Instruction Manual

Temperature Controller

TC-3200 Lite

Ver. 1.1   ENG

TC3200 LITE

Thank you very much for the choosing Hot Temp **Product.**
A content of manual can be different on each product version.
Some parts of manual can be changed without notice to the users.
Please contact to Head Office or Sales Office for questions of the product.

Contents

Warning and Caution for the safety

- These are contents to keep users safe and protect loss of their properties.
- Please Read the user's manual before you start to use the product and
  be careful not to make problem from the wrong operation.
- Screen shots and pictures in User's Manual can be different
  from the product.

⚠ Caution

If you don't keep the following steps, you can get hurt on your body or properties.

● DO NOT Touch the product or power plug with wet hands.
(You can get electric shock.)

● NEVER break up the product while the product is running.
(There is high voltage inside of the product.)

● Separate the controller unit or progress other repairs after turning off
the power.
(It can cause severe malfunction if you separate a controller unit
while the product is running.)

● DO NOT change, separate or fix the product of your own accord.
(You MUST visit Head Office or Sale Office for fixing.)

● Please use rated capacity of fuse.
(DO NOT use iron or copper wire instead of fuse,
It may cause malfunction or fire.)

⚠ Warning

If you don't keep the rule, it is possible that you could get hurt.

● Clean a dust filter once a weeks.

● DO NOT shock or put heavy stuffs on the product.

● Please connect correct power according to the User Manual.

● Please use apparatus or electricity that connected to the product
within the range that allowed.

● DO NOT block the vents of the product.
(It can cause malfunction of the product.)

● DO NOT touch the Touch LCD with sharp stuffs or dirty hands.

→ Feature

The Controller is a device that has a function to maintain the desired temperature consistently by sensing the state of Hot Runner System by use of high-intellectual computer system named MICOM and input proper power. It has several important functions as below for precise temperature control.

● **PID Control and Balance Control**
PID Control is a method in order to maintain temperature at the set temperature value accurately by controlling output power reflecting proportion, integration, and differentiation values. In addition, it can raise same temperatures of nozzle and manifold accrding to heater capacity.

● **Re-Tuning**
Auto tuning is a function to extract the governing factors through analysing capacity of the heaters and heat constant of the mold (characteristics of latent heat and released heat). It helps precise control of temperature regardless of environmental change.

● **Output Type**
You can choose either PWM or SSR mode and control it with users optimized environment.

● **Color touch LCD and various display**
You can check and control the status of the product easier through various displays such as Text/Graph/Digital/Detail

● **Mold File**
You can Manage Setting data for the each Mold and move and copy setting data between several apparatus and control.

● **Alarm, Reporting and Self inspection**
It provides detecting detailed errors and reporting function and it is prossible to manage the machine quickly with the Alarm function. In addition, you can check the status of heater and thermocouple with self inspection.

● **Controller Unit System**
One unit controls 2 zones and it is possible to operate temporary mode without stopping whole system when there is a problem on near zone.
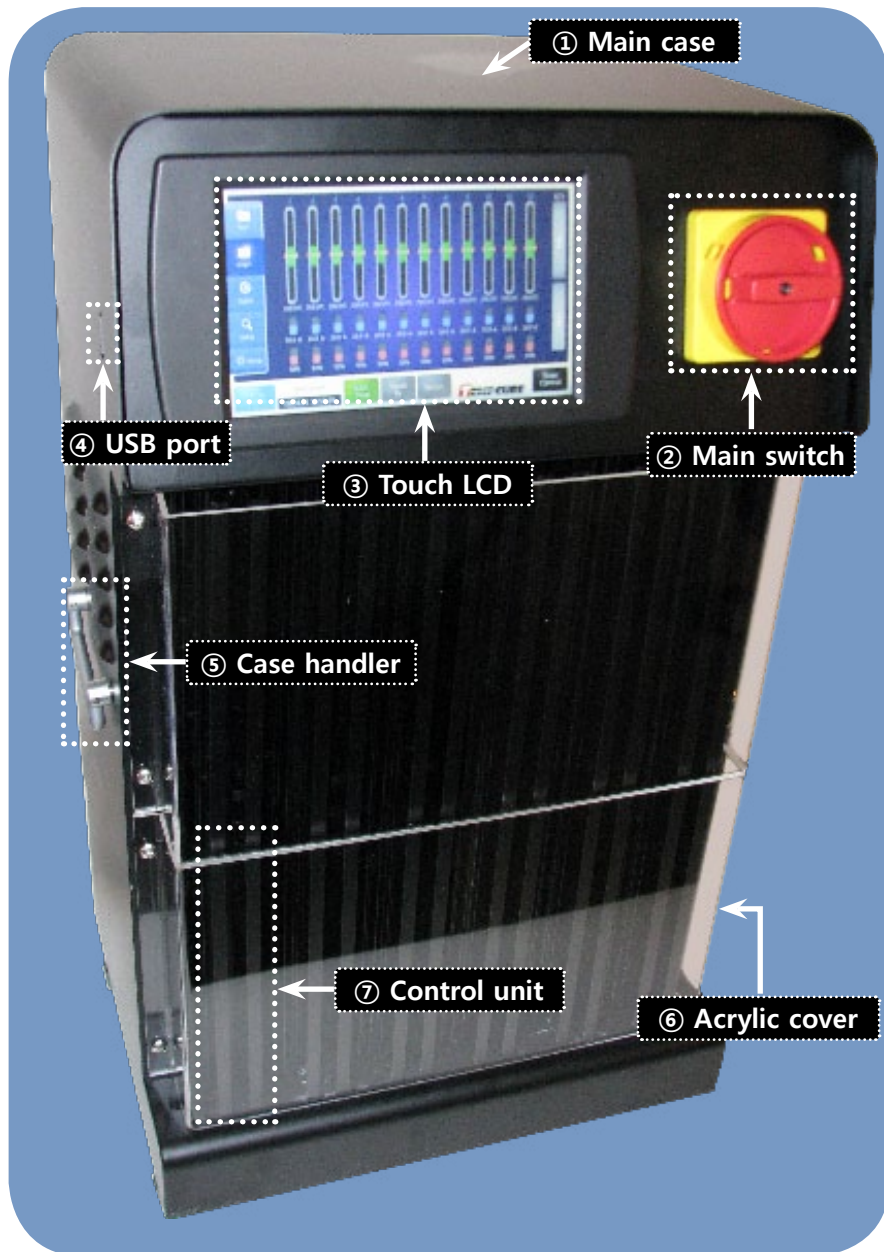
● **Sequence injection timer (option)**
You can manage and control timer and controller at the same time and we make the best circumstances in hot runner controller system.
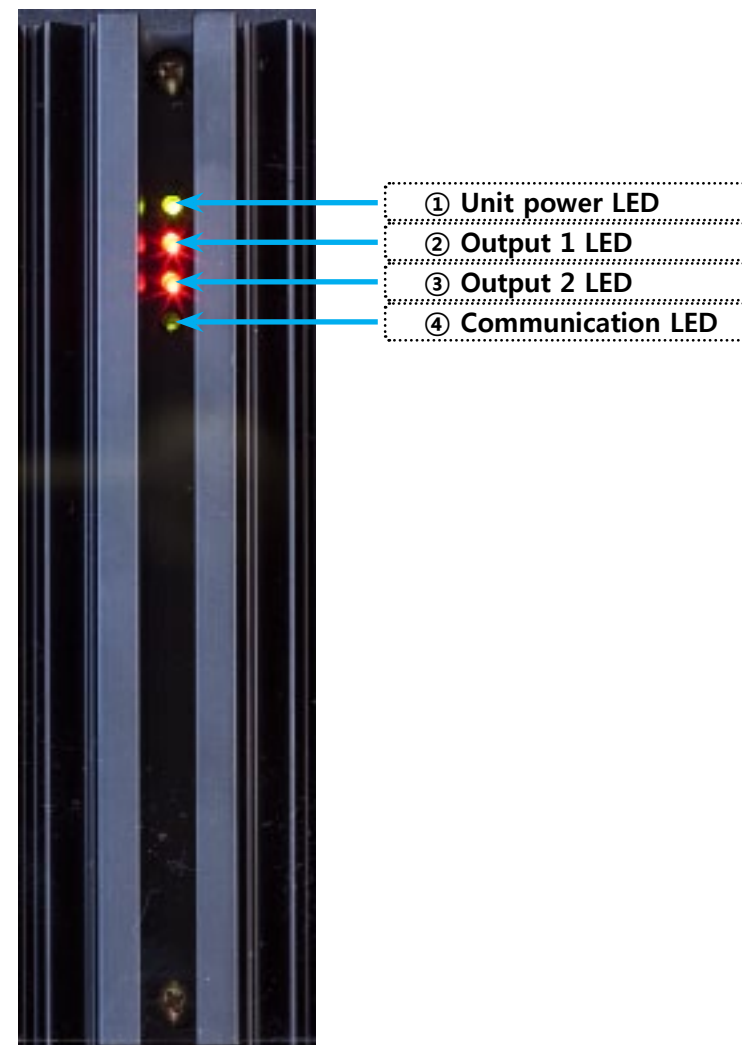
1. Controller unit specification

Thermocouple Calibration Accuracy	0.1℃
Control Accuracy	±0.3℃ from Set point
Control Algorithm	PID, Auto Tuning, Balance Controlling
Manual Mode	Power Compensation for incoming Voltage variation (0 ~ 65%)
Operation Range	30 ~ 500℃ (86~932℉)
Power Output Range	15 Amp/zone (3600W/Zone)
StandBy Temperature	User Selectable (30~500℃)
Boost Mode	1~99min. 0~65% output
Sensor	Thermocouple Type, J or K
Cold Junction Compensation	Internal to enclosure
External Resistance	10Meg. Ohms
Temperature Variation	Due to T/C Length None
Input Voltage	90~250VAC, 50/60Hz
Operation Conditions	0 ~ 50 ℃ UP to 90% humidity(Non-Condensing

ISO9001: 2000

2. Basic structure of controller

① Main case

④ USB port

③ Touch LCD

② Main switch

⑤ Case handler

⑦ Control unit

⑥ Acrylic cover

You can check the status of unit through unit LED.

