Alarm 2	Nop	Max Voltage	255 V	Alarm 3	Nop	Load-shorted Record	0	Alarm 4	Nop			Alarm 5	Nop			Alarm 6	Nop			Alarm 7	Nop	Setpoint Min	0	Alarm 8	Nop	Setpoint Max	0	Alarm 9	Nop	Device Number		Alarm 10	Nop		2147483647
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- **Change ID Name:** Touch it to call up small keyboard and rename the zone you want.
- **Set output power percent in Manual mode:** Touch **Manual** to call up small keyboard.
- **Change General parameters:**
 - Touch Setpoint to call up small keyboard.
 - Touch Alarm High to call up small keyboard.

Touch Alarm Low to call up small keyboard.

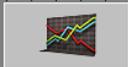
- Run or Stop this zone: Touch  [Run] /  [Stop]
- Turn off or turn on this zone: Touch [OFF] / [ON]
- Switch to Manual mode (in running state): Touch  [Manual].
- Activate Boost function (fast heating speed): Touch  [Boost], SV increases (maximum 99) and continues for a fixed time, (the set Boost time).
- Start Auto-Tune this zone: Touch  [Auto Tune]
- Select background color for this zone: Touch  [Color]
- Back to main interface: Touch  [Exit]

6.5 Group Config & Tools

Touch  [Group] on the main interface to enter the Group Configuration & Tools Management.

Group Config & Tools:

<p>Group-Click Config:</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="border: 1px solid gray; padding: 2px;">Setpoint</td><td style="border: 1px solid gray; padding: 2px;">200</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">Alarm High</td><td style="border: 1px solid gray; padding: 2px;">30</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">Alarm Low</td><td style="border: 1px solid gray; padding: 2px;">-30</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">Sensor Type</td><td style="border: 1px solid gray; padding: 2px;">J(J/K)</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">Temp Unit</td><td style="border: 1px solid gray; padding: 2px;">°C(°C/°F)</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">Soft Start</td><td style="border: 1px solid gray; padding: 2px;">2</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">Control Cycle</td><td style="border: 1px solid gray; padding: 2px;">1</td></tr> <tr><td style="border: 1px solid gray; padding: 2px;">T/C Error Detection</td><td style="border: 1px solid gray; padding: 2px;">0</td></tr> <tr><td colspan="2" style="border: 1px solid gray; padding: 2px;">Group-Color Config</td></tr> </table>	Setpoint	200	Alarm High	30	Alarm Low	-30	Sensor Type	J(J/K)	Temp Unit	°C(°C/°F)	Soft Start	2	Control Cycle	1	T/C Error Detection	0	Group-Color Config		<p>Tools:</p> <p style="text-align: center;">Tool Name: <input style="width: 100%;" type="text"/></p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid gray; padding: 5px; width: 45%;">Save</div> <div style="border: 1px solid gray; padding: 5px; width: 45%;">Load a Tool</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid gray; padding: 5px; width: 45%;">Tools Management</div> <div style="border: 1px solid gray; padding: 5px; width: 45%;">Compare</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid gray; padding: 2px;">CC Max Temp</div> <div style="border: 1px solid gray; padding: 2px;">0</div> <div style="border: 1px solid gray; padding: 2px;">Setpoint Min</div> <div style="border: 1px solid gray; padding: 2px;">0</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="border: 1px solid gray; padding: 2px;">Load Check</div> <div style="border: 1px solid gray; padding: 2px;">0</div> <div style="border: 1px solid gray; padding: 2px;">Setpoint Max</div> <div style="border: 1px solid gray; padding: 2px;">0</div> </div>
Setpoint	200																		
Alarm High	30																		
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Sensor Type	J(J/K)																		
Temp Unit	°C(°C/°F)																		
Soft Start	2																		
Control Cycle	1																		
T/C Error Detection	0																		
Group-Color Config																			






[Graph]: Check Present Curve and History Curve. (see Chapter 6.6)

6.5.1 Group Setting

Parameters for either all zones or zones with the same background color can be set all together.

6.5.1.1 Group Configuration Setting

Use to set parameters for all zones.

- 1) Touch Setpoint to call up small keyboard.
- 2) Input the required value.
- 3) Touch **[OK]** to complete the setting.

NOTE: If there is no response when you Touch the parameter's value, it means you do not have the authority in current user.

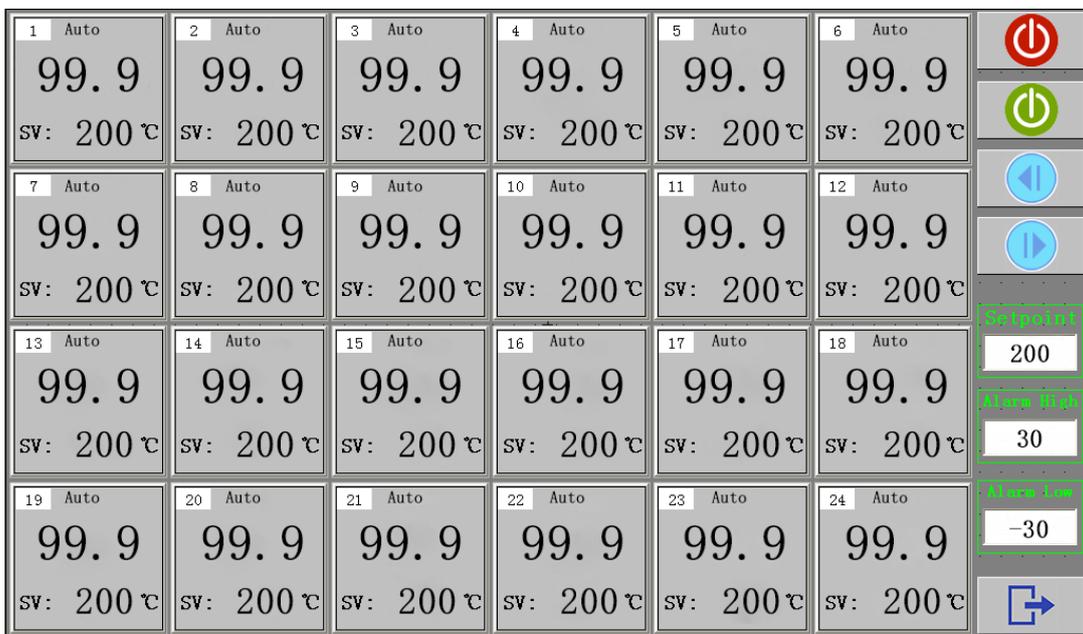
6.5.1.2 Group Color Setting

Use to set parameters for zones with the same background color and run or stop these zones.

Comment: To set the background color of each zone, please refer to 6.4.3

- 1) Touch **[Group-Color Config]**, background color selected window will appear.
- 2) Select the background color of zones you want, the setting page will appear.

