

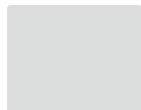
TEMI2000 SERIES

Operation Manual (Temperature and Humidity Programmable Controller)

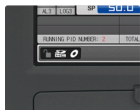


WELCOME

Thank you for purchasing Furnace controller production.
Please use after read instruction manual for safety.
Free to contact to our sales for
production inquiry and after service.



VARIOUS



SAMWON
Promising the Best

It is temperature and humidity programmable controller which equips with the general control, heating and cooling function by supporting high definition TFT-LCD touch screen and SD card.

<http://www.samwontech.com>

Being the controller market leader in the 21st century with the best technology



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This manual is commonly used for TEMI2000 Series.

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01. Cautions (Instructions) for safety

Thank you for your choice of our Temperature and Humidity Programmable Controller (TEM2000 series). This manual describes the method of installation of the product.

Cautions in this instruction manual

- Please deliver for the end user to possess always and keep it in the place accessible at any time.
- Use the product after full understanding of this installation manual.
- This installation manual does not warrant any other things because it is a description of the details for the function.
- A part or whole of this manual shall not be edited or copied randomly.
- The descriptions in this manual may be changed randomly without pre notice or warning.
- Even though this manual was made with elaboration, it will be appreciated if you inform to the purchasing point (Dealer shop and etc) or sales team in our company in case of deficiency, mistake or omission in the contents.

Cautions for the safety and modification (Change) of the product

- Please use this product after full understanding on the safety cautions in this manual for the protection and safety for this product and the system connected to this system.
- Our company is not responsible to the damages occurred by using or handling or unattended using not relying on this installation manual.
- Please install at the outside of this product when the additional protection and safety circuit is installed separately for the protection and safety for this product and the system connected to this system.
- The internal modification (Change) and addition to this product are prohibited.
- Do not disassemble, repair and modify of this product because it becomes the reasons for electric shock, fire and malfunction.
- In case of changing the part or the consumables of this product, please contact to the sales department of our company.
- Do not contact to the moisture with this product. It may cause the failure on this product.
- Do not apply the strong impact on this product. It may cause the damage and failure on this product.

With regard to the exemption for the responsibility of this product

- We are not responsible for any warranty on this product besides the defined cases in the quality assurance condition of our company.
- We are not responsible for the direct or indirect damages on the user of any third party due to the not expectable defect or the natural disaster in use of this product.

With regard to the quality assurance condition of this product

- The warranty period shall be one year from the purchasing of this product. Free of charge repair is available only for the cases of out of order occurred from normal use conditions.
- The repair due to the out of order occurred after the warranty period shall be repaired at the actual cost according to the defined condition by our company.
- The out of order occurred within the warranty period shall be repaired at the actual cost for the following cases in spite of within the warranty period.

(1) Out of order due to the mistake or fault of the user (Ex: Initialization by losing the password and etc.)	(4) Out of order due to the random disassemble, change or damage on the product.
(2) Out of order due to the natural disaster (Ex: Fire and flood and etc)	(5) Out of order due to the electric power instability
(3) Out of order due to the movement of product after installation.	(6) Others
- Please contact to the purchasing points or sales part of our company when after sales service is necessary because of the failure on the product.

Symbol marks for safety



(A) It means the "Handle with care" or "Cautions" In case of violation of this point, it may cause the death, severe injury or the extreme damage on the product.

- Product : It is marked on the points to be acknowledged certainly to protect the human body and device.
- Instruction manual : It describes the cautions to prevent the cases of endangered situation on the life and body of the user due to the electric shock and so on.



(B) It means "Ground terminal"

- Make the earth with the ground in case of product installation and controlling the product.



(C) It means the "supplementary explanation"

- It describes the points to supplement the explanation.



(D) It describes the "references"

- It describes the information and pages of reference to be referred.

Part 01

Operation and setting


1-1 Basic operation flow chart	4
1-2 Setting button operation	5
1-3 Setting button operation	6



01. Operation and setting

This product is programmable controller designed with dialogue style touch screen easy-to-use for the users.

1-1. Basic operation flow chart

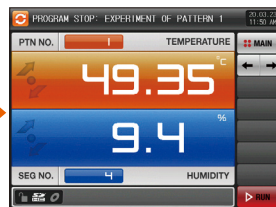
- The logo screen and the initial screen are displayed sequentially when the electric power is switched “ON” after installation of the product and it converts to the program stationary screen.
- It takes about 15 seconds for screen loading
- When  button is touched at the top of the program stationary screen, it converts to the main screen.
- Refer to [13. System initial setting] in [Installation manual] for change in the initial screen.



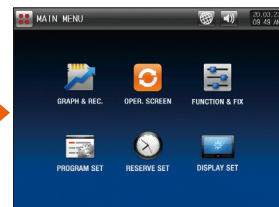
Logo screen



Initial screen

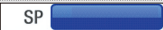











Program stationary screen



Main screen

1-2. Setting button operation

Button type	Button operation
	The "Set value" is touched in stationary operation/still screen and it is used for setting the set value wanted by the user.
	
	The "Pattern No." is touched in program still screen and it is used for setting the pattern number wanted by the user.
	It is used for inputting the general numbers and name.
	It is used for selection for one out of many types.
	It is used for selection for one out of more than 2 parameter setting. (ON/OFF/Inactive state)
	It is used for selection of Y/N for the corresponding parameter. (ON/OFF/Inactive state)
	It is used for general screen conversion.
	It is used for increasing or decreasing of the page within the same screen.
	It is used for the page conversion by the decrease and increase in time axis on the same screen.

1-3. Parameter setting method

- When is selected in [1-2 Setting button operation], the input key of the setting value is shown as followings and the necessary data can be input.
- When the data out of the setting range is input, error message ("LIMIT ERROR") is shown on the input data display window with the error sound ("Beep").

▶ SET POINT OF TEMPERATURE
[-50.00 ~ 150.00]

50.00

1 2 3 4 5 6 ← BS ESC

7 8 9 0 . +/- ✕ CLEAR ENTER ↵

▲ Input key for setting only the numbers

Input key for setting the pattern experiment name and DI error name ▶
Refer to [11. DI function and operation setting] in [Operation manual] for DI error name input key.

▶ TS TYPE OF 01 SEGMENT
[0 ~ 17]

00 00 00 00

1 2 3 4 5 6 ← CLR ESC

7 8 9 0 TS1 TS2 TS3 TS4 ENTER ↵

▲ Input key for time signal setting

▶ DI1 ERROR NAME
[ALPHABET / NUMERIC]

A B C D E F G H I J

K L M N O P Q R S T

U V W X Y Z () # _

1 2 3 4 5 6 ← CLR ESC

7 8 9 0 . - : SP ENTER ↵

▶ SET POINT OF TEMPERATURE
[-50.00 ~ 150.00]

50.00 LIMIT ERROR

1 2 3 4 5 6 ← BS ESC

7 8 9 0 . +/- ✕ CLEAR ENTER ↵

▲ Display when it is out of the setting range



NOTE

Touch key lock release

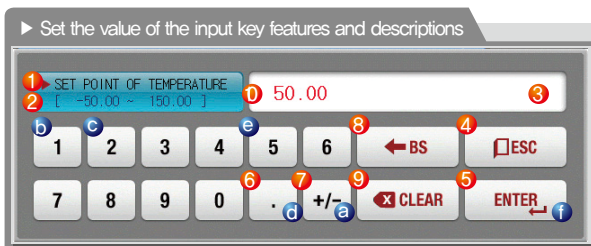
- Input OFF (Lock release state) for key block because the set value is not input when "Key block" is "ON".
- Refer to [4. Operation state screen setting] for details

(1) Method for effectiveness of setting button and setting value

- This product is designed as follows when the setting data input button is touched or to check the effectiveness of the input setting data by sound.
- “Beep” : When the basic setting button is touched or the setting data is input normally
- “Beep and beep” : When the input data by the setting data input key is out of the input range.
- Do not press with sharp thing (Pencil and etc) or excessive force on the input key for basic setting button or setting value.
It may cause the mal operation of the device or damage on the touch panel.

(2) Setting value input method

- Every input data used in this product is set by the set data input key, test name input key and time signal input key.
- The input key for set data is appeared when button is touched in [1-2 Setting button operation] and the value to be set can be input.
- Refer to [6-4 Time signal operation] for time signal input.
- Refer to [11. DI function and operation setting] in [Operation manual] for DI error name input key.



Ex) Set data input method

Press the set data input button in the corresponding screen →

Press the “ENTER” key finally after pressing the corresponding number in sequence

(a)→(b)→(c)→(d)→(e)

①	It displays “Parameter.”
②	It displays “Setting range.”
③	It displays “setting display window.” • It displays “LIMIT ERROR” when it is out of the setting range. • It displays “INPUT ERROR” when there is an error in setting unit.
④	It is used to return to original screen after stopping the input.
⑤	It returns to the original screen by saving the input data.
⑥	It is used for input the decimal point.
⑦	It is used for input the symbol (+/-).
⑧	It is used for erasing the input data by one character.
⑨	It is used for erasing all input data.
⑩	It displays the already input setting data.

Part **02**

Main screen 9



02. Main screen



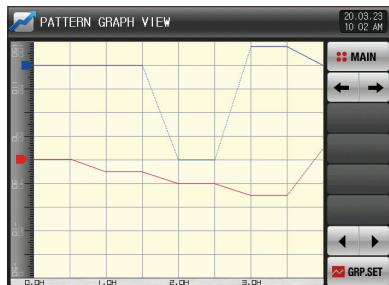
No.	Instruction	Description
①	GRAPH & RECORD	Moving to the screen to set Y/N for using graph display, graph record, SD card recording
②	OPERATION SCREEN	Moving to the operation screen
③	FUNCTION & FIX	Moving to the setting screen for additional function and operation method
④	PROGRAM SET	Moving to the program setting menu screen
⑤	RESERVE SET	Moving to the screen for setting current time, programmed operation time.

No.	Instruction	Description
⑥	DISPLAY SET	Moving to the screen for setting the screen brightness, back light electricity saving and humidity display.
⑦	BUZZER SOUND	It sets Y/N of use buzzer sound. The buzzer sound generated in DI error is operated when it is set for no use.
⑧	LANGUAGE SET	Set the language to use (English, Korean, Simplified, Traditional, Japanese, Russian languages available)

Part 03

Setting graph display and save

3-1 Pattern graph display	12
3-2 Presented value (PV) graph view	15
3-3 Presented value (PV) graph save setting	18
3-4 Memory save setting	20



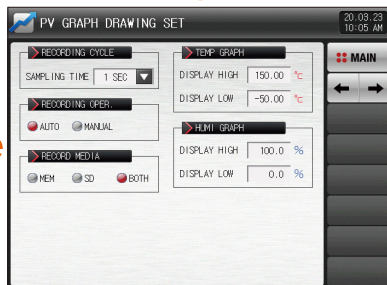
[Fig. 3-2] Graph & Saving screen 1 (Pattern graph display)



[Fig. 3-5] Graph & Saving screen 2 (Graph display selection)



[Fig. 3-12] Graph & Saving screen 4



[Fig. 3-9] Graph & Saving screen 3

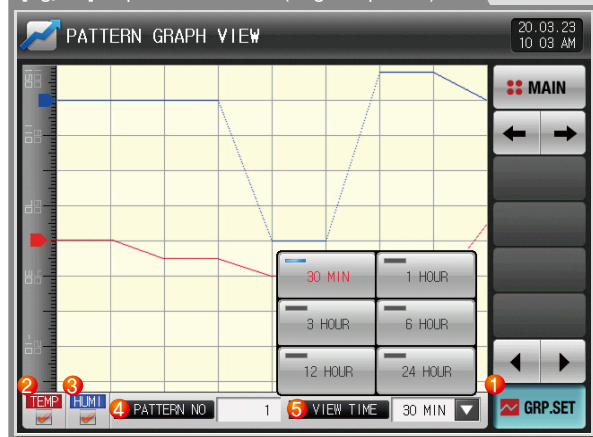


03. Setting graph display and save

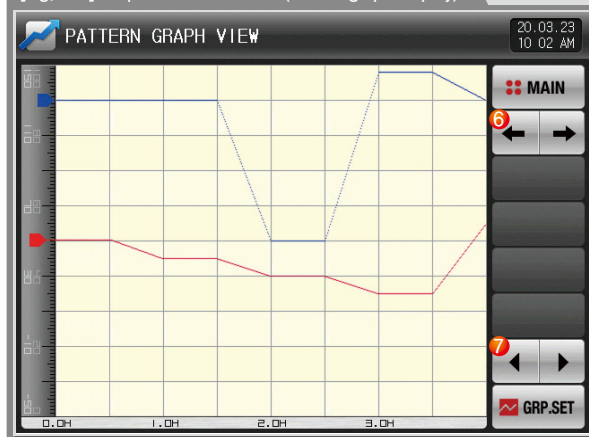
3-1. Pattern graph display

- It converts to [Fig. 3-2 Graph & Save screen 1 (Pattern graph display)] when [Graph & Save] is selected at the left top in [Fig. 2-1 Main screen]
- This screen displays the temperature and humidity operation pattern and progress time in program operation.
- It is a screen to display the input pattern in [Fig. 6-2 Pattern editing screen].
- Can change the status of Temperature · Humidity Check, ☒ and **PATTERN NO** , **VIEW TIME** even in the graph screen.