① Unit power LED
② Output 1 LED
③ Output 2 LED
④ Communication LED

ISO9001: 2000

3. Check up list and operate order before using the controller

1. Check Up status of wiring of connector that connected to the Mold and type of thermocouple(T/C). (Check up that wiring of the thermocouple and heater is separated and wiring is toward from the heater to the thermocouple.)

2. Check up resistance of heater, status of insulation and open of thermocouple.

3. Check up that specification of connecting cable.

4. Connect connecting cable after Mold is installed on injection machine.

5. Check up that input voltage (240V/380V) and setting voltage of controller are same and if so, connect the power cable. (You can find the voltage of the controller from the label on the Controller case.)

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

7. Turn the main power ON.

8. Check up that temperature is approached to the setting temperature with clicking Start Button. (It is more safety to use it after self inspection checking such as wiring, heater and T/C)

 Warning : You ALWAYS NEED to check that fan is working or not since if the fan under the controller is stopped, it causes malfunction.

4. Operating modes

Auto Mode (Start)

Auto mode is normal operation mode in which the temperature is controlled and maintained automatically in accordance with the set degree.

Stand-By Mode

Administrator can decrease setting temperature of the machine on pause time and turn the temperature back automatically after passing the pause time. You can save the electric energy.

When you start [Stand By Mode], Value of [Setting 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.

It will turn back to the [Auto Mode] After the [Stand by Hour/Minute].

Boost Mode

This is the function to output with setting value of [Maximum output of Boost %] to approach to the [Setting temperature (SV)] quickly without [PID control]

When you start [Boost Mode], timer will start running and it will turn to [Stop Mode] after running as much as minutes that set up for [Boost Minute] on the [System setting] Screen

Manual Out

It is emergency mode that can be automatically worked by manual out mode even if it occur sensor open, short and reverse.

5. Basic Operation

1. When you turn on Main S/W, System loading will run for 10 seconds.

2. After the loading, initialization of basic system will run for 10 seconds.

3. After the initialization, it will turn to the Main page and Basic running will be Stop Status.

4. You can use the controller from now on.

5. When you click Text Button, it will turn to the Text Screen.

6. Turn to the System to the start status by clicking [Start/Stop] Button.

7. When you click [Set up] button, you can fix several settings for the Zone.

6. Function of protection

1. Ground fault function
It 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 there occurs T/C open, short-circuit or reverse connection, this function prevents from overheat in mold by stopping output.

3. Protective over current function:
It is a function that is able to stop output and protect heater malfunction when being heater short or over current.

4. Soft-start
When power on, it will be running in [soft-mode] and protect heater malfunction from moisture by working slowly.

5. Setting Current-high and low function:
It is a function which is for detecting heater short or open. It protects heater by stopping output when it detects current because it occurs different setting value.

7. Structure of display

7.1. Basic display

7.1.1. Main display
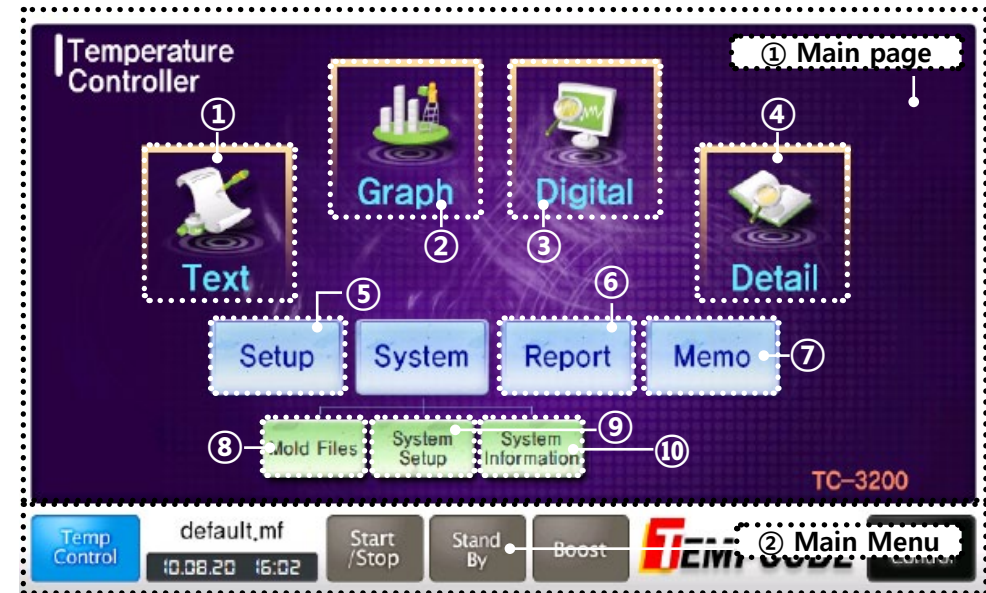
① **Main page:** Main page can be moved to 4 kinds of View Display, Setting Display, Report Display and Guide Display,

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

② **Main Menu:** This is the entire Displays and always on the bottom. It provides change of Temp Control / Timer Control screen and you can control status for Start / Stand By / Boost / Stop of System through the main menu.
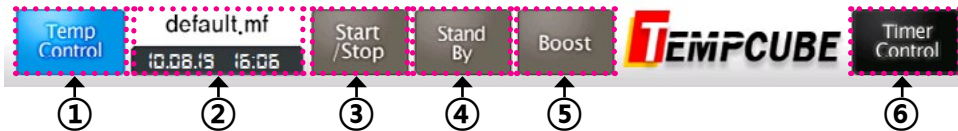
① **Temp Control :** Move the main display of temp controller.

② **Mold File Name & Clock :** It is presented loaded mold file names and time. Move "set mold file" by clicking it.

③ **Start/Stop :** Start or stop system.

④ **Stand By :** Set [Standby Mode].

⑤ **Boost :** Set [Boost Mode].

⑥ **Timer Control :** Move the main display of timer controller.

7.1.2. Sub Screen

① Sub Menu   ② Sub Screen

① **Sub Menu:** Sub menu is displayed through the entire sub screens and you can change View screen such as Text, Graph, Digital and Detail and also change setup screen.

② **Sub Screen:** It shows screen view or screen setup.

7.2. Operation screen

Operation screen has 4 kinds of screens, "Text / Graph / Digital / Detail".
Operation screen can be chosen by control status of controller or users.

It will show "YELLOW" on Alarm and "RED" on Error according to the status of Zone.

It will display prefix on Zone number by status of Zone.

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

You can change the screen page with arrow button when you cannot see the screen because of many Zones.

7.2.1. Text Screen

①Zone No
②Present Temp
③SetTemp
④Output Percent
⑤consumption current
⑥AlarmHigh
⑦AlarmLow
⑧Thermocouple
⑨Output method
⑩Watt
⑪ErrorCode

You can see the operation status of controller with "Text" type on the Text Screen. You can display [12 zones/24 zones/48 zones] on entire screen selectively with "Text" Button.