On this page, **[Run]** / **[Stop]** button only works for these zones.



- 3) Touch **[Setpoint]** or **[Alarm High]** or **[Alarm Low]** to call up small keyboard.
- 4) Input the required value.
- 5) Touch **[OK]** to complete the setting.

NOTE: If there is no response when you touch the parameter's value, it means you do not have the authority in current user.

6.5.2 Mold Tool Management

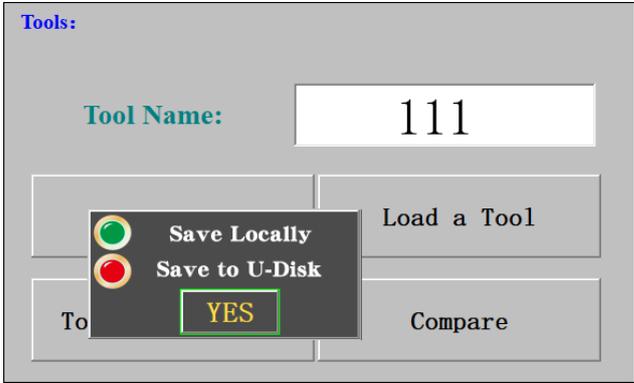
You can manage the mold setup pattern files by using **Tools Management**.

CTI-40 can save a maximum of 72 sets of mold files to the local memory, as well as to USB disk.

You can also import, export, and delete the mold pattern files.

NOTE: The mold pattern file is a database file containing the parameters of each zone.

6.5.2.1 Save a New Mold Tool Name



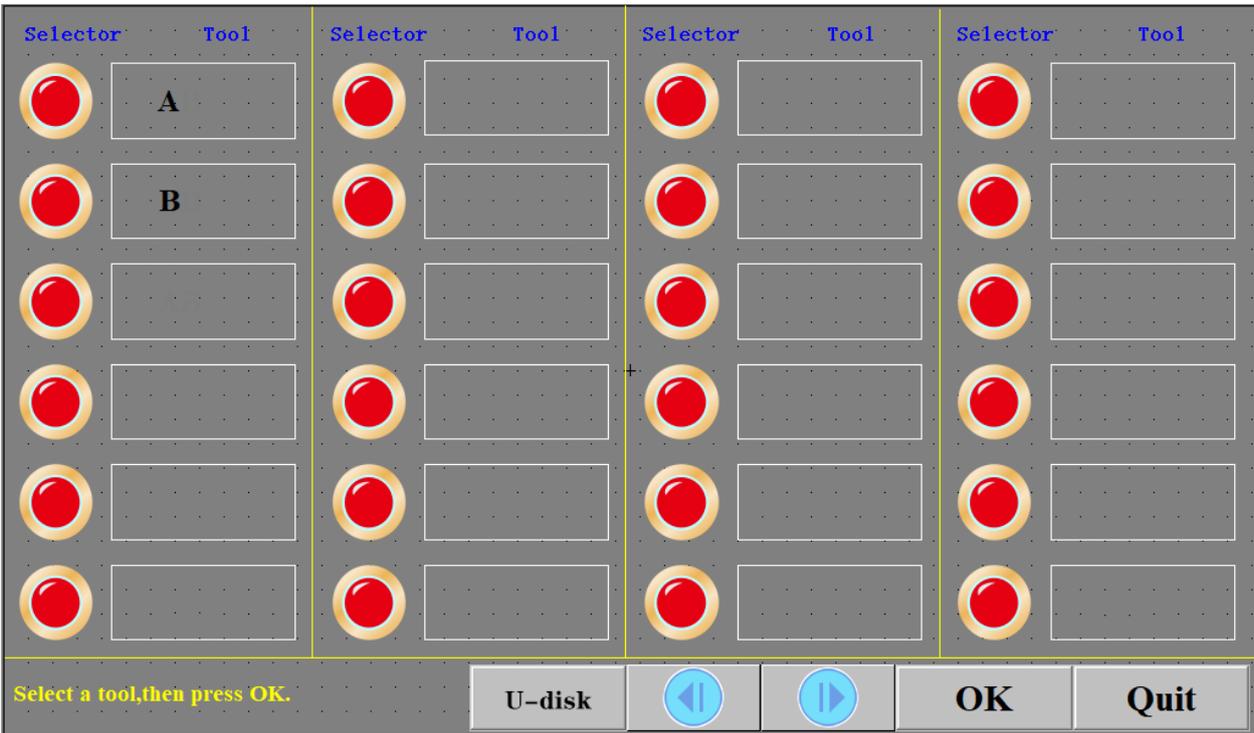
1. Input a new mold tool name in the box.
2. Touch the **[Save]** to save the name of the new mold tool pattern name.
Zones' On/Off state, auto/manual control mode, and the background color will be also saved in the pattern file.
3. Choose the [Save Locally] or [Save to USB Disk] and select yes to confirm.

CAUTION! NAME PATTERN FILE CAREFULLY!

If the name of the new mold tool pattern is same as the existing pattern name, the original file will be over-written by the new one.

6.5.2.2 Load a Tool

1. Touch the **[Load a Tool]** to enter to the mold tool name selected interface.



2. Touch the selector  next to the mold tool name to select.
3. Touch **[OK]** to import the parameters in the tool file.

Confirm to load the tool. Touch **[YES]**.

The system will generate a tool loaded report in the end of importing process.

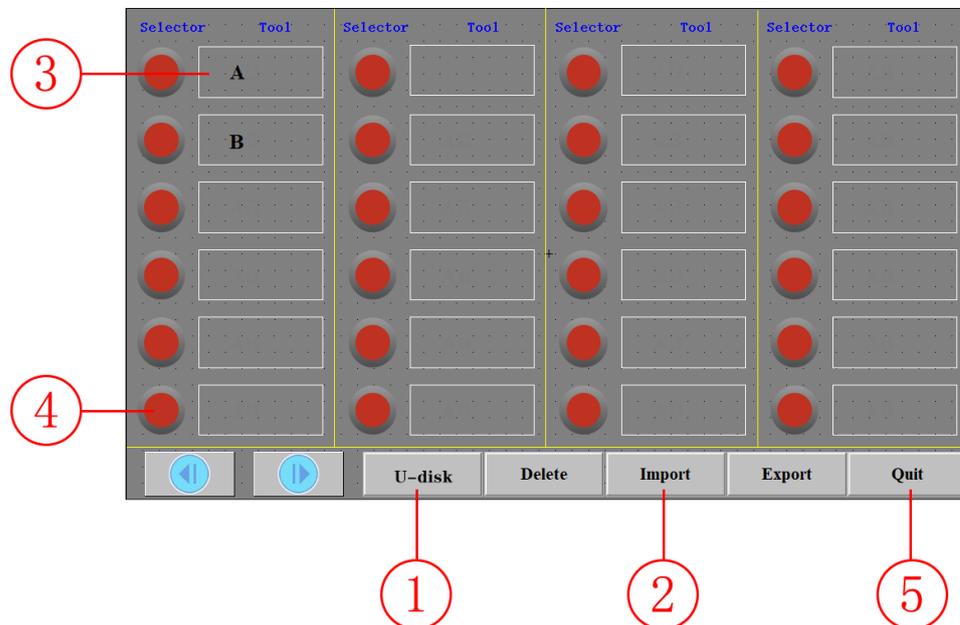
4. Touch **[QUIT]** on the report page to close it.
5. Touch **[QUIT]** to go back to the Group Config & Tools interface.

