User Manual

Hot Runner Temperature Controller

ISO9001:2008

CW 991

English

ORIGINAL VERSION

YUDO

Thank you for using YUDO product.

Integrated Control System

- Available to control the temperature and the Sequence Injection Timer
- Available to manage the injection condition for each mold as well the files and log
- The central control system for multi CW991 through the network

Easy To Use

- User friendly Color Touch LCD equipped with MMI
- To prevent the error setting, the authority code is provided to each user

Customization

- The optimized zone for the wide variety of injection environment
- Available to provide the special function upon customer's request

Reliability

- 15 criteria internal safety inspections
- CE certification, UL approved

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1. Check Point before use

Only persons with a thorough knowledge of the system's operation and capabilities should operate the system. Also, keep this user manual with processor so that he or she can refer to this manual.

- Our policy is one of continuous improvement and we reserve the right to alter product specifications at any time without giving notice.
- Whilst every effort has been made to avoid errors in the text, the author and publisher shall not be under any legal liability of any kind in respect of or arising out of the information contained herein.

  Please contact supplier or YUDO representatives to inquiry any questions.
- No part of this document may be reproduced in any form of by any means, electronic, mechanical photocopying or otherwise, without prior written permission of the copyright owner.

1) Appearance Checkup

Check actual controller received differences from contractual configurations.
Check Touch Panel carefully.
Contact supplier or YUDO sales office if you find any damaged or missing parts.

2) Safely Sign

Sign	Meaning	Sign	Meaning
	Must do Grounding		Caution
	Danger		Danger of electric shock
	Attention High Temperature		

3) Configurations and Dimensions

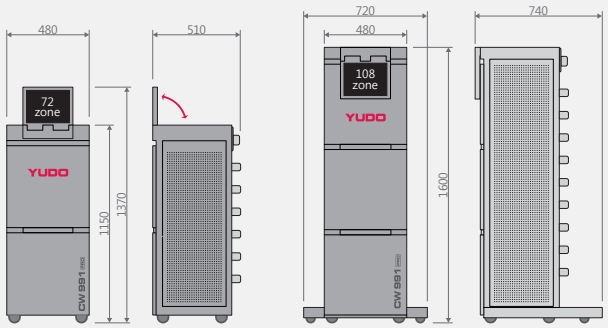
- Configurations

Model	Max of Zone No.	Max. Capacity	Remarks
CW991 PRO	72	Max 150A	12.1 inch Touch Panel
	108	Max 225A	12.1 inch Touch Panel
CW991 Slim	24	Max 100A	7 inch wide touch panel
CW991 Standard	48	Max 100A	12.1 inch Touch Panel
	72	Max 150A	12.1 inch Touch Panel
	96	Max 200A	15 inch Touch Panel
	120	Max 225A	15 inch Touch Panel

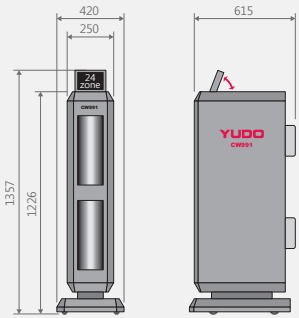
※Option: 16 channel timer [CW991 Standard 48zone is 8 channel]

CW991 PRO

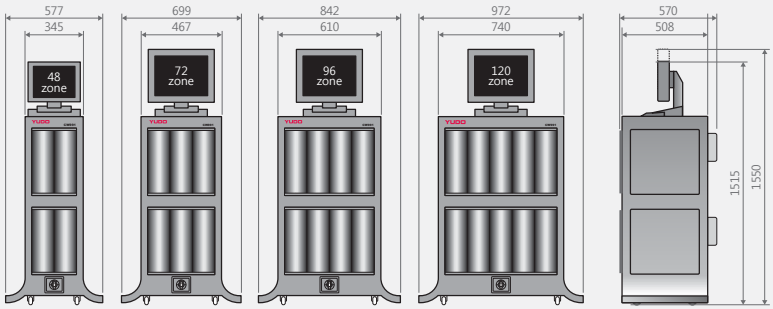
Unit : mm



CW991 Slim



CW991 Standard



4) Caution and Instructions for safety

4-1) Main risk element and prevention

• The Risk by electric and electric shock

- Be sure that currents can be flowing on the product because the controller is using 220Vac or higher and larger voltage in order to control heaters of mold, so it cause injury and even death when you touch on the side flowing currents accidently.
- Read all of general safety instructions closely, please be informed and take prevention measures for all of the accident can be cause while operating and maintenance.

- **Do not handle the controller with wet hands. Otherwise, it can cause electric shock or severe injury.**

- **Turning the controller on without notice when a worker maintains equipment is very dangerous. It can cause severe injury since currents can be flowing into the worker accidently. Thus, the worker has to notice maintenance to prevent co-worker to operate controller.**

- **Touching on the side flowing currents accidently, it can cause electric shock and even severe injury or death by flowing currents in a flash. Thus, please follow below procedures and instructions.**

  ■ After confirming whether the power is off or not, please check residual electricity on controller by tester.

  ■ Do not wear the accessory including metal (ring, watch, bracelet and so on) that can be flowed currents. It is at high risk for electric shock.

- **In case of melting a fuse or switching off, the reason can be a leakage current. If you turn equipment on without notice, not only the power is off but also the worker could be frosted cause by leakage current. At this moment, you have to maintain equipment after disassembling power.**

  ■ Risk part

  • Connector of heater output
  • Connector of solenoid valve output
  • Main power switch
  • Terminal and all kinds of cable of controller
  • Power supply
  • Bus-bar covered in side of controller and power cable

• A risk by heat

– Controller can be heating during operation. When you handle or maintain the controller, you can get scalded due to the heating part. Thus, please handle or maintain after finish to temperature drops to indoor temperature.

■ Risk part
- Heat sink
- Triac

4–2) Safety measures

• Precaution for safety

– To operate and maintain controller safely, please be informed well as to below instructions. Otherwise, you can be frosted by electrical risk or heat

■ Read all of instruction in this manual and being informed well.
■ After confirming whether the power is off or not, please check residual electricity on controller by tester.
■ A worker has to notice maintenance to prevent co–worker to operate controller.
■ Take proper equipment and procedure during the maintenance.
■ Do not do anything while the power is on. Do not wear the accessory including metal (ring, watch, bracelet and so on) that can be flowed currents.
■ In case you do maintenance while the power is on, please do work after making co–workers to be noticed for the work optically/acoustically.
■ Attach the direction board showing an emergency exit in working area.
■ Be sure about emergency shelter and aisle.
■ Remove obstructions on the emergency aisle.
■ Attach the direction board showing emergency shelters in working area.
■ Do not handle equipment when you are drunk or sick.
■ Maintenance without guidance or supervision of manager is restricted.

• Locking device

– Install the locking device to reduce losses by accident to the minimum. Do not damage locking device by yourself.

– During stopping operation, it can shut the function operated out from the power flowed accidently.

– In case insert power to controller installed locking device, it can cause serious situation as well as possibility to damage controller. The locking device has to be handled by trained worker only, and it has to be confirmed operation of locking device is working properly.

• Locking device & Tag

– The purpose to install locking device is protection for maintenance worker from the risk caused by unexpected power inserting.

– The purpose of Tag is notification showing maintenance to other worker in order to get safety from the risk caused by unexpected power inserting.

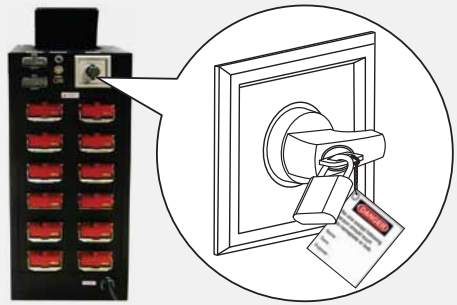
– Maintenance worker has to notify the maintenance prior to the beginning work by tag hanging.