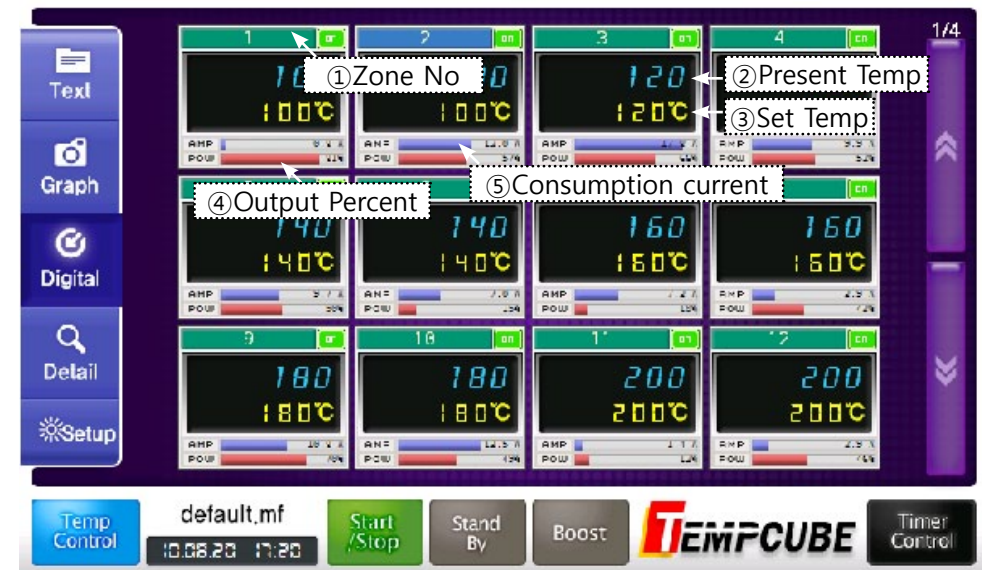→ **Display changing function in text display**
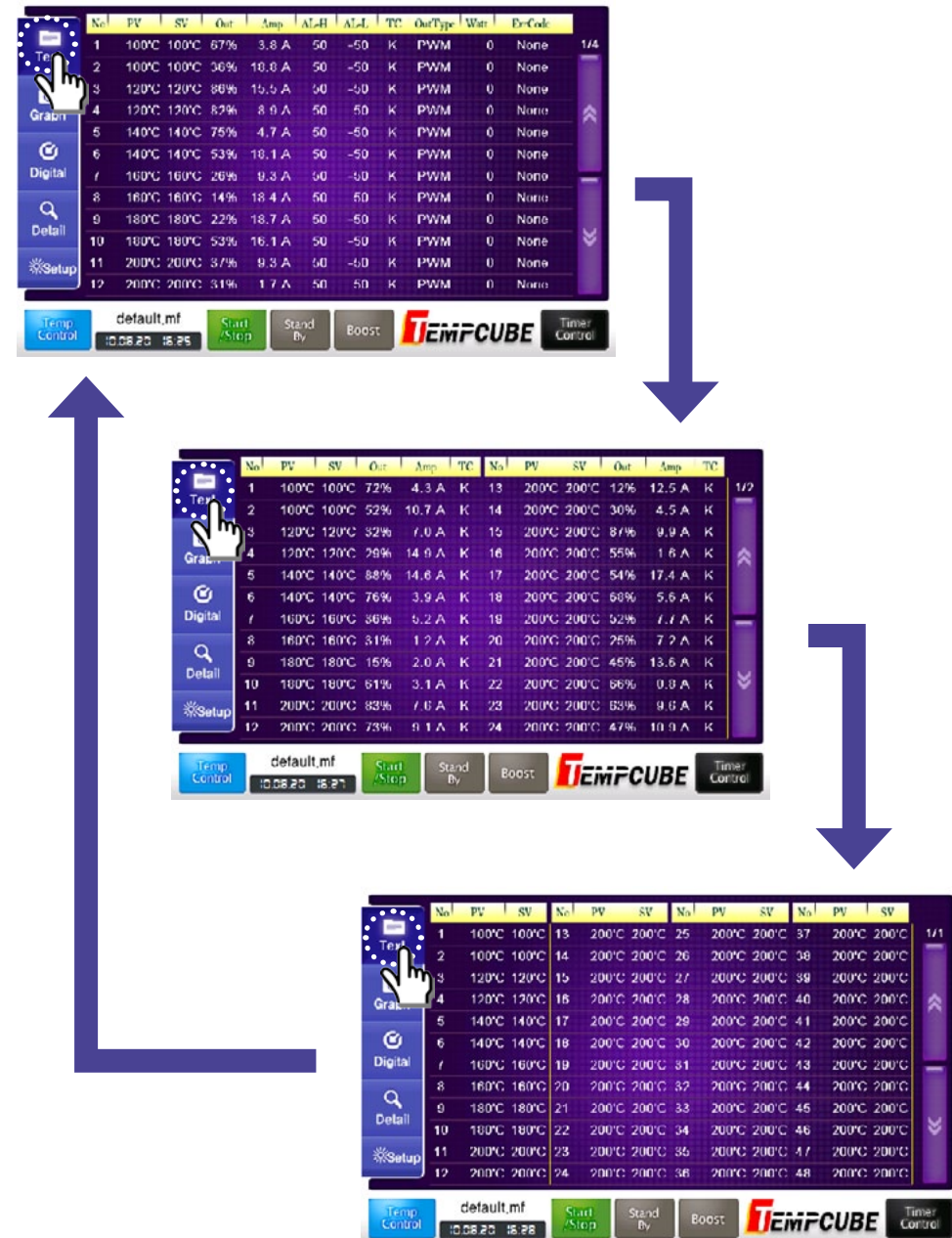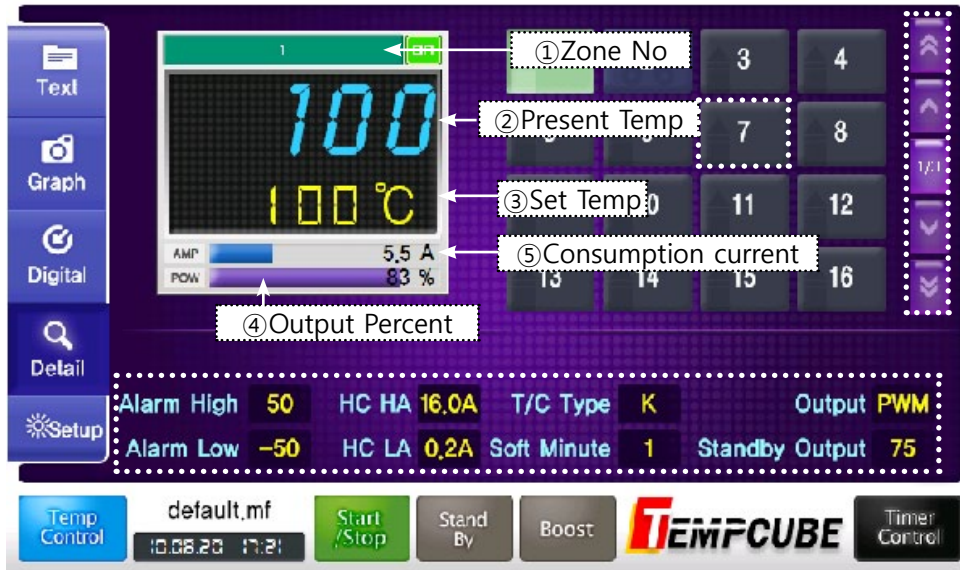
7.2.2. Graph
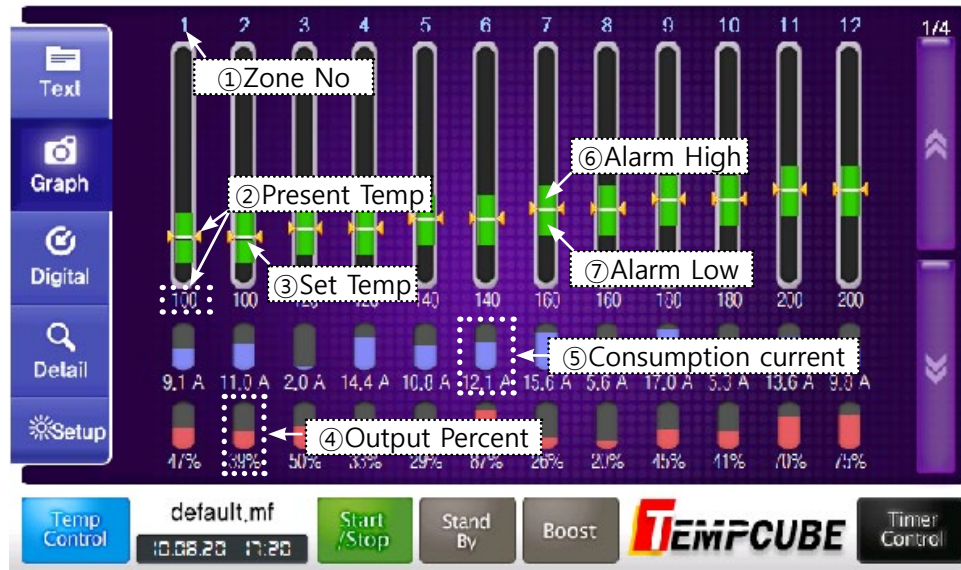
You can see the operation status of controller with "Bar" type on the Graph Screen. You can display [12 zones] on entire screen.

7.2.3. Digital

You can see the operation status of controller with "Digital" type on the Digital Screen. You can display [12 zones] on entire screen.

7.2.4. Detail

①Zone No
②Present Temp
③Set Temp
⑤Consumption current
④Output Percent

You can use Detailed 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 with Digital Number and [16 zones] will be displayed on zone selection button on the right side.

7.3. Setting display

7.3.1. Basic setting display
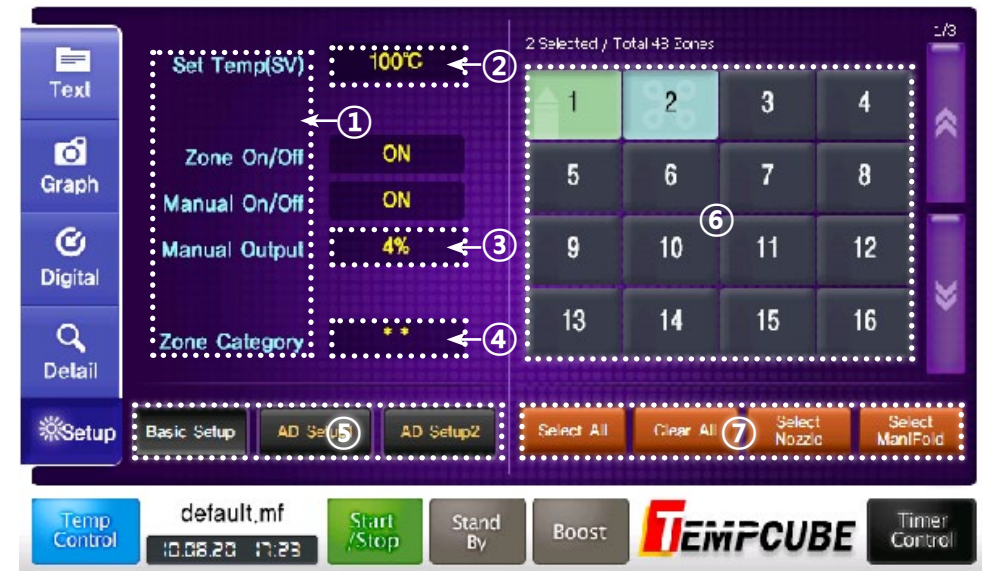
① **Setting item name:** This is the place that displayed name of setting item.

② **Display setting value:** It will display setting value for set up.

③ **No setting value:** It will display [- -] when there is no setting or no selection of zone.