[Fig. 3-1] Graph & Save screen 1 (Program operation)





[Fig. 3-2] Graph & Save screen 1 (Pattern graph display)





Display the graph setting menu

- ① • Display the parameters related to the pattern graph operation at the bottom depending on ON/OFF operation on the graph menu button

The temperature (Red) is disappeared on the graph screen when the checked  button is touched in the currently operating screen and temperature (Red) is displayed in the graph screen when  button is touched again.

- ,  buttons are used even in during operation(RUN).

The humidity (Blue) is disappeared on the graph screen when the checked  button is touched in the currently operating screen and humidity (Blue) is displayed in the graph screen when  button is touched again.

- ,  buttons are used even in during operation(RUN).

Setting the pattern No. to be displayed

- ④ • Display the input key to set the pattern No. when (Pattern No.) is touched.
- Refer to [Fig. 3-4 Pattern No. input screen]

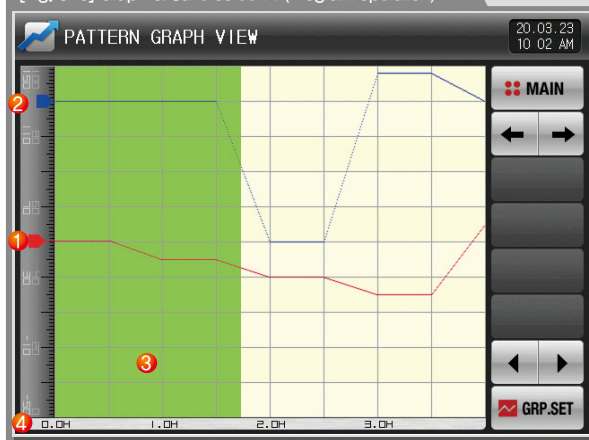
Setting the time on graph X axis

- ⑤ • Display of the input key to set the time on X axis when (Display time) is touched.
- The time on X axis can be changed during operation

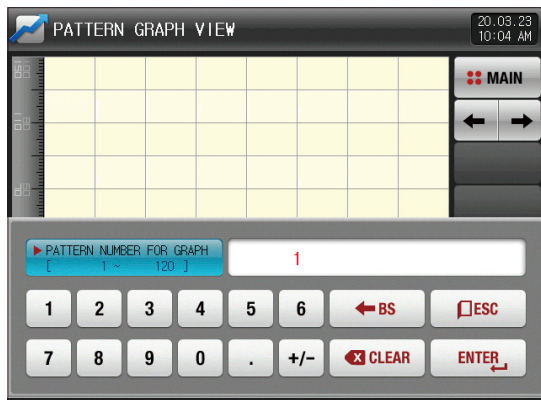
Moving from current screen to next screen

- ⑦ Change into the Previous/Next stage on the time axis when  is touched on the current page.

[Fig. 3-3] Graph & Save screen 1 (Program operation)



- ① Display the current temperature during operation
- ② Display the current humidity during operation
- ③ Display in green for the operation ended part
- ④ Display the processing time for the set pattern in [6-1 Program pattern setting]



[Fig. 3-4] Pattern No. input screen

References

- ▶ It is a screen to input the pattern No. to be displayed in graph.
- ▶ The pattern No. can be input even during operation.

Parameter	Setting range	Unit	Initial value
PATTERN NO.	1 ~ 40	ABS	1
VIEWTIME	30 MIN, 1 HOUR, 3 HOURS, 6 HOURS, 12 HOURS, 24 HOURS	ABS	30 MIN

3-2. Presented value (PV) graph view

- It is a screen to display the data recorded in [4-1(4) Stationary operation 3 operation screen] and [4-2(4) Program operation 3 operation screen].
- The date and time saved into the memory are displayed at the top of the screen. [Reference 1]

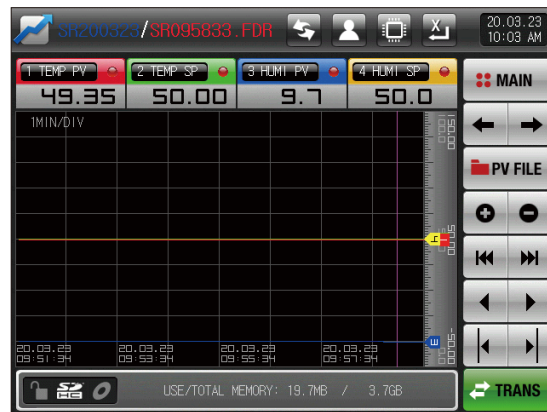


- ① It displays the temperature (Set-data, Indicated-Data) and humidity (Set-data, Indicated-Data)
- When the checked is touched, it is disappeared on the graph screen and when is touched, it is displayed on the graph screen.
 - Refer to [Fig. 3-5 and Fig. 3-6 Graph & Save setting screen 2]
- ② Key lock / SD card / Storage indicator
- ③ : Display to update the graph screen immediately which is being saved.

- ④ When Setting copy the recorded PV file in the internal memory to an SD card
- : Send the selected file.
 - : Send the whole file.
- ⑤ Set storage media display
- : Memory card file
 - : SD card file
- ⑥ Set graph display direction
- : Vertical (Y-AXIS)
 - : Horizontal (X-AXIS)
- ⑦ Moving from current screen to next screen
- ⑧ When is touched, the files saved into the internal memory is displayed.
- Moving from current screen to next screen
- ⑨ The time axis is expanded or reduced.
- ⑩ Moving to the beginning and end of the displayed PV graph page
- ⑪ Moving of graph screen by one page.
- Moving the blue line on the graph screen up/down by 1 DOT
- ⑫
- When the screen is touched, the indicated values are displayed while the blue line moves.
- ⑬ Copy the recorded PV files into the internal memory to SD card.



[Fig. 3-6] Graph&Save setting screen 2 (Graph display is not selected)

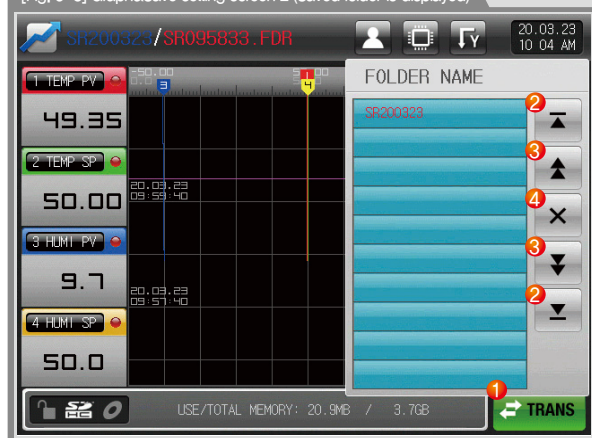


[Fig 3-7] When setting the X-AXIS of Trend direction, Graph Screen

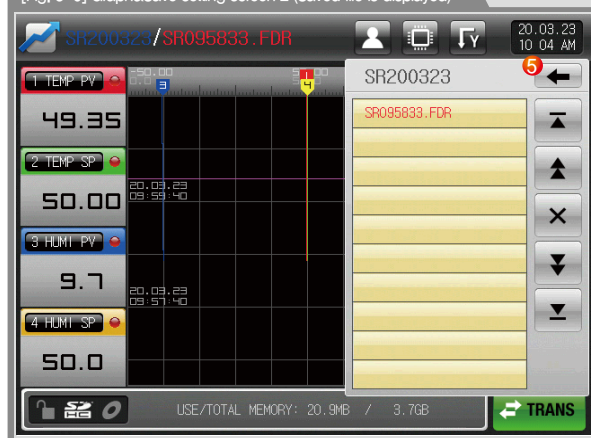
References

- ▶ It is a screen for no selection from the temperature (Set-data, Indicated-Data) and humidity (Set-data, Indicated-Data)
- ▶ It is a screen to display the saved file into the internal memory.
- ▶ Refer to [4-1(4) Stationary operation 3 operation screen] and [4-2(4) Program operation 3 operation screen] for saving into internal memory.

[Fig. 3-8] Graph&Save setting screen 2 (Saved folder is displayed)



[Fig. 3-9] Graph&Save setting screen 2 (Saved file is displayed)

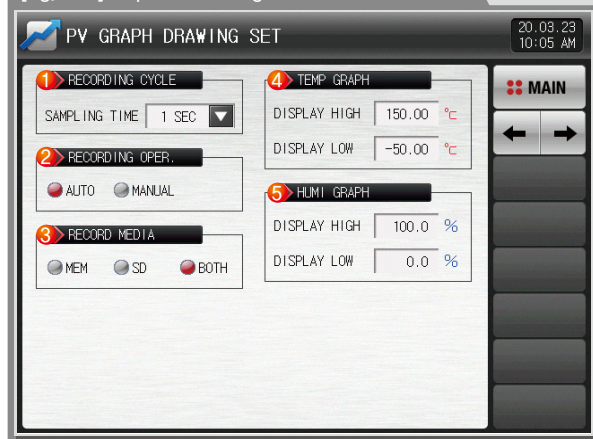


- ① Copy the recorded PV files into the internal memory to SD card.
- ② Move to the start and end in case of data searching stored in the internal memory
- ③ When search for the saved file in the internal memory, up / down to the end 10 to the units.
- ④ Close the PV file
- ⑤ Move to the folder

3-3. Presented value (PV) graph saving setting

- This screen is to set the display range and sampling time which are necessary for graph recording in [4-1(4) Stationary operation 3 operation screen] and [4-2(4) Program operation 3 operation screen].

[Fig. 3-10] Graph&Save setting screen 3



Setting the PV graph saving period

- It is not changeable during PV graph saving
- Saving about 31 days is possible when sampling time is set in 1 minute in saving into internal memory.

