

# CW991

TEMPERATURE CONTROLLER  
HOT RUNNER SYSTEMS

User Manual

English

SLIM



STANDARD



**YUDO**  
Consilience Technology

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► We reserve the right to change specifications without notice.

CAUS

CE  
ISO9001: 2008

**YUDO**



**Thank you for using YUDO product.**

## High Precision

High Precision (0.01°C / 0.018°F), High Reliable Hardware

## Multi Zone

Multi zone configurations (Max. 120 zones, 6 zones / unit)

## Telecontrol

Remote Control based on standard MODBUS-RTU

## Easy Use

User friendly Touch Panel equipped with MMI.  
A quick and easy way to manage process parameters  
Integrated Sequence Injection Timer and Hot Runner Control

## Data Management

Easy Data management to store and manage files in folders  
Self Diagnostics  
(GROUND FAULT, TRIAC SHORT, HEATER OPEN/SHORT  
SENSOR REVERSE, SENSOR BURNOUT, RJC, ADC, FUSE, AC)

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## 1. Introduction

Only persons with a thorough knowledge of the system's operation and capabilities should operate the system. 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 inquire any questions.
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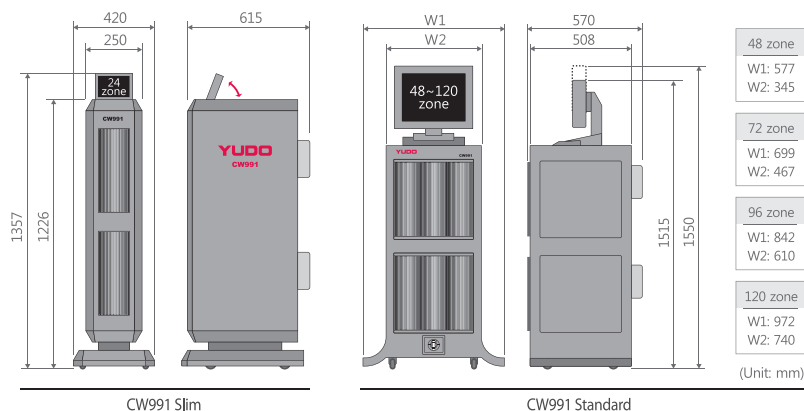
### 1) Inspection

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) Configurations and dimensions

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

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



### 3) General Safety Instructions

- Only a licensed electrician should install the system.
- Read all of these instructions before connecting power and turning on the system. Follow all warnings and instructions mentioned on this manual.
- Unless specifically explained in this manual or directed by a YUDO service technician, do not attempt to operate the system yourself. Doing so could result in damage to the system, or serious personal injury.
- Do not modify the controller or insert in-genuine parts.
- Do not disassemble or modify the controller. It may cause malfunction or injury.
- Be sure that all of the cables (power cables, thermocouple cables, and input power cables) are free from wear or damage.
- Check that the system is completely disconnected from the power source.
- Be sure that the input power is rated and sequence of phases is correct. If the local supply is outside the specified range please contact YUDO for advice.
- Check that earth/ground connection is in good condition.
- When in use this equipment does not emit magnetic noise in excess of 400 AT/m.
- Install controller in upright position.
- Do not handle the controller with wet hands.
- 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.
- Warm up the controller for more than 30 min. at 10°C. (50°F)
- Keep out of equipment generating heat.
- Where not to use this equipment
  - In dirty and salty atmosphere any dirt, salt.
  - Never allow to install where mechanical vibration and impact are occurred.
  - In an explosive, corrosive or inflammable atmosphere.
  - Keep out of the sun.
  - Never allow to install where the temperature varies severely.
  - Keep out of inflammable materials.
  - Keep out of the electromagnetic wave.

## 2. Installation and operation

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

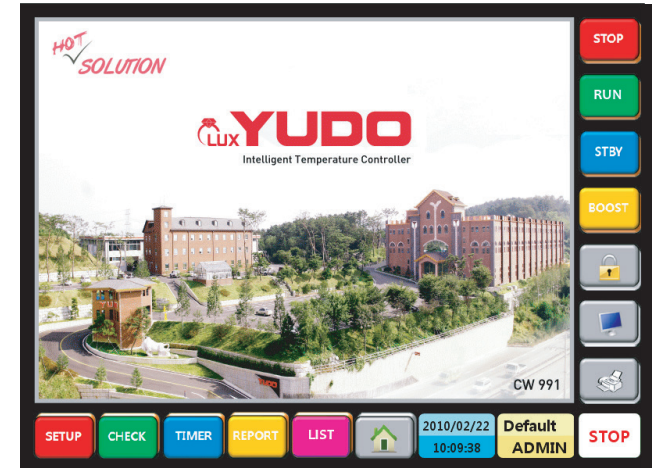
(Controller's main input power is shown on the label on the backside of controller cabinet. If you find the differences between actual main input power and power shown on the label, contact an authorized representative. Unless, it may cause damage to controller units and/or malfunction of controller.)

- 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.
- 9) Switch the controller ON.
- 10) Login to the system. 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: Setting Value).
- 13) Select the RUN button to run the system.
- 14) Verify whether the actual temperatures (PV: Point Value) reach to the target temperatures (SV).






### A guide to Hot Runner Temperature Controller (HRTC)

- CW-991 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 Configurations



### About the button and status bar

- |   |  |
|---|--|
|    | STOP(Red) : Stop all zones by touching the "STOP" button.  |
|    | RUN(Green) : Run all zones by touching the "RUN" button if any zone is activated (ON).   |
|  | STBY(Blue) : This switches the controller into Standby mode. Standby mode remains for standby temperature (Stby SV) and standby time (Stby Time).            |
|  | BOOST(Yellow) : This switches the controller into Boost mode. Boost mode remains at Boost output (Boost MV) for Boost temperature (Boost SV) and Boost time. |
|  | Login : Move on to User Login screen by touching "Login" button.   |





View : Move on to four views screen by touching VIEW button.  
Four views consist of Text, Bar, Picture and Digital views.



