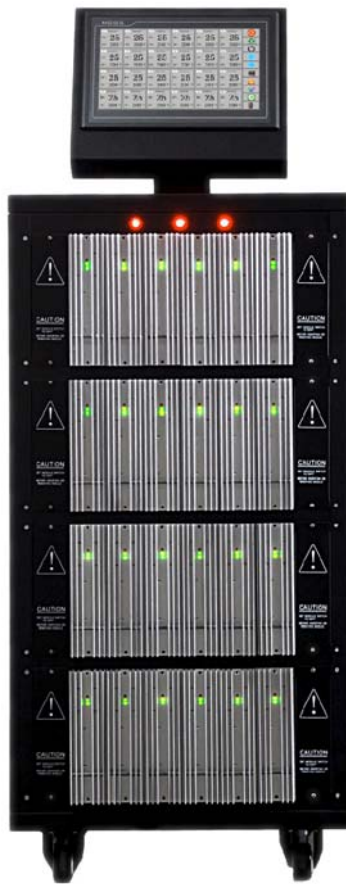# M20 Series
Temperature & SVG Controller
USER'S MANUAL

> ⚠ **For avoid wrong operation to make human injured or machine damage, please read this instruction carefully before use the instrument.**

Ver. 2.0

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

Our products have been 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.

- 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 persons with knowledge of the system's operation and capabilities should operate the system.
- Read all of these instructions before connecting power and turning on 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 main frame must be covered with the 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 outlets on the unit become blocked, This is where the system's cooling airflow exits. If this area of the mainframe becomes cluttered and insufficient airflow or the system maybe damaged.
- 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   M20 Series Mainframe Configurations

The M20 controller is made up of 4 different models of mainframes which change based on the number of zones required. These are referred to as M20-XS, M20-S, M20-M, and M20-L.

All of the mainframes employ the same temperature control module M20-M2, and the same sequence valve gate control module M20-V2.

Access to all users serviceable parts, including fuses, are done through the front of the controller by loosening the upper and lower screws on each heat sink and using the attached tool or screw driver to lever the module out.

The connectors for the mold-power and thermocouple cables, and the connectors for valve gate control cables, as well as the circuit breakers, are located at the rear of the mainframe.

Typical M20 Mainframes

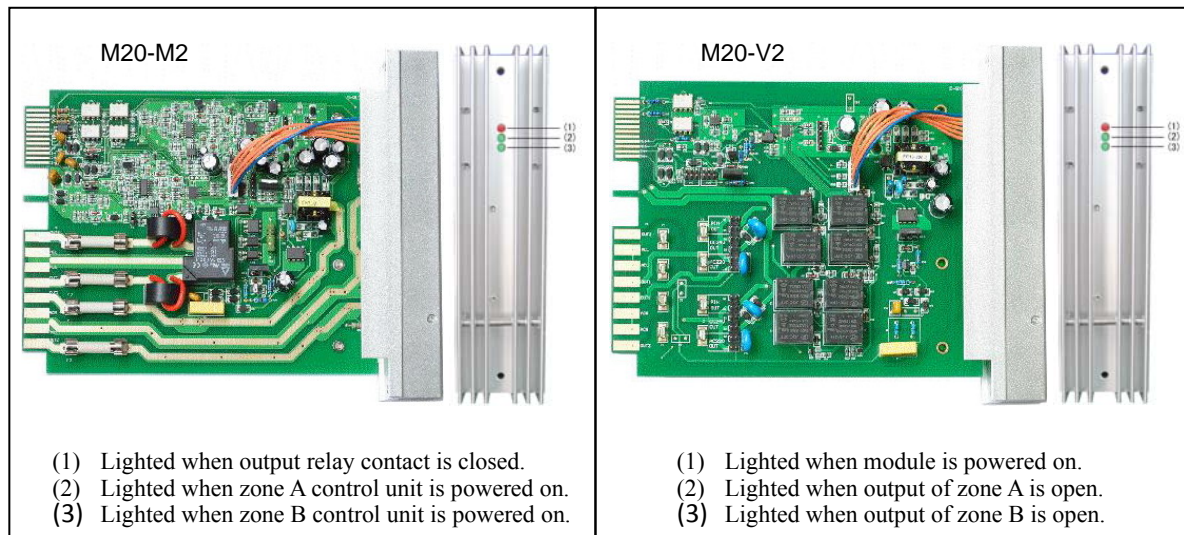| M20-XS | M20-S | M20-M | M20-L |
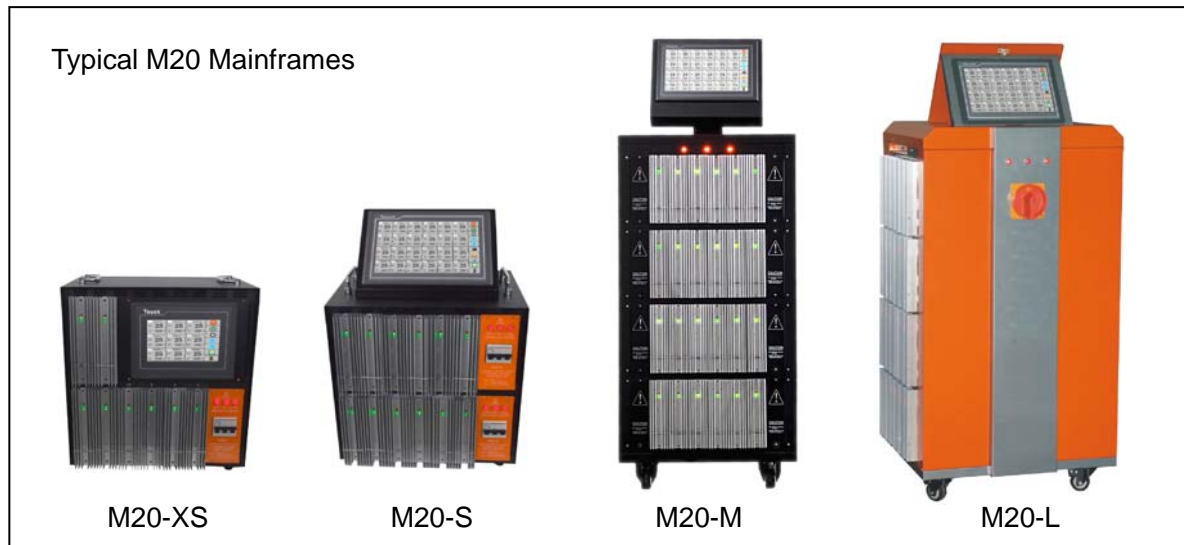
1.2   Control Modules

M20-M2 temperature control module come standard with two zones at 15amps per zone.

M20-V2 sequence valve gate control module can control two valve gates each module.

The modules are fully interchangeable across all mainframe designs. The externally mounted heat sink and integrated design reduce maintenance cost and downtime.

M20-M2

M20-V2

(1)   Lighted when output relay contact is closed.
(2)   Lighted when zone A control unit is powered on.
(3)   Lighted when zone B control unit is powered on.

(1)   Lighted when module is powered on.
(2)   Lighted when output of zone A is open.
(3)   Lighted when output of zone B is open.

Important!

Each module in the mainframe has a unique ID for each zone stored as a parameter in the module.

This ID should be corresponded with the zone controlled by this module, such as ID "1 "& ID "2" for the module's zone A & zone B used to control zone 1 & zone 2, ID "3" & ID "4" for another module's zone A & zone B used to control zone 3 & zone 4, etc.

When you change the module's position, you should change its IDs, to make its IDs corresponded with the zones controlled by it.

Comment:

ID of the module M20-V2 begins from 97 if the temperature control zones are less than 97.

ID of the module M20-V2 continues to the module M20-M2 if the temperature control zones are more than 96.

1.3   Specifications

Model	M20-XS	M20-S	M20-M	M20-L
User Interface	Full color LCD touch screen			
Display Size	7.0"	10.2"		
Max. Total Zones	16	32	64	120
Max. Temp. Zones	16	32	64	120
Max. Sequence Zones	16	24		
Power Supply	3-Ph+E(4 wire) 200-240Vac			
	3-Ph+N+E(5 wire) 380-415Vac			
Working Conditions	0~55℃ (32~131℉), 10~80%RH (No condensing)			
Storage Conditions	-20~70℃ (-4~158℉), 10~80%RH (No condensing)			
Temperature Control				
Control Mode	Auto-PID / Manual	**Measurement Range**	0~500℃（32~932℉）	
Output Control	Zero Cross / Phase Angle	**Setting Range**	0~450℃（32~842℉）	
Thermocouple	J or K-Type, software selectable	**Temperature Unit**	℉ or ℃, software selectable	
Calibration Accuracy	±0.25% FS	**Control Stability**	±1digit-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			
Sequence Valve Gate Control				
Trigger Signal	DC24V or Dry contact	**Trigger Mode**	4 modes selected	
Screw Position Signal	DC 0~10V	**Screw Position Unit**	mm or inch	
Control Mode	Auto / Manual	**Time Resolution**	1s, or 0.1s, or 0.01s	
Output Signal	DC24V, or AC220V or Relay contact	**Output Connector**	Varies options available	

1.4 Typical Thermocouple & Mold Power Connectors Wiring
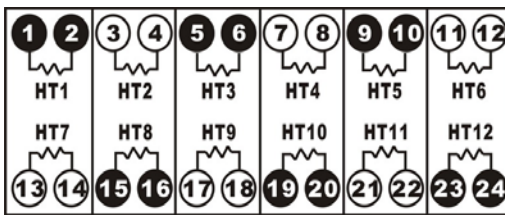
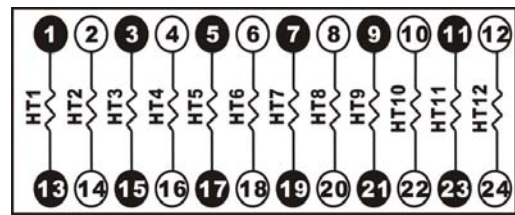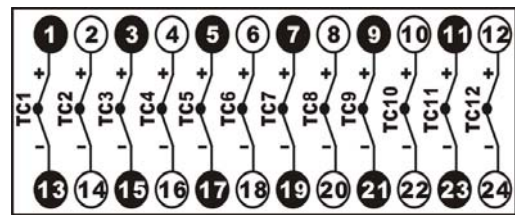✓ Thermocouple & Mold Power Combination Wiring
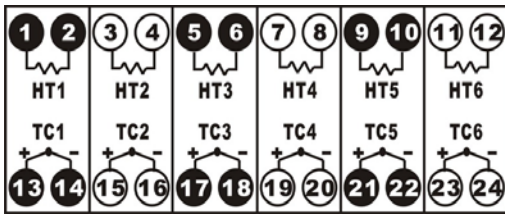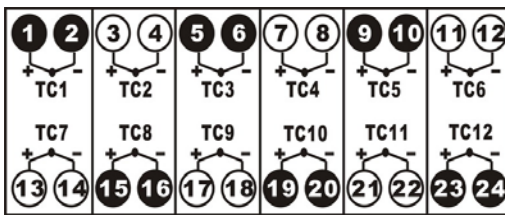