Internal memory and Setting Y/N for saving the data into the SD card

- AUTO : Saving the data in synchronized with Operation/Stop automatically
- MANUAL : Saving the data by the saving key in the Operation screen 3 manually

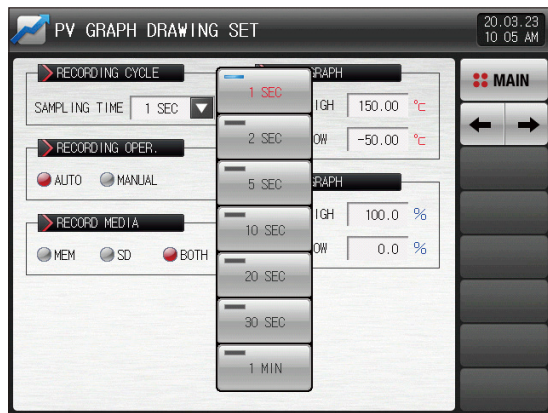
Setting the media for data saving

- MEM : Stored in the internal memory
- SD : Stored in the SD card
- BOTH : Simultaneously stored in the internal memory and SD card

Setting the display range of Temperature graph

Setting the display range of Humidity graph

Parameter	Setting range	Unit	Initial value
SAMPLING TIME	1 SEC, 2 SEC, 5 SEC, 10 SEC, 20 SEC, 30 SEC, 1 MIN	ABS	1 SEC
RECORDING OPER.	AUTO, MANUAL	ABS	AUTO
RECORD MEDIA	MEM, SD, BOTH	ABS	BOTH
TEMP GRAPH DISPLAY HIGH	T.EU (-2.50 ~ 102.50%) (Temp graph display lower limit < Temp graph display upper limit)	T.EU	T.EU(100.00%)
TEMP GRAPH DISPLAY LOW		T.EU	T.EU(0.00%)
HUMI GRAPH DISPLAY HIGH	H.EU (0.0 ~ 100.0%) (Humi graph display lower limit < Humi graph display upper limit)	H.EU	H.EU(100.0%)
HUMI GRAPH DISPLAY LOW		H.EU	H.EU(0.0%)



[Fig 3-11] Sampling time of Recoding cycle setting screen

3-4. Memory save setting

- It is a screen to set the transmitting of pattern and parameter to SD card.
- It is a screen displayed in SD card option only.

[Fig. 3-12] Graph&Save setting screen 4



Setting the items and direction of transmitting in SD card and TEMI2000



- PTN. : Download or upload the set pattern in [6-1 Program pattern setting]
- PARA. : Download or upload the set parameter
- ALL : Download or upload the pattern and parameter
- DOWNLOAD : Transmitting the selected transmitting items out of the internal data in TEMI2000 to SD card
- UPLOAD : Transmitting the selected transmitting items out of the saved data in TEMI2000 to SD card

①

② It displays the current capacity of SD card

- It displays when the SD card is inserted only

③

When the data is not in recording to SD card,  is activated and download and upload are possible when  is touched by.

Parameter	Setting range	Unit	Initial value
BACKUP ITEM	PTN., PARA., ALL	ABS	PTN.
DIRECTION	DOWNLOAD, UPLOAD	ABS	DOWNLOAD

Part 04

Operation state screen setting

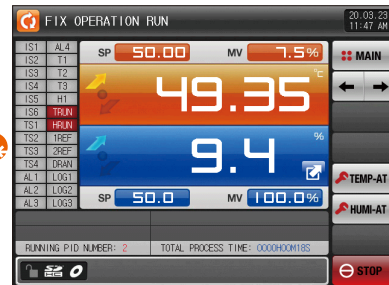
4-1 Stationary operation	23
4-2 Program operation	30
4-3 Auto tuning and tuning point	40



[Fig. 4-1] Stationary operation still screen 1



[Fig. 4-5] Stationary operation still screen 1



[Fig. 4-7] Stationary operation still screen 2 (General)



[Fig. 4-9] Stationary operation still screen 3




[Fig. 4-8] Stationary operation still screen 2 (Heating-Cooling)



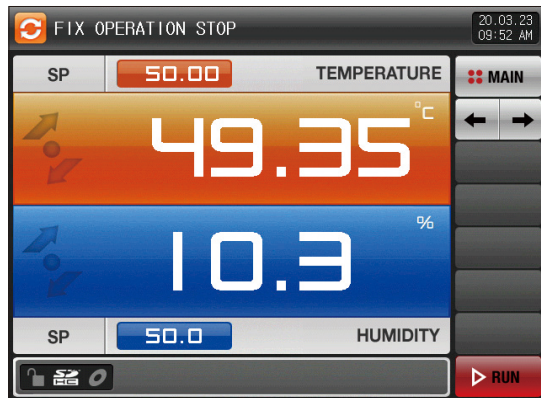
04. Operation state screen setting

4-1. Stationary operation

(1) Stationary operation still screen 1

- When the operation state screen is selected in [Fig. 2-1 Main Screen], it is converted to "Stationary operation still screen 1."
- Select the operation method with "Stationary" in [5. Operation motion setting]
- When  at the right bottom of [Fig. 4-1] Stationary operation still screen 1 is touched by, it converts to [Fig. 4-5] Stationary operation still screen 1.
- If parameter isn't set due to the noise, it is displayed as [Fig. 4-2] Parameter setting error screen due to noise.

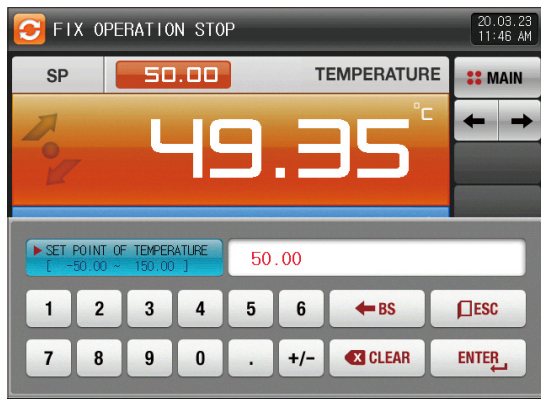
In this case, Please use to establish a noise countermeasure about power and communications cable.



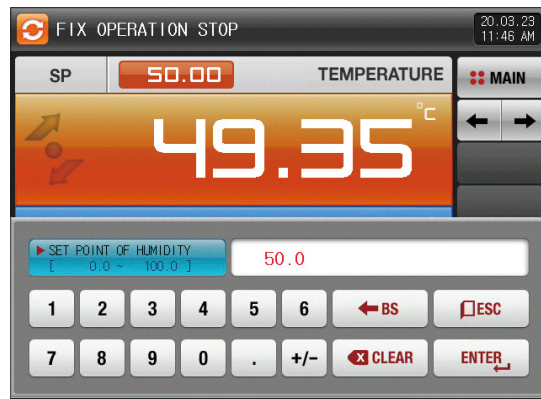
[Fig. 4-1] Stationary operation still screen 1



[Fig. 4-2] Parameter setting error screen due to noise



[Fig. 4-3] Screen of Input for temperature setting about operation temperature



[Fig. 4-4] Screen of Input for humidity setting about operation




Parameter	Setting range	Unit	Initial value
Temp setting data(SP)	T.EU(0.00 ~ 100.00%)	T.EU	T.EU(0.00%)
Humi setting data(SP)	H.EU(0.0 ~ 100.0%)	H.EU	H.EU(0.0%)

※ T.EU : Range of input data for temperature sensor

※ H.EU : Range of input data for humidity sensor

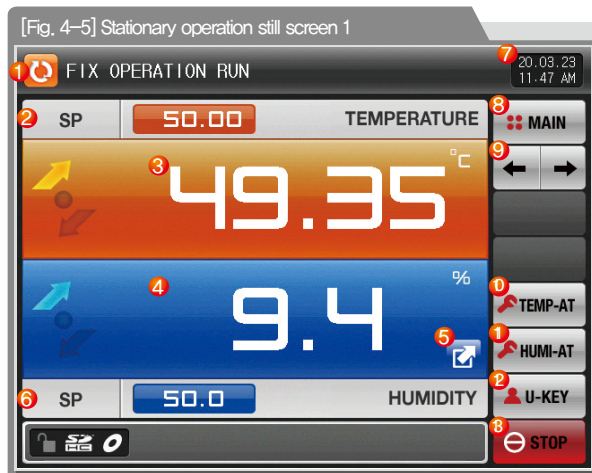
※ Refer to [Engineering units]

References

- ▶ The input for set value for temperature is activated when  button is touched [Fig. 4-3 screen of Input for temperature setting about operation temperature]
- ▶ The input for set value for humidity is activated when  button is touched. [Fig. 4-4 Screen of Input for humidity setting about operation]
- ▶ When the input of set data of temperature and humidity are completed, operate the stationary operation by selecting .

(2) Stationary operation #1 operation screen

- When the "Setting data(SP)" is touched even in operation, the input key setting for operation is activated.
- It is a screen for Measured data(PV) and Set data(SP).









①	It displays the current operation status. • The arrow rotates to the clockwise during operation.
②	It displays the temperature setting data (SP) to be controlled.
③	It displays the present temperature value (PV).
④	It displays the present humidity value (PV).
⑤	Full screen button

⑥	It displays the humidity setting data (SP) to be controlled.
⑦	It displays the current date/time and LCD backlight is off when it is touched. • Red LED lamp at the right top is ON when the backlight is OFF in still state. Moving to [Fig. 2-1 Main screen]
⑧	• It displays the key pad to input the password when main button restriction is set. • Refer to [Fig. 5-2 Screen in restriction setting of main button]
⑨	Moving from current screen to next screen
⑩	Execution or releasing the auto tuning with temperature set value (SP). • Y/N of the tuning button display is set in [8. PID group] in [Operation manual]
⑪	Execution or releasing the auto tuning with humidity set value (SP). • Y/N of the tuning button display is set in [8. PID group] in [Operation manual]
⑫	User button • Y/N for use in [13. System initial setting] in [Operation manual] • User uses the wanted relay in [10. DO relay setting] in [Operation manual] when the user button is used. Ex) It is used for light the chamber. • The set relay is operated when the "User" button is touched by in the stationary and program operation/stop screen.
⑬	Stationary operation / Stop button



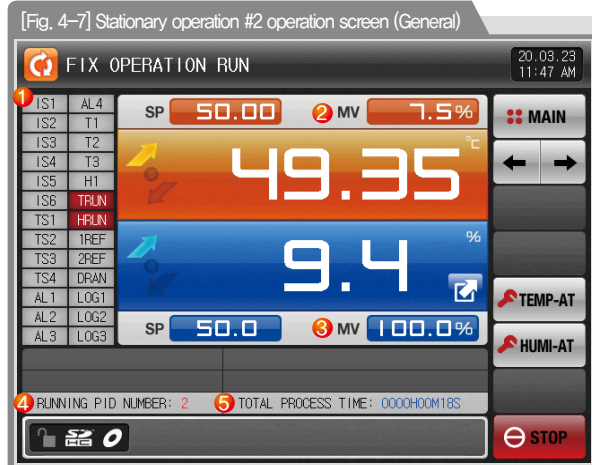
[Fig. 4-6] Stationary operation still screen 1 Full screen

References

- ▶   : Setting data > Measuring data is displayed in TEMP and HUMI increase.
- ▶   : Setting data = Measuring data is displayed in TEMP maintaining.
- ▶   : Setting data < Measuring data is displayed in TEMP decrease.

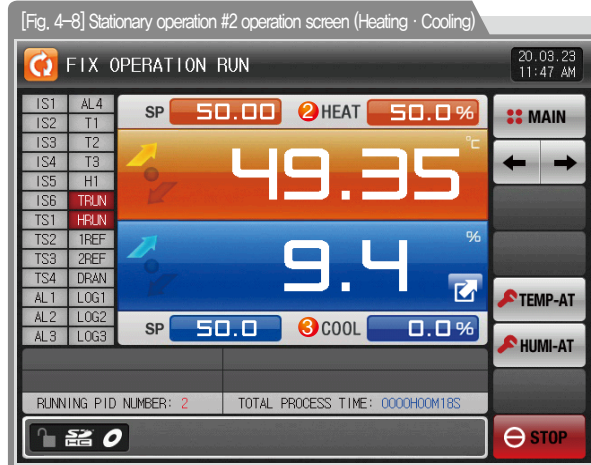
(3) Stationary operation #2 operation screen

- It is a screen to display the display lamps for measuring data, setting data and output volume.
- When the "Output volume" is touched in Heating-Cooling, output volume, Heating volume and Cooling volume are displayed in turn.





