Parts of the manual can be changed without notice to users. Please contact INCOE Technical Service with questions regarding the product.
WARNING AND CAUTION FOR SAFETY

Failure to follow steps can lead to bodily injury, death and property damage.

Caution

• NEVER touch the product or power plug with wet hands or near water.
• NEVER disassemble the product while the product is plugged into power. (There is high voltage inside the product.)
• DO NOT change, separate or fix the product of your own accord. (You MUST contact INCOE Technical Service for repair.)
• Only use specified rated capacity fuses. (Failure to do so may cause malfunction or fire)

Caution

• Warnings are to keep users safe and prevent injury.
• Please read the user’s manual before using the controller.
• Screenshots and pictures in User’s Manual can be different from the actual product.

Warning

• Clean dust filter once a week.
• DO NOT shock or put heavy objects on the product.
• Must connect correct power according to the User Manual.
• Supply voltage must be within the allowable range.
• DO NOT block the vents of the product. (It can cause product malfunction)
• DO NOT touch the Touch LCD with sharp objects or dirty hands.
FEATURES

The controller is a device used to maintain the desired temperature consistently by sensing the state of a Hot Runner System using the MICOM computer system and proper input power. Several important features are listed below for precise temperature control.

• **PID Control and Balance Control**
  PID Control is a method used to maintain the Set Temperature value accurately by controlling output power reflecting proportion, integration, and differentiation values. In addition, the balance control feature can raise the temperature of the nozzles and manifold at the same rate.

• **Re-Tuning**
  Auto tuning is a function used to extract the governing factors through analyzing heater capacity and the heat constant of the mold (characteristics of latent heat and released heat). It helps precisely control temperature regardless of environmental change.

• **Output Type**
  PWM or SSR mode selection options to optimize control based on the surrounding environment.

• **Color Touch LCD and Various Displays**
  Verifies and controls the status of the system easier through various displays such as Text/Graph/Digital/Detail.

• **Mold File**
  Ability to manage and save data for the each mold. Move and copy data settings between several controllers.

• **Alarm, Reporting and Self Inspection**
  Provides reporting function and detects errors. It is possible to manage the machine quickly with the Alarm Function. In addition, you can check the status of heater and thermocouple with self inspection.

• **Control Unit System**
  One unit controls 2 zones. It is possible to temporarily manually operate without stopping the whole system when there is a problem with an individual zone.

1 Control Unit Specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple Calibration Accuracy</td>
<td>0.1°C</td>
</tr>
<tr>
<td>Control Accuracy</td>
<td>±0.3°C from set point</td>
</tr>
<tr>
<td>Control Algorithm</td>
<td>PID, Auto Tuning, Balance Controlling</td>
</tr>
<tr>
<td>Manual Mode</td>
<td>Power Compensation for incoming Voltage variation (0~65%)</td>
</tr>
<tr>
<td>Operation Range</td>
<td>30<del>500°C (86</del>932°F)</td>
</tr>
<tr>
<td>Power Output Range</td>
<td>15 Amp/zone (3600W/Zone)</td>
</tr>
<tr>
<td>Stand-By Temperature</td>
<td>User Selectable (30~500°C)(86-932°F)</td>
</tr>
<tr>
<td>Boost Mode</td>
<td>1<del>99min. 0</del>65% output</td>
</tr>
<tr>
<td>Sensor</td>
<td>Thermocouple Type, J or K</td>
</tr>
<tr>
<td>Cold Junction Compensation</td>
<td>Internal to enclosure</td>
</tr>
<tr>
<td>External Resistance</td>
<td>10Meg. Ohms</td>
</tr>
<tr>
<td>Temperature Variation</td>
<td>Due to T/C Length None</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>90~250VAC, 50/60Hz</td>
</tr>
<tr>
<td>Operation Conditions</td>
<td>0~50°C Up to 90% humidity(Non-Condensing)</td>
</tr>
</tbody>
</table>
2 Basic Structure of Controller

Visual status check of unit through unit LED.

- Touch LED
- Main Switch
- USB Port
- Handle
- Acrylic Cover

- Unit power LED
- Output 1 LED
- Output 2 LED
- Communication LED
3 Check List and Operation Before Using the Controller

1. Check status of the mold's connector wiring. Verify type of thermocouple (J/K). Check that wiring of the thermocouple and heater is separated.