– Install the locking device after stopping operation of controller and checking if the controller power is off.

• Locking device & Tag Installation guide

– During maintenance, install locking device as follow.

1. Stop the operation if the controller is working.
2. Turn the main power off.
3. Pull the handle of main power switch.
4. Put the locking device in a gap when you pull the handle.
5. To notify maintenance to workers, hang the tag with locking device.



Name card(example)

– Maintenance worker consists of one person at least, and the name/team of maintenance worker who can handle locking device has to be shown on the tag.

4–3) Check List

- Read all of these instructions before connecting power and turning on the system. Follow all warnings and instructions mentioned on this manual. Our company does not take responsibility at all if you use it Contravening or mishandling.
- If It is low temperature as less than 10℃ (50°F), Warm up the controller for more than 30 min.
- Need regular repair to use the controller continuously and safely.
- Some components have their own product Lifecycle.
- Warranty period is 1 year in normal condition.
- Input socket has danger of electric shock, Must not contact with body and goods which is applying an electric current.
- Be sure that all of the cables (power cables, thermocouple cables, and input power cables) are free from wear or damage.
- Establish locking device in case of maintenance this product.
- To prevent Breakage or trouble this product, Be sure that the input power is rated and sequence of phases is correct.
- Check that the system is completely disconnected from the power source.

- Do not modify the controller or insert in-genuine parts.
- Do not disassemble or modify the controller. It may cause malfunction or injury.
- Check that earth/ground connection is in good condition. (Be sure to do ground connection for any eventuality)
- Do not post device or wiring which is causative of noise around this product.
- Use controller at vertical stance.
- Do not handle the controller with wet hands.
- When water infiltrated, Inspect certainly because there is electric leakage, danger of fire.
- Clean up any water, oil, dirt, cleaning fluids etc. that may have spilled during a mold change or since the last production run. It may cause injury.
- Keep out of equipment generating heat.
- Where not to use this equipment.
  - Clean up any dirt, salt content.
  - Never allow to install where mechanical vibration and impact are effective.
  - Never allow to install where corrosive or inflammable gas are in
  - Keep out of the sun.
  - Never allow to install where the temperature changes severely.
  - Keep out of inflammable materials.
  - Keep out of the electromagnetic wave.

2. Installation and operation

1) Make sure that the controller's main power switch is in the OFF position prior to connection of the controller to the power source.
2) Check all of the cable connections of the mold (if required).
   Check the thermocouple type.
   Be sure that all of the cables are free from wear or damage.
3) Check wiring standards whether YUDO standard.
   (Power, Thermocouple combined type) or DME standard, etc.
4) Check Power/Thermocouple cables specifications (Connector size, no. of pins).
5) Using an Ohmmeter, check the resistance and isolation of power cables.
   Check the open thermocouple cables.
6) Connect power/thermocouple cables to the mold only after the mold is loaded on the injection molding machine.
7) Connect the controller to the power source if the power source and controller's main input power are same.

   (Controller's main input power is shown on the label on the backside of controller cabinet. If you find the differences between actual main input power and power shown on the label, contact an authorized representative. Unless, it may cause damage to controller units and/or malfunction of controller.)

8) Check that the earth/ground connection is in good condition.
   Ensure the system and the mold have the same ground reference.
   ※ Unless, Noise may cause damage to fuse and/or Triac, and it may cause injury. Also, short circuit and electric shock accident can be occurred.
9) Switch the controller ON.
10) Enter the password, Then select and load the required Mold file.
11) Verify the target zones On/Off status. Switch the target zones ON if they are not.
12) Enter the target temperatures (SV: Set Value).
13) Select the RUN button to run the system.
14) Verify whether the actual temperatures (PV: Present Value) reach to the target temperatures (SV).

A guide to Hot Runner Temperature Controller

- CW991 is an advanced multi-channel, high precision hot runner temperature controller designed for nozzles and manifolds equipped with personal computer for temperature control.
- Wide color screen Touch Panel equipped with MMI (Man Machine Interface) makes it possible to user friendly interface.

3. Home Screen

About the buttons and Status bar

① **Left / Right** : Move on to the previous or next Screen

② **Home**: Move on to Home Screen

③ **Date & Time** : Display current date and time(Status displays)

④ **Help**: Move on to Help Screen

⑤ **Temperature Controller** : Display menu which needs for temperature controller like temperature monitoring, Mold check. etc.

⑥ **Mold File** : Move on to Mold File Screen for Mold file management & open. Show Selected Mold file name on the bottom of this button.

⑦ **RUN**: Begin operation of the present activated zone

⑧ 

Operation Status : Display Operation Status

⑨ 

STOP: Stop all zones.

⑩ 

Login: Move on to Login Screen according to login level.
Display the present logged in user on the bottom of this button.

⑪ 

Timer: Move on to Sequence Injection Timer Setting Screen controlling Mold valve gate ON/OFF
[Optional Sequence Injection Timer]

4. Login Screen

• The screen according to login level.

• The Login Methods are  “Quick Start” (Without tap password in),  “User”,  “Admin”,  “User Selection”.

• Login result is displayed at the bottom right on login button.

About the buttons

①  **Quick Start**: Use Controller immediately without enter password. When Login through Quick Start function, use of some function is limited as login by general user.

②  **User**: When displays the keypad button which can login by general user, Enter user password and click Enter button. **[Password : 1234]** Use of some function is limited when login by general user

③ 

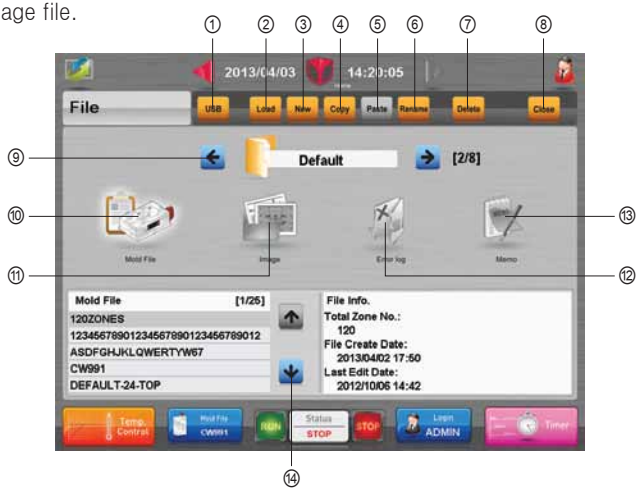
Admin: When displays the keypad button which can login by Admin Enter Admin password and click Enter button.
[Password: yudo2010] Admin password is alterable, when change the password, must remember or take a Memo password certainly.

④ 

User Selection : Another button to login by registered general user. When press the button, displays registered general user lists, and choose one of users.
Put password in input box and click Enter button, then use controller by selected user.
Use of some function is limited when login by general user.
The name of user and password are alterable thereby login by Admin.

5. File Screen

- This screen is for Mold File management(File Copy, Delete and Rename etc.) and loading Mold File.
- This screen provides brief information on the selected file and preview of image file.



About the buttons

① 

USB: Use for Check & Copy Mold File or Image File in top folder. This button is reversed 

if press Mold Folder Button and displays Mold File or Image File

If do not insert USB memory, this button 

becomes inactivation

② 

Load: Load the selected Mold File and move onto the next screen. Shows the selected Mold File name at the bottom of Mold File button.

③ 

New: Create new Mold Folder.

④ 

Copy: Copy the selected file. And Cancel Copy mode thereby selects copy button.

Copy Ready Display : 

⑤ 

Paste: Through Copy Button, Paste the copied file to selected Mold folder. To use Paste Mode, Copy Ready Display should be showed on Copy button.

⑥ 

Rename : Open keyboard by touching Rename button. Change file name by using keyboard. Only Mold File name can be change. Select desired Mold File before touching button.

⑦ 

Delete: Delete the selected Mold Folder, Mold File and Image File. Select desired Folder or File. Delete is possible in occasion that log in as Admin

Choose Mold Folder :  This button is reversed if press Mold Folder Button.