Wiring Mode 1
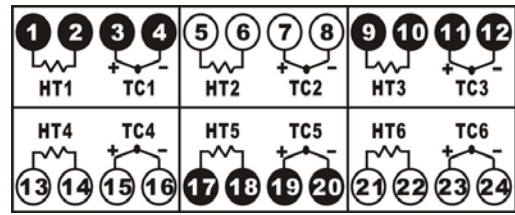
Wiring Mode 2

✓ Thermocouple & Mold Power Separated Wiring

Wring Mode 3

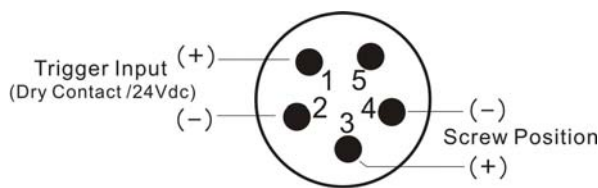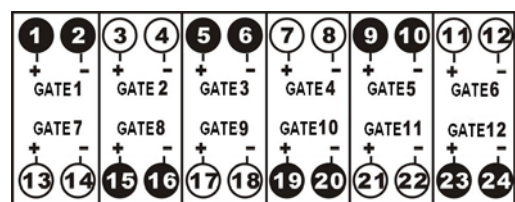
Wiring Mode 4

1.5 Typical Sequence Trigger & Output Connectors Wiring

✓ SVG Input Wiring

✓ SVG Output Wiring

| Signal	Pins	Description	Type
Trigger Input	1 & 2	Sees a closed condition or DC24V as a signal to start the timer on the valve sequence	Normally Open Dry Contact Or DC24V
Screw Position	3 & 4	Accepts a Voltage source input that relates to the main screw position. A calibration routine within the controller adjusts actual input to actual screw position.	0 to 10 Volts

1.6 System Wiring (only temperature control)
(power wiring depends on the voltage specification)
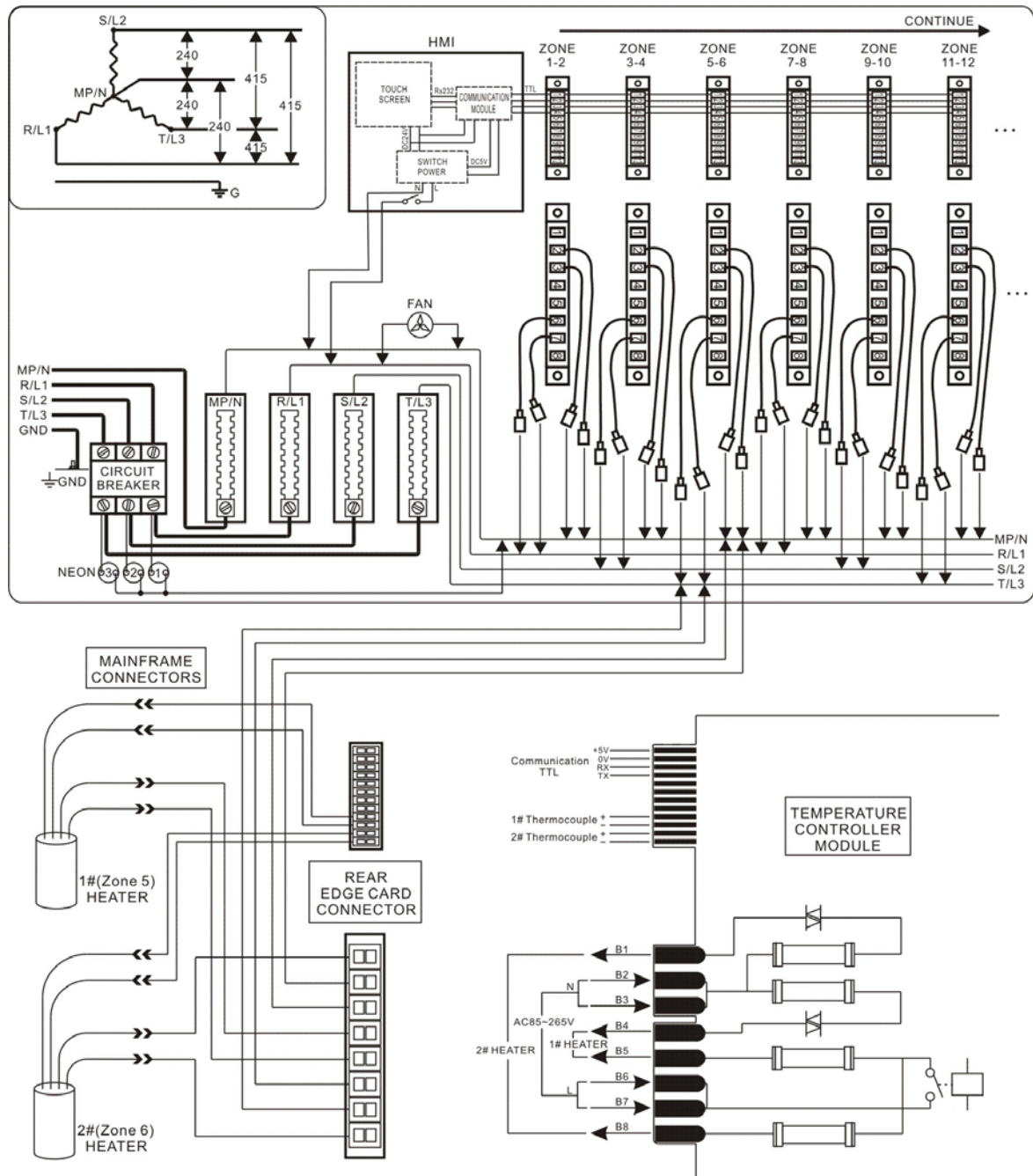
1.7 Power Wiring
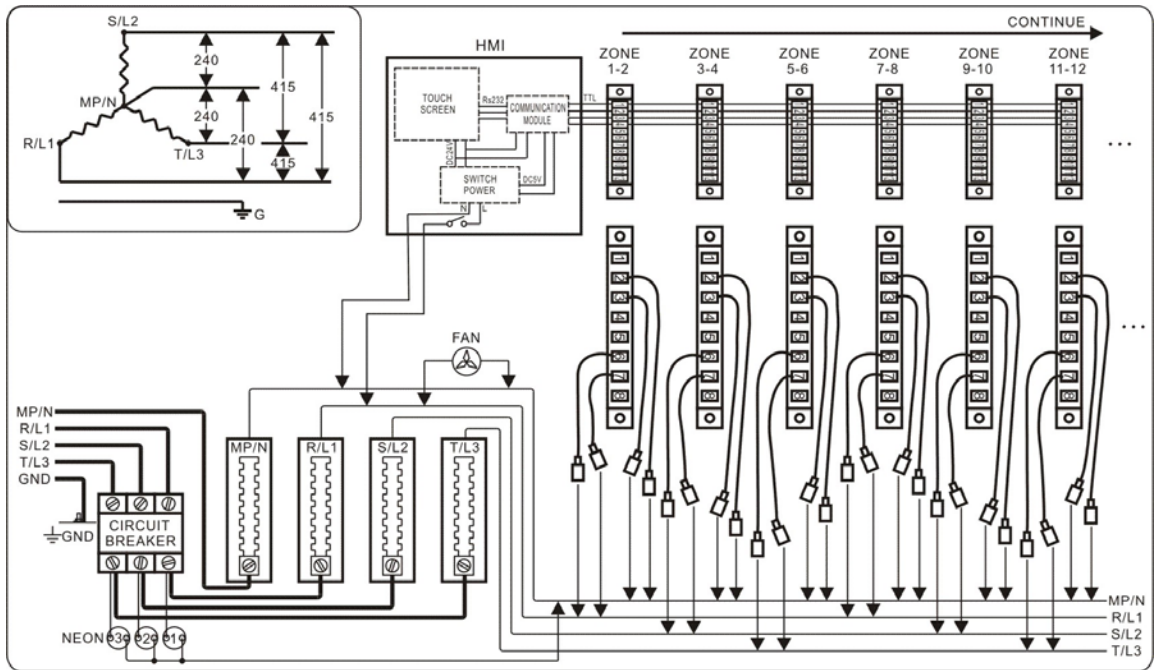
3-Ph+N+E (5 wire) 380-415Vac
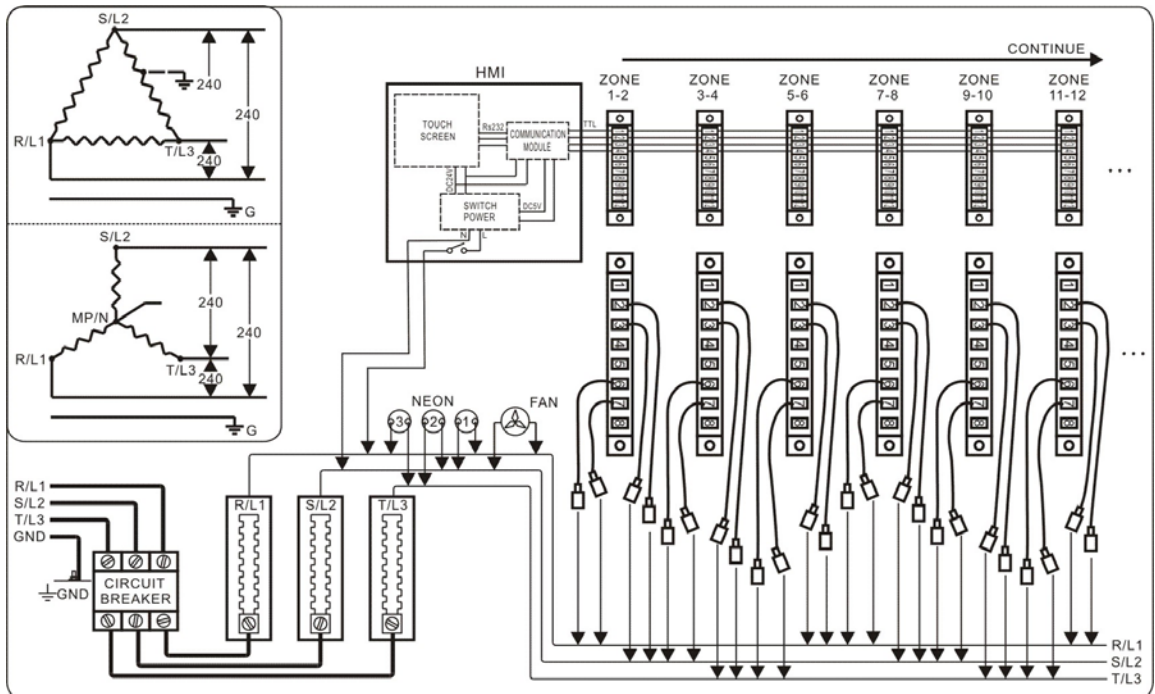
3-Ph+E (4 wire) 200-240Vac

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.