2. Check resistance of heater, status of insulation and open thermocouples.

3. Check specification of connecting cable.

4. Connect cable after mold is installed on injection molding machine.

5. Check that input voltage (240V/380V) and setting voltage of controller are the same and if so, connect the power cable. (The voltage of the controller is labeled on the control cabinet.)

6. Ground wire of controller MUST be grounded. (It prevents from electric shock, fuse and triac broken by voltage noise.)

7. Turn on main power.

Warning: ALWAYS check that the fan is working.

4 Operating Modes

Auto Mode (Start)

Auto Mode is the normal operation mode in which temperature is controlled and maintained automatically in accordance with the Set Temperature.

Stop Status

Stand-By Mode

Operator can decrease Set Temperature of the system when running Stand-By Mode. The controller will return to Auto Mode automatically after the Stand-By time is elapsed.

When starting [Stand-By Mode], Value of [Set Temperature (SV)] is changed to temperature of Stand-By Mode (% rate, [Stand-By Output] of [Advanced setting 2]) and it runs for [System Setting] [Stand by Hour/Minute] setting time.

The controller will automatically return to [Auto Mode] after the [Stand-By Hour/Minute] is reached.

Boost Mode

This is the function to output setting value of [Maximum output of Boost %] to approach to the [Set Temperature (SV)] quickly without [PID control].

When starting [Boost Mode], timer will start running and it will return to [Auto Mode] after time for [Boost Minute] on the [System Setting] Screen has elapsed.

Manual Out

Emergency mode that can be automatically worked by Manual Out Mode with thermocouple open, short and/or reverse.
5 Basic Operation

1. Turn on main power switch, system loading will run for 10 seconds.
2. Initialization of basic system will run for 10 seconds.
3. Main Page will display and controller will be in Stop Status.
4. Controller is now fully functional.
5. Click [Set up] button to change temperature settings as needed.

6 Protective Functions

1. Ground fault function
   Automatically detects short between a heater and frame ground and stops output and protects heater, after turning the power on.
2. T/C open function
   If T/C open, short-circuit or reverse connection occurs, this function prevents overheating by stopping output.
3. Protective over current function
   This function is able to stop output and protect heater malfunction when heater short or over current occurs.
4. Soft-start
   When the power is turned on, Soft-Mode is initiated to protect heater malfunction from moisture by working slowly. According to settings [Soft Minute/%] on the [AdSetup1] screen.
5. Setting Current-high and low functions
   Functions for detecting heater short or open. It protects heater by stopping output when it detects current beyond setting values.

7 Structure of Display

7.1 Basic Display

7.1.1 Main Display

(A) Main page

1) Text Display
2) Graph Display
3) Digital Display
4) Detail Display
5) Basic Setting Display
6) Report Display
7) Memo Display
8) Mold File Display
9) System Setup Display
10) System Information Display
7.1.2 Sub Screen

① Sub Menu: Sub menu is displayed through all sub screens and can change view screen such as Text, Graph, Digital and Detail and also go to setup screen.

② Sub Screen: Shows screen view or screen setup.
7.2 Operation Screen

Operation screen has 4 types of screens, “Text / Graph / Digital / Detail”.

Shows “YELLOW” on Alarm and “RED” on Error according to the status of zone.

Display prefix on Zone number by status of Zone as follows:

x: Zone Off Status  
t: Zone Auto Tuning Status  
p: Manual PID Control  
m: Manual Output Status

7.2.1 Text Screen

The screen page can be changed with the arrow button to view control zones beyond 12 zones.

Visualize the operation status of controller with “Text” type on the Text Screen. 12, 24, or 48 zones can be displayed selectively with “Text” Button.
7.2.2 Graph

Visualize the operation status of controller with "Bar" type on the Graph Screen. 12 zones can be displayed at a time.

The screen page can be changed with the arrow button to view control zones beyond 12 zones.

7.2.3 Digital Screen

Visualize the operation status of controller with "Digital" type on the Digital Screen. 12 zones can be displayed at a time.

The screen page can be changed with the arrow button to view control zones beyond 12 zones.
7.2.4 Detail Screen

Use Detail Screen to observe a specific zone.