Choose Mold File :  Press Mold File Button and Select in Mold File List

Choose Image File :  Press Image Button and Select Image File List

⑧ 

Esc: Close File Screen and Move on to Home Screen.

⑨ 

Left/Right : Change Mold Folder.

⑩ 

Mold File : Show Mold File list of the selected Mold Folder.

⑪ 

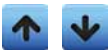
Image: Preview the Image files of the selected Mold Folder. Following image formats are available. “.bmp, .jpg, .jpeg .png”

⑫ 

Error Log: Brief Error Log information on the selected file.

⑬ 

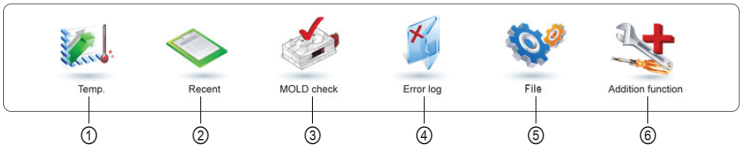
MEMO: Preview the Memos of the selected Mold Folder.

⑭ 

Up/Down : Move on to previous or next file list.

6. Temperature Controller Menu Screen

• This Screen is for Selecting one of Temperature Controller Menu.



About the buttons

① 

Temperature Monitoring : Move to selecting screen and Choose one of the Variety Temperature Monitoring (Bar View, Text View, Digital View, Trend View and Picture View).

② 

Recent File : Move to Recent File Screen which is saved the recent mold file lists. Load the Mold file on Recent file screen.

③ 

Mold Check: Move on the screen which can check controller or Mold Condition. This button is visible, when login level is Admin.

④ 

Error Log : Move on Error Log Screen to check the past record Errors.

⑤ 

File: Move on File Screen to load Mold files & file management.

⑥ 

Additional Function : Move on Additional Function Screen to set-up Current Time, Memo, Password change.

7. Temperature Monitoring Screen

• To select the desired screen among Text, Bar, Trend, Picture and Digital View Screen.

About the buttons

①  **Bar View** : Move on ‘Bar View’ Screen which displays Temperature Monitoring sign as Bar graph form.

②  **Text View** : Move on ‘Text View’ Screen which displays Temperature Monitoring sign as Text form.

③  **Digital View** : Move on ‘Digital View’ Screen which displays Temperature Monitoring sign as same form of Box

④  **Trend View** : Move on ‘Trend View’ Screen which displays Temperature Monitoring sign as connected line.

⑤  **Picture View** : Move on ‘Picture View’ Screen which displays Temperature Monitoring sign on background image.

1) Bar View Screen

- The data is displayed in a Bar graph format.
- To see heating condition through the color of Bar graph even if separate with touch panel.
- Green portion of bar shows the range of ideal temperature control, and Yellow color shows warning section.
- Gray portion of bar shows deactivated zone.
- Black line of bar shows the set values of alarm high and low.
- Blue line of bar shows target temperature.

About the buttons

① PV: To view actual temperature.
(PV) on text box below bar graph, Bar Graph is not changed in itself

② SV: To view target temperature.
(SV) on text box below bar graph, Bar Graph is not changed in itself

③ 

Current: To view current.
(Current) on text box below bar graph, Bar Graph is not changed in itself.

④ 

Output: To view output rate.
(Output) on text box below bar graph, Bar Graph is not changed in itself.

⑤ 

Boost: By touching 'Boost' button, Operates Boost mode which is for rising target temperature rapidly.
Boost Mode is operating toward established temperature by configured time and output rate.
Activate during operation only

⑥ 

Standby: To move Standby mode.
Standby mode is for protecting time loss and saving energy to keep right temperature. If user wants to take a break, fall setting temperature to Standby temperature(lower temperature) and keep the proper temperature. When the configured time is finished, It returns the original setting temperature.
Activate on standby setting temperature during configured time only. Activate during operation only.

⑦ 

Up/Down : Move to on next or previous page. Each page shows 24 zones

⑧ 

Temperature Monitoring : To move and select the different style of Temperature Monitoring Screen.

• Abbreviation table

No.	Abbreviation	Explanation
1	PV	Present Value, Current Temperature
2	SV	Set Value, Setting Temperature
3	MV	Manipulation Value, Control Valve

2) Text View Screen

- The data is displayed as text values.
- This screen allows you to view target and actual temperatures, output rates and currents of heaters.
  Furthermore, it allows you to change data setting values.
- Move on to Data Setting Screen from current screen which allows you to change data setting values by touching any line of zones. The methods of selecting zones are Individual(Press each zone on the line), Part(Select button) and All(All button).
- If zone is deactivated, zone text turns in gray

About the buttons

① 

All: Move on to the Data Setting Screen which input the same value in all zones.

② 

Range of zones : To enter start and finish number of selecting zone. The finish zone number isn't over the total zone number.

③ 

Select: To move Data Setting Screen which can enter the same value from start number to finish number selected in Range of zones.

EX) If you want to change same value from No. 2 zone to No.24 zone,

① Enter start zone No. 2 in left edit screen.
② Enter finish zone No. 24 in right edit screen.
③ Press Select button.

④ 

Boost: By touching 'Boost' button, Operates Boost mode which is for rising target temperature rapidly.
Boost Mode is operating toward established temperature by configured time and output rate.
Activate during operation only.

⑤ 

Standby: Activate on standby setting temperature during configured time only. To move Standby mode.
Activate during operation only.

⑥ 

Left/Right : To change displayed zone number on the screen.
By right button, changes to 12→24→48→12 zones.

⑦ 

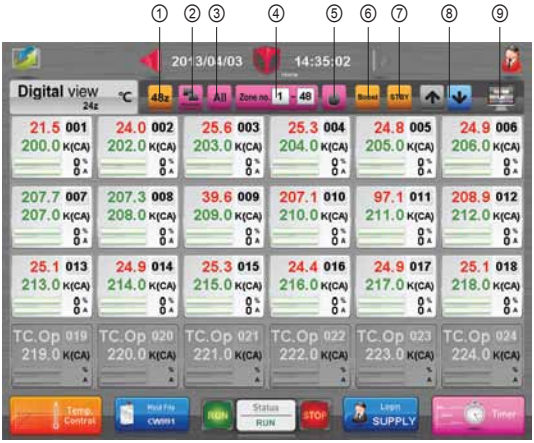
Up/Down : Move on to next or previous page of this screen
Each page shows 12, 24 or 48 zones.

⑧ 

Temperature Monitoring : To move and select the different style of Temperature Monitoring Screen.

3) Digital View Screen

- The data is displayed in Same Box format.
- Move on to Data Setting Screen from current screen.
- There are 4 methods of selecting zones.
  ※ Individual(Press individual box), Part(Select button), All(All button) zone select and Random(Random Selection button).
- If zone is deactivated, Box turns in gray.



About the buttons

① 24z, 48z **Zone view :** To change displayed zone number By press the button

② Ramdom **Random Selection** : To move Random Selection Screen which can select zones randomly.

③ All **All**: To move Data Setting Screen which can enter the same value in all zones.

④ 

Range of zones : To enter start and finish number of selecting zone. The finish zone number isn't over the total zone number.

⑤ 

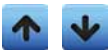
Select: To move Data Setting Screen which can enter the same value from start number to finish number selected in Range of zones.

⑥ 

Boost: By touching 'Boost' button, Operates Boost mode which is for rising target temperature rapidly.
Boost Mode is operating toward established temperature by configured time and output rate.
Activate during operation only.

⑦ 

Standby: Activate on standby setting temperature during configured time only. To move Standby mode.
Activate during operation only.

⑧ 

Up/Down : Move on to next or previous page of this screen
Each page shows 24 or 48 zones.

⑨ 

Temperature Monitoring : To move and select the different style of Temperature Monitoring Screen.