Print : Move on to Data Export screen to save selected screen to USB port by touching PRINT button.



Setup : Move on to Mold File screen by touching SETUP button.



Check : Move on to detailed report screen showing All zone's information by touching CHECK button.



Timer : Move on to Sequence Injection Timer Setting screen by touching TIMER button.  
[Optional Sequence Injection Timer unit]



Report : Move on to Report screen showing Error History, Memo, Help Views by touching REPORT button.



List : Move on to List screen displaying past mold file list and loading the list by touching LIST button.



Home : Move on to Home screen by touching HOME button.



Date & Time : Displays system date and time.



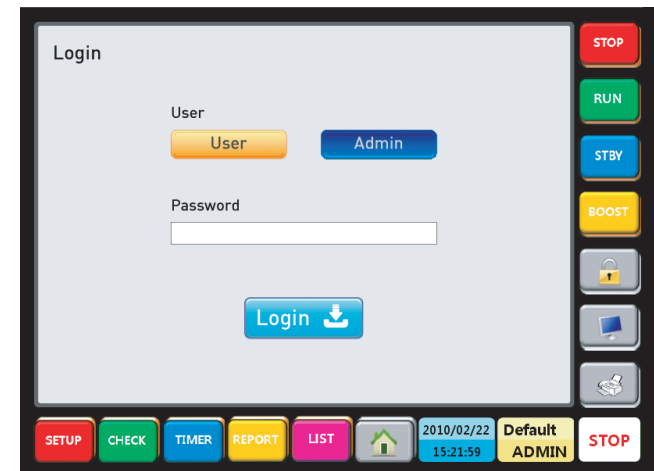
File Name & Login : Displays selected Mold File name and Login level.



Operation Status : Display operation status.

## 4. User Login Screen Configurations

- Touch "User" button or "Admin" button according to login level. Then enter the password for login level (user or admin)
- Login mode (user / admin) is displayed on File Name & Login status bar.



### About the Button

User Level : Select the login mode between User and Admin.

Unselected Button Color

Selected Button Color

Password : Enter password for user or admin.

Open the keypad by clicking the text box below password. Then enter the password and click Enter button.

[User : 1234, Admin : 1111]

User mode can change and save only essential menus for operating the controller.



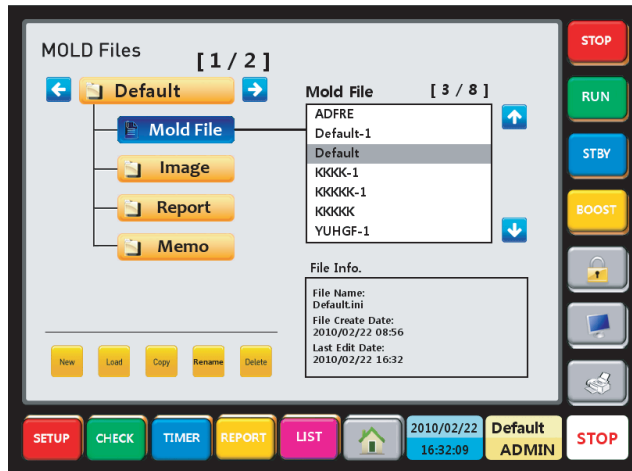
Login the menu by touching "Login" Button.

This verifies the password of user level (user / admin).

If password is wrong, Login error message will be displayed on edit window.

## 5. Mold Setup Screen Configurations

- This screen is for File management and loading Mold File screen.
- This provides brief information on the selected file and preview of image file.



### ■ About the Button



Left, Right arrow Button : Move on to previous or next Mold Folder by touching left or right arrow button.



Up, Down arrow Button : Move on to previous or next file list by touching up or down arrow button.



Shows Mold File list of the selected Mold Folder by touching "Mold File" button.



Preview the image files of the selected Mold Folder by touching Image button. Following image formats are available. ".bmp, .jpg, .jpeg, .png". Set Picture View screen wallpaper by selecting Image File.



Preview the error reports of the selected Mold Folder by touching Report button.



Preview the Memos of the selected Mold Folder by touching Memo button.



Create new Mold Folder by touching "New" button.



Load the selected Mold File and move onto the Data setting view screen by touching "Load" button.



Select Mold File in order to make a file copy. Copy the file by touching "Copy" button.



Open keypad by touching "Rename" button. Change file name by using keypad. Only Mold File name can be changed. Select desired Mold File before touching button.



Select desired Folder or File. Delete the Mold Folder and Mold File by touching "Delete" button.

## 6. Data Setting View Screen Configurations

- This screen is for changing Mold File name and the number of target zones.
- This screen shows thermocouple types, output modes, target temperatures (SV) of each zone.

**Data Setting**

Mold File Name : Default

Total Zones No. : 72

Zone		T/C	Output Type	SV
No	Name			
1[1-1]	ZONE 1	K(CA)	SSR	120.0
2[1-2]	ZONE 2	K(CA)	SSR	120.0
3[1-3]	ZONE 3	K(CA)	SSR	120.0
4[1-4]	ZONE 4	K(CA)	SSR	120.0
5[1-5]	ZONE 5	K(CA)	SSR	120.0
6[1-6]	ZONE 6	K(CA)	SSR	120.0

All Edit Select Zone No. : 1 ~ 72

SETUP CHECK TIMER REPORT LIST 2010/02/23 10:36:12 Default ADMIN STOP

### About the Button



Move on to "Mold Setup" screen by touching "Esc" button.



Move on to Home screen by touching "Ok" button.



Move on to previous or next row by touching Up, Down arrow button.  
Moves from 6th to 7th zone by touching "Down" arrow button.  
Move directly on to the desired zone by touching desired row.