- ① It displays the control output volume (MV). The "ON" state is displayed in red and "OFF" state is displayed in dark grey.
- Setting the state lamp in [13. System initial setting] in [Installation manual]
 - Setting up to 24 for lamp in [13. System initial setting]

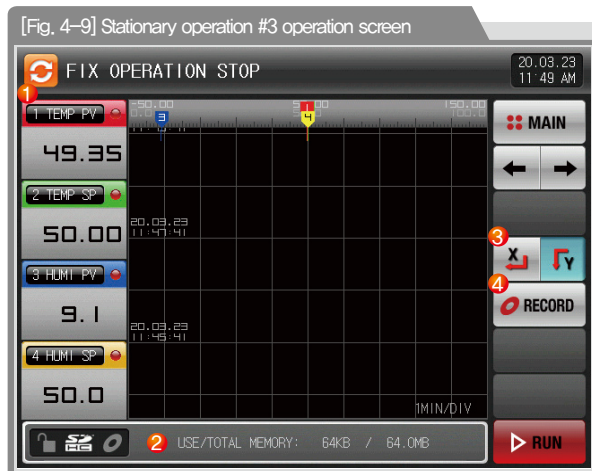
- ② It displays the control output volume (MV) in temperature. When the output volume part is touched in controlling the Heating-Cooling, output volume (MV), Heating volume (H.MV) and Cooling volume (C.MV) is displayed in turn.



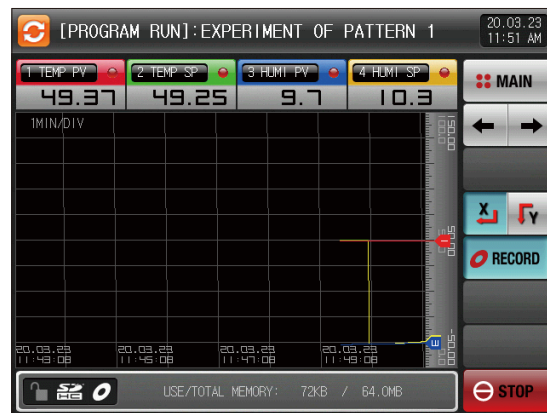
- ③ It displays the control output volume (MV) in humidity. When the output volume part is touched in controlling the Heating-Cooling, output volume (MV), Heating volume (H.MV) and Cooling volume (C.MV) is displayed in turn.
- ④ It displays the currently applied PID group number.
- The applied PID group can be checked in [8. PID group] in [Installation manual]
- ⑤ It displays the total process time of stationary operation.

(4) Stationary operation #3 operation screen



- The left of the screen is to display the measuring data, setting data of Temperature and Humidity.
-  check box sets Y/N for data display.
- Press  RECORD at the right middle to save the data of recording.
- Save the important graph files into the SD card.
- Refer to [3-2 Present value (PV) graph view]
- To download to SD card is not allowed while the measurement data, set data and output data of temperature&humidity is saved to internal memory.



- ① It displays the measuring data, setting data of currently operated Temperature and Humidity.
- ② It displays the capacity of internal memory.
 - About 90 days of saving is available when the sampling time is set in 1 second.

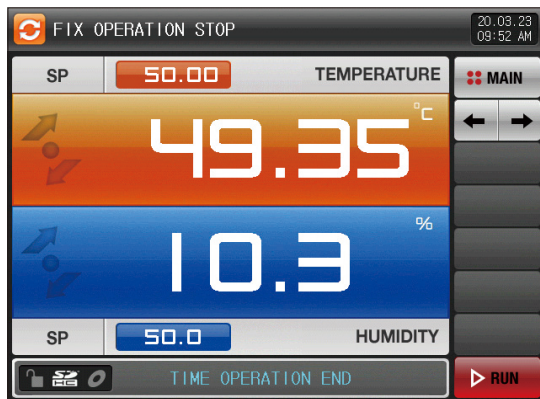


[Fig. 4-10] X-AXIS setting screen of Stationary operation

- ③ Set graph display direction
 -  : Vertical (Y-AXIS)
 -  : Horizontal (X-AXIS)
- ④ It is a button to save the measuring data, setting data of currently recorded Temperature and Humidity into the memory (Internal memory, SD card).

(5) Termination screen for operation of stationary time setting

- The stationary operation is terminated while it shows the message, "The time setting operation is terminated:" when the operation is terminated by the elapse of setting time in [5. Operation motion setting]
- The message is not appeared on the screen when it is forcibly terminated by pressing "Stop" button during operation.
- The message is disappeared by touching the corresponding part when the operation termination message is display in case of operation termination.
(It is same with the program operation termination.)

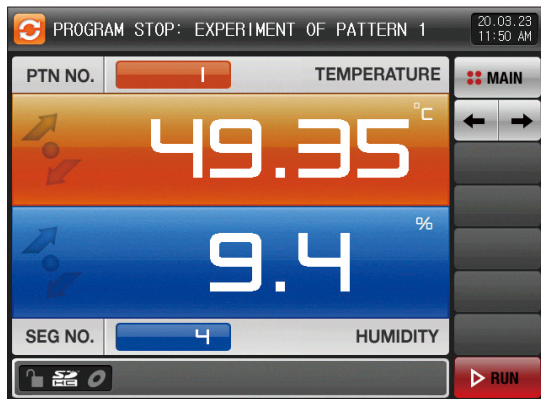


[Fig. 4-11] Termination screen for operation of stationary time setting

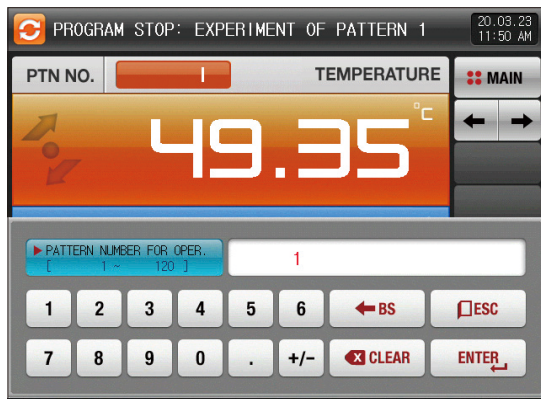
4-2. Program operation

(1) Program operation still screen 1

- It converts to “Program operation still screen 1” when the operation state screen is selected in [Fig. 2-1 Main screen].
- Select the operation method with “Pattern” in [5. Operation motion setting].
- Refer to [6-1 Program pattern setting] for pattern setting method.
- It converts to [Fig. 4-12 Program operation #1 operation screen] when  is touched by on the right bottom in [Fig. 4-14 Program operation #1 still screen]



[Fig. 4-12] Program operation #1 still screen



[Fig. 4-13] Screen for pattern number setting
input key to be operated

References

- ▶ When the button **PTN NO.** is touched by for inputting the pattern number setting to be operated, it is activated as shown in [Fig. 4-13] Screen for pattern number setting input key to be operated.
- ▶ Execute the program by selecting **▶ RUN** button when the input for the pattern number setting to be operated is completed.

Parameter	Setting range	Unit	Initial value
Pattern number	1~120	ABS	1



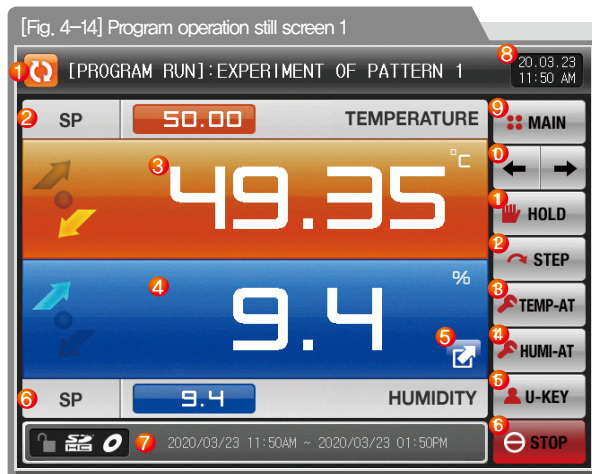
CAUTION

Cautions in operation

- It is not operated when the program is not input into the pattern number on the screen.
- Refer to [6-1 Program pattern setting]

(2) Program operation #1 operation screen

- The pattern number cannot be set during operation.
- It is a screen for Measured data and Set data.



- ① It displays the current operation status.
• The arrow rotates to the clockwise during operation

- ② It displays the temperature setting data (SP) to be controlled.

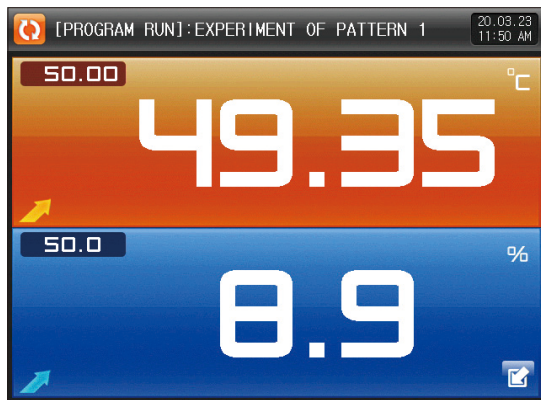
- ③ It displays the present temperature value (PV).

- ④ It displays the present humidity value (PV).

- ⑤ Full screen button







- ⑥ It displays the humidity setting data (SP) to be controlled.

- ⑦ Operation start time ~ End time display
- ⑧ It displays the current date/time and LCD backlight is off when it is touched.
• Red LED lamp at the right top is ON when the backlight is OFF in still state.
- ⑨ Moving to [Fig. 2-1 Main screen]
• It displays the key pad to input the password when main button restriction is set.
• Refer to [Fig. 5-2 Screen in restriction setting of main button]
- ⑩ Moving from current screen to next screen
- ⑪ Maintaining (Hold On) or Release (Hold Off) the currently operating temperature and humidity set value.
- ⑫ Terminating the currently processing segment and forced moving to the next segment.
- ⑬ Execution or releasing the auto tuning with temperature set value (SP).
• Y/N of the tuning button display is set in [8. PID group] in [Operation manual]
- ⑭ Execution or releasing the auto tuning with humidity set value (SP).
• Y/N of the tuning button display is set in [8. PID group] in [Operation manual]
- User button
• Y/N for use in [13. System initial setting] in [Operation manual]
• User uses the wanted relay in [10. DO relay setting] in [Operation manual] when the user button is used.
Ex) It is used for light the chamber.
• The set relay is operated when the "User" button is touched by in the stationary and program operation/stop screen.
- ⑮ Program Operation/stop button



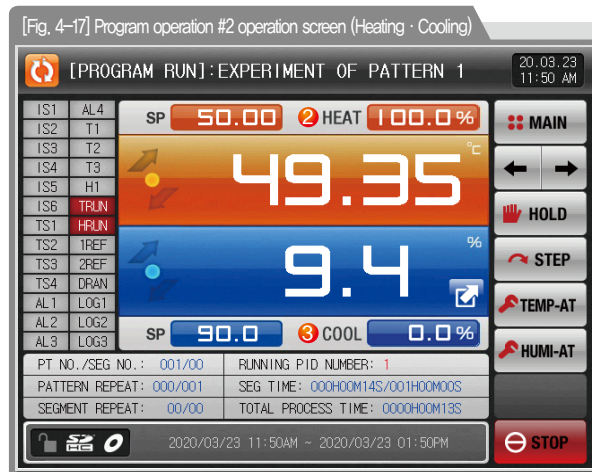
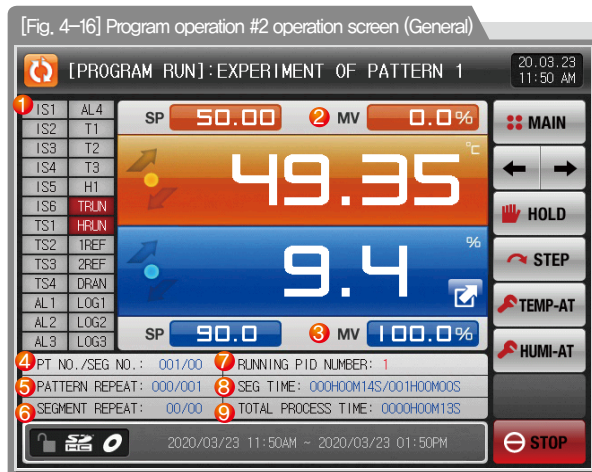
[Fig. 4-15] Program operation still screen 1 Full screen

References

- ▶ It displays the direction of current pattern processing.
- ▶   : Setting data>Measuring data is displayed in temperature increase.
- ▶   : Setting data=Measuring data is displayed in temperature maintaining.
- ▶   : Setting data<Measuring data is displayed in temperature decrease.