3-1) Random Selection Screen

- Below screen is for changing data value.
- You can choose only one zone or several zones by dragging indicated zones.
- Yellow color boxes are selected zones. If you touch it again, the selected zone is not activated.

About the buttons

① Reset: Selected zones turn to unselected condition.

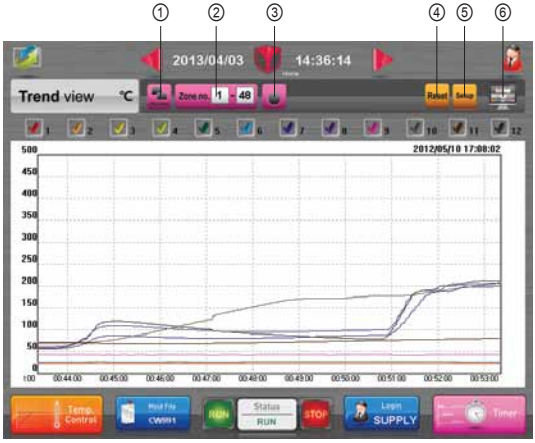
② Ok: Move to Data Setting Screen for selected zones.

③ Cancel: Back to Digital View Screen.

④ Up/Down: Move to next 48 zones units.

4) Trend View Screen

- You can monitor Current temperature by line graph.
- You can select zones by touching Select and Random Selection button.
- By pressing check mark at the top of graph, the relevant zone can be showed /hid.
- Max. 12 zones can be shown on the screen.
- You can change color of lines and range of Y axis.



About the buttons

① 

Random Selection: Move on to randomly selection screen. Max. 12 zones can be selected.

② 

Range of zones : To enter start and finish number of selecting zone. The finish zone number isn't over the total zone number.

③ 

Select: Only zones from Range of zones(starting zone to ending zone) are shown. Max. 12 zones can be selected and they are shown from starting zone in order.

④ 

Reset: Delete all graph on screen and show line graph again.

⑤ 

Set-up: Move on to Trend View Setup Screen for changing color and range of Y axis.

⑥ 

Temperature Monitoring : To move and select the different style of Temperature Monitoring Screen.

4-1) Trend View Setup Screen

- You can change line color and range of Y axis on this Trend View Screen.
- For changing line color, touch a checking mark on upper line and then, lower line. The color will be changed to lower line color.

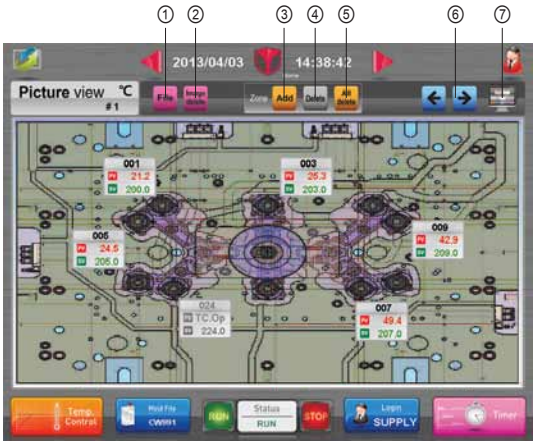
About the buttons

Ok: Apply changed information on Trend View Screen.

Cancel: Move on to Trend View Screen with ignoring changed information.

5) Picture View Screen

- This screen is temperature monitoring screen which can check indicated zone by adding it on background image.
- This screen allows you to add and delete zones on the image.
- To select background image by touching File button.



About the buttons

① File: Move on to selection screen for selecting Mold image which you can use background image of current screen.

② Image delete: Show background image of current screen as an empty screen.

③ Add: To add user selected zones on the image by touching Add button. If executive keypad for number appears, enter desired zone number, press enter key and point the location. To relocate the user selected zone by dragging the zone box. Equal number can not display overlapping.

④ Delete: To delete user selected zones on the image by selecting the target zone and touching Delete button.

⑤ 

Delete all: To delete all zones on background image.

⑥ 

Left / Right : Move on to Picture View Screen
Max. 6 pages can be shown. You can see current page number(#1) on bottom of “Picture view”

⑦ 

Temperature monitoring : Move on to changing screen for different Temperature Monitoring screen.

5-1) Image Selection Screen

• You can choose Mold image for background image of Picture View Screen.

About the buttons

① 

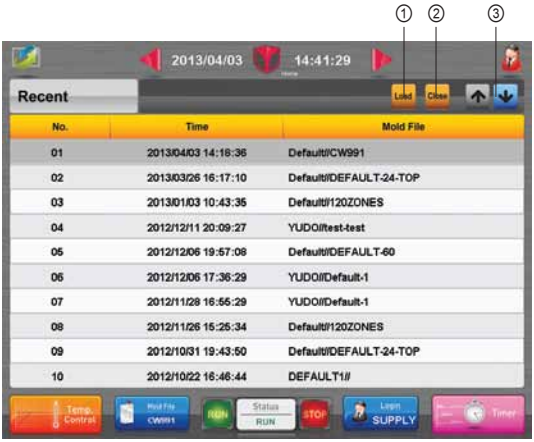
Ok: By touching this button, selected image is being background of Picture View Screen.

② 

Cancel: Move on to Picture View Screen.

8. Recent Screen

- You can check saved Mold files and select and load one of them.
- Max. 20 files can be registered. No.1 is latest one.



About the buttons

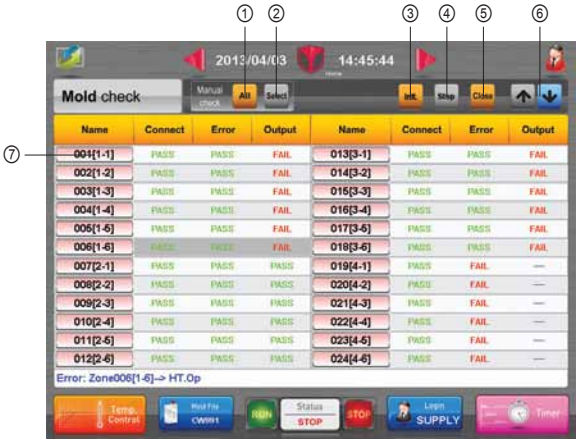
① Load: To load selected Mold file by touching indicated file and move on to next page. You can check loaded Mold file name at the bottom of Mold File button.

② Close: Move on to Home Screen after closing recent file.

③ Up/Down: Move on to next or previous page.

9. Mold Check Screen

- You can check connection status of units, error of Mold & controller and output status on this Mold Check Screen.
- After pressing 'All' or 'Select' button and checking Mold, The error message will be indicated on bottom side when you touch verified line. Please refer to error code table to see Error code on Error Log Screen.



About the buttons

① 

All: Progress Mold confirmation for all zones.

② 

Selection: Progress Mold confirmation just for selected zone. Touch Zone number for selecting indicated zone.

③ 

Initialization: Delete Mold identify contents on current screen, return to initial status for selected zone.

④ 

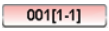
Stop: Stop Mold confirmation. This button will work during Mold confirmation.

⑤ 

Close: Close Mold Check Screen, back to Home Screen.

⑥ 

Up/Down: Move to next unit of 24 zone.

⑦ 

Zone number: You can select indicated zone number by touching this button for Mold confirmation. If you touch it again, the button will be reacted.

10. Error Log Screen

- The Error Log Screen allows you to view errors that have occurred.
- Activating buzzer sound when errors occur on controller or Mold.

About the buttons

① All delete **Delete all**: Delete all logged error information.

② **Buzzer off**: Turn off the buzzer when activating buzzer sound.

③ Close **Close**: Back to previous screen.

④ **Up/ Down**: Move on to previous or next page.