Note: All zones will now work on the imported settings, and the mold tool name is shown in the status bar.

6.5.2.3 Tools Management

Touch the **[Tools Management]** to enter the management interface.

You can browse the tool files in the USB disk or local drive and manage these files.



- ① **[Local File]** or **[USB File]**: Select file location.
- ② **[Delete]**: delete the selected file.
[Import]: import the files selected from the USB disk to the local disk.
[Export]: export the files selected from the local disk to the USB disk.
- ③ **Tool Name**.
- ④ **Tool selector & indicator**:  Red- not selected,  Green - selected.
- ⑤ **[Quit]**: back to the Global Config & Tool Management interface.

6.5.2.4 Comparison of Assigned Parameters

1. Input the Tool Name that needs to be compared in the tool files.
2. Touch **[Compare]** to compare the parameters of the online modules with the ones of the existing tool file.
3. If data is consistent, Touch **[YES]**.

6.5.2.5 Online Browsing and Modify Tool Data

You can browse the ID number and all parameters of each zone. When you Touch a parameter, the parameter changes to yellow filled background (other parameters in the same zone change to blue background). Touch the parameter again to bring up the small keyboard to modify it.

Num	Name	SV	ALH	ALL	Sn	C/F	Set	T	Pi	P	I	D
0	ID1	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
1	ID2	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
2	ID3	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
3	ID4	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
4	ID5	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
5	ID6	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
6	ID7	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
7	ID8	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
8	ID9	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
9	ID10	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
10	ID11	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
11	ID12	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
12	ID13	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
13	ID14	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
14	ID15	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
15	ID16	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
16	ID17	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000
17	ID18	200.000	30.000	-30.000	0.000	0.000	2.000	1.000	5.000	9.000	160.000	20.000

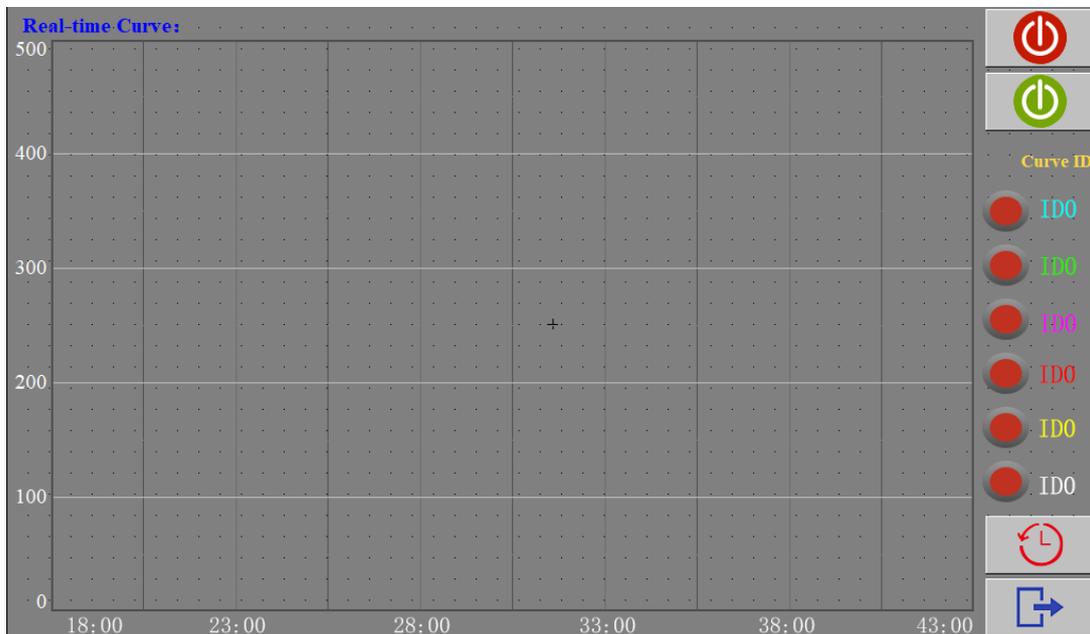
Zone's Setting & Status: Tool Name: A Save Quit

6.5.3 Back

Touch  [Exit], back to the main interface.

6.6 Graph

Touch  [Graph] on the main interface of  [Group], then you can enter the Real Time Display Screen.



You can select 6 zones max. to view the real-time curve.

Touch  **[History]** on this screen to enter the History Curve Display.

Touch  **[Exit]** back to the main interface.

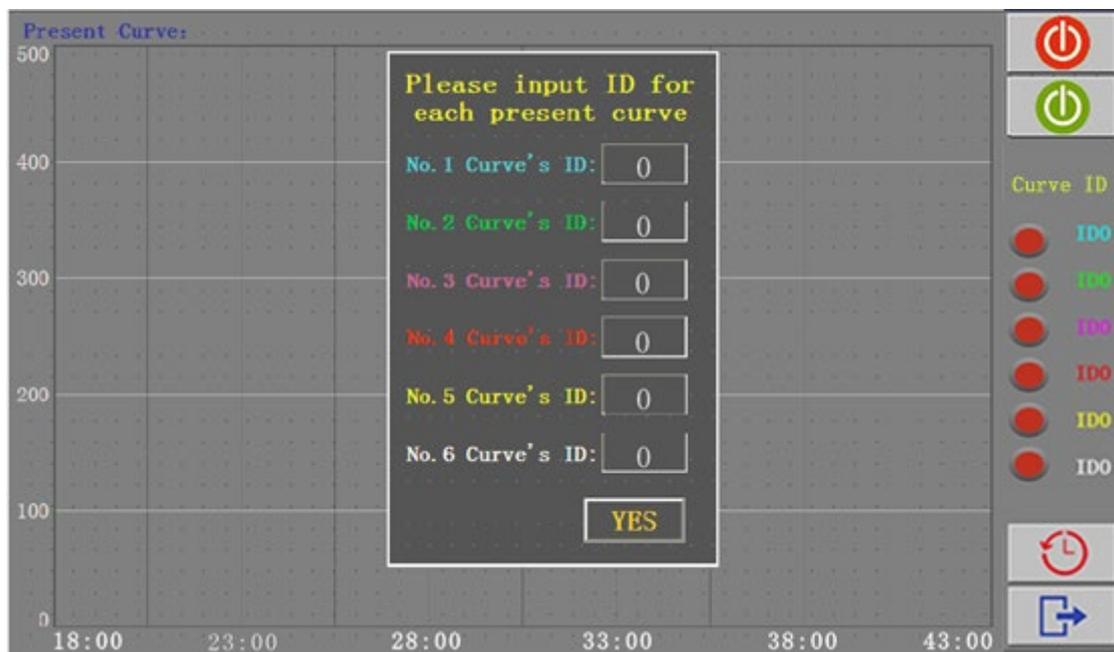
6.6.1 Real-time Curve

6.6.1.1 Select Zone ID to View

On Real Time Curve Screen, you can view max. 6 zones.