2.2   Mounting the HMI (only M20-M Series)

1. Connect the HMI's power cable and communication cable to corresponding plug on the mainframe.
2. Mount the HMI on the mainframe by screws provided.

2.3   Connecting the Power Cable (except M20-XS, M20-S Series)

1. Select the power input wire size according to the load power, and the national and local electrical codes. (if required)
2. Remove the metal cover of the power input terminal block by removing screws around its perimeter.
3. Remove the plastic panel of the terminal block.
4. Insert power input cable through access hole provided on the cover. (if use this type cover)
5. Connect AC input cord to the input terminal block as shown on the inner-side of cover, for the input voltage configuration you are attaching to.
6. Connect the earth cord to the ground terminal beside the input terminal block.
7. Cover the plastic panel on the terminal block.

8. Take up excess slack in cable and secure with strain relief clamp provided on the terminal block cover. (if use this type cover)
9. Mount the metal cover of the power input terminal block on the mainframe.
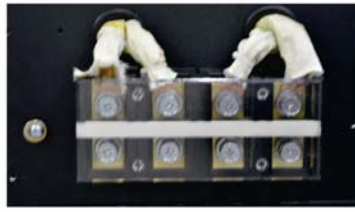
(1) (2) (3)

(4) (5)

CAUTIONS!
✔ 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.
✔ Should use O-type terminal on the power input cord connected to the terminal block.
✔ Do not apply power to this cable or the unit when the back terminal block cover is removed.
✔ Do not connect AC power input cord to your in-plant power distribution system until the back terminal block cover is securely in place.
✔ Make sure that the chassis has been earth grounded before applying power.

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 of the cable connections between the system and the mold (if required). Make sure all of 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 if the wiring mode on mainframe is same as on mold.
- Confirm that the sequence valve gate control output meets the requirement of the valve.
- Confirm that the sequence trigger signal meets the requirement of the controller.

3.2　Verifying the Connection

1. Connect the thermocouple and mold power cables (if required).
2. Connect the sequence trigger signal cable and output cable (if required).
3. Using an Ohmmeter, touch one test lead to the mold and the other to the mold ground terminal on the system. Resistance must be less than 1Ω.
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. Turn on the HMI.
5. Log in the system (if required).
6. Load a mold setup (if required).
7. Checking 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.
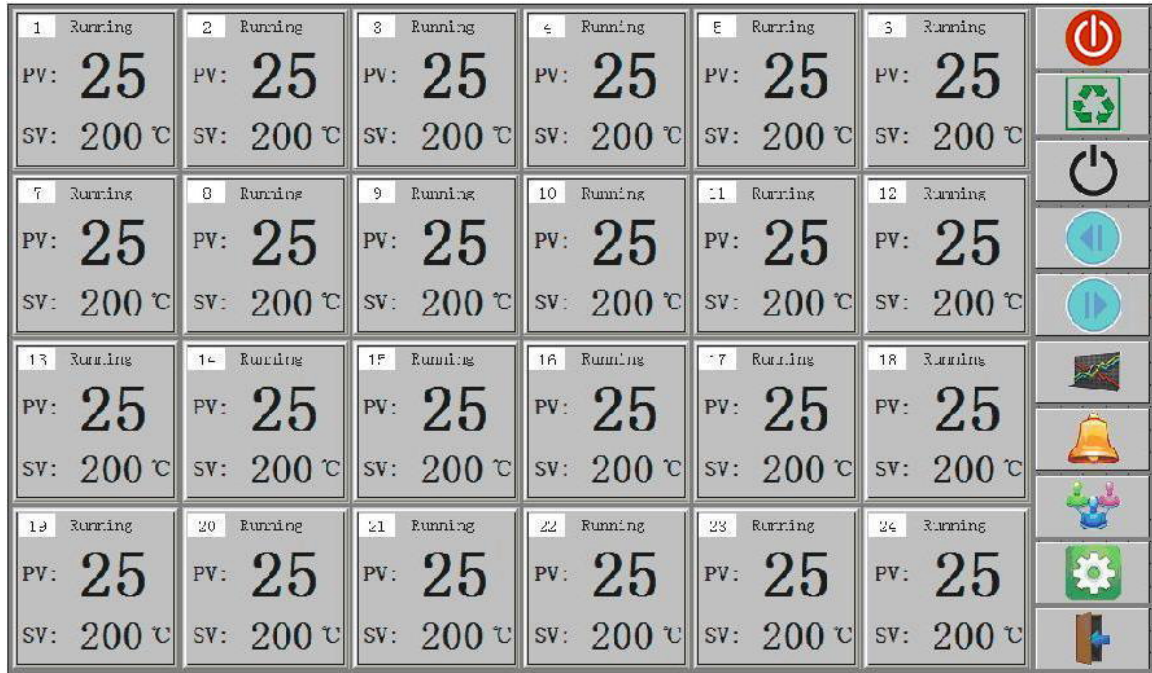
IMPORTANT!

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 the system and general operations.

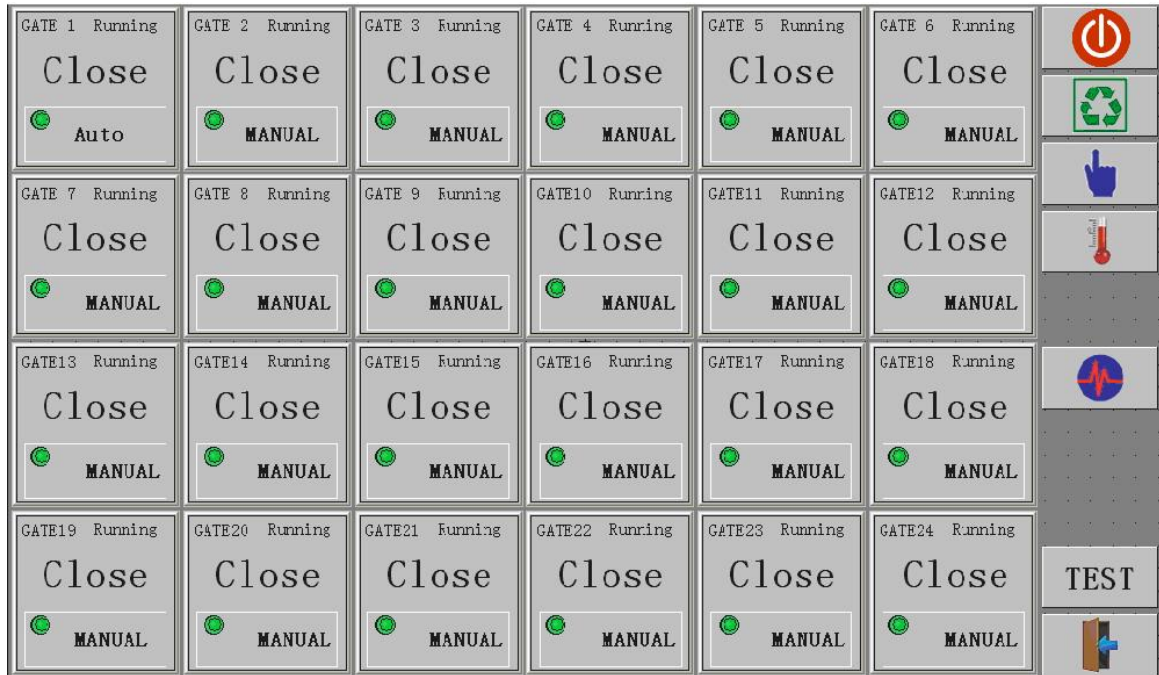### 4.1.1   Temperature Control (M20-XS is different)

[Run] (green)/**[Stop]** (red): Run or Stop temperature & valve gate control of all zones. In Stop mode, shows Run; and in Run mode, shows Stop.

[Auto]: Place the temperature control of all zones in Auto mode.

[Standby]: Place the temperature control of all zones in Standby mode. In this mode, the target is 70% of setpoint.

[Page Up]: Used to view the previous page.

[Page Down]: Used to view the next page. On the last page, you will see

[Sequence Control]: Shift to the sequence valve gate control interface.

[Graph Display]: Used to view the real-time or history data curve.

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

[Group Setting]: Enter the group (global) setting and the pattern (mold) files management.

[System Setting]: Used to enter the system setting.

[Login]/[Logout]: Used to log in/out the system to achieve the different authority.
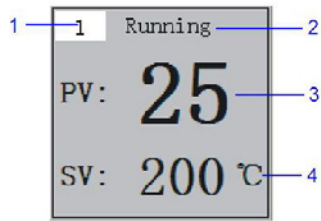
(1) **Zone Number**. ;'

(2) **Zone Status**: alarm information is in red.

(3) **Actual Temperature**: if thermocouple is open, 999 is displayed.

(4) **Setpoint / Power output %/ Amps** (can be shifted)**.**

4.1.2   Sequence Valve Gate Control (M20-XS is different)

 [Run] (green)/**[Stop]** (red): Run or Stop temperature & valve gate control of all zones. In Stop mode, shows Run; and in Run mode, shows Stop.

 [Auto]: Place the sequence valve gate control of all zones in Auto mode.

 [Manual]: Place the sequence valve gate control of all zones in Manual mode. In this mode, each valve gate can be opened or closed by manual.

 [Temperature Control]: Shift to the temperature control interface.

 [Sequential Chart]: Used to view the open & close sequence setting of all gates.