• Error code table

No.	Error message	Explanations
1	Fuse(Fuse Error)	Fuse Open
2	AC.Er(AC Error)	AC frequency abnormality
3	AL-H(Alarm High)	Actual temperature exceeds set point of alarm high
4	AL-L(Alarm Low)	Actual temperature drops down set point of alarm low
5	HT.Op(Heater Open)	Heater Open - The heater connection is broken.
6	HT.St(Heater Short)	Shorted Heater – The heater is shorted or exceeds the maximum rating of the module
7	TC.Re(TC Reverse)	Thermocouple Reversed - The T/C connection is wired + to - at some point
8	TC.St(TC Short)	Thermocouple Pinched - The T/C is pinched or the controller thinks it is pinched.
9	TC.Op(TC Open)	Thermocouple (T/C) Open - The T/C connection is broken
10	Rj.Er(RJC Error)	Internal temperature sensor of controller unit failed
11	AD.Er(ADC Error)	Analog/Digital converter error in controller unit
12	GR.St(GND Fault)	Current detection failed
13	Ca.Er(Calib. Error)	Calibration problem
14	CT.Er(CT Error)	CT current problem
15	Tr.St(Triac Short)	Triac problem occur

11. Data Setting Screen

- This screen is for changing the data of each zones.
- Individual zone, selected range of zones, all zones and random selected zones can be changed.
- Blue zone indicator at top middle corner shows the selected zone(s) as below.
  ① Individual Zone : [Zone Number]
  ② All Zones : [Zone ALL]
  ③ Range of Zones : [Start Zone number ~ End Zone number]
  ④ Random Selection Zones : Rnadom: 1, 4, 6, 8, ···
- Current page number(#1) of screen is shown at the top left next to Data Setting phrase.
- If all zones are selected, the setting values of zone 1 are displayed. If a range of zones are selected, the setting values of start zone are displayed.
- If random of zones are selected, the setting values of tailender zones are displayed.

1) Data Setting Screen Page #1

About the buttons

① Close: Move on to previous screen by touching "Close" Button.

②  **Left/Right** : To move the next Data Setting Screen. If you Login via “Quick start” , “User” or “User Selection” , It wouldn’t move because there’s no further page.

③  **Up/Down** : Move on to the previous or next zone.
Up/Down arrow buttons are visible if an individual zone is selected

ID No. : IID(Identification) No. Edit box shows identification number of individual zone.
ID No. Edit box is not editable.

ON/OFF : Activate/Deactivate the selected zone(s) by touching ON/OFF button.
If this button is On, the selected zone(s) is(are) activated

Name: To change User defined name of zone at Name Edit box for easy reference.

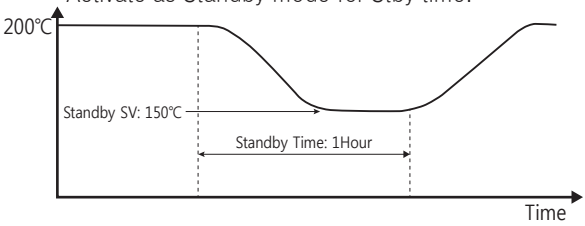
Name application : To display Name registered in name edit box instead of zone number on monitoring screen.
If this button is On, Shows the phrase of name edit box on monitoring screen instead of zone number.

SV(Set Value) : SV means Set temperature, It is edit screen for entering target temperature.

Stby(Standby) SV : It is edit screen for entering target Temperature when is activating as Standby mode
This button is just visible, when login level is Admin.

Stby Time : It is edit screen for entering operation time when is activating as Standby mode. This button is just visible, when login level is Admin.

EX) Stby SV : 150℃, Stby Time : 60mins,
Set Temperature: 200℃
Activate as Standby mode for Stby time.

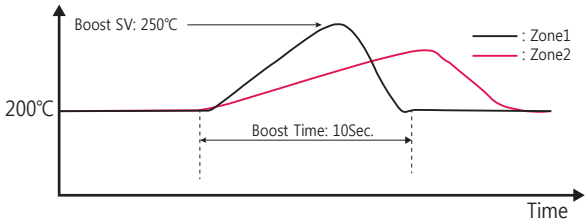


Boost SV : It is edit screen for entering target temperature when is activating as boost mode
This button is just visible, when login level is Admin.

Boost Time : It is edit screen for entering operation time when is activating as boost mode
This button is just visible, when login level is Admin.

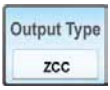
Boost MV : It is edit screen for entering output rate when is activating as boost mode.
This button is just visible, when login level is Admin.

EX) Boost SV : 250℃, Boost Time : 10sec
Boost MV : 100%, Set Temperature: 200℃
Zone 1 : Activate as Boost mode until at the point of Boost SV
Zone 2 : Activate as Boost mode for Boost time.



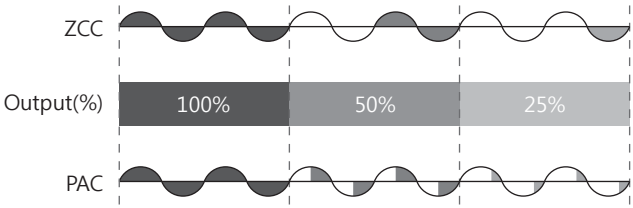
2) Data Setting Screen Page #2

About the buttons



Output Type : It is the how to heat up heater.
Output types : ZCC, ZCC2, PAC(Auto), PAC(60Hz), PAC(50Hz)
If the button is touched, output type changes in following order.
※ Cannot change while the controller is working

ZCC(Zero Cross Control), PAC(Phase Angle Control)
PAC(Auto): Automated Input Frequency detection
PAC(60Hz): Fix Input Frequency as 60Hz
PAC(50Hz): Fix Input Frequency as 50Hz



T/C Type : T/C Type is the type of Temperature Sensor which is located on Mold.
T/C Types : K(CA) & J(IC) Type
If press the button, could change the sensor type
Check T/C sensor in Mold and tune to individual zone
If sensor isn't correct, Control would be unstable or temperature deviation could happen
※ Cannot change while the controller is working.

T/C Reverse : To reverse the polarity of physically upside down connected Thermocouple (without wiring change)
If "TC.Re" or "TC Reverse" error message appears, switch T/C Reverse button on.

Buzzer: To decide whether ring the buzzer or not when error occurs, If turn on button, the buzzer rings.
Buzzer On/Off button is activated, only if all zones are selected.

Buzzer Time : It is edit screen for entering operation time of buzzer sound. Buzzer On/Off button is activated, only if all zones are selected

AL High : It is edit screen for entering the (+)set point to initiate the alarm. If the actual temperature exceeds set-up temperature plus AL High set point, AL high function activates.

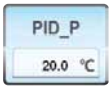
AL Low : To change the (-)set point to initiate the alarm
If the actual temperature drops below set-up temperature plus AL Low set point, AL low function activates.

Soft Start : This function prevents from heater coil damage caused by moisture at fast heat up. Therefore, this function warms up the system gradually. It has 3 modes, Always, Off and 1 Time.
When press this button, operation changes progressively

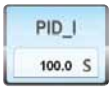
Always : Performance the function as often as operation
OFF : Do not performance Soft Start function
1Time : After permitting power to controller, proceed just once

Auto Tuning : To calculate the optimal PID values automatically by the controller.
Auto Tuning Modes : Always, Off, 1 Time.
If press this button, change mode step by step.
※ Therefore, the default set point is highly recommended

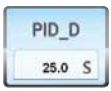
PV Filter : To change duration of average actual temperature. The actual temperature is the average temperature for the above given duration.



PID_P(Proportional-Integral-Derivative_Proportional):
To change the set point of proportional bandwidth used in PID control.
If the set point of proportional bandwidth is high, the actual temperature reaches to the target temperature (SV) slowly because of less output.
Unless, the actual temperature reaches to the target temperature (SV) fast because of more output.
However low set point may cause hunting (fluctuate up and down periodically).
※ Therefore, the default set point is highly recommended.