1) Touch the ID number to enter the curve's ID selection window.

2) Input the ID number that you want to view the curve, and then Touch **[YES]** to confirm.



6.6.1.2 Select the Curve Display

Select the button before the ID number to select the curve display.

 Red – not selected,  Green - selected.

The curve's color is the same as the color of ID number.

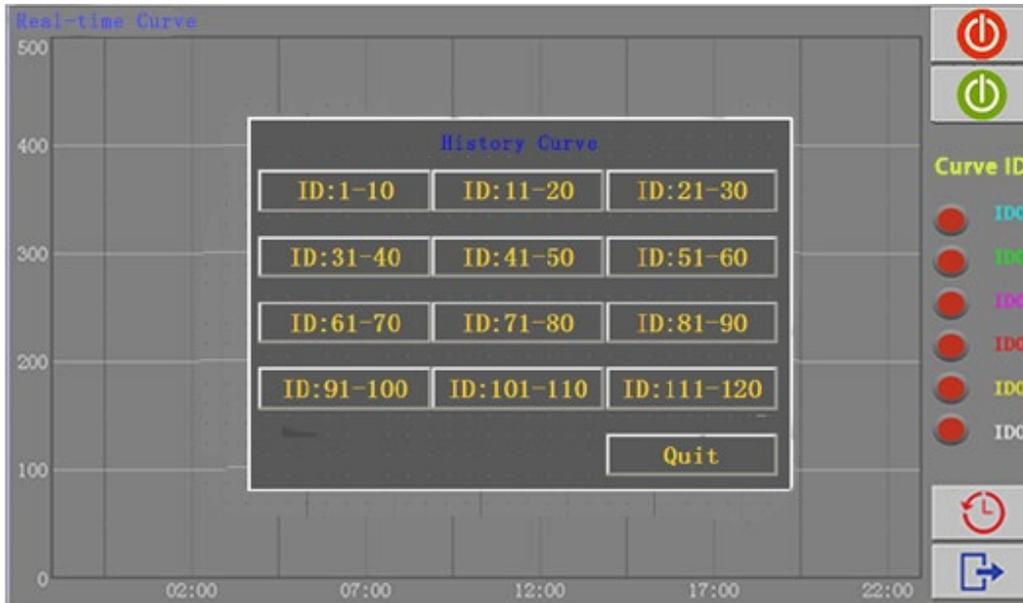
6.6.2 History Curve

The system default setting is not saving the temperature data.

If you need to review the history curve or export the history data, you need to set the data save interval in the system setting. The system can save the temperature data in the latest 15~30 days.

6.6.2.1 Select Zone ID to View

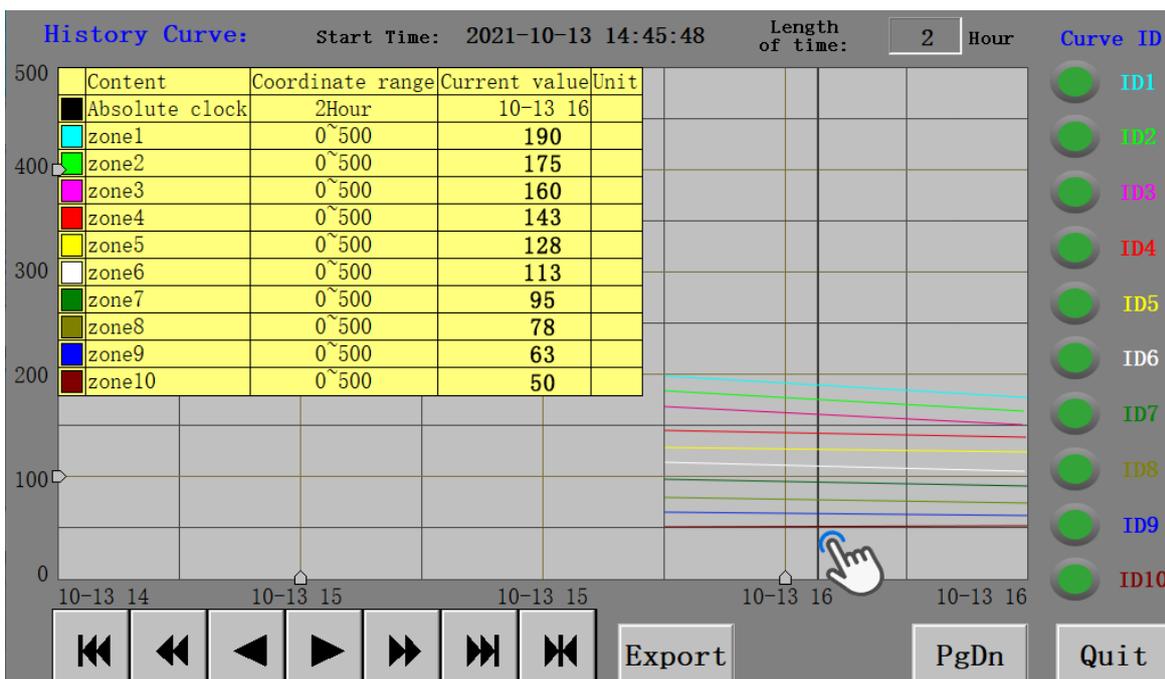
We you Touch  **[History]** on the real time curve screen, a pop-up History Curve ID selection window will be displayed. Each History Curve ID group can display 10 zones. Select the ID group to view or go back to the real time curve by selecting **[Quit]**.



6.6.2.2 Select the Curve Display and view temperature value.

Touch the round button before the ID number to select.  Red – not selected,  Green - selected. The curve's color is the same as the color of ID number.