④ **Difference of setting value:** It will display [* *] when setting values are different if you choose several zones.

⑤ **Page change of setting screen:** This is the button that change setting screen of [basic setup], [Advanced setup 1] and [Advanced setup 2]. You can set up Advance setup when "Lock Mode" is released only.

⑥ **Zone Selection Button1:** When you click the button, it is selected and when you click the button again, it is released.

⑦ **Zone Selection Button2:**

Select All ☞ Click when you select the entire zone.

Release All ☞ Click when you release the entire zone.

Select nozzle ☞ When you click this option, zone that set as nozzle is selected and when you click this option again, zone that set as nozzle is released.

Select Manifold ☞ When you click this option, zone that set as Manifold is selected and when you click this option again, zone that set as Manifold is released.

7.3.1.1. Basic setting

① **Setting Temperature (SV):** You can set up 30~500℃ (86℉~932℉) range of temperature.

② **Zone ON/OFF:** You can turn ON/OFF control of the zone.

③ **Manual Mode:** This is the setting for control of zone as Auto or Manual.
   ※ Manual Mode, This is the emergency operation mode when thermocouple is malfunctioned or request injection urgently. User can control amount of output as user wants.
(You can use this mode when there is Sensor open (TC Op) or Sensor Short (TC St).)

If you set [Manual Mode] as "ON", setting of [amount of manual output] is activated. You can control amount of output from 0% to 65% and output of your own accord.

④ **Amount of Manual output:** you can set only when Manual Mode is "ON" and set amount of output of the zone from 0% to 65% manually.

⑤ **Zone Classification:** You can set as [Nozzle] or [Manifold] for setting or classification of zone.

7.3.1.2. Advanced setting 1

Remark! ONLY Skilled user can use Quick setting since it will affect to operation of hot runner controller system a lot. (It is basically locked by [System setup] [lock setup] to protect change of setting value by user's mistake.)

① **T/C Type** : Set thermocouple type [J] or [K].

② **Soft (Minute):** You can run this with [Soft Mode] to protect heater. If it is satisfied the condition below, it will output "30%" of usage power (amount of control) for setting minute when power is on and it will protect damage of heater from moisture by control activity on the low heat status.

   Condition: 1) Temperature of zone is below 50% of setting temperature.
   2) It is until setting time after starting (default one minute)

③ **Upper limit of current:** This is the function for investigation when heater has problem (Short Circuit). When current is authorized above the upper limit of current, it will show Error Code, "Ht St" and Alarm will run and output will be stopped.

④ **Lower limit of current:** This is the function for investigation when heater has problem (open). When current is authorized below the lower limit of current, it will show Error Code, "Ht Op" and Alarm will run and output will be stopped.

⑤ **Output type:** You can select the output type with [SSR] or [PWM] according to the environment.
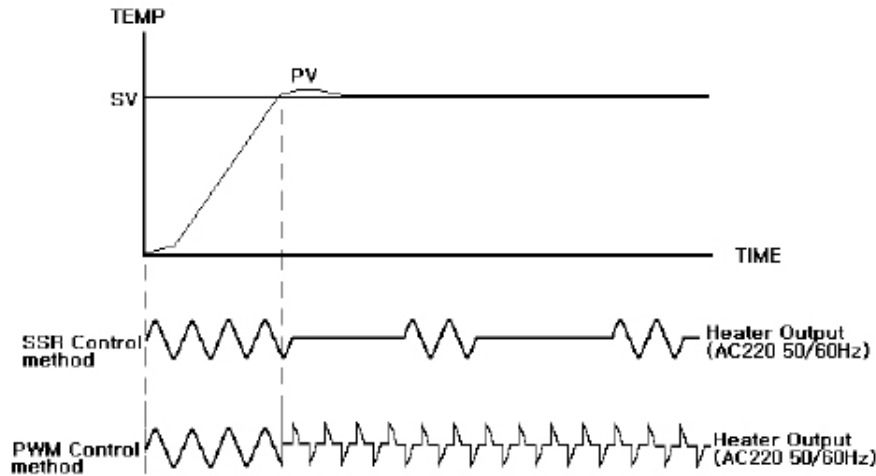
⑥ **Upper limit of Alarm:** You can set upper limit of temperature with standard of setting temperature and Alarm will run on raising temperature above the setting temperature.

⑦ **Lower limit of Alarm:** You can set lower limit of temperature with standard of setting temperature and Alarm will run on decreasing temperature below the setting temperature.
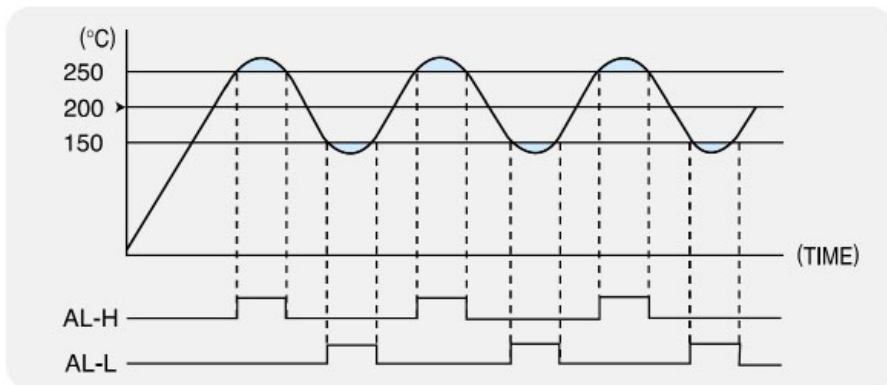
If you set Setting temperature (SV) as 200℃, Upper limit of Alarm as 50℃ and Lower limit of Alarm as -50℃? ☞ Alert of Upper limit of Alarm (Al. Hi) will be raised on current temperature 250℃ and Alert of Lower limit of Alarm (Al. Lo) will be raised on 150 ℃.

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7.3.1.3. Advanced setting 2

① **Stand By Output:** Users can reduce the setting temperature of machine to the stand by output % on pause time and turn back automatically after the pause time. So you can save the electric energy.

② **Boost Maximum Output:** It will be set Maximum amount of Output (%) of heater on the Boost Mode (When you raise the temperature of heater quickly).

③ **T/C Correction:** It will be set to correct as much as the gap of temperature when there is difference between temperature of thermocouple and real temperature.

④ **T/C Change of Zone:** This function is to control the temperature with reference of other thermocouple around the machine when you cannot control the temperature on the error of the thermocouple.

⑤ **Tuning Mode:** You can re-tune to meet the feature of the heater when you cannot control the temperature.
(It will run output activity 2 or 3 times to find the feature until re-tuning is completed.)

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⑥ **Setup PID:** You can set value of PID manually according to some Mold or status of the heater.

⑦ **K (Constant):** This is the value of constant to apply on calculation of PID.

⑧ **P (proportion):** This is the value to apply on calculation of amount of the output about the gap of the setting temperature.

⑨ **I (Integral):** This is the major value to get rid of the accumulation gap around the setting temperature.

⑩ **D (differential):** This is the major value to prevent from sudden change of amount of the control.

7.3.2. System setting display

System Setup is for the setting of the entire system. You can set when you click [System Setup] on [Main Screen].
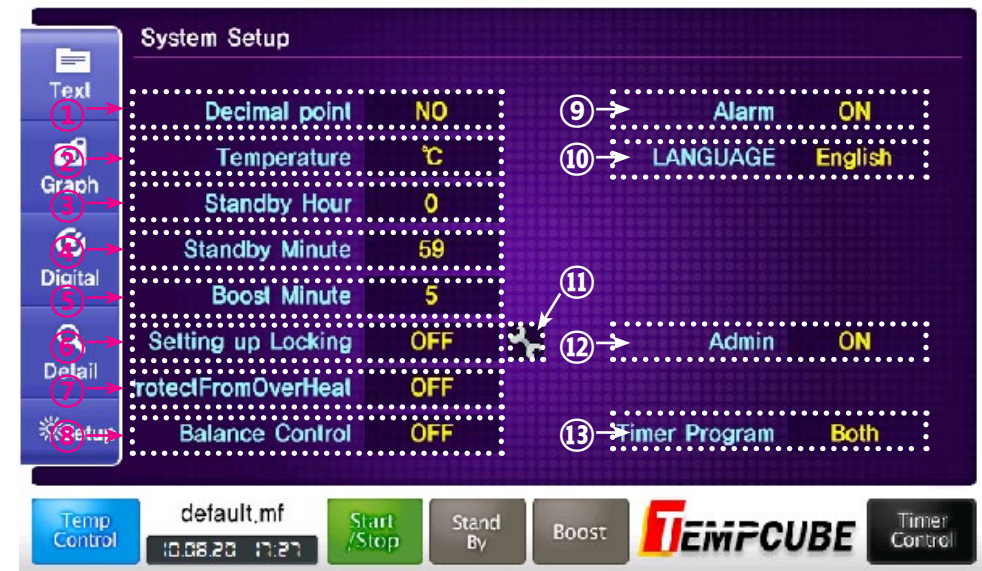
① **Display of Decimal Point:** You can set how to display of [Current Temperature] on the [Active Screen].

Ex) Display of Decimal Point [Yes]: 200.0 ℃
Display of Decimal Point [No]: 200 ℃

② **How to display the temperature:** You can change the range of the using temperature. [℃↔℉]

Ex) How to display the temperature [℃]: 200℃
How to display the temperature [℉]: 200℉

③ **Stand By (Hour):** It will turn to [Auto Mode] after the setting hour on the Stand By Mode.