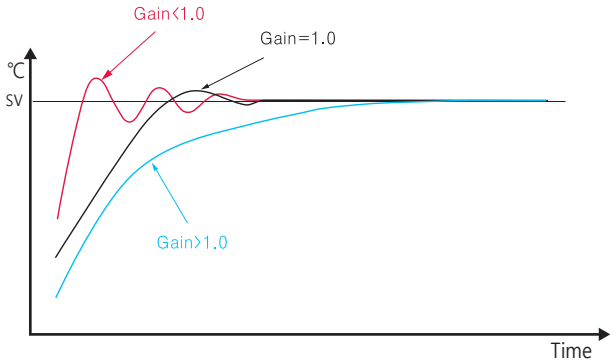
PID_I(Proportional-Integral-Derivative_Integral):
To change the set point of Integral time used in PID control.
If the set point of Integral time is high, the actual temperature reaches to the target temperature (SV) slowly.
Unless, the actual temperature reaches to the target temperature (SV) fast. However low set point may cause hunting.
※ Therefore, the default set point is highly recommended.

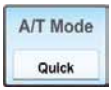


PID_D(Proportional-Integral-Derivative_Derivative):
To change the set point of Derivative time used in PID control.
If the set point of Derivative time is high, amount of reaction on rapid temperature variation is high.
※ Therefore, the default set point is highly recommended.

A/T Gain : To precisely change the set point of A/T Gain If you are satisfied with PID values calculated by Auto Tuning function.

Conditions	Results
Gain < 1.0	Fast response time, but it may cause high hunting.
Gain = 1.0	Same PID values calculated by Auto Tuning function.
Gain > 1.0	Slow response time, but it may cause low hunting.





A/T Mode : To decide PID value in Controller whether processing automatically calculated auto tuning Time shortly or not.

A/T Modes : Quick Mode, Full Mode.

Quick: Time that reach target temperature is short than Full tuning and temperature control can be unstable than Full tuning.

Full: Time that reach target temperature is long than Quick tuning and is stable compares Quick tuning.

※ Therefore, the default set point is highly recommended.

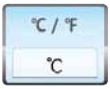
3) Data Setting Screen Page #3

About the buttons

PV Sync:To determine whether to rise temperature or not after standing for temperature rise of latest zone. If the button on the Data Setting Screen page #1 is off, it is inoperative even though it is turned on.

Heater Sync: This is the function when the temperature sensor of particular zone has some problem, temporarily refer to output rate of other zones and put Heater output out. It's edit screen to enter the other zone number which is working ordinarily and heater capacity is the most similar to the zone. The inputted zone number is saved until power is OFF.

EX) Errors occur on T/C of zone #7
If heater capacity of zone #8 is most similar with zone #7
Setting: After touching the Heater Sync button of zone #7, input number 8. If the ON/OFF button is OFF on zone #7, change to ON.



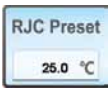
℃ / ℉: To select Degree C or Degree F as required.

PV Offset: To change the offset value in order to match between the display temperature and the actual temperature when occur temperature discrepancy.

Decimal Point: This function is when do not want to see below decimal point of temperature value.

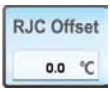
ON: Show the point
OFF: Do not show the point

RJC(Reference Junction Compensation): RJC is sensor for measuring controller inside temperature. When the trouble or abnormality is happened in this inside temperature sensor, Change this button as ‘MANL’, you can use as entering any value on RJC control edit screen. When It’s AUTO mode, use inside temperature as it is.



RJC Preset: This is edit screen for entering temporary value when the trouble or abnormality is happened in this inside temperature sensor.

It can be entered only if RJC button is selected as ‘MANL’.



RJC Offset: To change the offset value of internal temperature sensor of controller unit in order to calibrate temperature discrepancy.

Language: To set the language.

File Init (File Initialization): To initiate all variables of loaded Mold File. Timer setting values for Sequential Value Gate Controller are not initiated.

Auto Stby: After checking injection signal from Injection machine, If there are no signal, It shifts into a standby mode automatically.

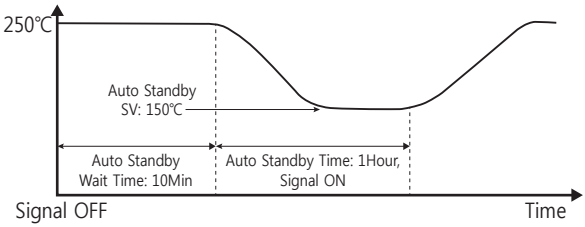
In spite of entering the auto standby mode, If Injection signal is inputted from injection machine, The mode is switched from Auto Stby(Standby) mode to operation mode. This function is activated only if optional Timer is set and selected all of zones.

This button is to enter Auto Stby time for entering Auto Stby mode.

Auto Stby SV: This function is edit screen to input set-up temperature for entering Auto Stby mode. Auto Stby SV edit screen is also activated only if optional Timer is set and selected all of zones.

Auto Stby Time: To change Auto Stby Target Time. The Function is editable with timer selecting all of zone only.

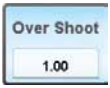
EX) Auto Stby Wait Time: 10 min, Auto Stby SV: 150℃, Auto Stby Time: 1 hour
After wait 10 minute when the signal is off, Auto Stby is operated for an hour.



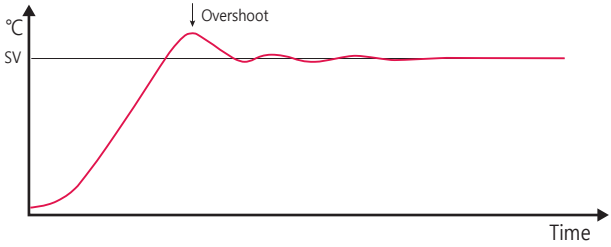
Update: To upgrade the software. Download the latest software to USB Memory. Insert Media then wait about 10 seconds until the USB Memory is ready to use. Touch Update button to upgrade the latest software.

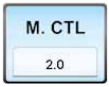
4) Data Setting Screen Page #4

About the buttons



Overshoot: Overshoot means in the process of temperature rising, indicating temperature is exceeded set-up temperature to the max. This edit screen can control overshoot minutely.





M.CTL: To set the maintenance range of set value.

Sensor Range: When the temperature rising, If it does not move up to present temperature value at a set time, it is detected as T/C sensor short. At this time, It is the edit screen to enter the set range of temperature.

Sensor Time: When the temperature rising, If it does not move up to present temperature value at a set time, it is detected as T/C sensor short. At this time, It is the edit screen to enter the set time.

Robot Stop: To stop robot operation when errors occur by connecting with equipment made by YUDO. To use the function, all the cables for controller are needed, and the Buzzer button on Data Setting Screen page #2 has to be set by ON.

Robot Time: To set the time to stop the operation of YUDO's Robot. It is operated after duration(setting value) when errors occur on controller.

12. Timer Screen [Optional]

- This is screen for ON/OFF control the Mold valve gate.
- To manually open or close the selected valve gates or all valve gates at the same time.
- To reflect to the next shooting out signal, must do save changed values.

About the buttons

① 

Total time: To set or edit total shooting out time. It's not related to Injection opeartion motion, just for referring to enter Delay & Open time.

② 

All: To be ready to open all channels manually.

This sign is displayed the prepared state to manually open all channels.

③ 

Select: To be ready to open selected channels manually.

This sign is displayed the prepared state to manually open selected channels.

By pressing the channel No button, Select the channel for manually open. Inverted button means selected this button, and OFF mode channel can not be selected.

④ Open

Open: Progress selected manually open between manually open all channels and manually open selected channel If injection signal is on, this button is not working.
When the mode of channel is OFF, this channel is not working.

⑤ Save

Save: Save the setting value of each channel which is currently set.

⑥ Close

Close: To move on to Home Screen without saving.

⑦ 

Up/Down : Move on to next or previous page.

⑧ 1 ~ 20

Channel No: Be ready to operating channel when manually open the selected channel. Select and Clear is possible while operating channel manual open. But, Cannot be selected the OFF mode channel.