Apply same value to all zones by touching "All" button.  
This function is available only when any zone except Mold File Name and Total Zone No. is selected.



Edit Mold File name, number of total zones, and the setting values of each zone by touching Edit button.  
If Mold File Name is selected, keyboard pops up.  
If total Zones No. is selected, numeric keypad pops up.



Apply same value to the range of selected zones by touching Select button. Open numeric keypad to enter range of desired zones by touching left (start) and right (end) number input boxes.  
End zone number can not access total zone number.  
This is available only when the range of desired zones is entered.

Example : If you want to change from 5th zone to 24th into same value, follow the below procedures.

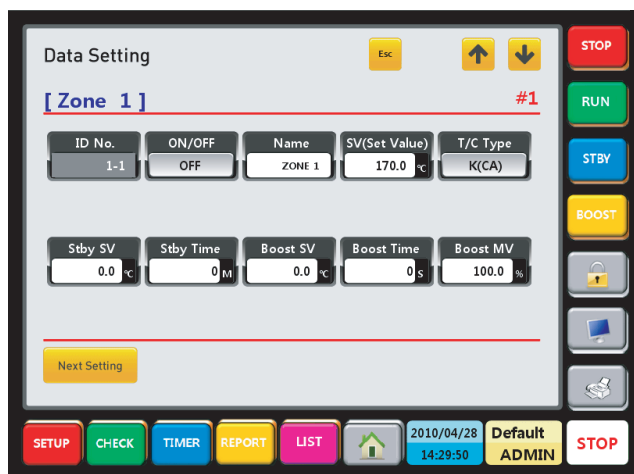
Select Zone No. : 5 ~ 24

- ① Touch left box. Then enter start zone number 5 by using numeric keypad.
- ② Enter end zone number 24 by touching right box.
- ③ Touch Select button.

## 7. Data Setting Screen Configurations

- Individual zone, selected range of zones, and all zones can be changed.
- Number of screens depends on Login level (user, admin)  
[User : 1 Screen, Admin. : 3 Screens]
- Blue zone indicator at top left corner shows the selected zone(s) as below.
  - ① Individual Zone : [Zone Number]
  - ② Selected Zones : [Start Zone number ~ End Zone number]
  - ③ All Zones : [Zone ALL]
- Current page number of screen is shown in red at the top right corner.
- If all zones are selected, the setting values of zone 1 are displayed.  
If a range of zones is selected, the setting values of start zone are displayed.

### 1) Data Setting Screen Page #1



#### ■ About the buttons



Move on to previous screen by touching "Esc" button.



Ok Move on to Home screen by touching "Ok" button.  
Ok button may be invisible up to previous screen.



Move on to the previous or next zone by touching Up/Down Arrow button. Up/Down arrow buttons are visible if an individual zone is selected.



Move on to next Data Setting Screen Page by touching Next button. If login level is User, Next button is invisible because there is only one page for user level.



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



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



To change User defined name of zone at Name Edit box for easy reference. If title, Name of edit box is touched, black color user's zone name turns in red. This user's zone name is shown in 7 letters on Text View Screen and 4 letters on Digital View Screen.



To change Target temperature.



To select thermocouple type by toggling button.  
J(IC) and K(CA) thermocouples are available.  
Check the thermocouple types of Mold.



Stby SV (Standby Set Value)  
To change Standby Target Temperature.  
If login level is user, this button is invisible.



To change Standby Target Time.  
If login level is user, this button is invisible.



To change target temperature for Boost mode  
If login level is user, this button is invisible.



To change target time for Boost mode.  
If login level is user, this button is invisible.



Boost MV (Boost Manipulation Value)  
To change Maximum output for Boost mode.  
If login level is user, this button is invisible.

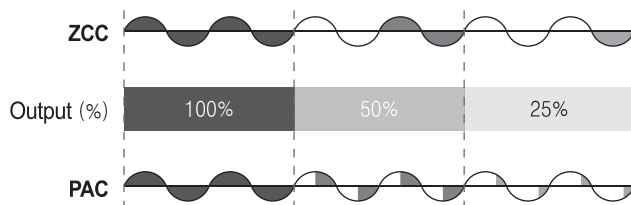
## 2) Data Setting Screen Page #2



## ■ About the Buttons



To select output type. If the button is touched, output type changes in following order.  
Output types : ZCC, PAC(Auto), PAC(60Hz), and PAC(50Hz).



PV Sync (Point Value Synchronization)

To switch PV Synchronization function on or off.

PV Synchronization function allows the selected zones to be heated up simultaneously.

If Point Value (actual temperature) is higher than selected zones for PV Sync, it remains at the current temperature.

If On/Off button of "Data Setting Screen Page #1" is Off, PV Synchronization function is not working.



To revert the polarity of thermocouple.

If "TC.Re" error message appears, switch T/C Reverse button on.



To switch Buzzer function on or off.

If all zones are selected, Buzzer On/Off button is activated.



To change the duration of buzzer sound.

If all zones are selected, Buzzer On/Off button is activated.



AL High (Alarm High)

To change the set point to initiate the alarm if the actual temperature exceeds over AL High set point.



AL Low (Alarm Low)

To change the set point to initiate the alarm if the actual temperature exceeds below AL Low set point.



To select Soft Start mode.

Soft Start Modes : Always, Off, 1 time

This function prevents from heater coil damages caused by over output at the initial stage.

This may cause slow down temperature rising speed due to a certain restricted output at the initial stage.



To select Auto Tuning mode.

Auto Tuning Modes : Always, Off, 1 time

To calculate the optimal PID values automatically by the controller.



PV Filter (Point Value 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.