(3) Program operation #2 operation screen



- It is a screen to display the display lamps for measuring data, setting data and output volume.
- When the "Output volume" is touched in Heating-Cooling, output volume, Heating volume and Cooling volume are displayed in turn.

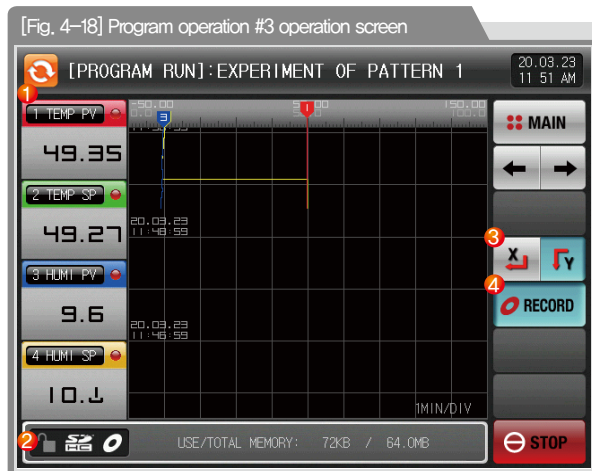


①	<p>It displays the control output volume (MV). The "ON" state is displayed in red and "OFF" state is displayed in dark grey.</p> <ul style="list-style-type: none"> • Setting the state lamp in [13. System initial setting] in [Installation manual] • Setting up to 24 for lamp in [13. System initial setting]
②	<p>It displays the control output volume (MV) in temperature. When the output volume part is touched in controlling the Heating-Cooling, output volume (MV), Heating volume (H.MV) and Cooling volume (C.MV) is displayed in turn.</p>
③	<p>It displays the control output volume (MV) in humidity. When the output volume part is touched in controlling the Heating-Cooling, output volume (MV), Heating volume (H.MV) and Cooling volume (C.MV) is displayed in turn.</p>
④	<p>It displays the currently operated program pattern number and segment number.</p>
⑤	<p>It displays the pattern repetition state.</p> <ul style="list-style-type: none"> • The figure in the front in PATTERN REPEAT: 000/001 shows the frequency of repetition and the figure at the end shows the set repetition frequency.

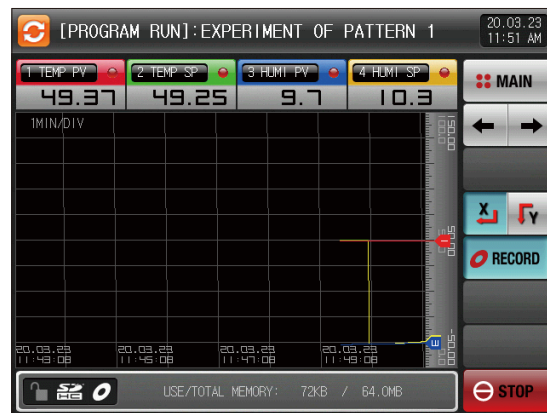
⑥	<p>It displays the partial repetition state.</p> <ul style="list-style-type: none"> • The figure in the front of SEGMENT REPEAT: 00/00 shows the frequency of repetition and the figure at the end shows the set repetition frequency.
⑦	<p>It displays the currently applied PID ground number.</p> <ul style="list-style-type: none"> • The applied PID group can be checked in [8. PID group] in [Installation manual].
⑧	<p>It displays the segment process time and setting time of currently processing segment.</p> <ul style="list-style-type: none"> • The time in the front of SEG TIME: 000H00M34S/000H03M52S shows the segment processing time and the time at the end shows the set time in [6-1 Program pattern setting]
⑨	<p>It displays the total process time of program operation.</p>

(4) Program operation #3 operation screen



- The left of the screen is to display the measuring data, setting data of Temperature and Humidity.
-  check box sets Y/N for data display.
- Press  RECORD at the right middle to save the data of recording.
- Save the important graph files into the SD card.
- Refer to [3-2 Present value (PV) graph view]
- To download to SD card is not allowed while the measurement data, set data and output data of temperature&humidity is saved to internal memory.



- ① It displays the measuring data, setting data of currently operated Temperature and Humidity.
- ② It displays the capacity of internal memory.
 - About 90 days of saving is available when the sampling time is set in 1 second.

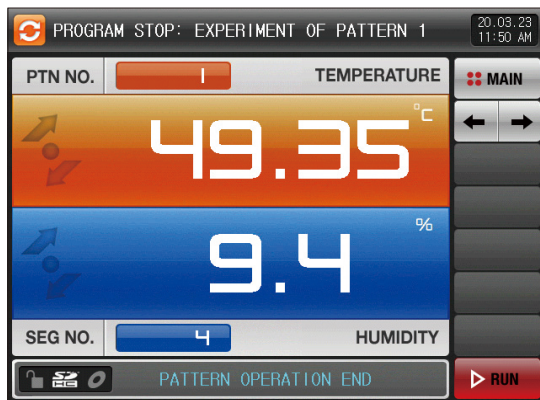


[Fig. 4-19] X-AXIS setting screen of Program operation

- ③ Set graph display direction
 -  : Vertical (Y-AXIS)
 -  : Horizontal (X-AXIS)
- ④ It is a button to save the measuring data, setting data of currently recorded Temperature and Humidity into the memory (Internal memory, SD card).

(5) Termination screen for operation of program

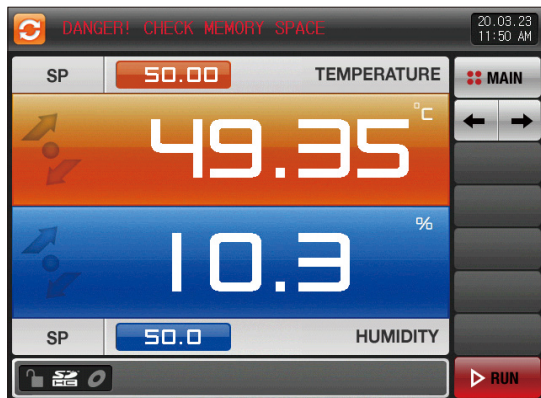
- The program operation is terminated while it shows the message, "The program operation is terminated." when the operation for segment setting range saved into the pattern is terminated.
- The message is not appeared on the screen when it is forcibly terminated by pressing "Stop" button during operation.
- The message is disappeared by touching the corresponding part when the operation termination message is display in case of operation termination.
(It is same with the stationary operation termination.)



[Fig. 4-20] Termination screen for operation of program

(6) Other operation screen

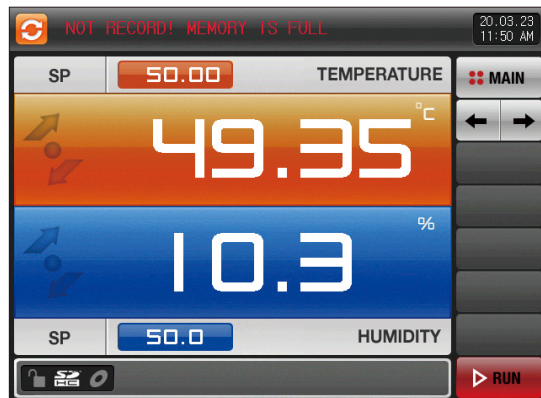
- It is a screen to display warning in operation screen.



[Fig. 4-21] Screen for warning of shortage of memory capacity

References

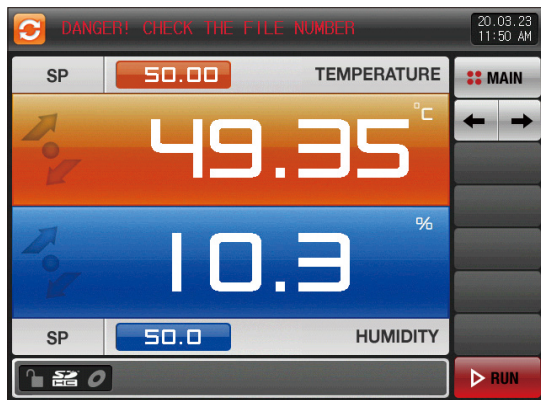
- ▶ It is a screen when internal memory capacity is up to 60.8 megabytes.



[Fig. 4-22] Warning screen for no extra space in memory

References

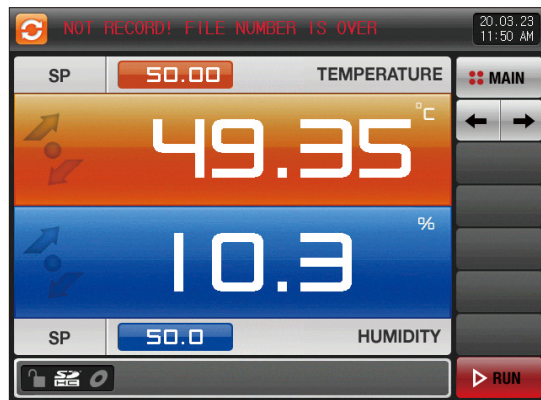
- ▶ Screen for no extra space in internal memory.



[Fig. 4-23] Warning screen for lack of saved file number

References

- ▶ It is a screen when the number of saved files is over 240 in internal memory.



[Fig. 4-24] Warning screen for full of saved file number

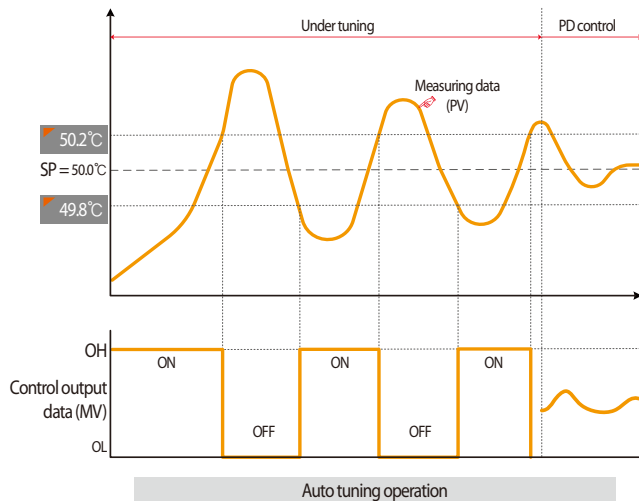
References

- ▶ It is a screen when the number of saved files is fulfilled up to 256.

4-3. Auto tuning and tuning point

- The segment is held during program operation and the segment is processed when the auto tuning is terminated.
- Auto tuning is a function to set the optimal PID integer automatically by measuring and calculating the object of control with controller.
- The controller generates the ON/OFF control output during "2.5 periods" during auto tuning and it calculates the P, I, D data automatically based on the period and oscillation magnitude using the limit cycle to the object to be controlled.
- The Auto-Tuning is available in program.stationary operation.