The basic setting information will be shown on the bottom of the screen and the screen will show the operation status of controller. 16 zones will be displayed on zone selection buttons on the right side.

The screen page can be changed with the arrow button to view control zones beyond 16 zones.

7.3 Setting Display

7.3.1 Basic Setting Display

① Setting item name
② Display Setting Value: Displays setting values for set up.
③ Manual Output Setting - In % Value: It will display [- -] when there is no setting or no selection of zone.
④ Difference of Setting Value: Displays [* *] when setting values are different for multiple zones.
⑤ Setup Screen Selections: This button changes the setting screen of [Basic Setup], [Advanced Setup 1] and [Advanced Setup 2]. Changes can only be made to Advance setup when "Lock Mode" is off.
⑥ Zone Selection Button 1: When clicking the button, the zone is selected. Click the button again to release.
⑦ Zone Selection Button 2:
   Select All ☞ Click to see all zones.
   Clear All ☞ Click to release all zones.
   Select Nozzle ☞ Zones that are set as Nozzles are selected. Click this option again to release all nozzle zones.
   Select Manifold ☞ Zones that are set as Manifold are selected. Click this option again to release all manifold zones.
7.3.1.1 Basic Setting

1. **Set Temperature (SV):** Set up 30~500°C (86°F~932°F) range of temperature.
2. **Zone ON/OFF:** Turn ON/OFF control of the zone.
3. **Manual Mode:** Turn ON/OFF Manual Mode for the selected zone(s).
   - **Manual Mode:** This is the emergency operation mode used to control the amount of output manually when thermocouple has malfunctioned. (i.e. use when there is Sensor Open (TC Op) or Sensor Short (TC St).)
4. **Manual Output:** Set only when Manual Mode is “ON” and set amount of output of the zone from 0% to 65% manually.
5. **Zone Category:** Set as [Nozzle] or [Manifold] for setting or classification of zone.

7.3.1.2 Advanced Setting 1

**Note!**
ONLY an authorized user can use Quick Setting since it will affect the operation of Hot Runner Controller System. (It is locked by [System Setup] [Lock Setup] to protect change of setting value by user error.)

1. **T/C Type:** Set thermocouple type [ J ] or [ K ].
2. **Soft Minute/%:** Time and % settings for protective function Soft Mode. If the conditions below are satisfied, zone will output [%] of power for a duration of [Soft Minute].
   - **Condition:** 1) Temperature of zone is below 50% of Set Temperature.
   - 2) [Soft Minute] time has not elapsed
3. **Upper limit of current:** This function will identify heater current above the setting (short circuit). When current is detected above the upper limit of current, it will show Error Code "Ht St", Alarm will sound, and output will be stopped.
4. **Lower limit of current:** This function will identify heater current below the setting (short circuit). When current is detected below the lower limit of current, it will show Error Code "Ht Op", Alarm will sound, and output will be stopped.
Output type: Can select the output type with [SSR] or [PWM] according to the environment.

Alarm High: Set upper limit of temperature variation of standard Set Temperature and Alarm will run on temperature above the Set Temperature.

Alarm Low: Set lower limit of temperature variation of standard Set Temperature and Alarm will run on temperature below the Set Temperature.

If Set Temperature (SV) as 200°C, Alarm High as 50°C and Alarm Low as -50°C? Alert of (Al. Hi) will be raised on temperatures above 250°C and (Al. Lo) will be raised on temperatures below 150°C.

1. Stand-By Output: Users can reduce the Set Temperature of zones to the Stand-By-Output % when in Stand-By Mode and turn back automatically to Auto Mode after the pause time from the System Setup Screen.

2. Boost Maximum Output: Increases Output (%) of heater when in Boost Mode (to raise the temperature of heater quickly).

3. T/C Correction: Use to adjust temperature when there is a difference between temperature of thermocouple and real temperature.

4. T/C Change of Zone: Use to control the temperature with reference of another thermocouple when temperature cannot be controlled because of a faulty thermocouple.

5. Tuning Mode: Use to re-tune and recalculate the control of the heater when temperature cannot be controlled. (It will run output activity 2 or 3 times to recalculate until re-tuning is completed.)
7.3.2 System Setup Display

System Setup is for settings for the entire system. Access by clicking [System Setup] on [Main Screen].