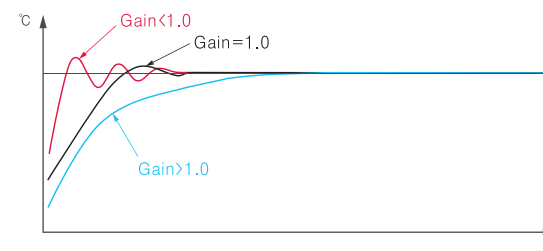
Therefore, the default set point is highly recommended.



A/T Gain (Auto Tuning 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.

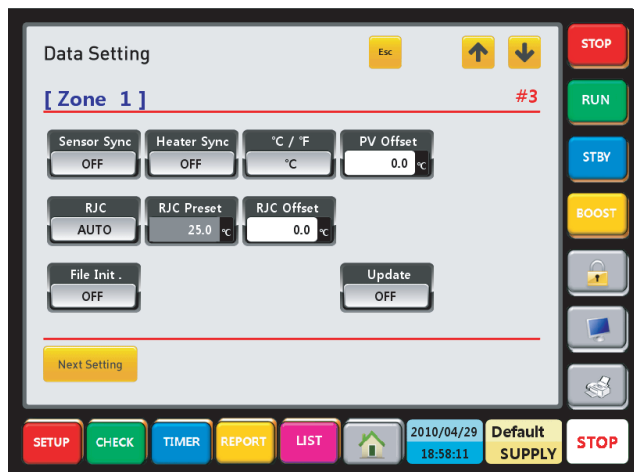


A/T Mode (Auto Tuning Mode)

To select Auto Tuning mode.



## 3) Data Setting Screen Page #3



## ■ About the buttons



## Sensor Sync (Sensor Synchronization)

To temporarily change the alternative thermocouple zone (slave zone) if the thermocouple errors occur.

This function gets the thermocouple data from the appointed zone to control the controller output.

Actual temperature could be different from display temperature.



## Heater Sync (Heater Synchronization)

To temporarily change the alternative heater output zone (slave zone) if the thermocouple errors occur.

This function gets the heater output from the appointed zone to use the same heater output for the selected zone.

Actual temperature could be different from display temperature.



To select Degree C or Degree F as required.



## PV Offset (Point Value Offset)

To change the offset value in order to increase or decrease the display value of actual temperature.



## RJC (Reference Junction Compensation)

To select the sensing method of controller unit internal temperature sensor.

Sensing Methods :

Auto - To sense the actual internal temperature of controller unit.

Manual - To activate RJC Preset edit box.



## RJC Preset (Reference Junction Compensation Preset)

To change the sensing value of internal temperature of controller unit.

If RJC button is at Manual position, RJC Preset edit box is editable.



## RJC Offset (Reference Junction Compensation Offset)

To change the offset value of internal temperature

sensor of controller unit in order to calibrate temperature discrepancy.



## File Init. (File Initialization)

To initiate all variables of loaded Mold File.

Timer setting values for Sequential Valve Gate Controller are not initiated.



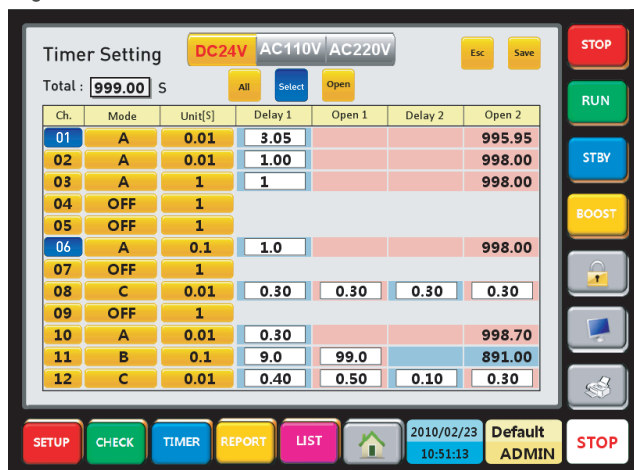
## To upgrade the software.

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.

## 8. Timer Setting Screen Configurations [Optional]

- To change Sequential Mode and display unit of output Sequence Injection Timer.
- To selectively open or close each valve gate individually to precisely control the material flow front.
- To manually open or close the selected valve gates or all valve gates at the same time.



### About the buttons

Esc

To move on to Home screen by touching "Esc" button.

Save

To save all values by touching "Save" button.

Open

To manually open or close all valve gates at the same time.

If injection signal is on, this button is not working.

When the Mode of channel is Off, this function is not working.

All

To select all valve gates(channels) by touching All button. To manually open all valve gates(channels) by touching Open button when All button is activated. If injection signal is on, this Open button is not working.

Select

To activate Select button by touching Select button and select the desired valve gates(channels) by touching individual Channel No.

01 ~ 12 button. To manually open the selected valve gates(channels) by touching Open button when the Select button is activated.

If injection signal is on, this Open button is not working.

01 ~ 12

Channel No.

To manually open or close individual valve gate by touching the channel no. button when All button and Select button are not activated (All, Select Orange Color). Valve gate remains at open by first touching Channel No. button. Valve gate gets closed by second touching Channel No. button. If injection signal is on, this button is not working.

To select the sequential mode by touching Mode button of individual valve gate. The mode button changes in following order.

Mode : OFF, A, B, C

OFF

OFF Mode : To switch the sequential valve gate control 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, Delay 1 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

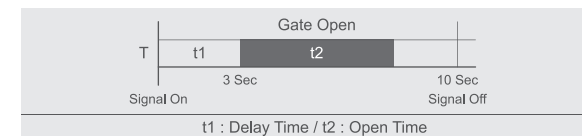
B Mode : To run B mode.

If injection start signal is on, remain valve gate closed for delay 1 time. Then open valve gate for Open 1 time.

Finally close valve gate.

Ex) Injection signal : 10 sec, Delay 1 time : 3 sec, Open 1 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.



### Caution!

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

## 9. Report Screen Configurations

C

C Mode : To run C mode.