④ **Stand By (Minute):** It will turn to [Auto Mode] after the setting Minute on the Stand By Mode.
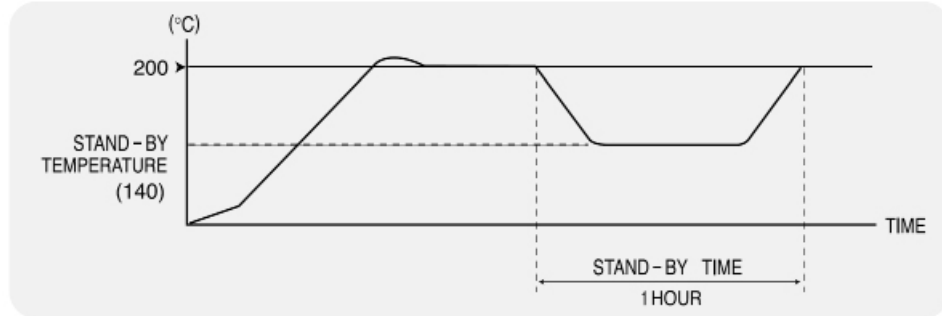
ex) In case (Set Temp:SV) : 200 ℃, t(Stand-By Hour) : 1 hour (1:00),
   P (Standby out) : 70 %
☞ Stand-By mode is 140 which is 70% of mode set temperature.

⑤ **Boost (Minute):** It will turn to [Stop Mode] after the setting Minute on the Boost Mode.

⑥ **Setup Lock Function:** This is the function to lock the system NOT normal user to change Advanced Setup and some System Setup.
 * Setting that affected by Setup Lock Function
  → [Basic Setup]: [Advanced Setup 1] / [Advanced Setup 2]
  → [System Setup]: [Alarm] / [LANGUAGE] / [Administrator] / [Timer Program]

⑦ **Protecting overheat function:** This is the function which is automatically able to detect the time of temporary checking or pause. Regarding this, it protects from overheat of mold and burning or over-temperature resin by converting (Stand-by condition)

⑧ **Balance control:** It prevents from overheat of mold or burning or over-temperature resin in ready time by raising all of zones of setting temperature value at the same time according to heaters capacity and status.

⑨ **Alarm:** If you use Alarm function, Alarm function will run when system has error.

⑩ **LANGUAGE:** You can change display language according to your language.

⑪ **Setting in details:** It browses setting in details display in order to set details in each setting

⑫ **Administrator:** You open administrator mode.

⑬ **Timer program:** If sequence injection timer is installed, you can select and control it.

7.4. Mold File

7.4.1. Mold File setting

 [Mode File] is setting for Mold. You can set on each Mold. Even if Mold is changed, you can load the existed setting without setup again. You can set when you click [Mold File] on [Main Screen].
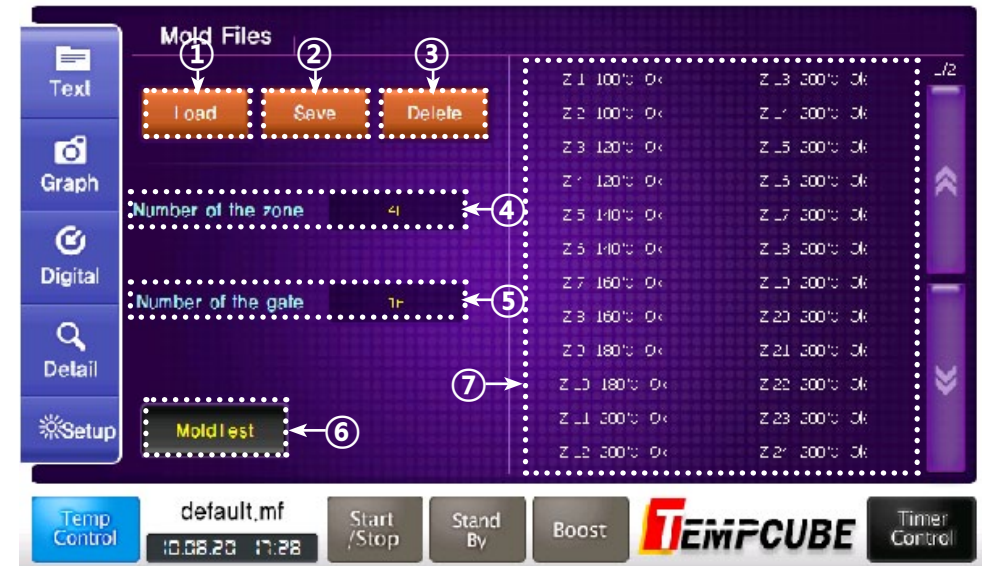

① **Load:** It will load the saved Mold File in the [Memory] or [USB Stick].

② **Save:** It will save the loaded mold file or save the file with other name.

③ **Delete:** It will delete the saved Mold File in the [Memory] or [USB Stick].

④ **Number of Zone:** It will set a number of zones.

⑤ **Number of gate:** It will set a number of gates.

⑥ **Mode Test:** You can test the Mold.

⑦ **Checking Window for zone status:** It will display setting temperature of each zone and status of current communication.

7.4.2. Mold Test

Mold Test will guide that user can check the status of system and investigate the problem.

1. Select [Mold File] Menu on the [Main Page].
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 you start [Start] Button, test will start.

* When you find the problem, it will be useful if you refer to [Problem and how to handle the problem while you are using the controller] and [Error Code Table] on Chapter 13.
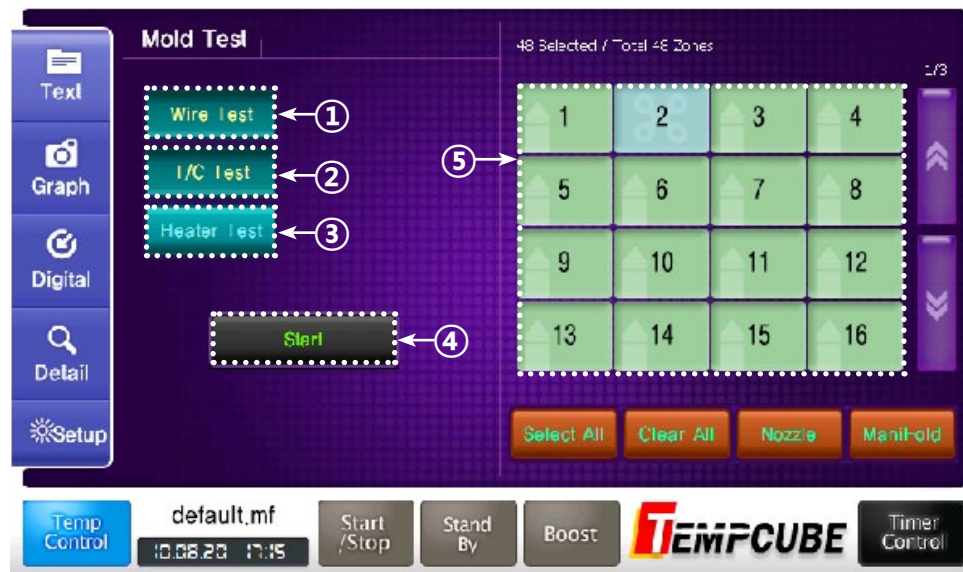
① **Wire Test:** You can test wiring Test, T/C, open/Short Circuit/reverse connection for heater wiring and so on.
② **T/C Test:** open/Short Circuit/ reverse connection Test for T/C.
③ **Heater Test:** open/Short Circuit Test for heater
④ **Start:** When you click the Button, screen will be changed to Test Screen and test will start.
⑤ **Selection Button for Test Zone:** You can choose the zone to test selectively.

7.4.3. Run mold test

Test will progress when you click [Start] Button on [Mold Test] and Progress Status will be displayed.
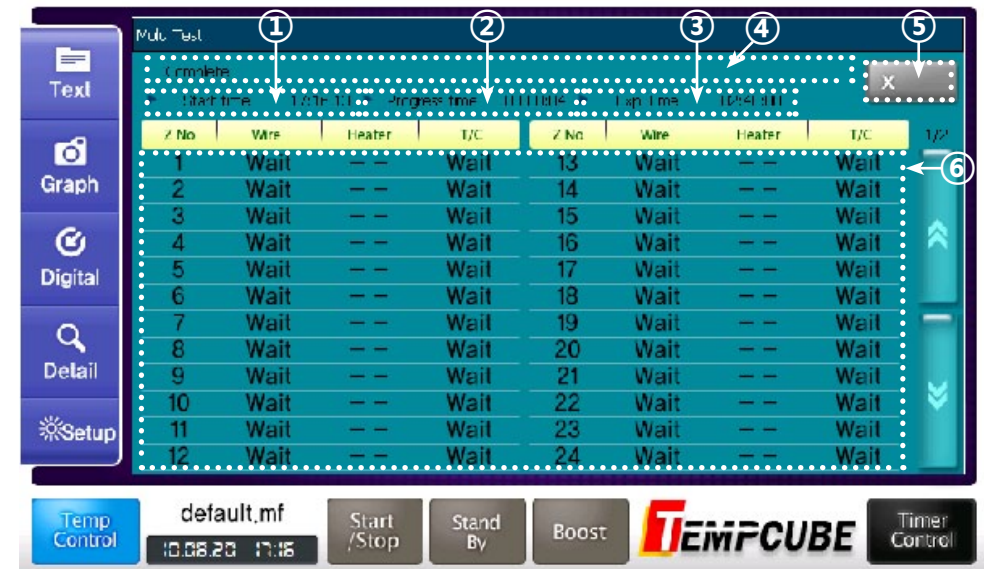
① **Start Time:** It will display Start time of the Test.

② **Progress Time:** It will display Progress of the Test.

③ **Remaining time:** It will display forecast remain time until the end of test.

④ **Finish Rate:** It will display finish rate of the test with 100%.