TEST **[Test]**: Used to simulate the trigger signal to test all valve gates control.

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

(1) **Gate Number**.

(2) **Working Status**.

(3) **Valve Gate Status**: Open or Close.

(4) **Control Mode**: Auto or Manual.
     In Manual mode, touch it to open/close gate.

(5) **Start Trigger Indicator**: green--off, red--on.

4.2   USB Port

The USB port on the M20 series is intended to be used to copy pattern (mold) setup 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 M20 controllers that support the same file type.

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

CAUTION!
- Never power on with a device in the USB port.
- Never connect a powered hub or other device to the USB port.
- Removing the USB disk from the system during a 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 contain as few files as possible.

Chapter 5　Security & System Setting

5.1　Login / Logout the System

In order to avoid accidents happened, and protect the system data, different level operators have different authorities.

To achieve the corresponding authority, the operator should login the system by his or her user name and password before operation.

And he or she should logout the system after finishing operations, in order to avoid other people mis-operate the controller by his or her name.

- In the absence of user login status, the main interface displays [image]. Touch it to open the Login screen, select the corresponding user name and input password to login the system.
- In the status of the user login, the main interface shows [image] . Touch it and the system opens a dialog box to confirm your operation. You can click **[Yes]** to logout the system.

User's Authorities List

| User Group	Authorities	Remarks
Non-Login	Cannot operate the system.	Authorized to Change Setpoint
	➢ Run/Stop system. ➢ Change the zone temperature setpoint. ➢ View zone status, data curve, etc. ➢ Mute when alarms.	Everyone Can Change Setpoint
Operators	➢ All authorities of Non-Login. ➢ Choose control mode. ➢ Change password. ➢ View module types and status. ➢ Set system time ➢ Set auto-pager time. ➢ Set authority for operators not to login.	Initial password is "1" for the user "operator".
Engineers	➢ All authorities of Operators. ➢ Modify all parameters of zones. ➢ Check the system log. ➢ Modify the module's ID. ➢ Clear all records. ➢ Group setting.	Initial password is "654321" for the user "engineer".
Administrators	➢ All authorities of Engineers. ➢ Manage the users and authorities. ➢ Auto-generate the module's ID. ➢ Clear all the modules' ID (Be careful)	Initial password is "87654321" for the user "director". The user "Administrator" is reserved.

5.2   System Setting

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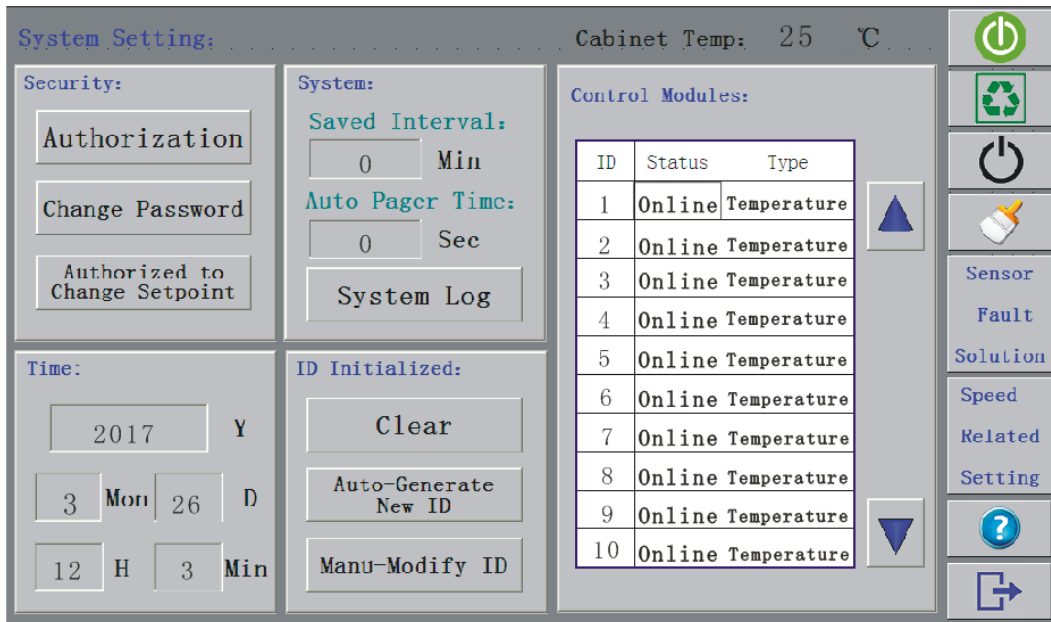
5.2.1   Security

- **Authorization**: You can manage the users, include add, copy and delete user.

  You can also check the user's properties.

  ◆ The user's name allows to be edited.

  ◆ There 3 User Groups: operators, engineers and administrators.

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

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

  Engineers: Authorized to use all functions except manage users and Clear or Auto-generate the Module's ID.

  Administrators (the user same named cannot be deleted): All authorities.

- **Change Password**: You can change the password for the current user.
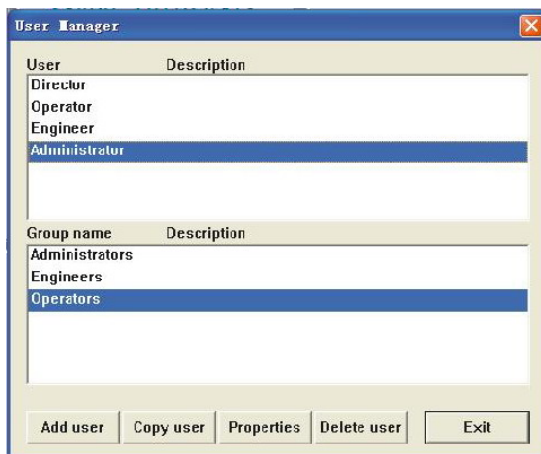
- **Authorized to Change Setpoint / Everyone Can Change Setpoint**:

  Touch it to change the authority setting for operators not login.

  - Display **Authorized to Change Setpoint**:

    It means current setting is Everyone Can Change Setpoint.

    Operators not login the system can run/stop the system, and change the setpoint.

  - Display **Everyone Can Change Setpoint**:

    It means current setting is Authorized to Change Setpoint.

    Only the operators login the system can run/stop the system, and change the setpoint.

5.2.2 Time

For the system time initialization, the setting method is:
- Click the parameters required to set, then you can input the value by small keyboard on the screen.
- Click the **[OK]**, and you can finish the modification.

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

5.2.3 Cabinet Temperature

Display the current ambient temperature in the control cabinet.

5.2.4 System

- **Saved Interval:** After the setting time, the system saves the data automatically.

  0 min. means not to save the data, and you cannot see the history curve.
- **Auto Pager Time:** After the setting time, main interface displays the next page automatically.

  0 sec. means not to auto pager.
- **System Log:** By clicking it, you can check the system operation log.

SN	Time	Operation	Operator
1	2017-04-06 16:01:04	System is powered on, start to run.	Not Login.

System operation log:

Config

Quit

5.2.5 ID Initialized

To initialize the ID numbers for all online modules.
- **Clear:** Reserved for manufacturer **(Be careful to use it)**.
- **Auto-Generate New ID**: Reserved for manufacturer **(Be careful to use it)**.
- **Manu-Modify ID:** If you replace a module, the new one's ID should be same as the original one's.

5.2.6 Control Modules

Display the communication status of each module and its type.

5.2.7 Clear Operation Log & Historical Data

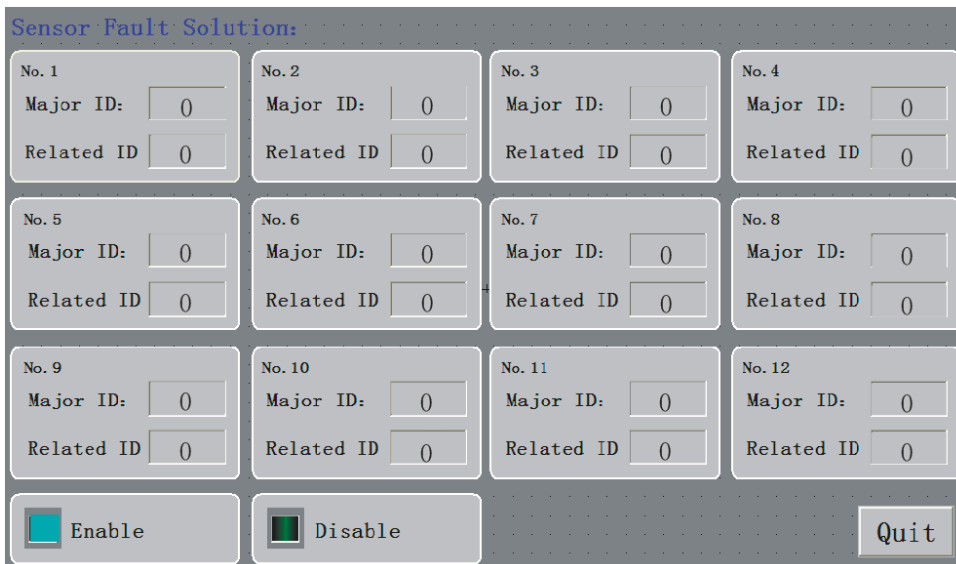Touch [icon], you can clear all operation log and all historical curve data.

5.2.8 Sensor Fault Solution

You can appoint a zone as another zone's sensor fault reference. Generally, the sensors of these two zones are near to each other.
When the sensor of Major ID is failed, the controller will use the temperature of Related ID to simulate the failed one, and finish the temperature control of Major ID.
This function can be enabled or disabled according to requirements.

- Click the **[Sensor Fault Solution]** to enter its setting interface.