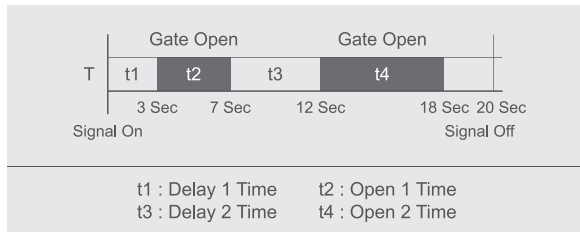
To run B Mode (Delay 1, Open 1 time) and  
B mode (Delay 2, Open 2) sequentially.

EX) Injection signal : 20 sec

Delay 1 Time : 3 sec, Open 1 Time : 4 sec

Delay 2 Time : 5 sec, Open 2 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.



1

Time Unit [1 sec] : To change the time unit in integer.

0.1

Time Unit [0.1 sec] : To change the time unit in decimal point.

0.01

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

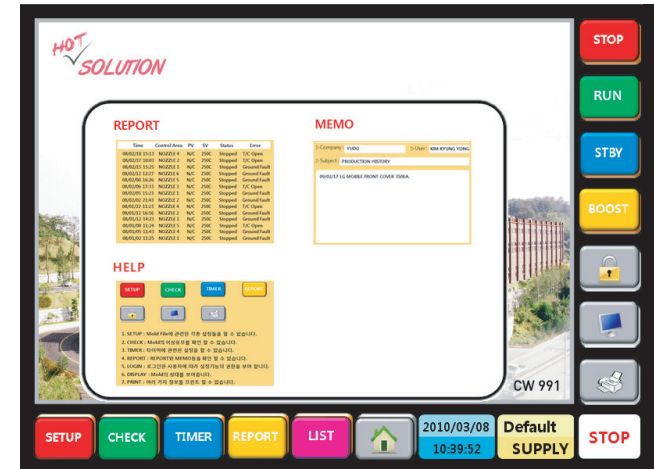
· Solenoid Valve Output voltage

Indicators	Remarks
DC 24V AC 110V AC220V	Solenoid valve is not connected to cable. Fuse Error in Timer.
DC 24V AC 110V AC220V	Solenoid output voltage is 24VDC.
DC 24V AC 110V AC220V	Solenoid output voltage is 110VAC.
DC 24V AC 110V AC220V	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)

- To select the desired screen among Report, Memo and Help Screen.
- If report screen is run, all buttons of Home Screen are disabled.



■ About the Icons

**REPORT** To run Report Screen by touching Report Icon.

**MEMO** To run Memo Screen by touching Memo Icon.

**HELP** To run Help Screen by touching Help Icon.

## 1) Error History Screen

- The Error History Screen allows you to view errors that have occurred.
- Turn off the buzzer sound when errors occur.

Time	Zone No. Output	PV Cur.	SV AL-H	Status AL-L	Error
2010/02/23 10:49:51	12-4	1050.0	0.0	STOP	TC Burnout
2010/02/23 10:49:51	0.0	0.0	510.0	-10.0	
2010/02/23 10:49:51	12-5	1050.0	0.0	STOP	AC Error
2010/02/23 10:49:51	0.0	0.0	510.0	-10.0	
2010/02/23 10:49:51	12-5	1050.0	0.0	STOP	TC Burnout
2010/02/23 10:49:51	0.0	0.0	510.0	-10.0	
2010/02/23 10:49:51	12-6	1050.0	0.0	STOP	AC Error
2010/02/23 10:49:51	0.0	0.0	510.0	-10.0	
2010/02/23 10:49:51	12-6	1050.0	0.0	STOP	TC Burnout
2010/02/23 10:49:51	0.0	0.0	510.0	-10.0	

## ■ About the buttons



To turn off the buzzer sound when errors occur.  
Then return to Home screen.



Up/Down : To move on the next or previous page  
by touching Up/Down arrow button.

## - Error Messages

No	Error Message	Explanations
1	Fuse	The fuse for that zone has failed.
2	AC.Er	Frequency of input power source is not rated.
3	AL-H	Actual temperature exceeds set point of alarm high.
4	AL-L	Actual temperature drops down set point of alarm low.
5	HT.Op	Open Heater - The heater connection is broken.
6	HT.St	Shorted Heater - The heater is shorted or exceeds the maximum rating of the module.
7	TC.Re	Thermocouple Reversed - The T/C connection is wired + to - at some point.
8	TC.St	Thermocouple Pinched - The T/C is pinched or the controller thinks it is pinched. (Default: 100% output, must see +20°F /11°C in 5 minutes). True Pinch - Temperature reading too far away to control - runaway. False Pinch - Heater is too small to heat the zone
9	TC.Op	Thermocouple (T/C) Open - The T/C connection is broken
10	Rj.Er	Internal temperature sensor of controller unit failed.
11	AD.Er	CT sensor of controller unit failed.
12	GR.St	Current detection failed.

## 2) Memo Screen

- It may be necessary to make a memo for the next shift operator when a problem with the mold occurs.  
Instead of writing that note on a piece of paper, which could easily get lost, create an online memo.
- Contents can be recorded up to 7 lines.  
You can enter the memo from any line.

Memo

Company : YUDO User : HAN G.T

Subject : LCD MONITOR

Contents :

2010-02-23  
350EA FINISHED

## ■ About the buttons



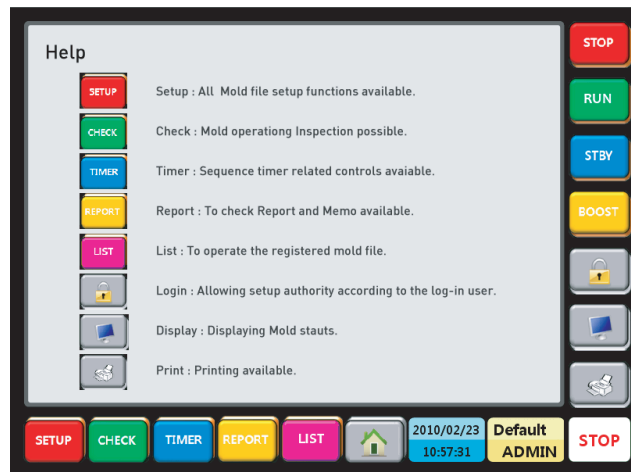
Move on to Home Screen without saving the entered memo  
by touching Cancel button.