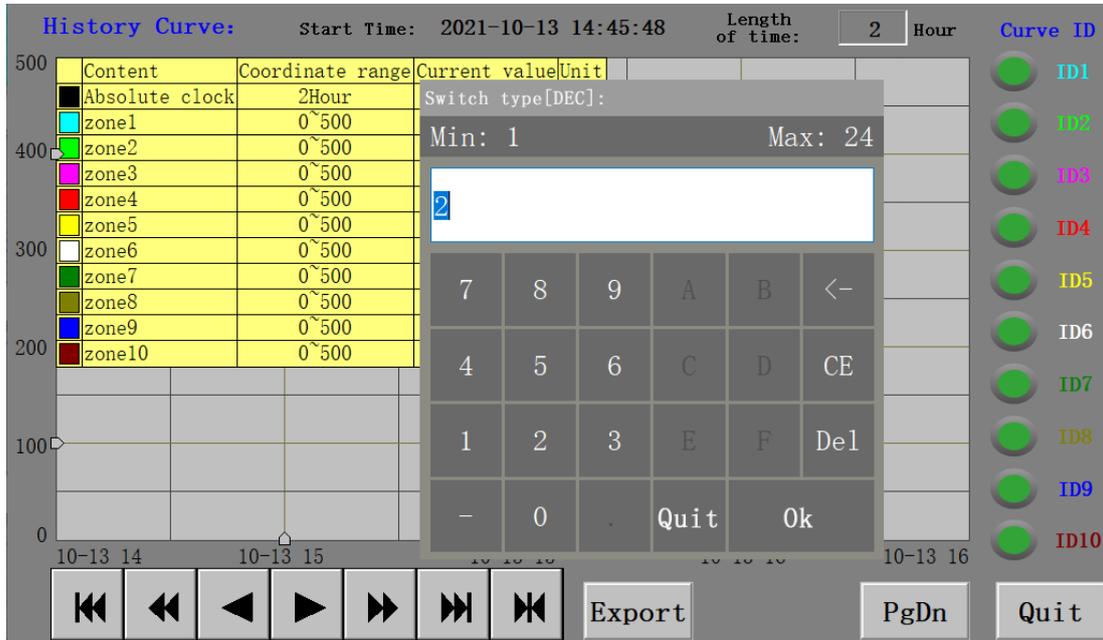
Select any point with your finger on the history curve, the temperature value of all curves in the same group at that time will be displayed in the content box.



6.6.2.3 Select the Curve Display Time and Start Time

When you enter the History Curve interface, the default start time of the curve is 2 hours previous. And the display time length of the abscissa (X axis) is 2 hours.

You can Touch on **[length of time]** on the top right corner, input a new time value (range 1--24), and the display time range of the abscissa will change to the newly set time length.

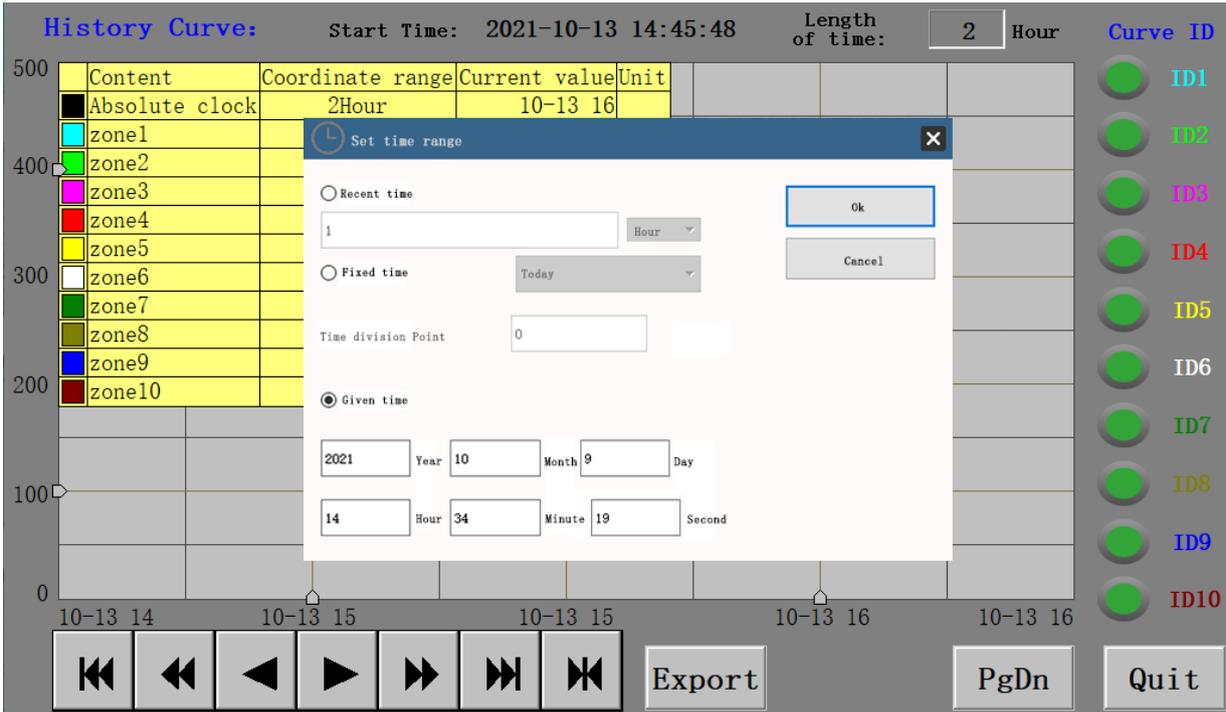


You can also select the start time by



- | | | | |
|---|--|---|---------------------------------------|
|  | Forward 0.5 hour based on the curve |  | Backward 0.5 hour based on the curve. |
|  | Forward 1.0 hour based on the curve |  | Backward 1.0 hour based on the curve. |
|  | Forward 2.0 hour based on the curve |  | Backward 2.0 hour based on the curve. |
|  | Select a specified time, a fixed time, or a recent period of time. | | |

(Refer to the picture below)



6.6.2.4 Zoom In & Zoom out the Curve.

You can adjust the scale of X/Y axis with the sliding bar, to zoom in or zoom out the curve.

6.6.2.5 View Other Zones

You can view the history curve of other zones by Touching [**PgDn**] or [**PgUp**].

In the first page, you will see the [**Present**] used to go back to present curve screen.

6.6.2.6 Export the Historical Data

You can export the historical data record (in csv format) to USB disk by Touching [**Export**].

Notes:

Only support USB disks that use a File Allocation Table (FAT or FAT32) format.

Only support USB versions 2.0 and 1.1.

Use an empty USB disk or one that contains as few files as possible.

Do not remove the USB disk from the controller during the writing operation.

6.6.2.7 Back to Real Time Curve

Touch the [**Quit**] button to go back to the real-time curve screen.

6.7 Alarms

Touch  [Alarm] on the main interface, to enter the Alarm History interface.



6.7.1 Alarm Record

6.7.1.1 Select the Record Time Period

Touch the **Start Time** window to input a new start date (the date format should be same as the original one).