⑤ **Finish:** Test will be finished when you click Finish Button whenever you want to stop on the test.

⑥ **Display of progress status:** It will display progress status of the test.

7.5. Report

7.5.1. Error record

Error Record collects generated error code from the hardware on system operation.

You can refer to [Error Code Table] on chapter 13 and you can solve the problem with referring to [Problem and how to handle the problem while you are using the controller] when issue is occurred.

7.5.2. Changing record

It will record a history of setting change or history of changed status on system operation.

It will help to operate the system if you refer to the changing record.

7.5.3. System record

It will record system start or history of loading [Mold File].

7.6. System information
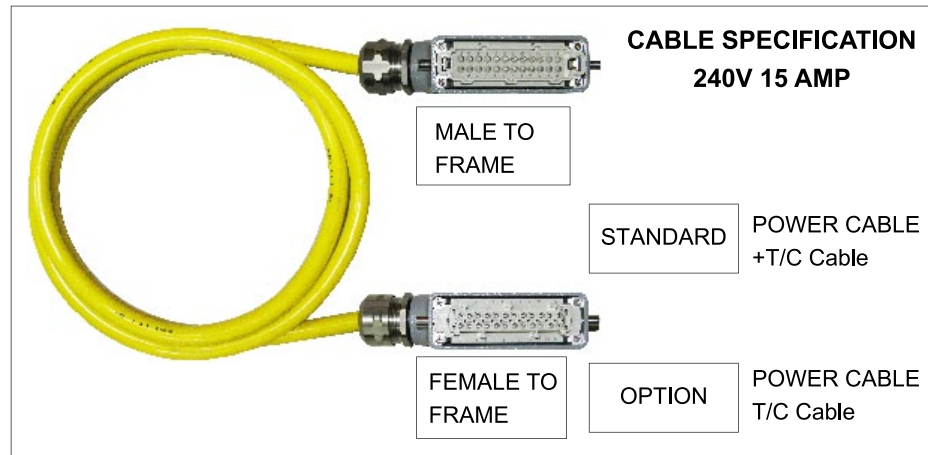

You can check system version or language file version with system information and you can use this for system upgrade.

8. Connector and cable

Connector means a component attached to the end part of cable in order to make it easy to connect / disconnect the wire to the mold / controller. Various kinds of connectors are used depending on load capacities.

8.1. Connecting cable

CABLE SPECIFICATION 240V 15 AMP	
MALE TO FRAME	
STANDARD	POWER CABLE +T/C Cable
FEMALE TO FRAME	
OPTION	POWER CABLE T/C Cable

8.2. How to wire a heater and T/C in connectors

■ **24Pin Connector**
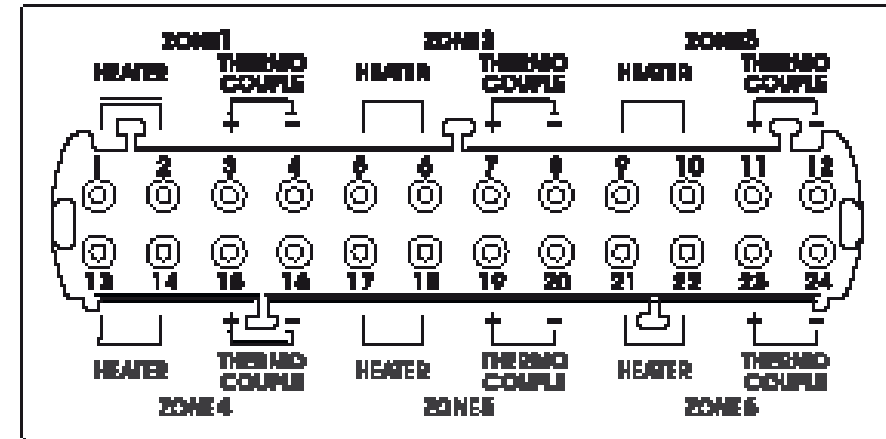
8.3. Standard specification

Attached connector in main case is female connector type, and TempControls supply it with 24 pins as same to the following standard.

NO	Controller	EA
1	6 Zone	1 EA
2	12 Zone	2 EA
3	24 Zone	4 EA
4	48 Zone	8 EA
5	60 Zone	10 EA
6	72 Zone	12 EA
7	84 Zone	14 EA
8	96 Zone	16 EA
9	108 Zone	18 EA
10	120 Zone	20 EA
11	132 Zone	22 EA
12	144 Zone	24 EA

8.4. Option

As for option in wiring, separate power lines from that of T/C can be selected depending on customer's preference.
But also the other connector out of standard could be equipped when those are supplied from customer. In case that, a cable is fabricated according to special order, controller connector must be individually fabricated in accordance with the cable specification.

24P Female heater   24P Male T/C connector
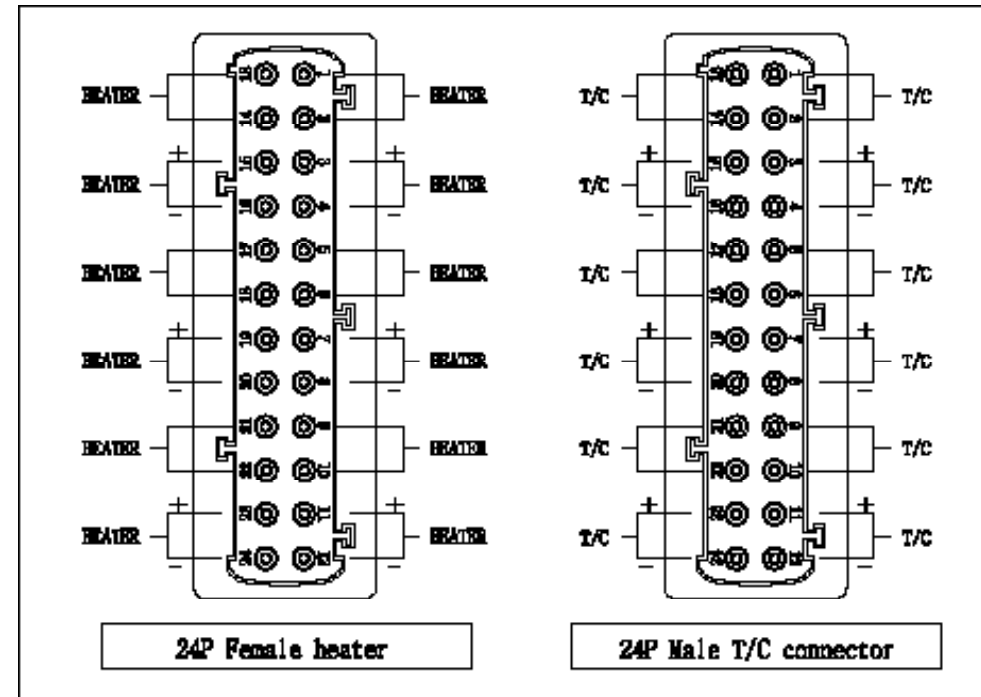
9. Default Value when Product is released

9.4.1. Basic Setting

No	Menu	Value
1	Set Temp(SV)	200℃
2	Zone ON/OFF	Off
3	Manual Mode	Off
4	Manual Output Rate	0%
5	Zone Category	Nozzle

9.4.2. Advanced Setting 1

No	Menu	Value
1	T/C Type	J
2	Soft Minute	1
3	Current high limit	16.0 A
4	Current low limit	0.2 A
5	Output Method	PWM
6	Alarm high limit	50 ℃
7	Alarm low limit	-50 ℃

9.4.3. Advanced setting 2

No	Menu	Value
1	Standby output	75%
2	Boost max output	65%
3	T/C Calibration	0 ℃
4	Change zone T/C	0
5	Tuning mode	Off
6	PID setting	Off
7	K	50
8	P	100
9	I	0
10	D	0

9.4.4. System setting

No	Menu	Value
1	Display decimal point	No
2	Display Temperature Unit	℃
3	Standby Hour	0 Hour
4	Standby Minute	59 min
5	Boost Minute	5 min
6	Lock Mode	Off
7	Lock Mode Password	1234
8	Protect from over heat	Off
9	Balance control	Off
10	Alarm	Off
11	LANGUAGE	English
12	Timer	Temp