- Set the Major ID and its Related ID. You can preset 12 pairs.
- Touch the **[Enable]** or **[Disable]** to activate or stop this function.
- Click **[Quit]** closing this interface.
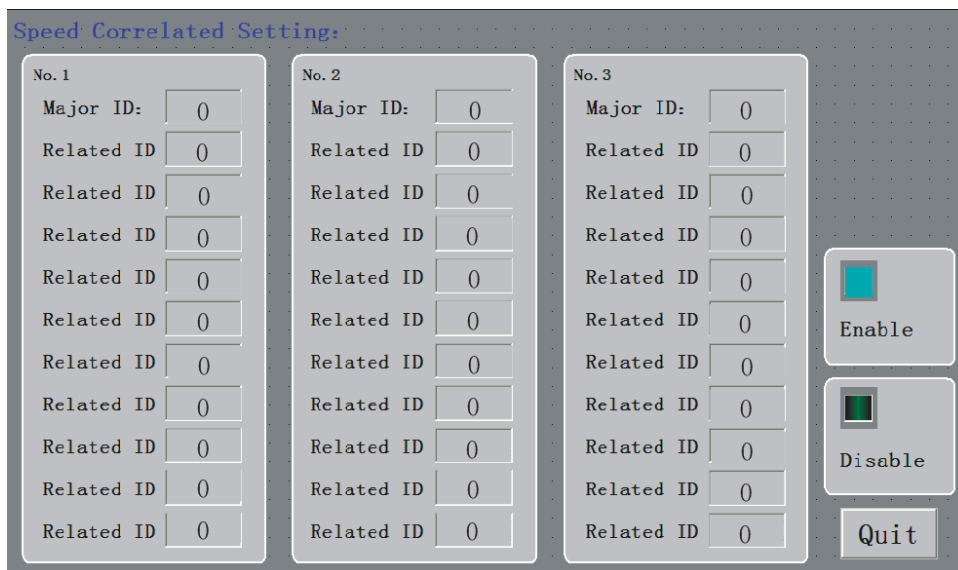
5.2.9 Speed Related Setting

You can appoint some zones as slaves of one zone. Their heating speed is related.

When the system start, the related zones will work in standby mode until the temperature of major zone arrives at the target.

Generally, the Major ID is manifold and the related IDs are nozzles.

This function can be enabled or disabled according to requirements.

- Click the **[Speed Related Setting]** to enter its setting interface.
- Set the Major ID and its Related ID. You can preset 3 groups.
- Touch the **[Enable]** or **[Disable]** to activate or stop this function.
- Click **[Quit]** closing this interface.

Speed Correlated Setting:

No. 1		No. 2		No. 3		
Major ID:	0	Major ID:	0	Major ID:	0	
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	Enable
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	Disable
Related ID	0	Related ID	0	Related ID	0	
Related ID	0	Related ID	0	Related ID	0	Quit

5.2.10 Help

Touch [?] , you can get the helps on operation.

5.2.11 Back

Touch [→] to back the main interface.

Chapter 6   Temperature Control Operations

6.1   Control Modes

- **Auto mode:**

  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 setpoint.

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

- **Standby mode:**

  This type of control is similar to 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 setpoint).

- **Manual mode:**

  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 getting the optimal PID value in some system.

  It is a "closed-loop" system and requires a thermocouple feedback signal.

  Generally, AT function is only been executed when PID factory setting cannot meet the system requirements.

  After finished auto tuning, the optimal PID value would be saved, and the controller returns to Auto mode.

  This function only can be selected by zone setting.

  Notes：To start PID auto-tuning function, present temperature value should be lower than setpint.

6.2   Soft Start (dehumidify) Function

To avoid the humidity make the heater burn out, the soft start function could output a lower current (**by phase control type**) to make dehumidify action when turn on the power.

During soft start time, the output power step up from 0% to 30%.

When 100°C (212°F) has been achieved or soft start time is over, the controller will return to Auto mode.

Soft start condition:

a) The controller is set for Auto mode.

b) The process temperature is less than 100°C (212°F).

6.3 Detail Parameters for Each Zone

Parameter	Description
Setpoint	Target temperature: 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	0 – J type thermocouple; 1 – K type thermocouple; 2 – E type thermocouple; 3 – T type thermocouple.
C/F	Temperature unit. 0 – Celsius (℃); 1 – Fahrenheit (℉).
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
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.
P	Control proportional band, 1 to span.
I	Integral time, 1~3600s.
D	Differential time, 1~3600s.
PV bias	Sensor correction is made by adding it to measured value.
Sensor Protection	Misconnection of heater & thermocouple diagnostic function. 0 – Off; 1 – On.
Load Checking	Heating invalid diagnostic function. 0 – Off; 1~10 – On, diagnostic time = (1~10) ×60s.
Slowing Heating	Heating speed slowing function. 0 – Off; 1 – On.
Rated Current	Rated load current (Amps). Alarms when the actual load current is over the setting.
Protective Current	High limit of load current. When the actual load current is over the setting, controller will limit it by decreasing output percent.
Max. Current	Reserved parameter.

6.4　Group Setting & Mold Patterns

Touch on the main interface, and then you can enter the Global Config & Pattern Management Screen.
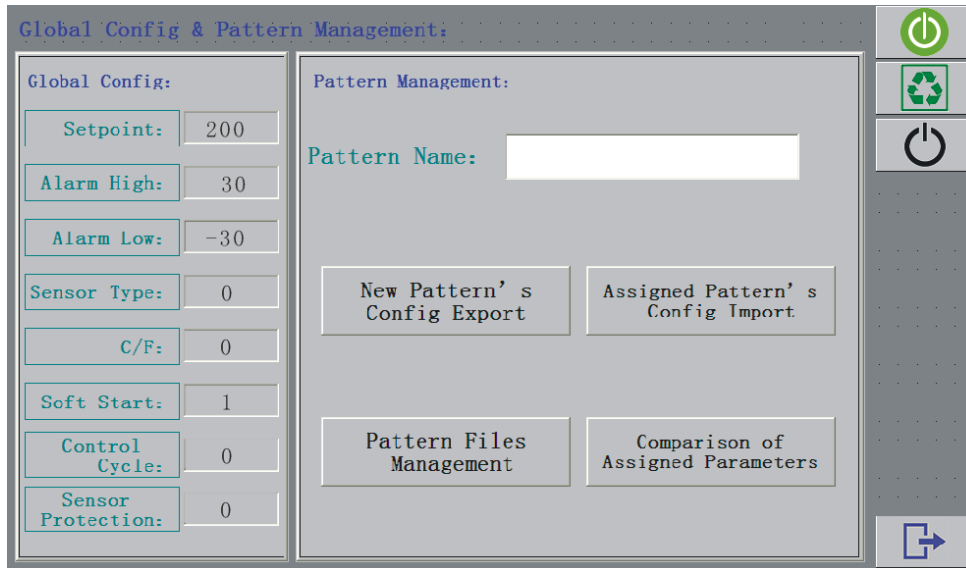
6.4.1　Group Setting

You can change parameters for all zones by **Global Config**.
- Click the parameter's value needed to be set, and then the small keyboard will appear.
- Input the required value.
- Click **[OK]** to complete the setting.

NOTE: If there is no response when you click the parameter's value, it means this parameter cannot be changed or the authority is not enough.

6.4.2　Mold Patterns

You can manage the mold patterns by **Pattern Management**.

M20 can save maximum 24 sets mold parameters.

You can import, export, and delete the pattern files, etc.

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

6.4.2.1　New Pattern's Config Export

1. Enter a new Pattern Name in the box.
2. Click the **[New Pattern's Config Export]** to save the settings of current online modules.

CAREFULLY!

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

6.4.2.2 Assigned Pattern's Config Import

1. Enter the Pattern Name that needs to be imported.
2. Click the **[Assigned Pattern's Config Import]** to upload the parameters in the pattern file to the online modules. The system will generate a report at the end of the upload process to inform user the results.

6.4.2.3 Pattern Files Management

Click the **[Pattern Files Management]** to enter the management screen.

You can browse the pattern files in USB disk or local, and manage these files.
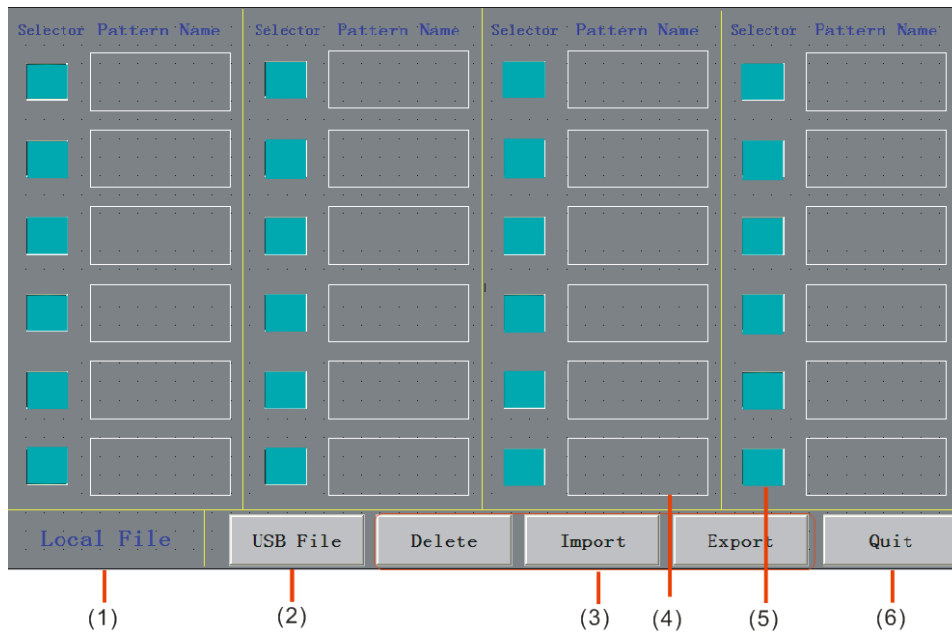
⑴ Indicate the selectable files location: **Local File** or **USB File**.

⑵ Files location selected**: [Local File]** or **[USB File]**.

⑶ **[Delete]:** used to delete the selected file;

   [Import]: used to import the files selected from the USB disk to the local;

   [Export]: used to export the files selected from the local to the USB disk.

⑷ Pattern Name.

⑸ Pattern selector & indicator**:**

   the green means the pattern is selected, and the blue means the pattern is not selected.

⑹ **[Quit]:** back to the Global Config & Pattern Management Screen.

6.4.2.4 Comparison of Assigned Parameters

1. Enter the Pattern Name that needs to be compared.
2. Click the **[Comparison of Assigned Parameters]** to compare the parameters of the online modules with the parameters of the pattern file.
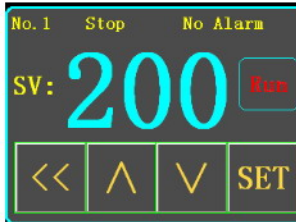
6.4.3 Back

Touch [icon] to back the main interface.

6.5 Zone Setting

Touch the Actual Temperature on the main interface, then you can enter Zone Parameters Setting Screen (different authority can see different parameters).

### 6.5.1 Non-Login Status (if everyone can change setpoint)

- **Change Setpoint**: by [<] [∧] [∨].
- **Save the change and quit the setting**: touch **[SET]**.
- **Run or Stop this zone**: touch **[Run]/[Stop]**.
  (only in system running state).