① Display of Decimal Point: Can set how to display [Current Temperature] on the [Active Screen].
   Ex) Display of Decimal Point [Yes]: 200.0°C
      Display of Decimal Point [No]: 200°C

② Display of Temperature: Can set the scale of the temperature. [°C ↔ °F]
   Ex) How to display the temperature [°C]: 200.0°C
      How to display the temperature [°F]: 392.0°F

③ Stand-By (Hour): Turns to [Auto Mode] after the Setting Hour elapses when in Stand-By Mode.

④ Stand-By (Minute): Turns to [Auto Mode] after the Setting Minute elapses when in Stand-By Mode.

⑤ Setup PID: Can set value of PID manually according to mold or heater specifications.

⑥ K (Constant): This is the value of constant to apply during calculation of PID.

⑦ P (Proportion): This is the value to apply during calculation for output amount based on the temperature difference.

⑧ I (Integral): This is the major value to eliminate the accumulation gap around the Set Temperature.

⑨ D (Differential): This is the major value to prevent sudden change of amount of control.

⑩ K (Constant): This is the value of constant to apply during calculation of PID.

⑪ P (Proportion): This is the value to apply during calculation for output amount based on the temperature difference.

⑫ I (Integral): This is the major value to eliminate the accumulation gap around the Set Temperature.

⑬ D (Differential): This is the major value to prevent sudden change of amount of control.
7.4 Mold File

7.4.1 Mold File Setting

[Mode File] is setting for mold. Can setup a Mold File on each mold. When the mold is changed, the user can load the existing file without setup again. Set by clicking [Mold File] on [Main Screen].

Ex) In case (Set Temp:SV): 200°C, t(Stand-By Hour): 1 hour (1:00), P (Standby out): 70% ⇒ Stand-By Mode is 140°C which is 70% of set temperature.

① Boost (Minute): Switches to [Auto Mode] after the setting time elapses during Boost Mode.

② Setup Lock Function: This is the function to lock the system from unauthorized user changes to Advanced Setup and System Setup.

*Settings affected by Setup Lock Function
→[Basic Setup]: [Advanced Setup 1] / [Advanced Setup 2]

③ Protecting overheat function: This is a function which is automatically able to detect the time of temporary checking or pause. Regarding this, it protects from overheat of system and burning or over-heating of resin (Stand-By condition)

④ Balance Control: Prevents from overheat of system or burning or over-heating resin by raising all zones of similar Set Temperature value at the same time according to heater capacity and status.

⑤ Alarm: If using Alarm function, Alarm will sound when system has error.

⑥ LANGUAGE: Can change display language.

⑦ Setting in details: Browse settings in details display in order to set details for each setting.

⑧ Administrator: Open administrator mode.

① Load: Loads the saved Mold File in the [Memory] or [USB Stick].

② Save: Saves the loaded Mold File or saves the file with another name.

③ Delete: Deletes the saved Mold File in the [Memory] or [USB Stick]

④ Number of the Zones: Sets a number of zones.

⑤ Number of the Gates: Sets a number of gates.

⑥ Mode Test: Go to Mold Test screen.

⑦ Checking Window for Zone Status: Displays Set Temperature of each zone and status of current communication.
7.4.2 Mold Test

Mold Test will guide the user to check the status of system and investigate errors.

2. Select [Mold Test] Button on the [Mold File].
3. Select test that needs to be investigated and select the next zone for test.
4. When selecting [Start] Button, test will start.

* When finding the problem, it will be useful if you refer to Troubleshooting and [Error Code Table] in Chapter 13.

7.4.3 Run Mold Test

Test will progress when clicking the [Start] Button on [Mold Test] and Progress Status will be displayed.

② T/C Test: Tests for Open/Short Circuit/reverse connection for T/C.
③ Heater Test: Tests heaters for Open/Short Circuit.
④ Start: Click the Button, screen will change to Test Screen and test will start.
⑤ Selection Button for Test Zone: Can selectively choose the zone to test.
7.5 Report

7.5.1 Error Record

Error record collects generated error codes from the hardware during system operation.