10. Diagram for terminal connection & structure

1. GND
2. 485 B
3. 485 A
4. TC2 +
5. TC2 -
6. TC1 +
7. TC1 -
8. Earth

9. AC 220V
10. Heater 2
11. Heater 1

13. FUSE 2 (2)
14. FUSE 2 (1)
15. FUSE 1 (1)
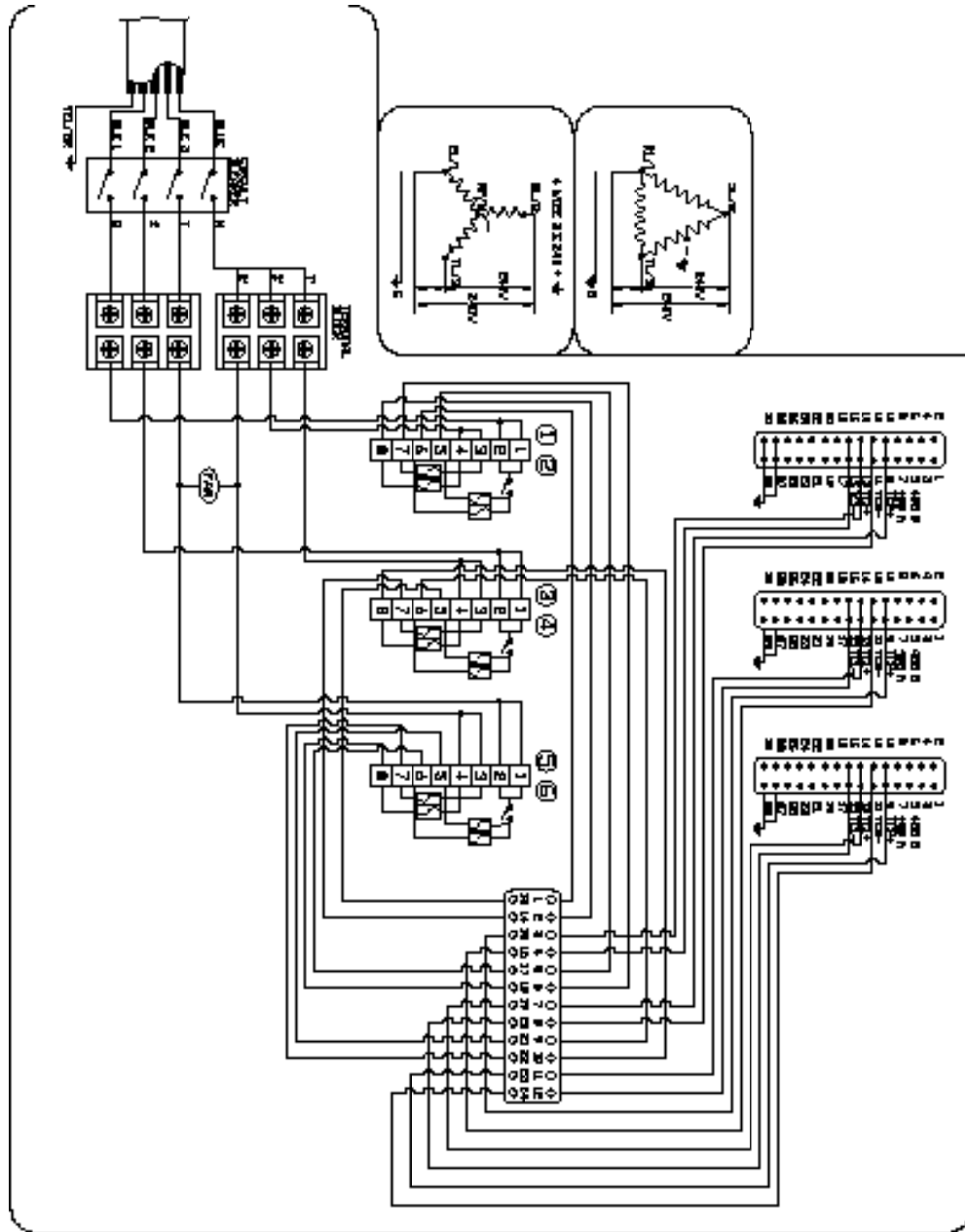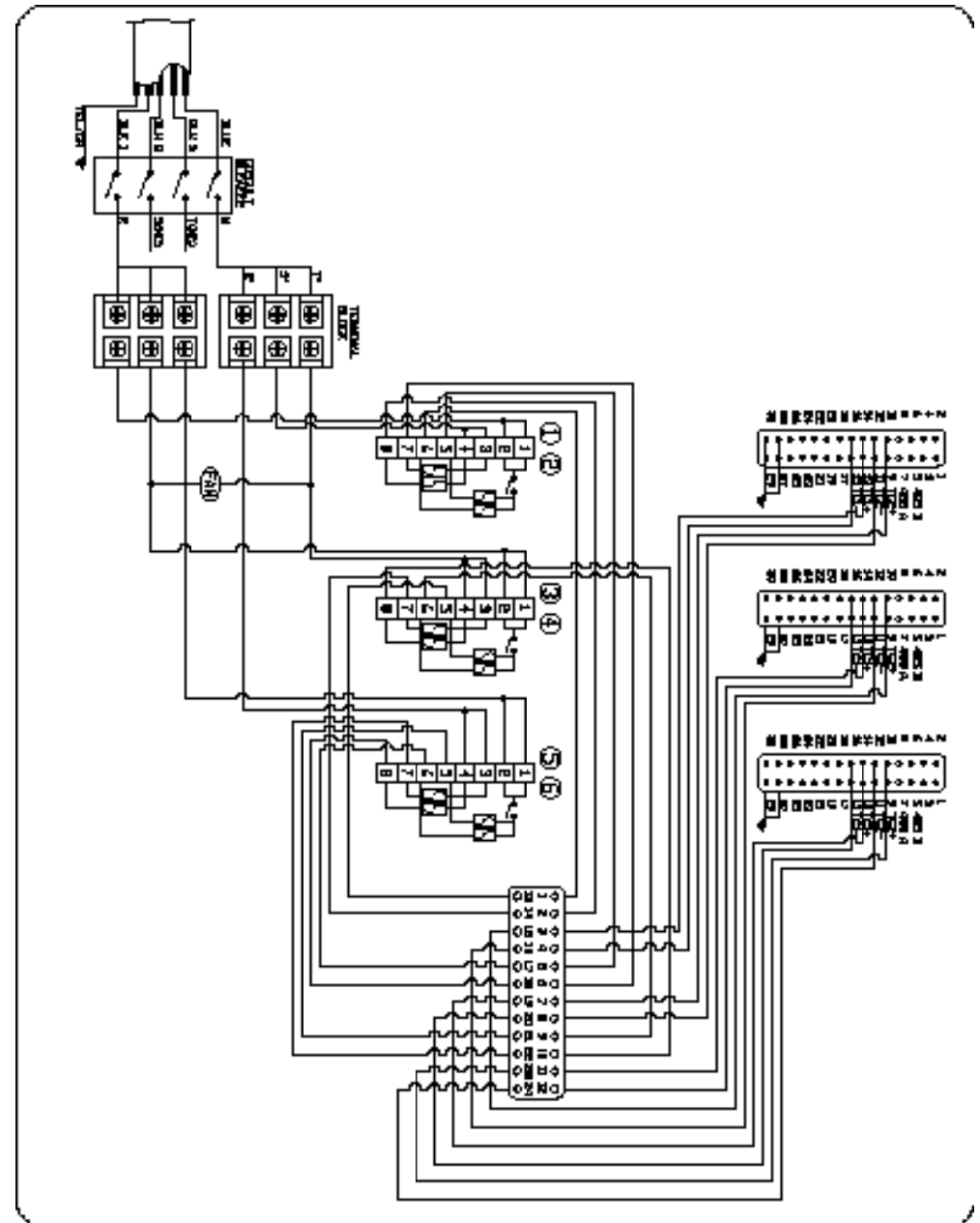16. FUSE 1 (2)
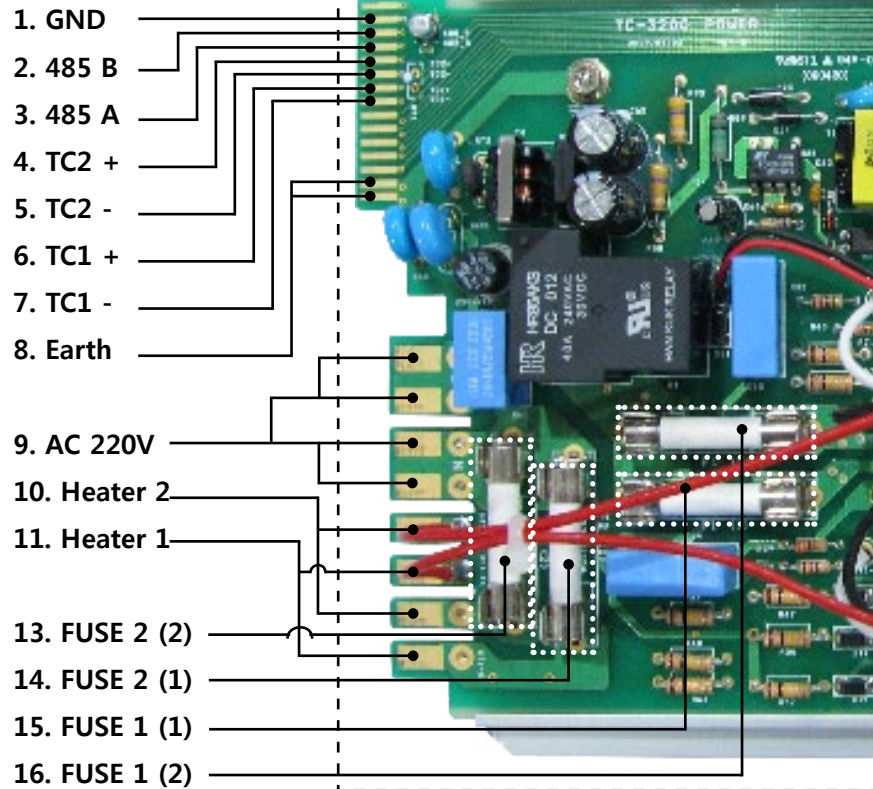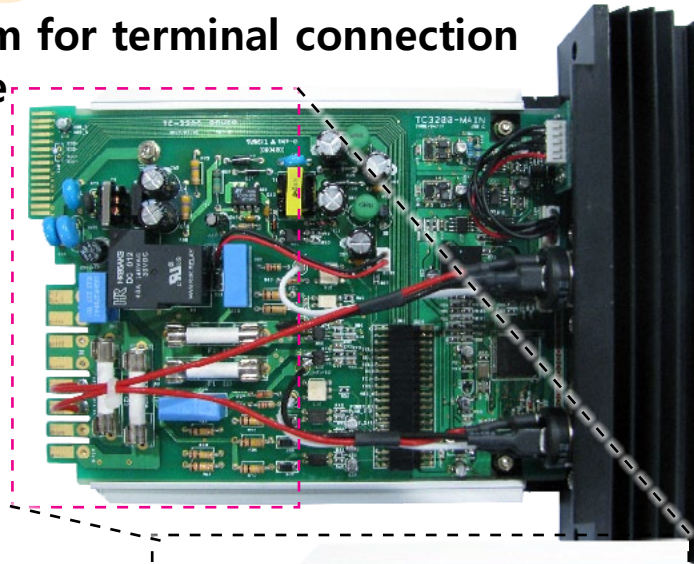
11. Electric wiring diagram