6.5.2 Operators-Login Status

- **Change Setpoint:** click it to call up small keyboard.
- **Run or Stop this zone**: touch **[Run]/[Stop]**.
  (only in system running state).
- **Change Control mode of this zone**:
  touch **[Auto]** or **[Manual]**.
- **Set power output percent in Manual mode**:
  click it to call up small keyboard.
- **Back to main interface**: touch **[Quit]**.
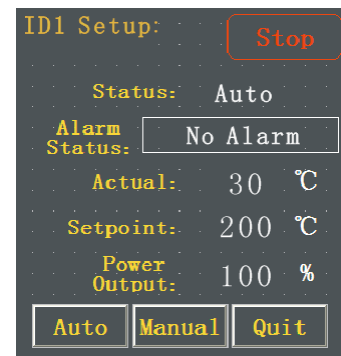
6.5.3 Engineers or Administrators Login Status
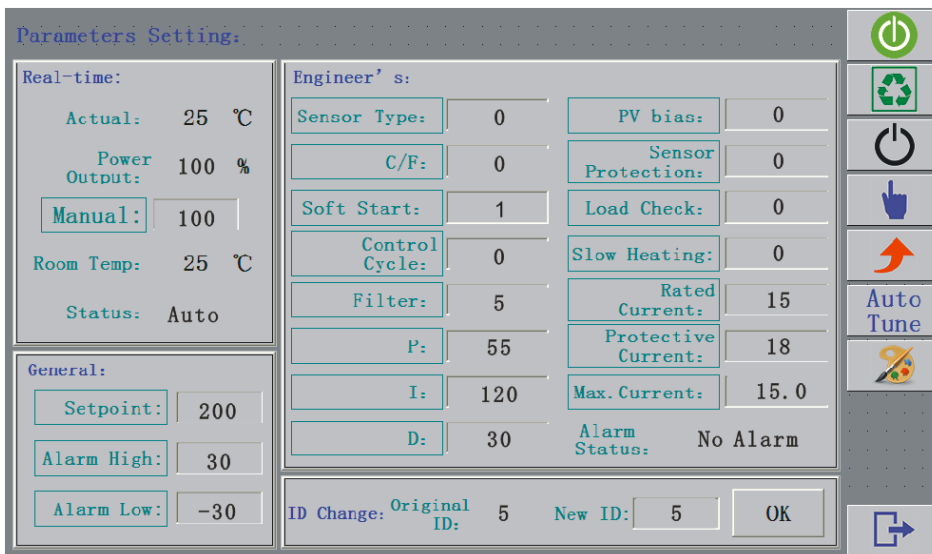
- **Change General and Engineer's parameter value:** click it to call up small keyboard.

- **ID Change**: click **New ID** to call up small keyboard.
  Be Careful! Incorrect ID can cause system work abnormally!

- **Select background color of this zone**: touch .

- **Run or Stop this zone**(only in system running state): touch [icon] (Run) [icon] (Stop).

- **Change Control mode of this zone**: touch [icon] (Auto), [icon] (Standby), or [icon] (Manual).

- **Set power output percent in Manual mode**: click the value of **Manual** to call up small keyboard.

- **Activate Boost function** (fast heating speed): touch [icon] , and the power output percent will be added 20% (max.100%) for 15s.

- **Start Auto-Tune**: touch [Auto Tune].

- **Back to main interface**: touch [icon] .

6.6   Graph Display

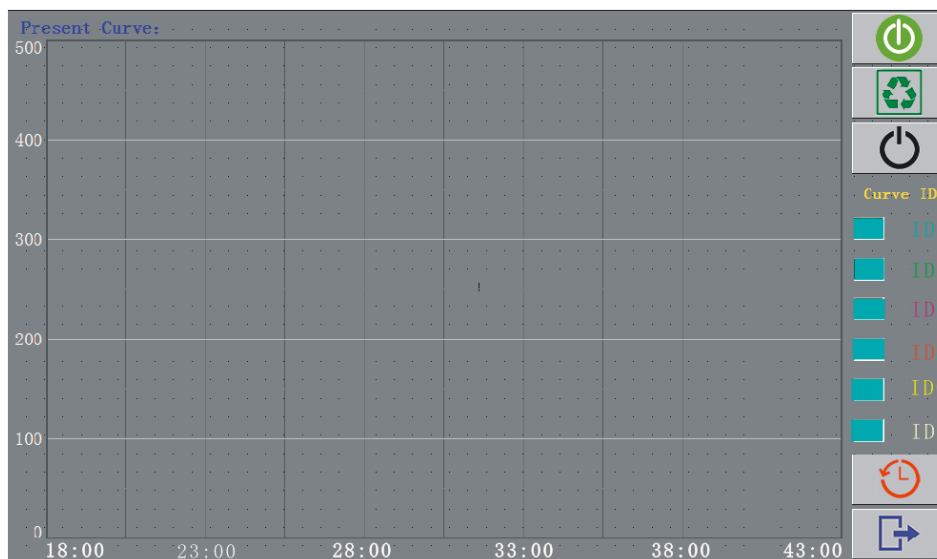Touch [icon] on the main interface, then you can enter the Present Curve Display Screen.

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

And you can touch [icon] on this screen to enter the History Curve Display.

And you can touch [icon] to back the main interface.

6.6.1   Present Curve (real-time)

6.6.1.1   Select Zone ID to View

On Present Curve Screen, you can view max. 6 zones.
Click the ID number to enter curve's ID selection mode.
Input the ID number which you want to view the curve, and then click **[YES]** to confirm.

6.6.1.2 Enable or Disable the Curve Display

The box before the ID number is used to enable or disable the curve display.

You can click it.

The blue means disable and the green means enable.

The curve's color is 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 should set the Saved Interval time in System Setting.

The system can save the temperature data in the latest 15~30 days.

6.6.2.1 Select Zone ID to View

When you touch on present curve screen, History Curve ID Selection interface will be displayed.

Each History Curve Screen can display 10 zones.

You can select the ID group to view, or back to present curve by **[Quit]** .

6.6.2.2　Enable or Disable the Curve Display

The box before the ID number is used to enable or disable the curve display.

You can click it.

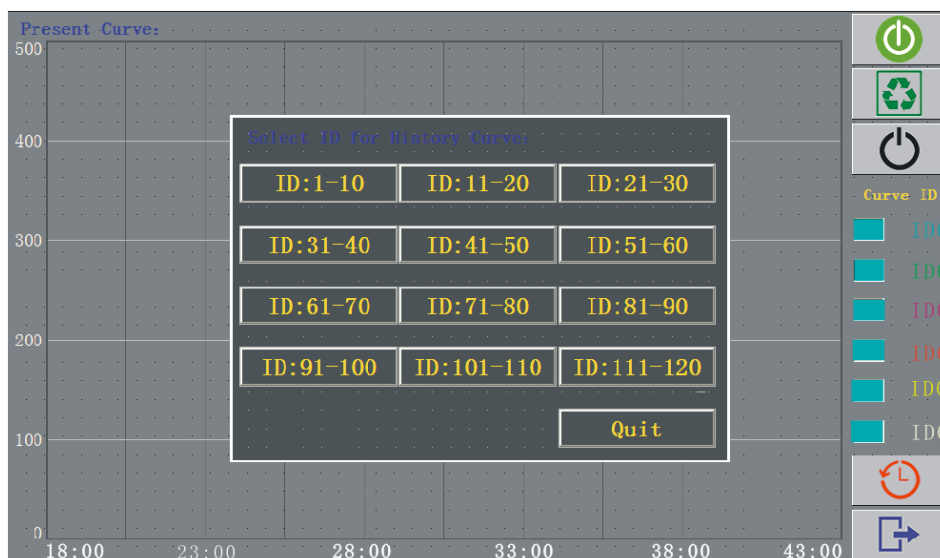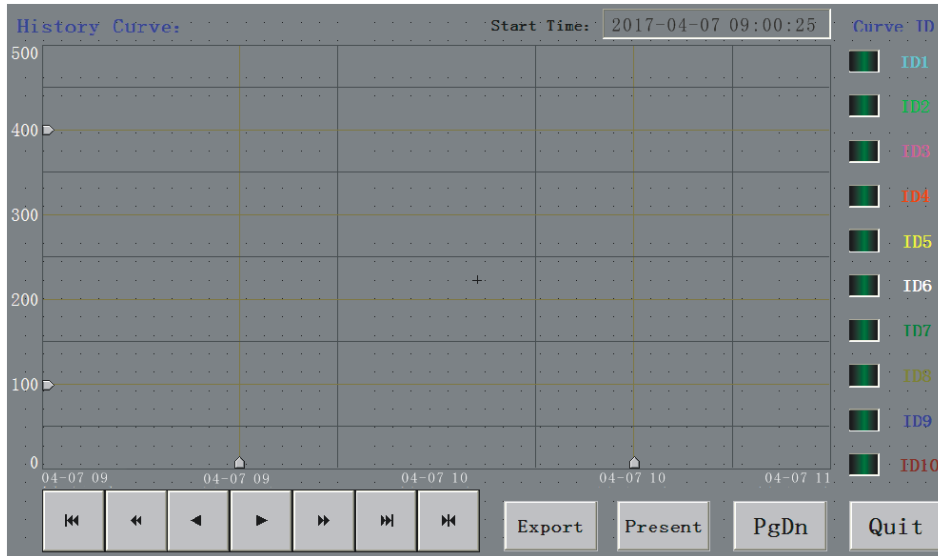The blue means disable and the green means enable.

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

6.6.2.3　Select the Curve Start Time

When you enter the History Curve Screen, the curve start time is 2 hours ago.

You can click the **Start Time** to input a new one (the time format should be same as the original one).

And you can select the start time by

	Select a specified time.

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

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 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 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 contain as few files as possible.
- Do not remove the USB disk from the system during the writing operation.

6.6.2.7 Back to Present Curve

Touch the **[Quit]** to back the present curve screen.

6.7 Alarms

Touch on the main interface, then you can enter the Alarm History Screen.

6.7.1 Alarm Record

6.7.1.1 Select the Record Period

You can click the **Start Time** to input a new one (the time format should be same as the original one). And then the **End Time**.

6.7.1.2 Refresh the Record

You can click to refresh the alarm records after selecting a new period.

6.7.1.3 View More Records

You can click to view more alarm records.

6.7.2 Mute Function (optional)

If the controller has an alertor, when the alarm is triggered, you can keep silence by .