The PID data calculated from the set value located PID group is saved automatically through Auto-Tuning from the currently set value.



CAUTION Cautions in operation

- Any change in set value (SP) in auto tuning does not change the tuning point. And the tuning is started with changed set value (SP) for target set value (TSP) after auto tuning termination.
- The auto tuning is stopped in case of "Sensor short" in input during auto tuning. At this time, the PID data is kept with the previous set value.
- When auto tuning is processed beyond 27 hours, the auto tuning is stopped.
- The PID set value can be changed during auto tuning, but the obtained PID data from calculating in auto tuning termination is reset with the obtained PID data.
- The PID set value is maintained with previous set value when the auto tuning is forcibly terminated.
- For better Auto-Tuning results, need to wait until stabilization by set value (temperature), then Autotuning the temperature first. And after Autotuning the humidity, will get better P, I and D value (data)

References

▶ An example of auto tuning depending on the set value.

- Operation method : Stationary operation/

Sensor input : Temperature (PT_1) - Set value (SP) : 50.0°C

- Temperature auto tuning point : 0.10% → EUS 0.10% = 0.2°C

- Range : -50.00°C ~ 150.00°C

- Output lower limit (OL) : 0.0% / Output upper limit (OH) :

100.0% 50.2°C 49.8°C : Auto tuning point

Part 05

Operation motion setting

5-1 Operation method setting	42
5-2 Fuzzy operation	44
5-3 Setting value change rate (SLOPE) operation	45



05. Operation motion setting

It is a screen for general additional functions and additional setting in stationary operation.

5-1. Operation method setting

- It converts to the "Setting screen for operation related motion" when the operation motion setting is selected in [Fig. 2-1 Main screen]

[Fig. 5-1] Setting screen for operation related motion

①

Setting with selection either of pattern or stationary operation for operation mode.(It cannot be changed during operation.)

- PROG : Setting in program operation
- FIX : Setting in stationary operation

②

Setting the recovery motion in black out

- STOP : A motion to return to the operation stop state after power on from the black out.
- COLD : An operation from the beginning after power on from the black out.
- HOT : A motion to return to the previous operation state after power on from the black out.

③

In case that the external disturbances occur, stabilized the control.

- OFF : The indicated value is stabilized depending on time when the overshoot is made.
- ON : The indicated value is stabilized faster than No operation case, as the overshoot controlling function is provided.

④

Automatic increase or decreased with the set rate in case of set value change

- It is adopted in stationary operation only.

⑤

Total operation in set time and in [4-1(3) Stationary operation #2 operation screen


- The operation stops when the process time is coincided with the set time.
- It is adopted in stationary operation only.

⑥

The key pad to input the password is displayed when the main button is touched by in the operation screen for setting the main button restriction setting.

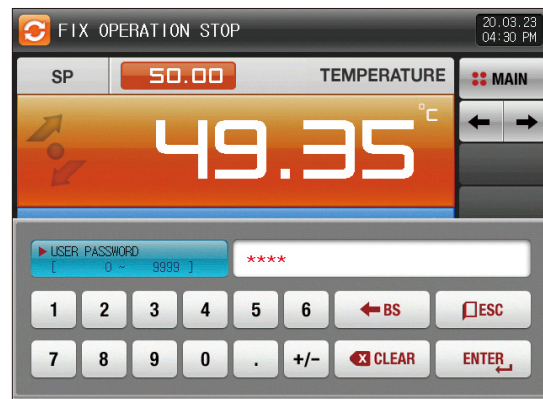
- Refer to [Fig. 5-2 Screen for main button restriction setting]

⑦

- The parameter setting is impossible when  button is touched by
- Screen rolling and key block releasing is possible.

Parameter	Setting range	Unit	Initial value
OPERATION MODE	PROG, FIX	ABS	FIX
POWER STOP MODE	STOP, COLD, HOT	ABS	STOP
FUZZY SELECT	OFF, ON	ABS	OFF
TEMP SLOPE	T.EUS(0.00 ~ 100.00%) / MIN	T.EUS / MIN	T.EUS(0.00%) / MIN
HUMI SLOPE	H.EUS(0.0 ~ 100.0%) / MIN	H.EUS / MIN	H.EUS(0.0%) / MIN
TIME OPERATION	UNUSE, USE	ABS	UNUSE
HOUR	0 ~ 9999 HOUR	ABS	0
MIN	0 ~ 59 MIN	ABS	0
RESTRICT OF MAIN	UNUSE, USE	ABS	UNUSE

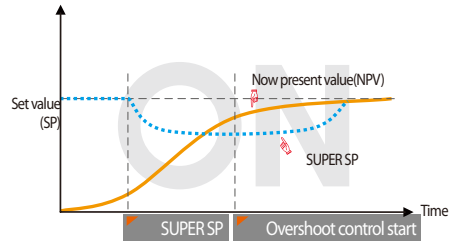
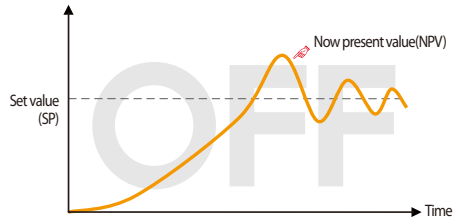
Return motion in black out	Program operation	Stationary operation
STOP	Program stop	Stop
COLD	Operation from the first segment	Operation
HOT	Operation from the segment before black out	Operation



[Fig. 5-2] Main button restriction setting screen

5-2. Fuzzy operation

- The overshoot may be taken place in case of severe change in operation or frequent changes in present value (SP).
More effective control can be made when the fuzzy function is operated at this time.
- Internal operation sequence of fuzzy function: It controls the overshoot by calculating the control output value (MV) with sub target value (Super SP) instead of present value (PV) from the overshoot control start time.



SUPER SP

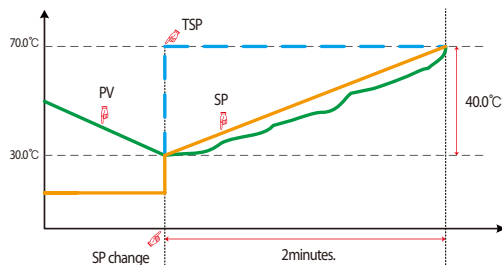
: Sub set value (Super SP)
Starting of internal calculation

Overshoot control start

: Sub set value (Super SP)
Start of application

5-3. Setting value change rate (SLOPE) operation

- The set value is changed by fixed changing rate from the now present value (PV) to set value when the set value is changed.



Change rate (Slope) operation

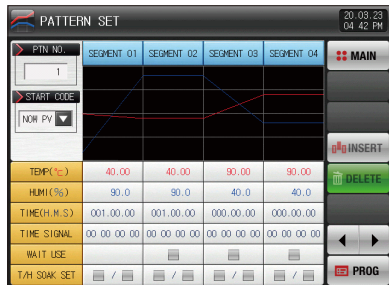
References

- ▶ Operation method: Stationary operation
- ▶ Temperature change rate: 20.0°C/Min
- ▶ Change [Changed SP(TSP) - PV at the SP changing point] with slope of 20.0°C per minute: $(70.0 - 30.0)^\circ\text{C} = \text{Change } 40.0^\circ\text{C}$ with the slope of 20°C
- ▶ Increase the current set value (SP) from 30.0°C to 70.0°C with uniform increasing rate for 2 minutes.

Part 06

Program setting

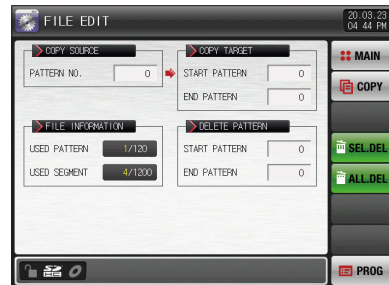
6-1 Program pattern setting	49
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6-5 Standby operation	62
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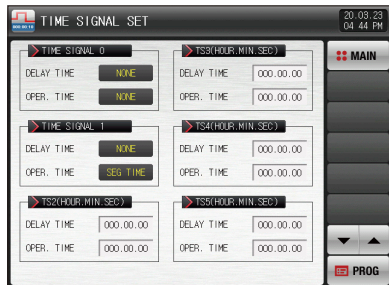
[Fig. 6-2] Pattern editing screen



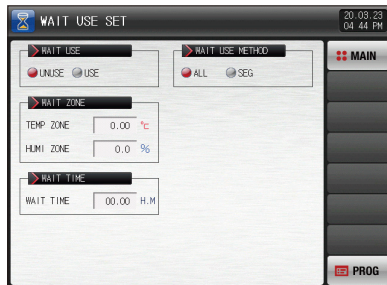
[Fig. 6-3] Pattern and segment repetition setting screen



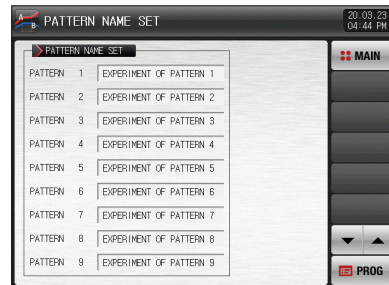
[Fig. 6-4] File editing screen



[Fig. 6-7] Time signal setting #1



[Fig. 6-10] Standby operation setting screen

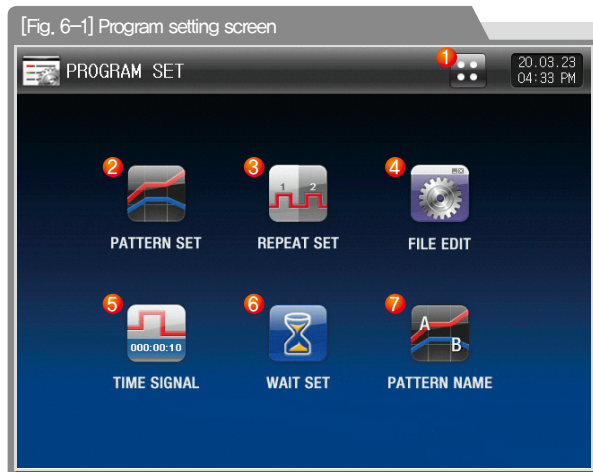


[Fig. 6-11] Experiment name setting screen



06. Program setting

- It converts to [Fig. 6-1 Program setting screen] when the program setting button is touched by in [Fig. 2-1 Main screen].
- It is a screen group to set the parameters related to the program operation.



①	Moving to [Fig. 2-1 Main screen]
②	Moving to the pattern editing screen
③	Moving to the screen for repetitive setting of pattern and segment
④	Moving to the screen for setting pattern copy and deletion
⑤	Moving to the screen for time signal setting
⑥	Moving to the screen for setting the standby screen
⑦	Moving to the screen for experiment name

6-1. Program pattern setting

- It is a screen to set the segment depending on the pattern number.
- Refer to [6-4 Time signal operation] for time signal setting.
- Please refer to the [6-5 Standby operation] to find things about the standby operation.

[Fig. 6-2] Pattern editing screen

	SEGMENT 01	SEGMENT 02	SEGMENT 03	SEGMENT 04
PTN NO.	1			
START CODE	NOW PV			
TEMP(°C)	40.00	40.00	90.00	90.00
HUMI(%)	90.0	90.0	40.0	40.0
TIME(H.M.S)	001.00.00	001.00.00	000.00.00	000.00.00
TIME SIGNAL	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00
WAIT USE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T/H SOAK SET	<input type="checkbox"/> / <input type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>	<input type="checkbox"/> / <input type="checkbox"/>

① Input the pattern number for segment setting

Setting the start condition for program operation.