Move on to Home Screen after saving the entered memo  
by touching Ok button.  
If none of memo lines is entered, move on to Home Screen  
without saving the memo.

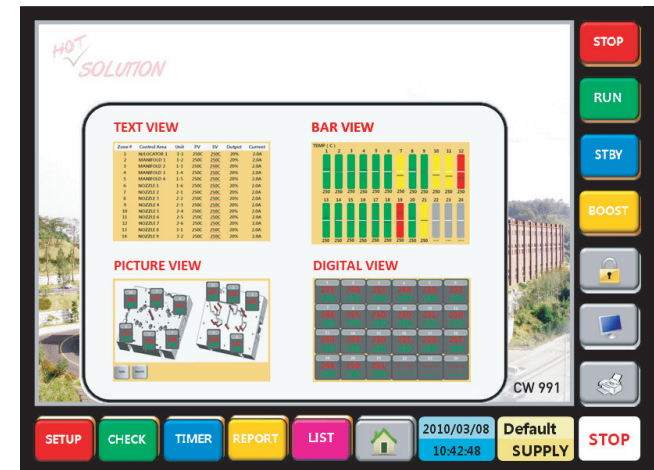
### 3) Help Screen

- The Help Screen allows you to view brief explanations on buttons of Home Screen.



## 10. View Screen Configurations

- To select the desired screen among Text, Bar, Picture and Digital View Screen.
- If report screen is run, all buttons of Home Screen are disabled.



### About the buttons

**TEXT VIEW** To run Text View Screen by touching TEXT VIEW Icon.

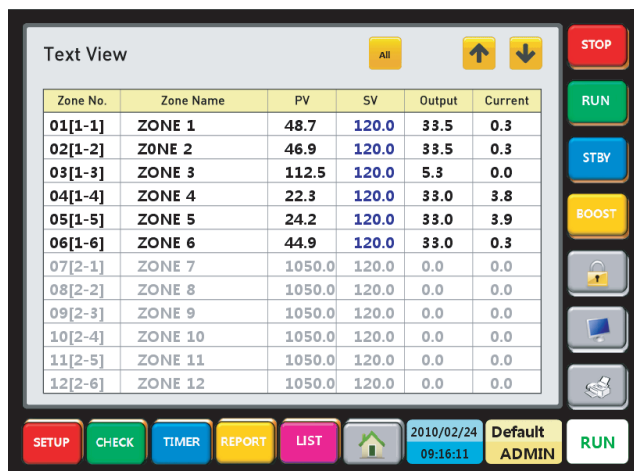
**BAR VIEW** To run Bar View Screen by touching BAR VIEW Icon.

**PICTURE VIEW** To run Picture View Screen by touching PICTURE VIEW Icon.

**DIGITAL VIEW** To run Digital View Screen by touching DIGITAL VIEW Icon.

## 1) 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 Basic Setting Screen which allows you to change data setting values by touching any line of zones.
- If zone is deactivated, zone text turns in light gray.



Text View

Zone No.	Zone Name	PV	SV	Output	Current
01[1-1]	ZONE 1	48.7	120.0	33.5	0.3
02[1-2]	ZONE 2	46.9	120.0	33.5	0.3
03[1-3]	ZONE 3	112.5	120.0	5.3	0.0
04[1-4]	ZONE 4	22.3	120.0	33.0	3.8
05[1-5]	ZONE 5	24.2	120.0	33.0	3.9
06[1-6]	ZONE 6	44.9	120.0	33.0	0.3
07[2-1]	ZONE 7	1050.0	120.0	0.0	0.0
08[2-2]	ZONE 8	1050.0	120.0	0.0	0.0
09[2-3]	ZONE 9	1050.0	120.0	0.0	0.0
10[2-4]	ZONE 10	1050.0	120.0	0.0	0.0
11[2-5]	ZONE 11	1050.0	120.0	0.0	0.0
12[2-6]	ZONE 12	1050.0	120.0	0.0	0.0

Buttons: All, Up, Down, STOP, RUN, STBY, BOOST, Lock, Home, Back, 2010/02/24 09:16:11, Default ADMIN, RUN.

### About the buttons



Move on to the Data Setting Screen and select all zones by touching All button.

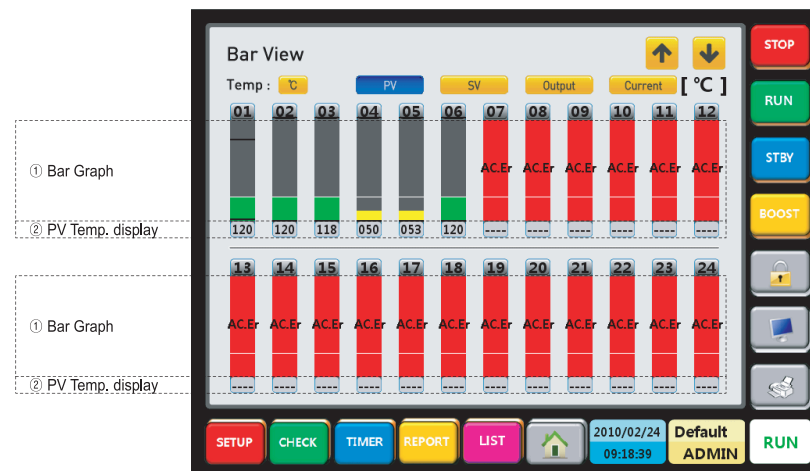


Move on to next or previous page of this screen by touching Up/Down arrow button. Each page shows 12 zones.