Notes:
- When the alarms of alarm zones are all cleared, the mute function of this zone is reset.
- When the mute function is activated, new alarm of the zone without alarm can reset it and trigger alertor again.

6.7.3 Alarm Status

Alarms on Zone Status	Alarms on Zone Parameter	Alarms on Alarm History	Remark
TC Broken	Sensor Broken	Outrange Upper Limit	Controller will shut off the output. Check the sensor or switch to manual mode.
TC Reversed	Sensor Reversed	Outrange Lower Limit	Controller will shut off the output. Check the sensor or switch to manual mode.
TC Error	Sensor Error	Sensor-Heater Misconnection	Related to parameter "Sensor Protection". Controller will shut off the output. Check the wiring. *It may cause a false alarm if the heater power is large or thermocouple's cable is long.*
Over Temp	Over Temp	Over Temp	Alarm value = Setpoint + Alarm High. Controller will shut off the output. Check the controller & the sensor.
Lower Temp	Lower Temp	Lower Temp	Alarm value = Setpoint + Alarm Low. Check the system thermal insulation. Or switch to manual mode.
Load Broken	Heater Broken	Heater Broken	Related to parameter "Load Checking". Controller will shut off the output. Check the heater.
Load Shorted	Overload	Heater Shorted	Controller will shut off the output. Check the heater.
SCR Shorted	Triac Shorted	Triac Shorted	Controller will shut off the output. Replace the triac.
Overload	Overload	Overload	Related to parameter "Rated Current". Check the heater and the Rated current setting.

Chapter 7 SVG Control Operations

Touch ![valve icon] on Temperature Control main interface, then you can enter Sequence Valve Gate Control main interface.
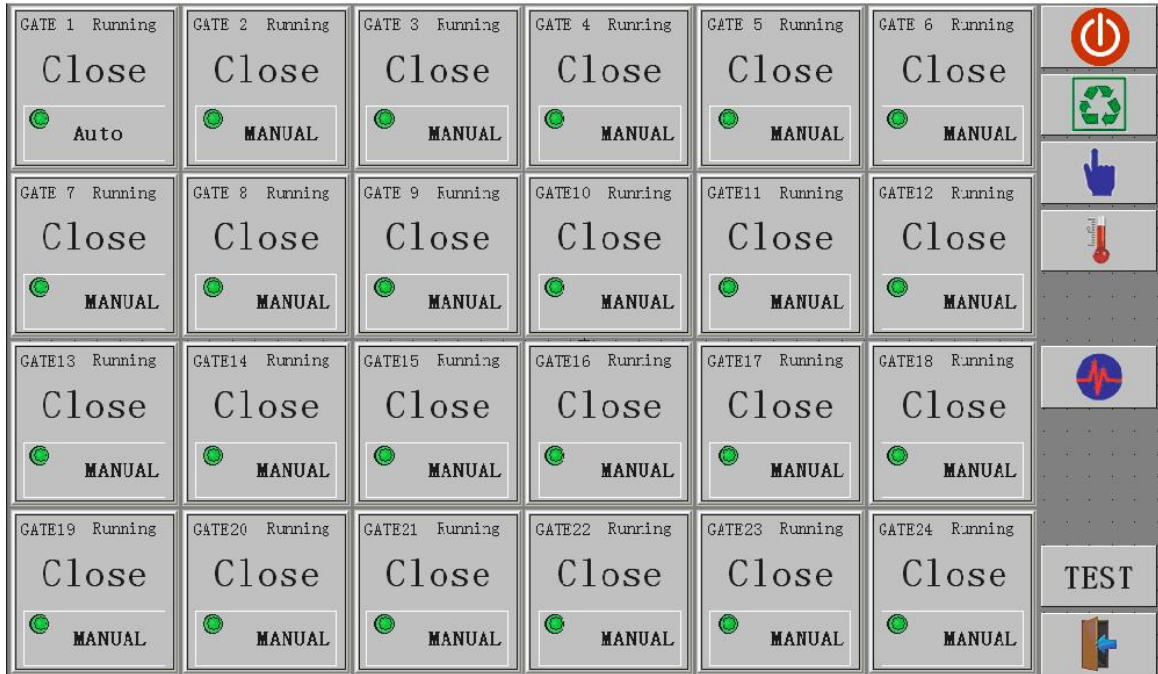
And touch ![thermometer icon] on Sequence Valve Gate Control main interface, then you can enter Temperature Control main interface.

7.1 Control Modes

- ![recycle icon] **Auto mode:**

  This type of control is an auto system and requires a start trigger signal.

  The controller does no more until it receives the start trigger after which it initiates the run timer from the zero time position. From this point gates open and close according to time or position settings that you have configured.
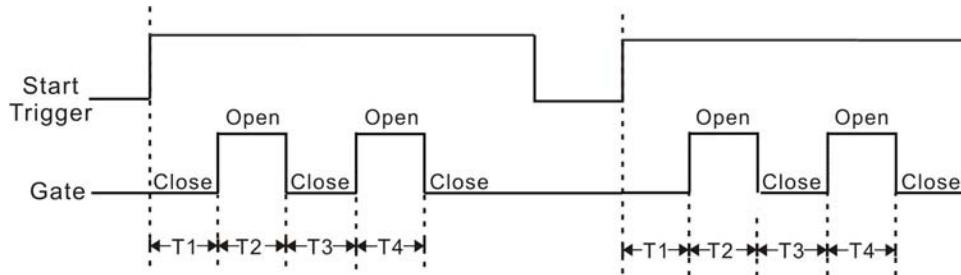
- ![hand icon] **Manual mode:**

  This type of control requires no start trigger signal.

  Each gate can be opened or closed by touching [**MANULE**].

7.2 Start Trigger Modes

This SVG controller supports gates open/close 1~2 times in a complete cycle.

- If the start trigger duration time is longer than a complete cycle of gate open/close, then the control process is:

1) When the controller receives the start trigger, it initiates the run timer from the zero time position.
2) Gates open after T1 time (or screw position is T1) from the controller receives start trigger;
3) Gates close after T2 time (or screw position is T2) from the gates open;
4) Gates open again after T3 time (or screw position is T3) from the gates close;
5) Gates close after T4 time (or screw position is T4) from the gates open;
6) The controller waits a new start trigger.

- If the start trigger time of duration is shorter than a complete cycle of gate open/close, then the control process has 4 modes selected by parameter "Input Type".:

Mode 0: Once the gate open/close cycle starts, it will ignore the new start trigger until the cycle ends. The control process is similar to the start trigger time of duration is longer than a complete cycle of gate open/close.
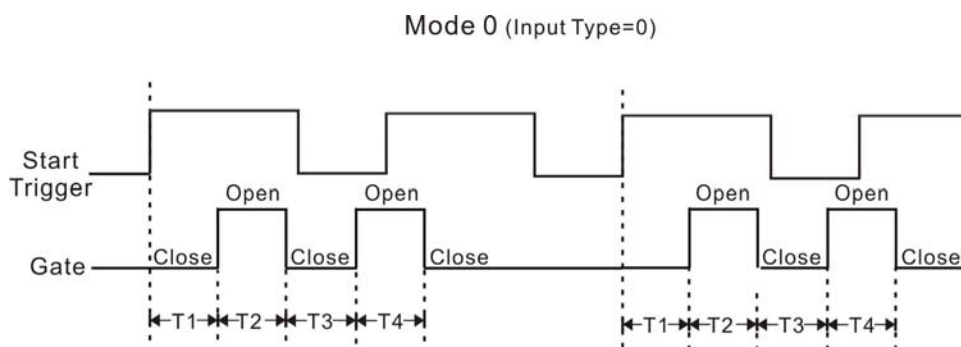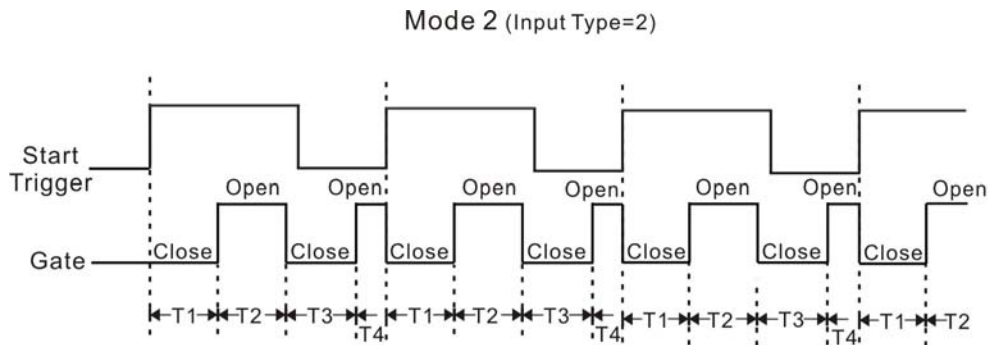

1) When the controller receives the start trigger, it initiates the run timer from the zero time position.
2) Gates open after T1 time (or screw position is T1) from the controller receives start trigger;
3) Gates close after T2 time (or screw position is T2) from the gates open;
4) Gates open again after T3 time (or screw position is T3) from the gates close;
5) Gates close after T4 time (or screw position is T4) from the gates open;
6) The controller waits a new start trigger.