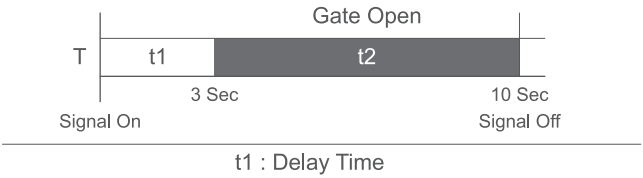
⑨ OFF

OFF: To switch the valve gate control relevant channel off.

A

A Mode: To run A mode.
If injection start signal is on, remain valve gate closed for Delay 1 time, and then open valve gate until injection signal is off.

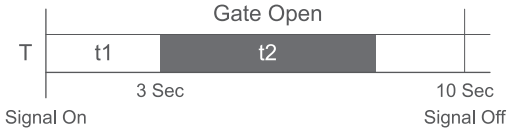
EX) Injection signal : 10 sec, Delay1 time : 3 sec
If injection start signal is on, remain valve gate closed for 3 sec. Then open valve gate for 7 sec.
Finally close valve gate.



B

B Mode : To run B mode.
If injection start signal is on, remain valve gate closed for Delay1 time. Then open valve gate for Open1 time.
Finally close valve gate.

EX) Injection signal : 10 sec, Delay1 time : 3 sec,
Open1 time : 4 sec
If injection start signal is on, remain valve gate closed for 3 sec. Then open valve gate for 4 sec.
Finally close valve gate



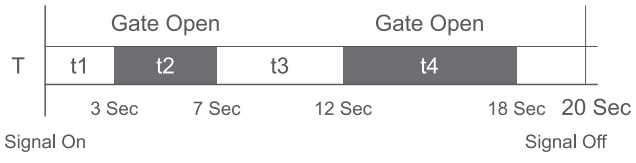
t1 : Delay Time / t2 : Open Time

※ Even though Open1 time is 9 sec, close valve gate when injection signal is off regardless remaining open 1 time.

C

C Mode: To run C mode.
To run B Mode (Delay1, Open1 time) and B mode (Delay2, Open2 time) sequentially.

EX) Injection signal : 20 sec
Delay1 time : 3 sec, Open1 time : 4 sec
Delay2 time : 5 sec, Open2 time : 6 sec
If injection start signal is on, close valve gate for 3 sec, then open valve gate for 4 sec.
After that, close valve gate for 5 sec, then open valve gate for 6 sec. Finally close valve gate.



t1 : Delay1 Time
t2 : Open1 Time
t3 : Delay2 Time
t4 : Open2 Time

⑩ 1 **Time Unit [1 sec]**: To set the time unit of relevant channel in 1 seconds.

0.1 **Time Unit [0.1 sec]**: To set the time unit of relevant channel in 0.1 seconds.

0.01 **Time Unit [0.01 sec]** To change the time unit in floating point scale which displays one hundredth of 1 sec.

• Solenoid Valve Output voltage

Indicators	Remarks
	Solenoid output cable is not connected Or Fuse Error in Timer
DC 24V	Solenoid output voltage is 24VDC
AC 110V	Solenoid output voltage is 110VAC
AC 220V	Solenoid output voltage is 220VAC

※ Caution!

Be sure that Solenoid valve output voltage is same with input voltage of Mold solenoid valve.

(If they are not same, it may cause damage or malfunction)

13. Additional Function Screen

• This is the screen for Memo, Time Setting, Help, Data Check, System Log, Login Setting, Firmware Version, etc.

About the buttons

Memo: Move on to Memo Screen for recording Work history & others.

Time setting : Move on to Time Setting Screen for setting present time .

Help: Move on to Help Screen for obtaining some information of each screen.

Data check: Move on to Data Check Screen for checking some data (Sensor type, Output of zones, setting temp. etc).

System log: Move on to System Log Screen for checking system and zone changes of information.

Login setting: Move on to Login Setting Screen for changing password of users or admin.

Firmware version: Move on to Firmware Version Screen for checking Software version or firmware of controller.

1) Memo Screen

- To write and edit memo such as work history or other information.

About the buttons

① Open: Move on to Memo File Selecting Screen for finding existing memo.

② New: To make a new memo, initialization current signed memo after checking whether save the memo or not.

③ Clear: Clear signed contents.

④ Save: Save signed memo.

⑤ Close: Move on to Additional Function Screen.

1-1) Memo File Selecting Screen

- To check saved memo list.
- To open or delete the saved memo.

About the buttons

① 

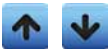
Delete: Press this button to delete file after selecting file .

② 

OK: After selecting file and pressing this button, Move on to Memo Screen which you select. The content displays on Memo Screen.

③ 

Cancel: Back to Memo Screen.

④ 
Up/Down: Move to the next or previous page.

2) Time Setting Screen

• To set present time or date.

About the buttons

Ok — **OK**: To change present time or date for entered in the Change time data.

Cancel — **Cancel**: Back to Additional Function Screen.

3) Help Screen

• To obtain simple information of each screen.

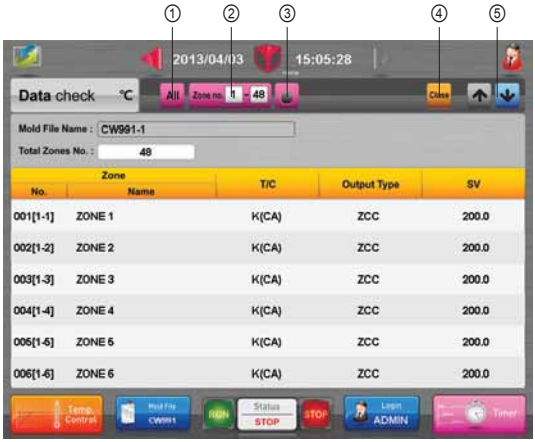
• When you touch buttons, each simple information appears.

About the buttons

① Close — **Close**: Back to Additional Function Screen.

4) Data Check Screen

- To check sensor type, output of zones, setting temp., etc.
- To change total zone number if you login by admin level.



About the buttons

① 

All: Move to Date Setting Screen for inputting same value on all zone.

② 

Range of zones: Input starting zone number and finishing zone number. It cannot be over total zone number.

③ 
Select: Move to Data Setting Screen for select partial zone.

④ 

Close: Back to Additional Function Screen.

⑤ 
Up/Down: Move to the next or previous zone of 6 unit.

5) Login Setting Screen

- To change user and admin name & password on this screen.
- Only Admin level allow to use Login Setting Screen.

※ Caution
If you want to change Admin's password, you must memorize it after changing it. Because Admin password cannot confirm it after changing password. Please do not expose Login Setting Screen to general user. Password can be spilled.

About the buttons

① USER1 **User**: You can change user name on the list by touching this button.

② **Password**: You can change user password by touching this button.

③ Ok **OK**: Move to previous screen after saving changed information.

④ Cancel **Cancel**: Move to previous screen after ignoring changed information.

6) Firmware Version Screen

- To check firmware and software version. The displayed number on screen is indigenous ID of Unit.

About the buttons

① Close **Close**: Back to Additional Function Screen.

14. Operation Examples

1) User Login

① Select Login User – Between User and Admin

② Enter Password – Enter the password according to selected user.

2)) Mold File Setting

① Touch Mold File

② Select Mold File – Select the desired file from Mold File list

③ Touch Load Button

3) Data Setting

① Zone ON/OFF – Switch on the desired zone

② Change target temperature (SV)

– Enter the desired temperature value on each zone

③ T/C Type[#2 page]

– Select thermocouple type between K(CA) and J(IC)

– Be sure that the same specification as mold thermocouple type.