## 2) Bar View Screen

- The data is displayed in a graphical format.
- This screen allows you to view target and actual temperatures, output rates and currents of heaters.

- Switch on or off individual zone by touching bar graph.
- If the zone is deactivated, full bar turns in gray. If errors occur in zone, bar turns in red.
- Black line of bar shows the set values of alarm high and low.
- White line of bar shows target temperature (SV).
- Green portion of bar shows actual temperature, and it is within allowable range of target temperature.
- Yellow portion of bar shows actual temperature, and it is out of allowable range of target temperature.



### About the buttons



Move to on next or previous page by touching Up/Down arrow button. Each page shows 24 zones.



To view actual temperature (PV) on text box below bar graph By touching PV button.



To view target temperature (SV) on text box below bar graph By touching SV button.



To view output rate on text box below bar graph By touching Output button.

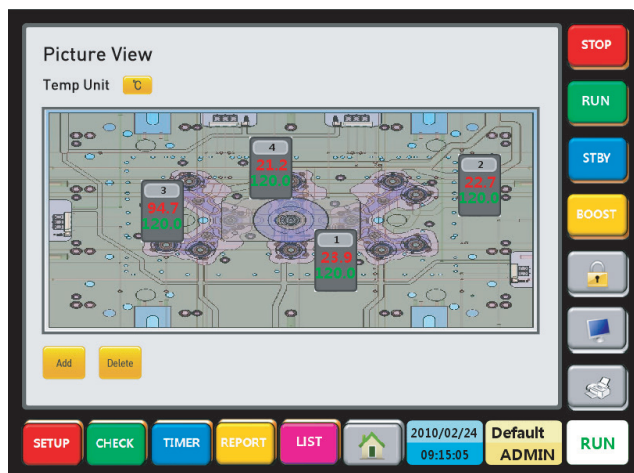


To view current on text box below bar graph By touching Current button.



### 3) Picture View Screen

- The data is displayed in an image format.
- This screen allows you to add and delete user selected zones on the image.
- To select background image from Mold setup screen by touching setup button.



#### ■ About the buttons



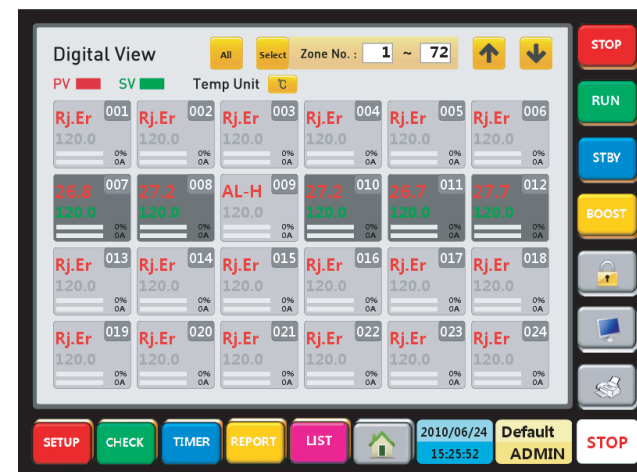
To add user selected zones on the image by touching Add button. If numerical keypad appears, enter desired zone number and point the location. To relocate the user selected zone by dragging the zone box. Only last entry is possible to relocate.



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

### 4) Digital View Screen

- The data is displayed in grid format.
- To change the data setting from Basic Setting Screen by touching individual grid.
- If zone is deactivated, grid turns in light gray.



#### ■ About the buttons



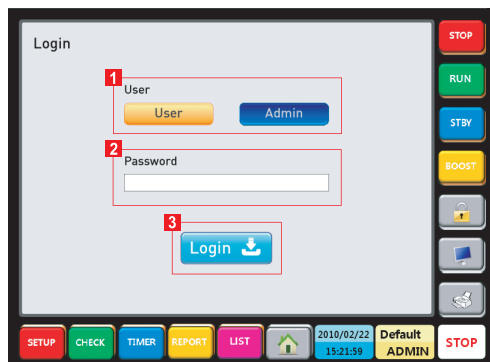
Move on to the Data Setting Screen and select all zones by touching All button.



Move on to next or previous page of this screen by touching Up/Down arrow button. Each page shows 24 zones.

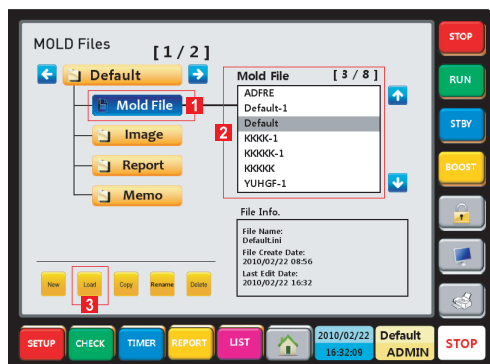
## 11. Operation Examples

### 1) User Login Screen



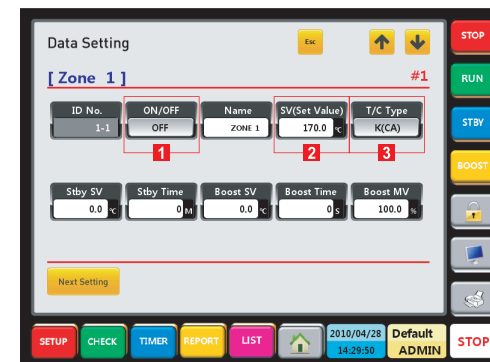
- ① Select Login User - between User and Admin.
- ② Enter Password - Enter password according to User login level.
- ③ Touch Login Button - Login completed

### 2) Mold Setup Screen



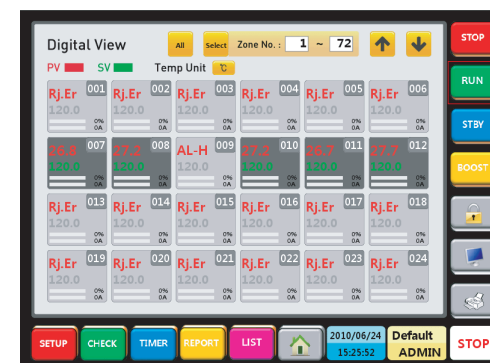
- ① Touch Mold File.
- ② Select Mold File - Select desired file from Mold File list.
- ③ Touch Load Button.