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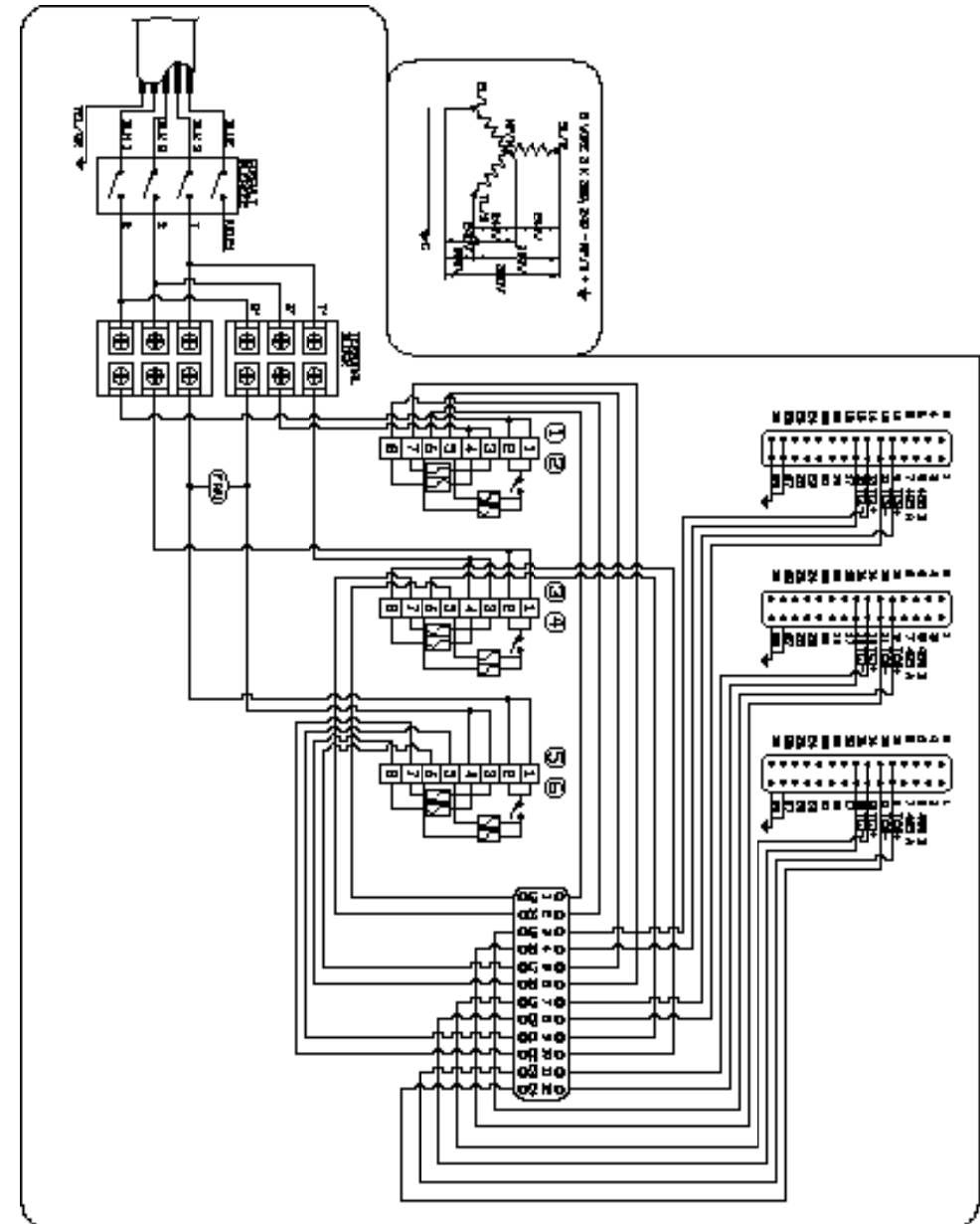
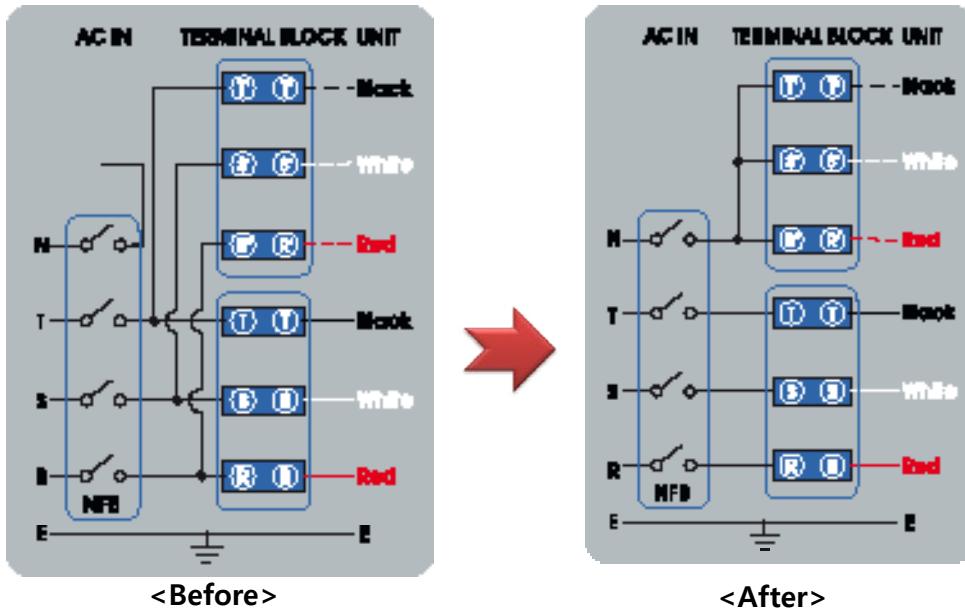## 11.2. 380V / 440V 3Phase 4 Line Type

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

<Before>　　　　　　　　<After>

1. Turn Power of controller OFF.

2. Turn the main power OFF.

3. Loose bolt on top of the main case and open the cover.

4. Separate R, S and T jumper wire that connected 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
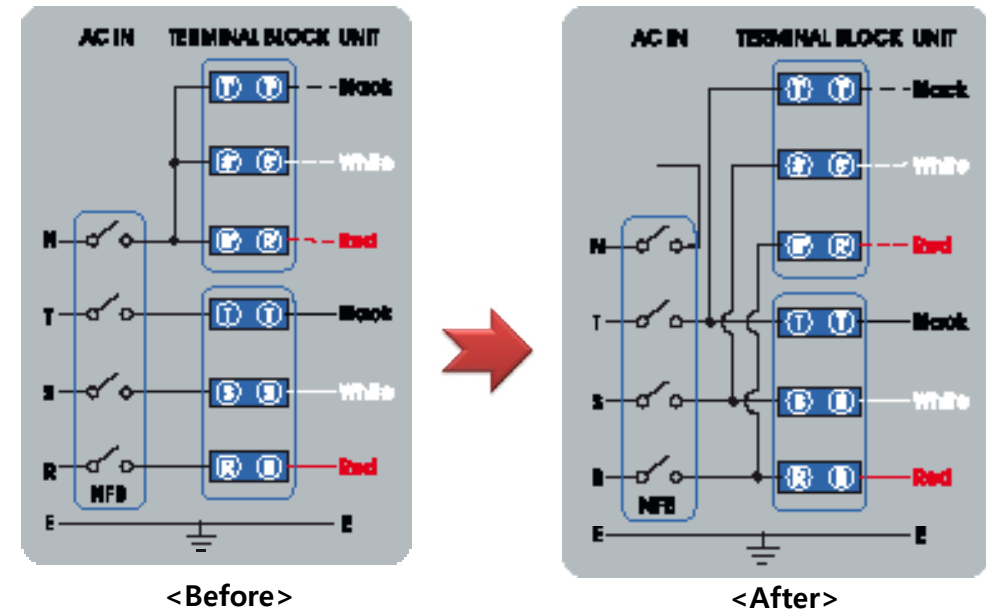
<Before>　　　　　　　　<After>

1. Turn Power of controller OFF.

2. Turn the main power OFF.

3. Loose bolt on top of the main case and open the cover.

4. Separate R', S' and T' jumper wire that connected 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. Check points for the trouble shooting

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

| No	Phenomenon	Probable cause	Check Point
10	Temperature drops continuously	- FS1 or FS2 fuse open - Heater open - the 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	Severe Temperature (Deviation between SetTemp&Sensing Temp.)	- Sensor Contact is unstable - Sensor type is different in each other	- Check contact state of sensor - Check sensor type - Try to re-tuning
12	Controller Temperature doesn't rises, But heater in actua mold is over heated	T/C wire is pressed by mold or it's coat is peeled, so as to contact mold or line	Check T/C wire and replace it
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. Table of error code

You can check the statue of HOT RUNNER SYSTEM in accordance with the error code

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

14. Security marks

	Dangerous voltage inside
	Disconnect AC Power Before Servicing
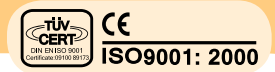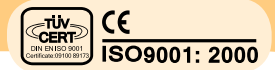
Hot Temp Corp.

5319 Brown Ave. St. Louis, MO 63120

sales@hot-temp.com   314-574-5777
www.hot-temp.com