Touch the **End Time** window and input a new end date.

6.7.1.2 Refresh the Record

Touch  [Refresh] to refresh the alarm records after selecting a new time period.

6.7.1.3 View More Records

You can touch   to view more alarm records.

6.7.2 Mute Function

The HMI's alarm is used as an alert. When the alarm is triggered, you can silence  by pressing [Mute]

Note: When the alarms are cleared, the mute function is reset. When the mute function is activated, the alarm will be triggered again if new alerts occur.

6.7.3 Alarm Codes

Alarm Code	Description	Solution
T/C Broken	Thermocouple sensor is broken. Controller will shut off the output.	Check the sensor. Run on manual mode.
T/C Reversed	Thermocouple wires are reversed. Controller will shut off the output.	Check the sensor. Run on manual mode.
T/C Error	The sensor is connected to the controller's output power terminals. Controller will shut off the output.	Check the wiring. If the heater power is large a false alarm can occur.
Over Temp	PV is over high alarm value. Alarm value = Setting value + Alarm High Controller will shut off the output.	Check the power & the sensor wiring.
Under Temp	PV is under low alarm value. Alarm value = Setting value + Alarm Low	Check the system thermal insulation. Check the wiring. Run on manual mode.
Load Broken	No heater is detected. Controller will shut off the output.	Check the heater and wiring.
Load Shorted	Heater is shorted. Controller will shut off the output.	Check the heater and wiring.
Triac	The Triac is damaged or out of control. Controller will shut off the output.	Check the triac.
Over Current	Load current is over the alarm value.	Check the heater and the Rated current setting.
Fuse blown	Fuse is blown out.	Check the heater for cause and replace the fuse.
No Response	The heater is working, but the temperature does not rise. Controller will adjust output percent to 0.	Check the sensor, its position and wiring.
Over Voltage	Supply voltage is over alarm setting.	Check the power supply.
CC Comm Failed	Communication between HMI and control modules is failed	Check the modules and communication wiring. Restart the controller.

CC Over Temp	Temperature of control cards in the mainframe is over high alarm value	Check the modules and the fans in the mainframe.
Leakage	Output percent exceeds (Normal Power + Leakage detection) %, the controller will alarm and show "leakage"	Check the mold, clean the leakage.
GND Fault	Heater current leak detected	Check the ground wire of the heater

6.8 Simple Working Mode

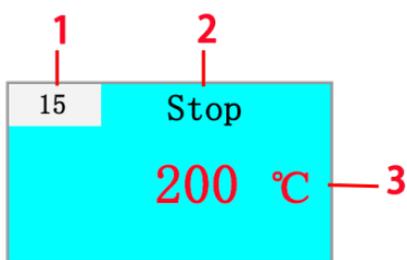
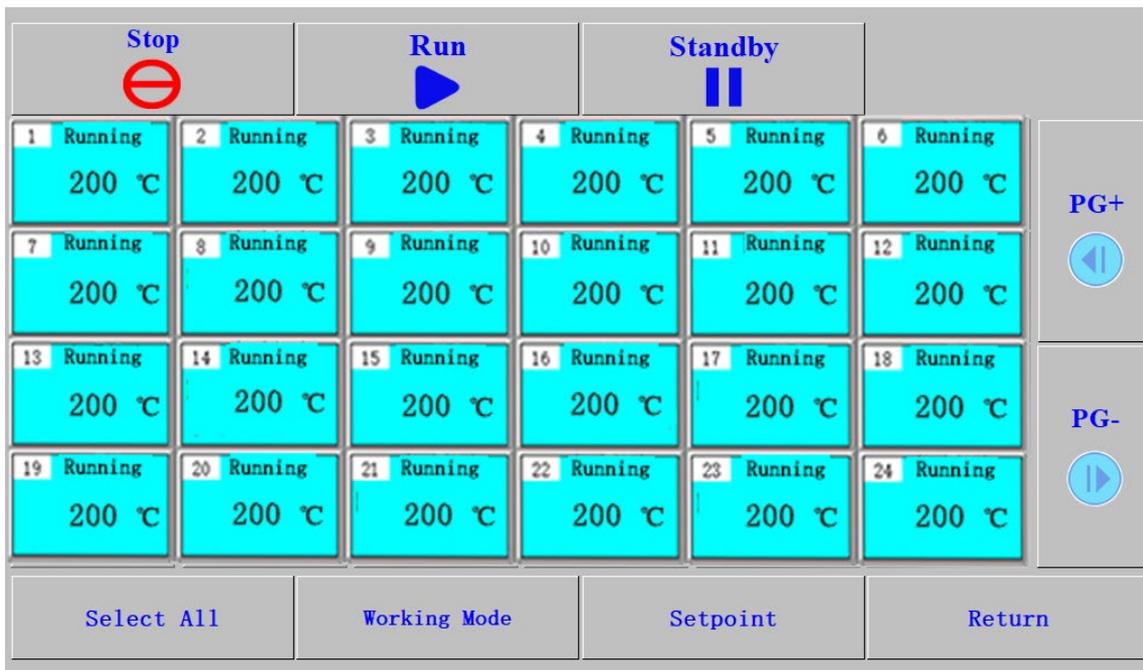
- Touch  [Settings] on the main interface, Touch  , select [Pro].
- Then check it to open the function.  Red- not selected  Green - Selected.
- Touch  [Settings] , enter the [Simple Config] Simple Working Mode Setting interface

Stop 	Run 	Standby 	Return 
Working mode	°C(°C/°F)	J(J/K)	
Soft Start	T/C Error Detection	Alarm High <input style="width: 50px; text-align: center;" type="text" value="0"/>	
Power Deviation(%) <input style="width: 50px; text-align: center;" type="text" value="0"/>	Rated Current(A) <input style="width: 50px; text-align: center;" type="text" value="0"/>	Alarm Low <input style="width: 50px; text-align: center;" type="text" value="0"/>	

Touch  to stop all temperature zones of the controller, Touch  to start all temperature zones,  to set all temperature zones to standby mode, Touch  to return to the main interface .