Mode 1: The gate open/close cycle will be terminated and gate close when the start trigger ends. The controller initializes the run timer when it receives the new start trigger.
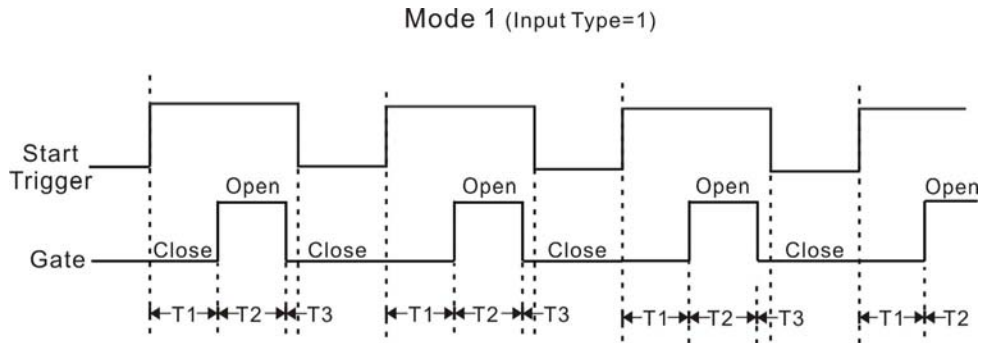
Mode 1 (Input Type=1)

1) When the controller receives the start trigger, it initiates the run timer from the zero time position.
2) Gates open after T1 time (or screw position is T1) from the controller receives start trigger;
3) Gates close after T2 time (or screw position is T2) from the gates open;
4) Gates open again after T3 time (or screw position is T3) from the gates close;
5) Gates close after T4 time (or screw position is T4) from the gates open;
6) In the control process, when the start trigger ends, the gate open/close cycle will be terminated and gate close.
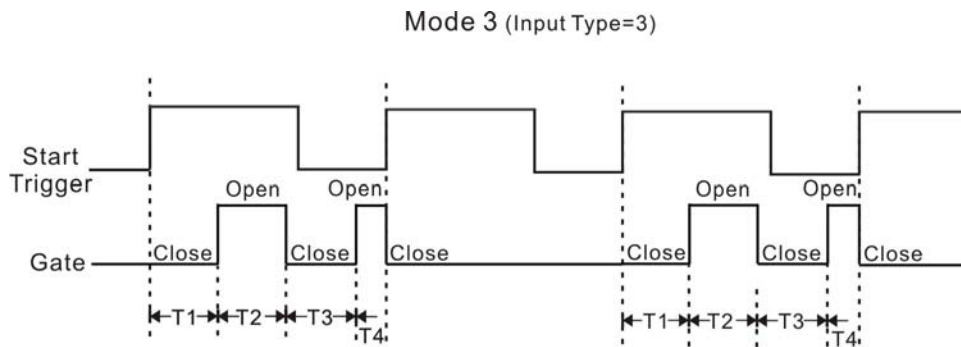7) The controller waits a new start trigger.

Mode 2: The gate open/close cycle will be terminated and gate close when the new start trigger comes. The controller initializes the run timer when it receives the new start trigger.

Mode 2 (Input Type=2)

1) When the controller receives the start trigger, it initiates the run timer from the zero time position.
2) Gates open after T1 time (or screw position is T1) from the controller receives start trigger;
3) Gates close after T2 time (or screw position is T2) from the gates open;
4) Gates open again after T3 time (or screw position is T3) from the gates close;
5) Gates close after T4 time (or screw position is T4) from the gates open;
6) In the control process, when the new start trigger comes, the gate open/close cycle will be terminated and gate close.
   At the same time, the controller initializes the run timer to start a new gate open/close cycle.

Mode 3: The gate open/close cycle will be terminated and gate close when the new start trigger comes. The controller initializes the run timer when it receives the next new start trigger.

Mode 3 (Input Type=3)

1) When the controller receives the start trigger, it initiates the run timer from the zero time position.

2) Gates open after T1 time (or screw position is T1) from the controller receives start trigger;

3) Gates close after T2 time (or screw position is T2) from the gates open;

4) Gates open again after T3 time (or screw position is T3) from the gates close;

5) Gates close after T4 time (or screw position is T4) from the gates open;

6) In the control process, when the new start trigger comes, the gate open/close cycle will be terminated and gate close.

7) The controller waits the next new start trigger.

7.3   Gate Open/Close Trigger Modes

You have two main options that you can use to set up gate opening and gate closing times.

1)   **Time value only**– if you have no ancillary sensors then your only choice for gate opening and closing is an internal timer.

2)   **Screw Position** (and time) – if you have position sensors that detect screw ram position and feed it back via an analogue (0~10Vdc) input, then you can set gate open and close relative to screw position. You can also use a combination of screw position and time.

7.4   Detail Parameters for Each Gate

| Parameter	Description
T 1	Gate open delay time (or screw position) from the controller receives start trigger.
T 2	Gate open duration time (or screw position for gate closing).
T 3	Gate open again delay time (or screw position) from it close.
T 4	Gate open duration time (or screw position for gate closing).
Input Filter	Filter for start trigger, used to reduce the influence of interference. When it is too large, the controller cannot work normally.
Input Type	Start trigger modes selection.
Resolution	Resolution for Time (sec) / Screw position (mm/inch)

7.5　Gate Setup

Touch the Gate Status "Open" or "Close" on the main interface, then you can enter Gate Setup Screen (different authority can see different parameters, and no parameter can be seen without login).
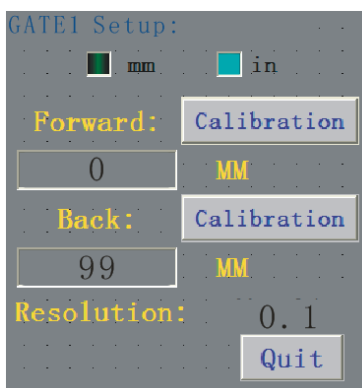
7.5.1　Operators-Login Status

- **Set T1 ~T4:**
  click the value to call up small keyboard.

- **Back to main interface**: touch [**Quit**].

7.5.2　Engineers or Administrators Login Status
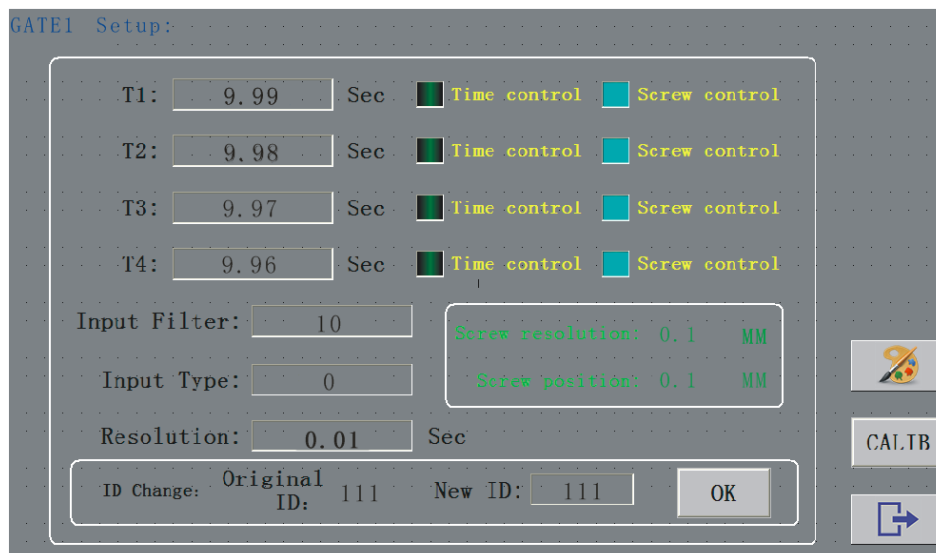
- **Screw Position Setup:** touch CALTB to call up screw position setup screen.


1) **Select screw position unit**:
   mm or inch, the green means selected.
2) **Set screw position resolution**:
   click the value to call up small keyboard, set 0.01, 0.1 or 1.
3) **Set screw forward & back position**:
   click the value to call up small keyboard.
4) **Calibrate screw forward & back position**:
   push the screw to forward position and touch [**Calibration**] of forward; next push the screw to its back position and touch [**Calibration**] of back.

You can repeat calibration if you feel that either position was incorrect.

When you are satisfied that all is good, touch [**Quit**] to set the figures and leave the screen.

- **ID Change**: click **New ID** to call up small keyboard.
  Be **Careful! Incorrect ID can cause system work abnormally!**

- **Select background color of this gate**: touch to call up background color setting screen.
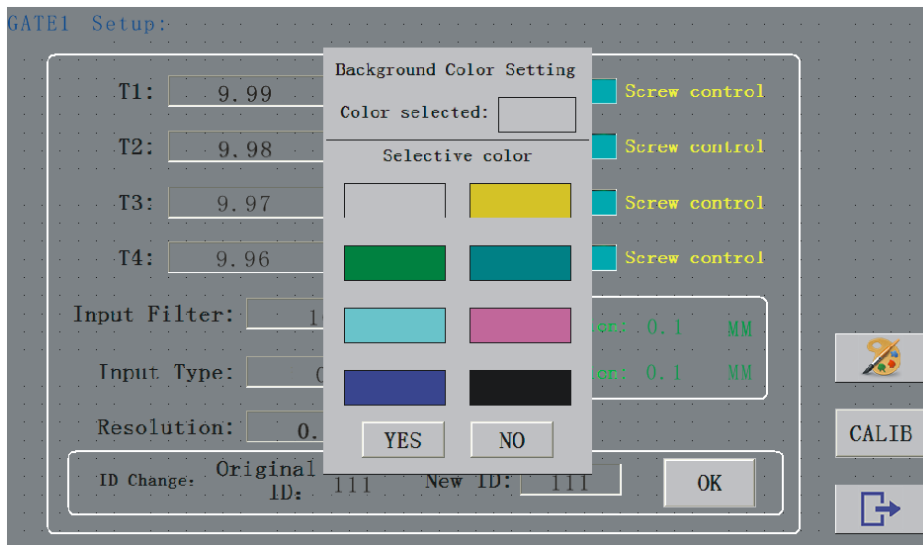
Select a color you want to use as background of this gate, and then click [**YES**] to set the figures and leave the screen.

- **Set input filter:** click the value to call up small keyboard.

- **Set input type:** click the value to call up small keyboard.

- **Set time resolution:** click the value to call up small keyboard, set 0.01, 0.1 or 1.

- **Select gate open/close trigger modes:**
  click the indicator of Time control or Screw control to select modes for T1~T4.
  The green means selected, and the blue means non-selected.

- **Set T1~T4:** click the value to call up small keyboard.

- **Back to main interface**: touch .

7.6 Preview the Setting

Touch on the main interface, and then you can see the sequential chart of all gates open/close setting. You can compare and confirm the setting.

7.7 Test

Touch TEST on the main interface to simulate a start trigger, and then the controller will starts a complete gate open/close cycle.

Chapter 8   Run/Stop System

8.1   Run System

Touch [power icon] on the main interface of temperature control or SVG control to run the system.

- **Temperature Control**

  All zones start to work in Auto mode except the module stopped by zone setting.

  - ➢ You can touch [power icon] on the main interface to make all zones wok in Standby mode.
  - ➢ You can make a specified zone work in Standby mode by 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-Tune function for a specified zone by Zone Setting.

- **SVG Control**

  All zones start to work in Auto mode.

  - ➢ You can touch [hand icon] on the main interface to make all zones wok in Manual mode.
  - ➢ In Manual mode, you can open or close each gate by touching [**MANULE**].

8.2   Stop System

Touch [power icon] on the main interface of temperature control or SVG control to stop the system.

All modules stop working.