Refer to Error Code Table in Chapter 13 to solve the issues while referring to Troubleshooting when issues occur.

7.5.2 Changing Record

Records a history of setting changes and history of status changes during system operation.

Helps to troubleshoot system by identifying when changes were made.
7.5.3 System Record

Records system start and history of loading [Mold File].

7.6 System Information

Checks system version or language file version with system information and can be used for system upgrade.
8 Power and Thermocouple Mold Cables

8.1 Power and Thermocouple Cables (Standard 20ft)

**POWER CABLE SPECIFICATION**

- **240V 15 AMP**

  - Power cable male to controller
  - Power cable female to mold

**THERMOCOUPLE CABLE**

- **TC cable female to controller**
- **TC cable female to mold**

8.2 Controller Side Connectors

Separate power and TC connections are standard.

<table>
<thead>
<tr>
<th>Load Pins</th>
<th>Zone 1</th>
<th>Row A 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone 2</td>
<td>Row A 3 and 4</td>
</tr>
<tr>
<td></td>
<td>Zone 3</td>
<td>Row A 5 and 6</td>
</tr>
<tr>
<td></td>
<td>Zone 4</td>
<td>Row A 7 and 8</td>
</tr>
<tr>
<td></td>
<td>Zone 5</td>
<td>Row B 2 and 3</td>
</tr>
<tr>
<td></td>
<td>Zone 6</td>
<td>Row B 4 and 5</td>
</tr>
<tr>
<td></td>
<td>Zone 7</td>
<td>Row B 6 and 7</td>
</tr>
<tr>
<td></td>
<td>Zone 8</td>
<td>Row C 1 and 2</td>
</tr>
<tr>
<td></td>
<td>Zone 9</td>
<td>Row C 3 and 4</td>
</tr>
<tr>
<td></td>
<td>Zone 10</td>
<td>Row C 5 and 6</td>
</tr>
<tr>
<td></td>
<td>Zone 11</td>
<td>Row C 7 and 8</td>
</tr>
<tr>
<td></td>
<td>Zone 12</td>
<td>Row A 9 and C 9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TC Pins</th>
<th>Zone 1</th>
<th>Row A 1(+) and 2(+)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone 2</td>
<td>Row A 3(+) and 4(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 3</td>
<td>Row A 5(+) and 6(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 4</td>
<td>Row A 7(+) and 8(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 5</td>
<td>Row B 2(+) and 3(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 6</td>
<td>Row B 4(+) and 5(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 7</td>
<td>Row B 6(+) and 7(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 8</td>
<td>Row C 1(+) and 2(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 9</td>
<td>Row C 3(+) and 4(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 10</td>
<td>Row C 5(+) and 6(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 11</td>
<td>Row C 7(+) and 8(+)</td>
</tr>
<tr>
<td></td>
<td>Zone 12</td>
<td>Row A 9(+) and C 9(+)</td>
</tr>
</tbody>
</table>
### 9 Default Values

#### 9.4.1 Basic Setting

<table>
<thead>
<tr>
<th>NO</th>
<th>Menu</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set Temp(SV)</td>
<td>200°C</td>
</tr>
<tr>
<td>2</td>
<td>Zone ON/OFF</td>
<td>Off</td>
</tr>
<tr>
<td>3</td>
<td>Manual Mode</td>
<td>Off</td>
</tr>
<tr>
<td>4</td>
<td>Manual Output Rate</td>
<td>0%</td>
</tr>
<tr>
<td>5</td>
<td>Zone Category</td>
<td>Nozzle</td>
</tr>
</tbody>
</table>

#### 9.4.2 Advanced Setting 1

<table>
<thead>
<tr>
<th>NO</th>
<th>Menu</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T/C Type</td>
<td>J</td>
</tr>
<tr>
<td>2</td>
<td>Soft Minute</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Current high limit</td>
<td>16.0 A</td>
</tr>
<tr>
<td>4</td>
<td>Current low limit</td>
<td>0.2 A</td>
</tr>
<tr>
<td>5</td>
<td>Output Method</td>
<td>PWM</td>
</tr>
<tr>
<td>6</td>
<td>Alarm high limit</td>
<td>50°C</td>
</tr>
<tr>
<td>7</td>
<td>Alarm low limit</td>
<td>-50°C</td>
</tr>
</tbody>
</table>