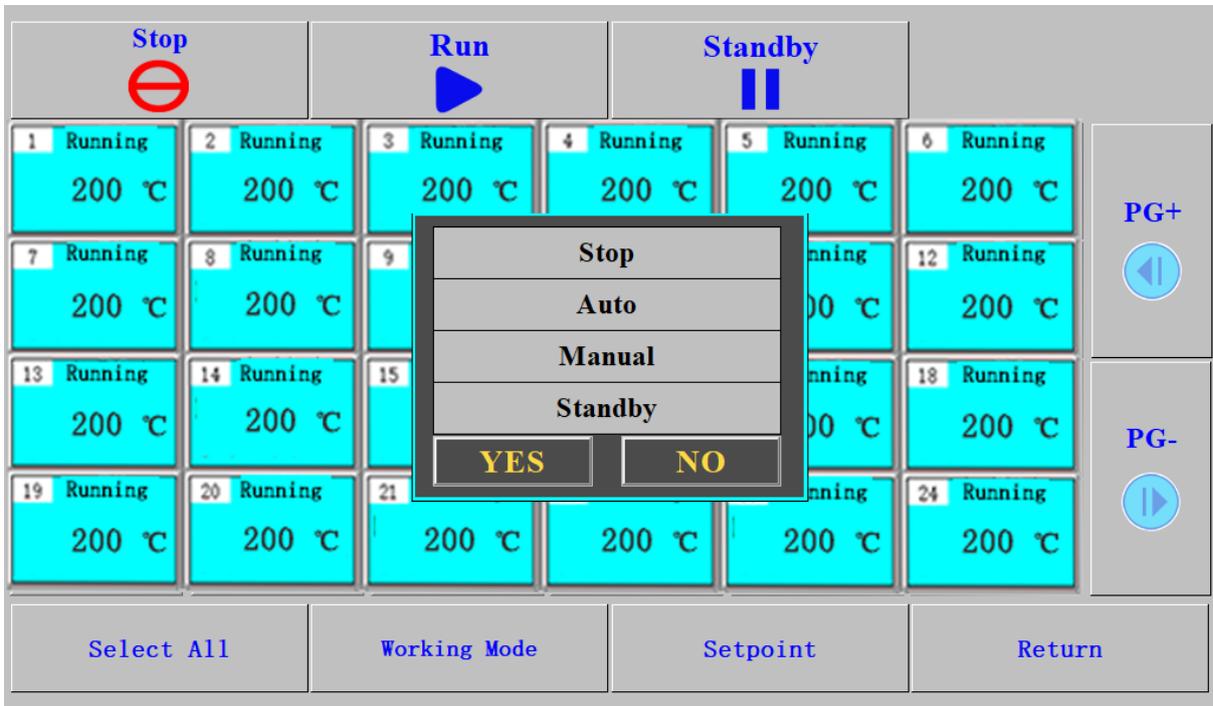
6.8.1 Working mode selection.

- Touch **[Working mode]** to enter to working mode selection interface.
- This interface shows the ID of temperature zone/current working mode/setpoint value.
- Touch **[PG+]/[PG-]** on the right side to view more temperature zones.
- Touch **[Select All]** to select all temperature zones on all pages.
- Or touch any zones on the screen (the selected zones will be blinking).
- Touch the zones again to cancel the selection.

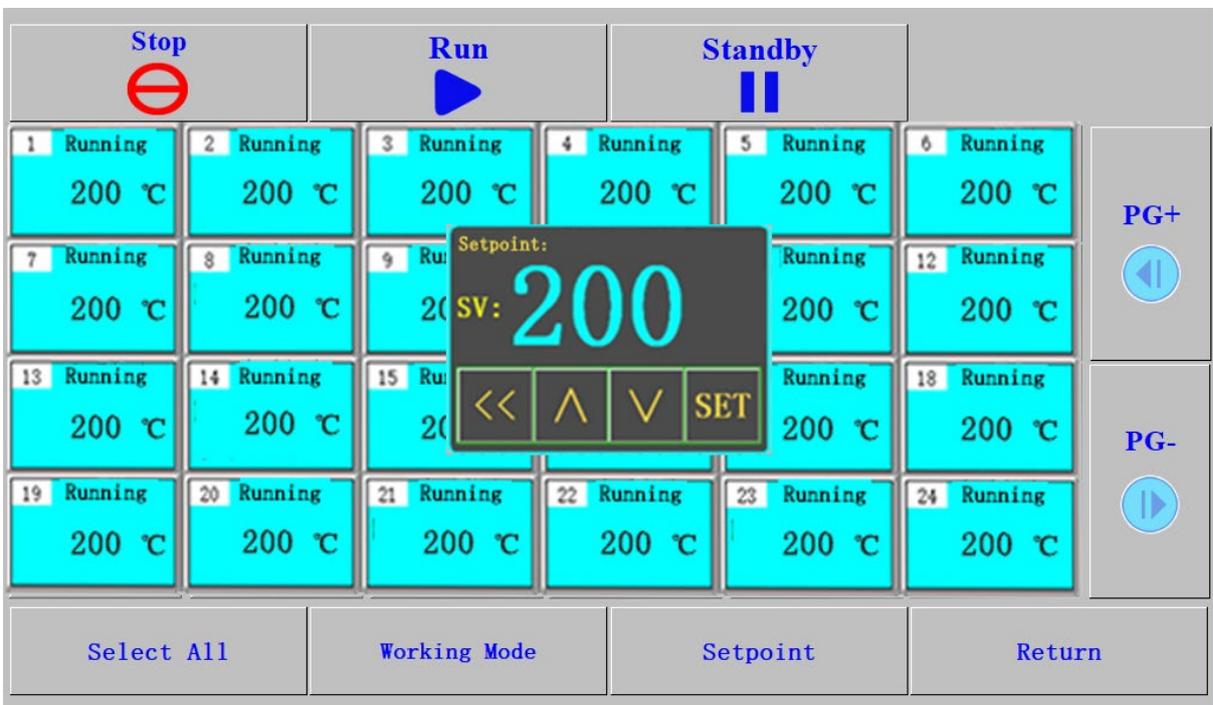


- ① Temperature zone ID number.
- ② Working modes (Stop/Run/Manual /Standby)
- ③ Setpoint value (Black in running status, Red in stop status).

- After running the zones, Touch **[Working mode]** below and in the pop-up window you can choose **[Stop/Auto/Manual/Standby]** to change the working mode.