• NOW PV

The set value (SP) is processed to the set time (TM1) from present value (PV) to the present value (SP1) set in segment 1 (SEG1) regardless of the slope or the start set value (SSP) in starting of the program operation.
(The remained time for operation is calculated by regarding of time passing till the program operation starting through referring the patterns of set program.)

②

• TEMP SSP

In case of starting the program operation, the present set value (SP) is started from temperature SSP and progresses to the set time (TM1) for currently set value 1 (SP1) in segment 1 (SEG1).

• HUMI SSP

It starts from the set SSP for present set value (SP) in starting of program operation and progressed to the set time (TM1) for currently set value 1 (SP1) in segment 1 (SEG1).

③ It sets the temperature set value of segment to be operated.

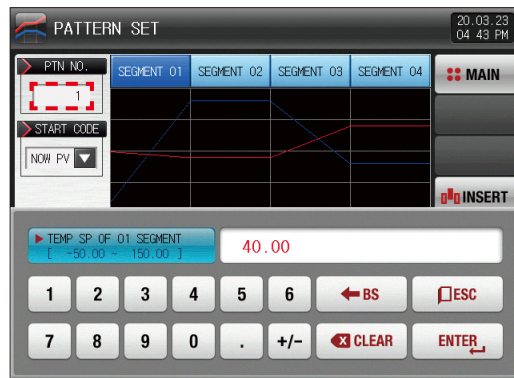
④ It sets the humidity set value of segment to be operated.

⑤ Setting the time of segment to be operated.

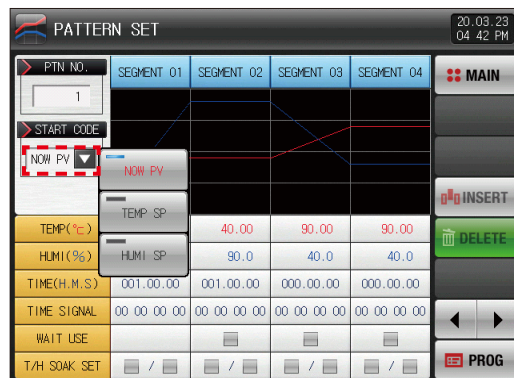
It sets the time signal of the segment to be operated.

- ⑥
- 4 time signals can be set for each segment and each time signal is set by selection from 18 types of time signal.
 - Refer to [6-4 Time signal operation]

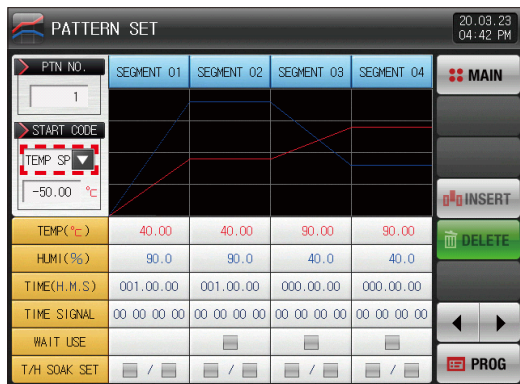
- ⑦ Selection of Y/N for using the Standby of Segment to operate.
 • Refer to [6-5 Standby operation]
- ⑧ Select the soak operation of the temperature and humidity segment.
 The selected segment operates soak without sloping.
- ⑨ When one of the buttons **SEGMENT 01** (Segment 01~99) is touched by for segment insertion, the selected button **SEGMENT 01** (Segment 01~99) and **INSERT** button are activated and the selected segment can be inserted when **INSERT** is touched by
- ⑩ When one of the buttons **SEGMENT 01** (Segment 01~99) is touched by for segment deletion, the selected button **SEGMENT 01** (Segment 01~99) and **DELETE** button are activated and the selected segment can be inserted when **DELETE** is touched by
- ⑪ Moving to left/right on the screen by 4 segment units.
- ⑫ Moving to [Fig. 6-1 Program setting screen] when **PROG** is touched by



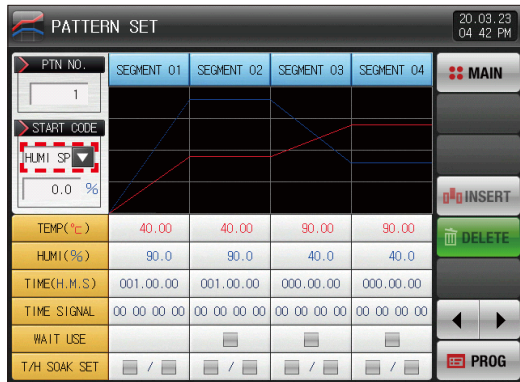
▲ The input key to set the pattern number is displayed when the "Pattern number" button is touched by.



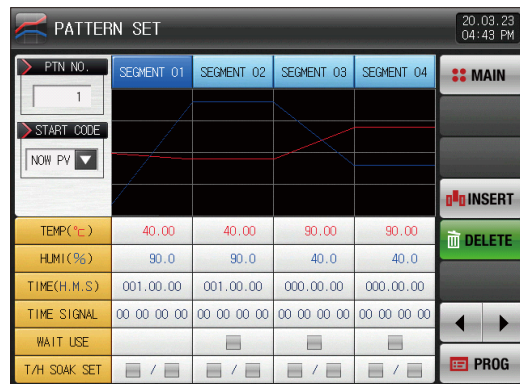
▲ When the "Starting condition" button is touched by, the input key to set the starting condition is displayed



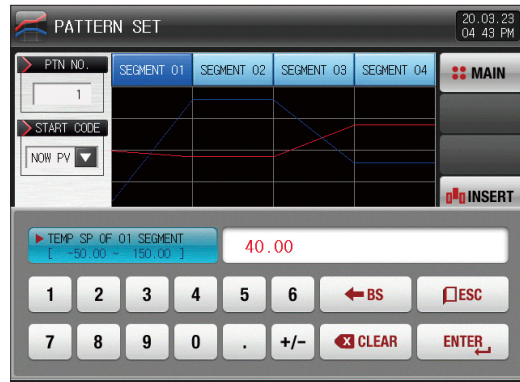
▲ It is a screen set with "TEMP SSP" for starting condition.



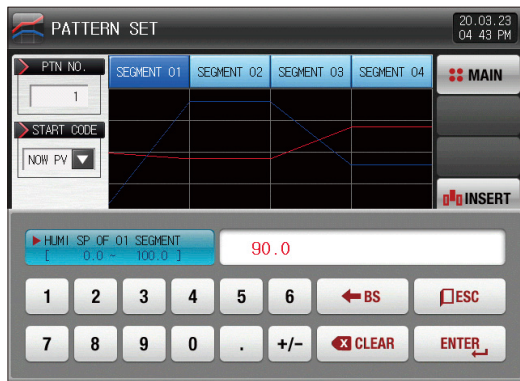
▲ It is a screen set with "HUMI SSP" for starting condition.



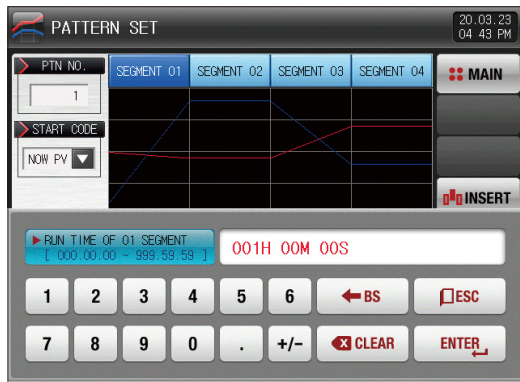
▲ **INSERT**, **DELETE** buttons are activated when **SEGMENT 01** button is activated.



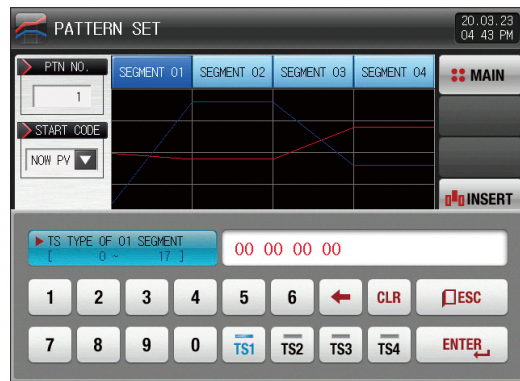
▲ The input key to set the set value is displayed when **90.00** (TEMP) button is touched by.



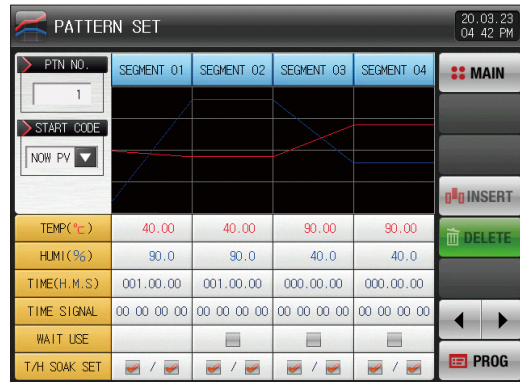
▲ The input key to set the set value is displayed when (HUMI) button is touched by. 20.0



▲ The input key to set the segment time is displayed when 001.00.00 (Time) button is touched by.



▲ The input key to set the time signal is displayed when 00 00 00 00 (Time signal) button is touched by.





▲ It is a screen set with T/H soak setting.

Parameter	Setting range	Unit	Initial value
PATTERN NO.	1~120	ABS	1
START CODE	NOW PV, TEMP SSP, HUMI SSP	ABS	NOW PV
SEGMENT #n TEMP SP	T.EU(0.00~100.00%)	T.EU	T.EU(0.00%)
SEGMENT #n HUMI SP	H.EU(0.0~100.0%)	H.EU	H.EU(0.0%)
SEGMENT #n TIME	-00.00.01 (OFF) ~ 999.59.59 (Hour, Min, Sec)	ABS	-00.00.01
SEGMENT #n TIME SIGNAL 1 ~ 4	0 ~ 17	ABS	0
SEGMENT #n WAIT USE	UNUSE, USE	ABS	UNUSE
SEGMENT #n T/H SOAK SET	UNUSE, USE	ABS	UNUSE

※ #n: 1 ~ 99

References

- ▶ Input by pressing  for time signal and SEG alarm input.
- ▶ Select  to escape from input screen.
- ▶ The wanted time signal group can be input by pressing TS1~TS4 for the set value in [6-4 Time signal operation].

6-2. Pattern repetition setting

- It is a screen to set the function for entire or partial repetition of set pattern.
- The operation method in pattern operation termination can be set.

[Fig. 6-3] Pattern and segment repetition Setting screen

The screenshot shows the 'REPEAT SET' screen with the following elements and callouts:

- 1** PATTERN SELECT: PATTERN NO. 1
- 2** PATTERN REPEAT: REPEAT COUNT 1
- 3** LINK PATTERN: 1
- 4** SEGMENT REPEAT: START SEGMENT (NO. 1: 0, NO. 2: 0, NO. 3: 0)
- 5** END SEGMENT: 0
- 6** REPEAT COUNT: 0
- 7** SEG. REPEAT MODE: END SP (selected) / START SP
- 8** PATTERN END MODE: END MODE (dropdown menu showing RESET, SEG HOLD, LINK RUN)

Buttons on the right: MAIN, PROG.