4) Temperature Monitoring

① RUN – Operate to raise the temperature

15. Controller Specifications

1) Input Specifications

No. of zones	CW991 PRO: 72/108 Zone (12/18 Unit) CW991 Slim: 24 Zone(4 Unit) CW991 Standard: 48/72/96/120 Zone (8/12/16/20 Unit) 6 Zone / Unit
Thermocouple Type	TC-K(IEC-584) TC-J(IEC-584)
Control range	0.00 ~ 500℃ (32 ~ 932℉)
Scan Rate	16.66ms
Scan Accuracy	±0.5% of F/S
Display Resolution Limit	0.1℃ or 1℃
Compensable Temperature variation	±2.0℃ (0 ~ 50℃)

2) Output Specifications

Output Mode	Phase Angle Control, Zero Cross Control
Output Resolution Limit	Phase Angle Control: Approximately 1,000 Resolution Zero Cross Control: 60Hz/50Hz – 120/100 Resolution
Transmission Output	15A / Zone, 50A / Unit(6 Zone)
Transmission Output period of renewal	0.02/1sec(Difference Between the output kind)

3) Data Communication Specifications

Protocol	EIA-RS485/422, USB V2.0
Max. number of connection	Max. 21 IDs (include Master). Repeater is required if additional IDs are connected
Communication Method	Half - duplex 2 wire
Communication Speed	19,200/38,400bps
Port Parameters	None Parity, 8 Data, 1 Stop Bit
Communication Distance	About within 1.2Km (Depending on the installation environment)

4) System Specifications

Input	PV Filtering Time	1 ~ 300 sec
	Disconnection Detection	Up Scale action and exceeding ±5% of input range.
Control	Control Method	Point Value Preceding Derivative PID
	P Band	0 ~ 500℃ (32 ~ 932℉), If value is 0℃, output changes between On (100%) and Off (0%)
	I Time	0 ~ 3,600 sec
	D Time	0 ~ 3,600 sec
	Hysteresis Range	0.1 ~ 50.0℃ (32.18~122℉)
	Self Tuning	Quick, Full Auto Tuning
	PID Manual Input	Enter PID value directly or change A/T Gain

Alarm	Range	500℃ (32 ~ 932℉)
	Alarm Type	Alarm High (Relative), Alarm Low (Relative)
	Hysteresis Range	500℃ (32 ~ 932℉)
Running the controller	RUN/STOP	Run or Stop
	BOOST	Duration, Target Temperature, Output rate
	STANDBY	Duration, Target Temperature
	Manual Run	Change input (PV) and output
	Synchronization	Synchronize PV
Self Diagnosis	Diagnosis Method	Ground Fault, Triac Short, Heater Open/Short, Sensor Reverse/Burnout/Short, RJC, ADC, Fuse, AC, Calibration, CT

5) Timer Specifications [Optional]

Input	Injection Signal	24Vdc, 110Vac, 220Vac
	Voltage	85 ~ 264Vac
Output	Relay	DC: 24Vdc(Max 100mA) X 16CH AC: 110Vac(Max 1A) X 16CH, 220Vac(Max 1A) X 16CH
System Rule	Mode	A Mode: Set Delay 1 time B Mode: Set Delay 1, Open 1 times C Mode: Set Delay1, Open1, Delay2, Open2 times
Misc		Setting Time Unit : 0.00 ~ 999 sec Independent running Detect and display Solenoid Value output voltage Open all valve gates or individual valve gate.

※ CW991 Standard 48 zone model use 8 channels

6) Environment Specifications

Operating Temperature	0 ~ 50℃ (32 ~ 122℉)
Operating Humidity	20 ~ 90%RH(Non-condensing)
Storage Temperature	-25 ~ 70℃ (-13 ~ 158℉)
Insulation Resistance	500Vdc, Over 20MΩ [Input Power-Field Ground, Input/Output-Field Ground]
Permissive Signal of TC Resistance	Less than 250Ω
Withstand Voltage	1,500Vac, 50/60Hz 1min [Input Power-F/G, Input/Output-F/G, Input/Output-Input Power]
Vibration Resistance	10 ~ 55Hz, Bandwidth 0.75mm, 3 directions 4 swings, 5 min/swing
Impact Resistance	147㎨, 3 directions-3 times
Magnetic Effect	Below 400 AT/m
Warming-up Time	Over 30 min

Net Weight	Model	Zone no.	Max. Weight	Remarks
	CW991 PRO	72	Below Max 175kg	* 6 Zone/Unit: Max 2.6kg
		108	Below Max 240kg	
	CW991 Slim	24	Below Max 80kg	* Input power cable : Max 1kg/1m
	CW991 Standard	48	Below Max 115kg	
		72	Below Max 135Kg	
		96	Below Max 175kg	
		120	Below Max 200kg	

EC Declaration of Conformity
according to EC Machinery Directive 2006/42/EC

We herewith declare, Yudo Co., Ltd.
169-4, Gujang-Ri, Paltan-Myun, Hwasung-Si, Gyeonggi-Do,
445-922, Republic of Korea

that the following machine complies with the appropriate basic safety and health requirements of the EC Directive based on its design and type, as brought into circulation by us. In case of alteration of the machine, not agreed upon by us, this declaration will lose its validity.

Machine Description: Temperature Controller
(Hot Runner Temperature Controller)

Machine Type: CW991-24, CW991-48, CW991-72,
CW991-96, CW991-108, CW991-120

Serial Number: -

Applicable EC Directive: EC Machinery Directive (2006/42/EC)

Applicable Harmonized
Standards: EN ISO 12100:2010
EN 60204-1/AC:2010

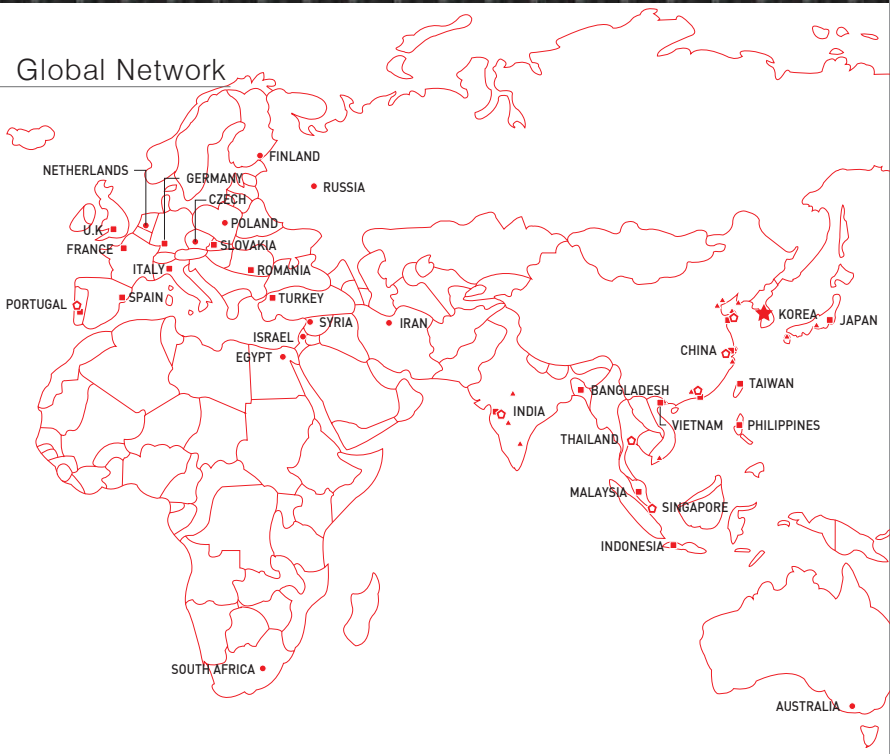
Applicable National Technical Standards And Specifications:
Rated input: 220/380 Vac, 3 Phase, 50/60 Hz, 100-225 A
Rated frequency: 50/60 Hz
Temperature Range: 0-500 °C
IP Degree: 20
A.I.C:25-50 kA

Date/ Authorized Signature:

Title of Signatory:

(2006/42/EC, Annex II)
The name and address of the person authorized to compile the technical file, who must be established in the Community;
Contact person:
Company:
Address:
Phone :
Fax:

Global Network



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