### 3) Data Setting Screen



- ① Switch on the desired zone.
- ② Change target temperature (SV).  
- Enter the desired value on selected zone.
- ③ T/C Type.  
- Select thermocouple type between K(CA) and J(IC).  
- Be sure that the mold thermocouple type is same.

### 4) Digital View Screen (Monitoring)



- ① RUN - Validate all data setting values by touching Run button.

## 12. Controller Specifications

### 1) Input Specifications

No. of zones	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°C (32 ~ 932°F)
Scan Rate	16.66ms
Scan Accuracy	±0.5% of F/S
Display Resolution Limit	0.1°C or 1°F
Compensable Temperature variation	±2.0°C (0 ~ 50°C)

### 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°C (32 ~ 932°F), If value is 0°C, 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°C (32.18~122°F)
	Self Tuning	Quick, Full Auto Tuning
	PID Manual Input	Enter PID value directly or change A/T Gain

Alarm	Range	500°C (32 ~ 932°F)
	Alarm Type	Alarm High (Relative), Alarm Low (Relative)
	Hysteresis Range	500°C (32 ~ 932°F)
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]

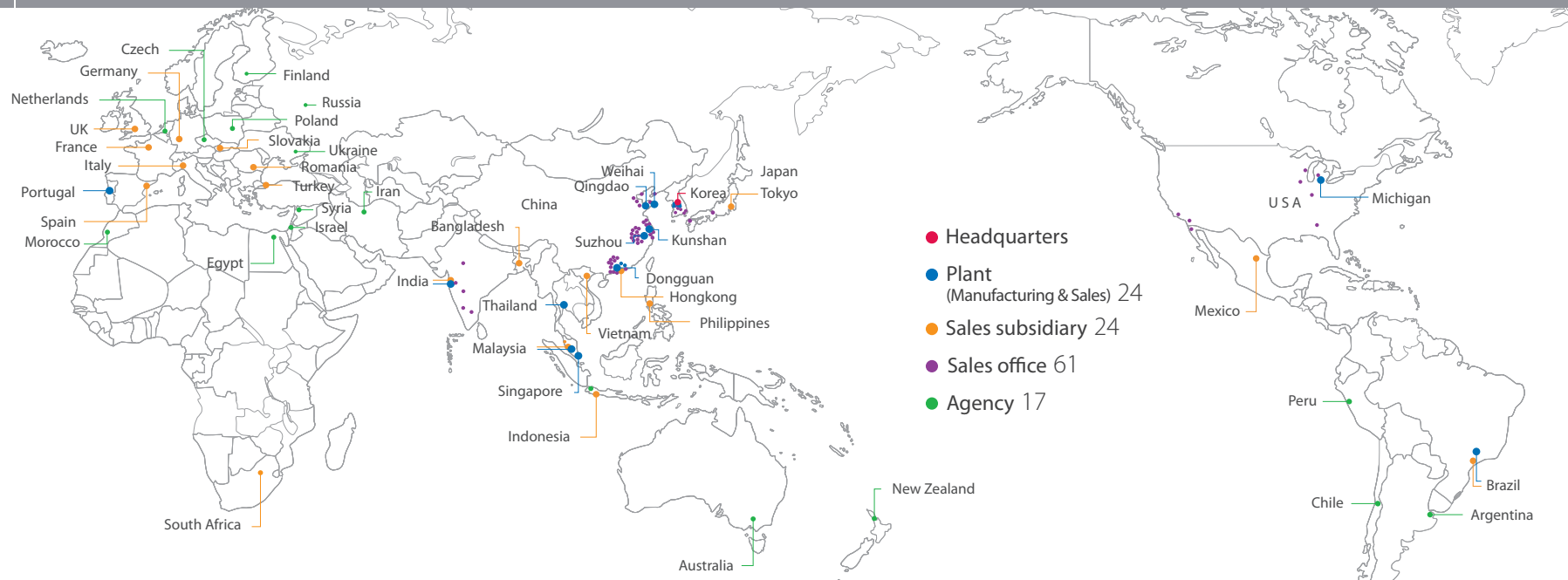
Input	Injection Signal	24Vdc, 110Vac, 220Vac
	Voltage	85 ~ 264Vac
Output	Relay	DC: 24Vdc(Max 100mA) X 16CH AC: 110Vac(Max 1A) X 16CH, 220Vac(Max 1A) X 16CH
	System Rule Mode	A Mode: Set Delay 1 time B Mode: Set Delay 1, Open 1 times C Mode: Set Delay1, Open1, Delay2, Open2 times
Misc		Setting Time Unit : 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°C (32 ~ 122°F)		
Operating Humidity	20 ~ 90%RH(Non-condensing)		
Storage Temperature	-25 ~ 70°C (-13 ~ 158°F)		
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	147m/s, 3 directions-3 times		
Magnetic Effect	Below 400 AT/m		
Warming-up Time	Over 30 min		
Net Weight	Model	Zone no.	Max. Weight
	CW991 Slim	24	Below Max 80kg
	CW991 Standard	48	Below Max 115kg
		72	Below Max 135Kg
		96	Below Max 175kg
		120	Below Max 200kg

※ 6 Zone/Unit : Max 2.6kg / Input power cable : Max 1kg/1m



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