#### 9.4.3 Advanced Setting 2

<table>
<thead>
<tr>
<th>NO</th>
<th>Menu</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standby output</td>
<td>75%</td>
</tr>
<tr>
<td>2</td>
<td>Boost max output</td>
<td>65%</td>
</tr>
<tr>
<td>3</td>
<td>T/C Calibration</td>
<td>0°C</td>
</tr>
<tr>
<td>4</td>
<td>Change zone T/C</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Tuning mode</td>
<td>Off</td>
</tr>
<tr>
<td>6</td>
<td>PID setting</td>
<td>Off</td>
</tr>
<tr>
<td>7</td>
<td>K</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>P</td>
<td>100</td>
</tr>
<tr>
<td>9</td>
<td>I</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>D</td>
<td>0</td>
</tr>
</tbody>
</table>

#### 9.4.4 System Setting

<table>
<thead>
<tr>
<th>NO</th>
<th>Menu</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Display decimal point</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Display Temperature Unit</td>
<td>°C</td>
</tr>
<tr>
<td>3</td>
<td>Stand-By Hour</td>
<td>0 hour</td>
</tr>
<tr>
<td>4</td>
<td>Stand-By Minute</td>
<td>59 min</td>
</tr>
<tr>
<td>5</td>
<td>Boost Minute</td>
<td>5 min</td>
</tr>
<tr>
<td>6</td>
<td>Lock Mode</td>
<td>Off</td>
</tr>
<tr>
<td>7</td>
<td>Lock Mode Password</td>
<td>1234</td>
</tr>
<tr>
<td>8</td>
<td>Protect from over heat</td>
<td>Off</td>
</tr>
<tr>
<td>9</td>
<td>Balance control</td>
<td>Off</td>
</tr>
<tr>
<td>10</td>
<td>Alarm</td>
<td>Off</td>
</tr>
<tr>
<td>11</td>
<td>LANGUAGE</td>
<td>English</td>
</tr>
<tr>
<td>21</td>
<td>Timer</td>
<td>Temp</td>
</tr>
</tbody>
</table>
11 Electric Wiring Diagram

11.1 240V 3Phase 3 Line Type
11.2 380V / 440V 3Phase 4 Line Type

11.3 240V 1 Phase 2 Line Type
12 Wiring Modification Method

12.1 Re-wiring for Supply Voltage AC380V/440V from Wiring for Supply Voltage 220V AC

1. Turn Power of controller OFF.
2. Turn the main power OFF. Disconnect power cord from power supply.
3. Loosen bolt on top of the main case and open the cover.
4. Separate R, S and T jumper wires that connect to Terminal Block and connect R', S' and T' phase and connect N(neutral) phase among R', S' and T'.
5. Left diagram is wiring before the change and Right diagram is wiring after completion.

12.2 Re-wiring for Supply Voltage 220V AC from Wiring for Supply Voltage AC380V/440V

1. Turn Power of controller OFF.
2. Turn the main power OFF. Disconnect power cord from power supply.
3. Loosen bolt on top of the main case and open the cover.
4. Separate R', S' and T' jumper wires that connect to Terminal block. Connect R' to R(red), S' to S(white), T' to T(black) and separate and insulate N(neutral) wire.
5. Left diagram is wiring before the change and Right diagram is wiring after completion.
## 13 Troubleshooting