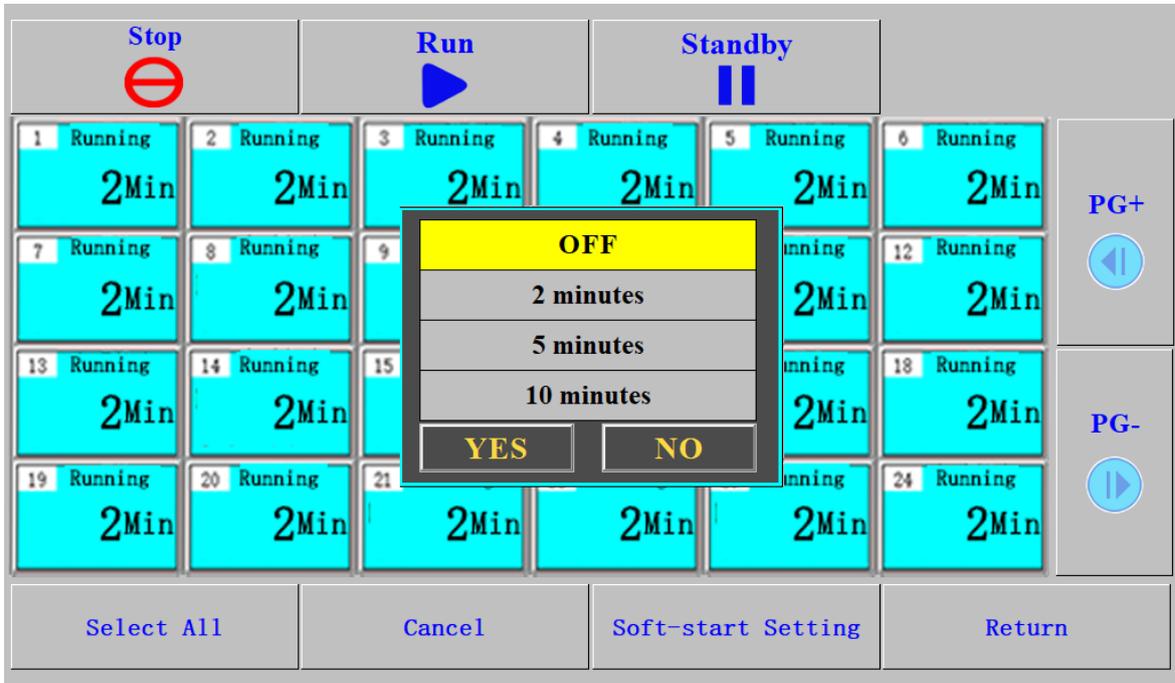


- Touch **[Setpoint]** to modify the temperature value in the pop-up window.

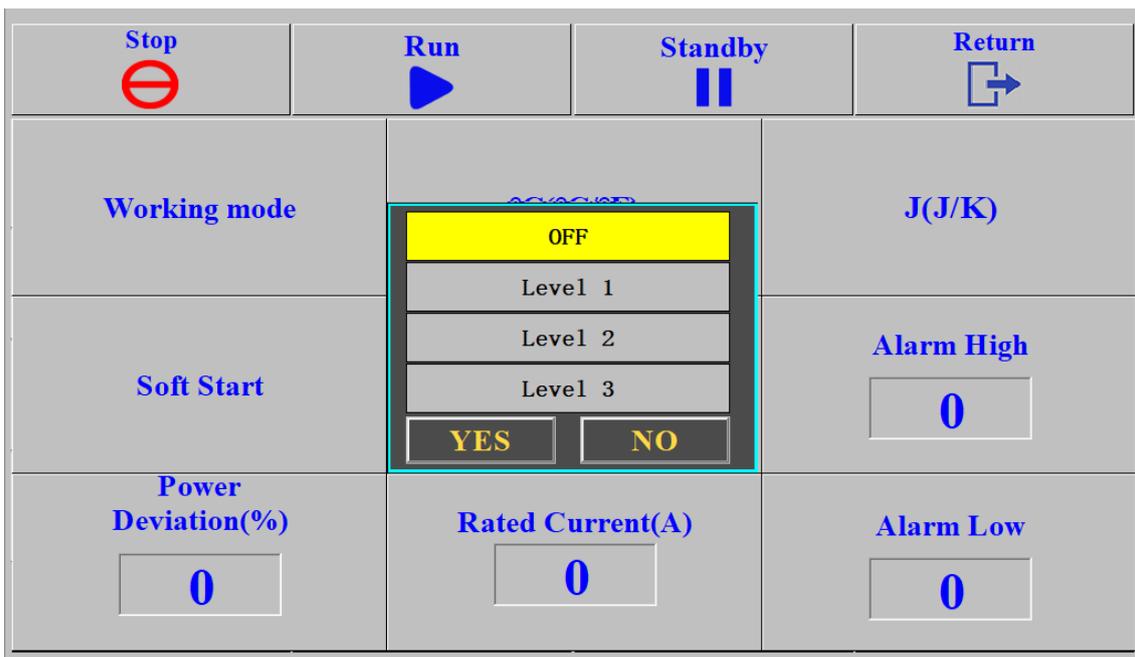


6.8.2 Soft Start Setting

- Touch [Soft Start] to enter to soft start setting interface.
- Touch [Select All] to select all zones.
- Touch [Soft Start Setting] to set the duration of soft start in the pop-up window.
- You can choose [OFF] [2 minutes] [5 minutes] [10 minutes].



6.8.3 Other Parameters Setting



Other parameters can be modified in the working mode setting interface.

[°C/°F]: Touch to change the temperature display unit.

[J/K]: Touch to change the thermocouple type.

[T/C Error Detection]: Touch to select the sensor fault detection level.

- **OFF: (Sensor no detection)**: Turn off the detection function.
- **Level 1**: Detects the load impedance; when an abnormality is found, it is judged as a wrong connection and an alarm is triggered.
- **Level 2**: Increase detection of maximum impedance of sensor based on the Level 1 detection.
- **Level 3**: Increase detection of minimum impedance of sensor based on the Level 2 detection.

[Alarm High]: Touch the value box to set the High deviation alarm value, **Range 0-60**.

[Alarm Low]: Touch the value box to set the Low deviation alarm value, **Range -99-0**.

[Power Deviation %]: Touch the value box to set the reference value of the power increase percentage when leakage occurs. When the actual output power increase percentage exceeds the set value, it will be judged as leakage and an alarm will be given. **Range 0-100**.

[Rated current]: Touch the value box to set rated load current value. When the actual current value is higher than the set value, an alarm will be given, **Range 1-40**.

Chapter 7 Run/Stop System

7.1 Run System

Touch  [Run] on the main interface to run the temperature control system.

Temperature Control

All zones start to work in Auto mode (disables keeping the data in system setting) or the mode before all temperature zones work in auto control mode when started, except for those turned off in temperature zone Settings.

Note: If you select save status data in system settings, the working mode of each temperature zone after startup is the working mode before the unit was powered off.

- You can Touch  [Standby] on the main interface to make all zones work in Standby mode.
- You can make a specified zone work in Standby mode by single Zone Setting.
- You can make a specified zone work in Manual mode and set its power output by Zone Setting.
- You can Run or Stop a specified zone by Zone Setting.
- You can activate Boost or Auto-Tuning function for a specified zone by Zone Setting.
- You can Run or Stop a group of zones with the same background color by Group Config.

7.2 Stop System

Touch  [Stop] on the main interface of temperature control to stop the system.

All modules will stop working.

- You can stop a specified zone by Zone Setting.
- You can stop a group of zones with the same background color by Group Config.
- Touch the start/stop button  of a temperature zone on the main control interface to stop the temperature zone individually.
- After selecting multiple temperature zones on the main control interface, Touch  [Stop] to stop only the selected temperature zone.