<table>
<thead>
<tr>
<th>NO</th>
<th>Phenomenon</th>
<th>Probable Cause</th>
<th>Check Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>error code [ TC Op ] display</td>
<td>- Sensor(T/C) was Disconnected</td>
<td>- Check T/C wire with tester, if disconnected, replace it</td>
</tr>
<tr>
<td>2</td>
<td>error code [ TC St ] display</td>
<td>- Sensor(T/C) wire is short on output side</td>
<td>- Check whether T/C wire is mis-contacted at connector or pinched by mold</td>
</tr>
<tr>
<td>3</td>
<td>error code [ TC Re ] display</td>
<td>- +/- polarity of sensor (T/C) is reversed</td>
<td>- After Checking the condition of connection in connector attached to mold and change polarity of T/C</td>
</tr>
<tr>
<td>4</td>
<td>error code [ HT Op ] display</td>
<td>- Heater was Disconnected</td>
<td>- Check resistance of heater with tester. If it is a faulty heater, replace heater</td>
</tr>
<tr>
<td>5</td>
<td>error code [ HT St ] display</td>
<td>- Short circuit in heater or capacity of heater is higher than upper limit of current</td>
<td>- Check short or open of heater with tester. - Change the capacity of heater that is lower than 20A</td>
</tr>
<tr>
<td>6</td>
<td>error code [ TR St ] display</td>
<td>- TRIAC attached to heat radiator board is damaged</td>
<td>- Check pin in TRIAC - If 2 or 3 pins are short, it is malfunctioned</td>
</tr>
<tr>
<td>7</td>
<td>error code [ FU1 Op ] display</td>
<td>- F-1 fuse is disconnected by momentary over current</td>
<td>- Replace F-1 fuse. (250V 20A)</td>
</tr>
<tr>
<td>8</td>
<td>error code [ FU2 Op ] display</td>
<td>- F-2 fuse is disconnected by momentary over current</td>
<td>- Replace F-2 fuse. (250V 20A)</td>
</tr>
<tr>
<td>9</td>
<td>Temperature rises continuously</td>
<td>- TRIAC attached to heat sink of controller is damaged</td>
<td>- Check pin in TRIAC - If 2 or 3 pins are short, it is malfunctioned</td>
</tr>
</tbody>
</table>

### Check Point:

- **10** Temperature drops continuously  
  - FS1 or FS2 fuse open  
  - Heater open  
  - Part of wire in heater is opened  
  - Sensor (T/C) open  
  - Change fuse (250V 20A)  
  - Check resistance of heater with tester  
  - Check heater open  

- **11** Significant Temperature Deviation (between SetTemp&Sensing Temp.)  
  - Sensor (T/C) Contact is unstable  
  - Sensor (T/C) type is different (J/K)  
  - Check contact state of sensor  
  - Check sensor type  
  - Try to re-tuning  

- **12** Controller Temperature doesn’t rise but heater in mold is over heated  
  - T/C wire is pinched in mold or it’s coating is peeled, so as to contact mold  
  - Check T/C wire and replace if necessary  
  - Check for T/C mis-wiring  

- **13** Setting temperature of controller equals with present temperature, but the heater in actual mold is overheated or cold.  
  - T/C (sensor) type between mold and controller is different. ex) CA(K)→IC(J) IC(J)→CA(K))  
  - Make T/C (sensor) type of mold equal with that of controller.
### 13.1 Error Code Table

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Display</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
<td>No Error</td>
</tr>
<tr>
<td>1</td>
<td>FU1 Op</td>
<td>Fuse 1 open</td>
</tr>
<tr>
<td>2</td>
<td>FU2 Op</td>
<td>Fuse 2 open</td>
</tr>
<tr>
<td>3</td>
<td>TC Op</td>
<td>Thermocouple open</td>
</tr>
<tr>
<td>4</td>
<td>TC St</td>
<td>Thermocouple short-circuit</td>
</tr>
<tr>
<td>5</td>
<td>TC Re</td>
<td>Thermocouple polarity reverse</td>
</tr>
<tr>
<td>6</td>
<td>AL Hi</td>
<td>High Limit alarm</td>
</tr>
<tr>
<td>7</td>
<td>AL Lo</td>
<td>Low limit alarm</td>
</tr>
<tr>
<td>8</td>
<td>HT Op</td>
<td>Heater open</td>
</tr>
<tr>
<td>9</td>
<td>HT St</td>
<td>Heater open</td>
</tr>
<tr>
<td>10</td>
<td>TR St</td>
<td>Triac short</td>
</tr>
<tr>
<td>240</td>
<td>ComErr</td>
<td>Communication error</td>
</tr>
<tr>
<td>241</td>
<td>TM_OT</td>
<td>Communication time out</td>
</tr>
</tbody>
</table>

### 14 Safety Symbols

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Electricity Symbol]</td>
<td>Dangerous Voltage Inside</td>
</tr>
<tr>
<td>![Warning Symbol]</td>
<td>Disconnect AC Power Before Servicing</td>
</tr>
</tbody>
</table>