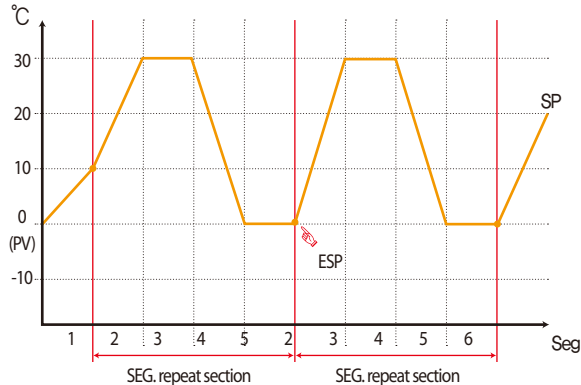
- ① It sets the pattern number to perform the repetitive operation.
 - ② It sets the repetition operation frequency of the set pattern.
 - ③ It sets the pattern number for repetitive operation in termination of set pattern operation.
 - ④ It sets the segment to start the partial repetitive operation out of the set patterns.
 - ⑤ It sets the segment to terminate the partial repetitive operation out of the set patterns.
 - ⑥ It sets the repetition frequency of the partial repetitive operation out of the set patterns.
- When operations to segment repeat, determines the start SP value.
- END SP : From the late operation END SP, SP value proceed.
 - START SP : From the start SP of segment, the SP value proceed.
- It decides the next operation when the set pattern operation is finished.
- RESET : The pattern termination signal is generated and the operation state is in program stop.
 - SEG HOLD : It is operated in last operation set value and hold state is maintained.
 - LINK RUN : The pattern set in the connection pattern is operated.

Parameter	Setting range	Unit	Initial value
PATTERN NO.	1~120	ABS	1
SEG. REPEAT MODE	END SP, START SP	ABS	END SP
REPEAT COUNT	0 (Indefinite repetition) ~ 999	ABS	1
LINK PATTERN	1~120	ABS	1
PATTERN END MODE	RESET, SEG HOLD, LINK RUN	ABS	RESET
START SEGMENT NO. 1~4	0~99	ABS	0
END SEGMENT NO. 1~4	0~99	ABS	0
REPEAT COUNT NO. 1~4	0~99	ABS	0

Example)

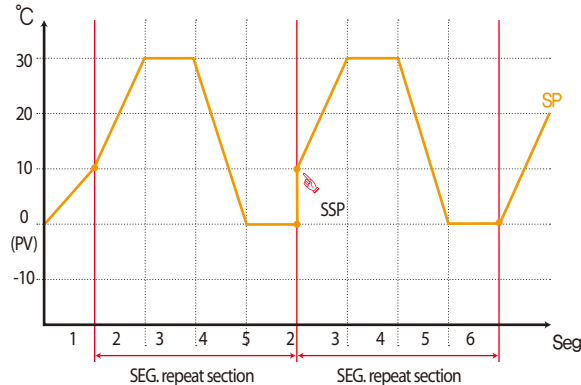
SEG. Repeat Mode : END SP

- From the late operation END SP, SP value proceed.



SEG. Repeat Mode : START SP

- From the start SP of segment, the SP value proceed.

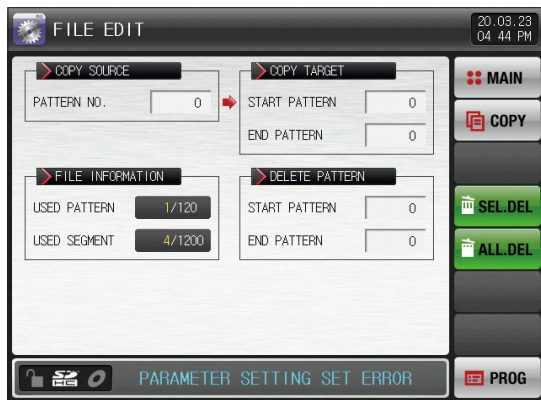


6-3. File editing

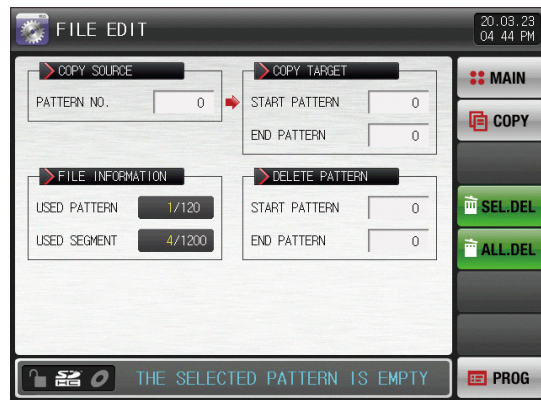
- It is a screen to copy or delete the input segment values in [Fig. 6-1 Program pattern setting].
- The pattern number in operation cannot be deleted.
- The deleted pattern cannot be recovere.



①	It sets the original pattern number to be copied.
②	It sets the first and last pattern number to be copied. <ul style="list-style-type: none">• The first pattern is copied only when the last pattern is "0."
③	It deletes the first and last pattern number to be copied. <ul style="list-style-type: none">• The first pattern is deleted only when the last pattern is "0."
④	It displays the total patterns set in [Fig. 6-1 Program pattern setting]. <ul style="list-style-type: none">• The change is impossible as it is only for reading.
⑤	It displays the total segments set in [Fig. 6-1 Program pattern setting]. <ul style="list-style-type: none">• The change is impossible as it is only for reading.
⑥	It copies the set pattern ① to the set pattern ②.
⑦	It initializes the set value of the pattern set in ③.
⑧	It initializes the set value of every pattern.



[Fig. 6-5] File editing screen #1



[Fig. 6-6] File editing screen #2

References

- ▶ The message: "PARAMETER SETTING SET ERROR" appears at the bottom of screen for copying or deleting by wrong input of pattern number.

References

- ▶ The message: "THE SELECTED PATTERN IS EMPTY" Appears at the bottom of screen for copying or deleting without saved data in the pattern number.

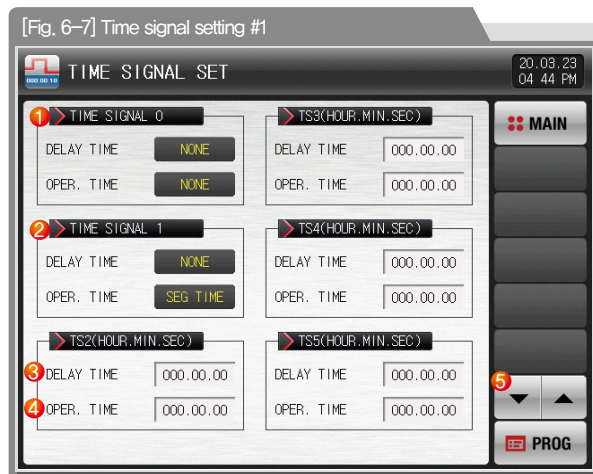
Parameter		Setting range	Unit	Initial value
PATTERN NO.		1~120	ABS	0
COPY	START PATTERN	0~120	ABS	0
	END PATTERN	0~120	ABS	0
COPY		UNUSE, USE	ABS	UNUSE
SEL DEL	START PATTERN	0~120	ABS	0
	END PATTERN	0~120	ABS	0
ALL DEL		UNUSE, USE	ABS	UNUSE

Message display	Explanation
"There is no saved information in the selected pattern."	It is displayed in case of copy when there is nothing saved in pattern number.
"The copy is completed in the selected pattern."	It is displayed in completion of selected pattern copy.
"The deletion is completed in the selected pattern."	It is displayed in completion of selected pattern deletion.
"The copy is completed in every pattern."	It is displayed in completion of every pattern deletion.
"The pattern to be copies is being used."	It is displayed in use of pattern.

6-4. Time signal operation

- The time signal operation is classified into ON/OFF operation, time setting operation and the set time signal is used for setting the time signal No. in segment setting in [6-1 Program pattern setting]

(1) Time signal ON/OFF operation



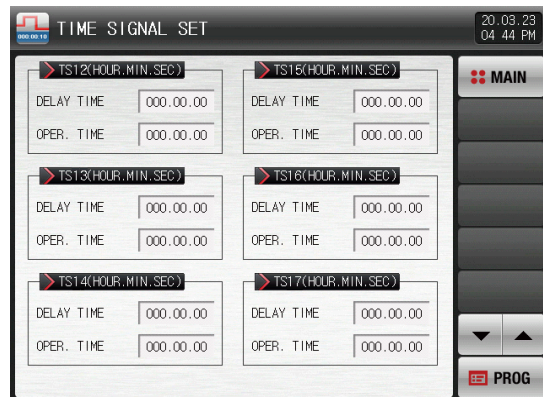
- The time signal is OFF during corresponding segment operation when "0" is selected.
 - The change is impossible as it is only for reading.
- The time signal is ON during corresponding segment operation when "1" is selected.
 - The change is impossible as it is only for reading.
- The time signal is "ON" after setting time is elapsed in delay time from the corresponding segment starting point.
 - However, the time signal is not operated when the corresponding segment time is bigger than delay time.
- The time signal is "ON" by the delay time in corresponding segment is "ON" only for set time in operation time.
 - However, the time signal is "ON" for the corresponding segment operation when the (delay time+operation time) is bigger than corresponding segment time and it is not operated in the next segment.
- Moving the screen up/down by 6 time signal units.

(2) Time signal time setting operation

- The time signal 2~17 (TS2~17) operate depending on delay time and operation time.



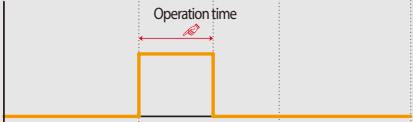
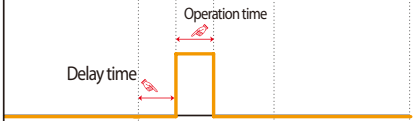
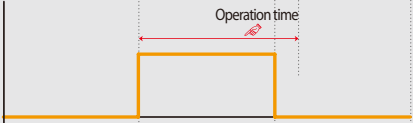
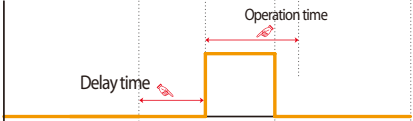
[Fig. 6-8] Time signal setting #2



[Fig. 6-9] Time signal setting #3

Parameter	Setting range	Unit	Initial value
DELAY TIME	000.00.00(OFF)~999.59.59 (Hour, Min, Sec)	ABS	000.00.00
OPER. TIME	000.00.00(OFF)~999.59.59 (Hour, Min, Sec)	ABS	000.00.00

(3) Example of operation in time signal input

Setting		Time signal operation		
Segment N time \geq Delay time + Operation time	1. Delay time = 000.00.00	ON Time signal OFF Segment		(n-1)segment time n segment time (n+1)segment time
	2. Delay time \neq 000.00.00	ON Time signal OFF Segment		(n-1)segment time n segment time (n+1)segment time
Segment N time < Delay time + Operation time It does not make influence on the next segment.	3. Delay time = 000.00.00	ON Time signal OFF Segment		(n-1)segment time n segment time (n+1)segment time
	4. Delay time \neq 000.00.00	ON Time signal OFF Segment		(n-1)segment time n segment time (n+1)segment time

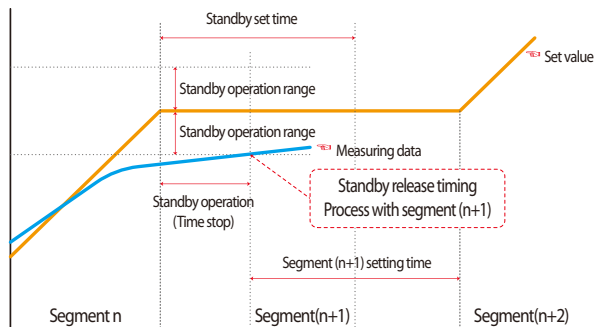
6-5. Standby operation

- It is a screen to set the temperature&humidity Stand-by Range and Stand-by Time during Program operation.
- The set standby operation here is applied to [Fig. 6-1 Program pattern setting].
- Definition of standby operation
 - Conditions for Stand-by Operation Entry ("OR" condition) : In case of no entry of either of temperature or humidity into the set range for standby operation within the set segment time
 - Conditions for Stand-by Operation Release ("AND" condition) : In case of entry of temperature and humidity into the set range for standby operation
 - The standby time has indefinite value when the standby time is not set (Initial value).

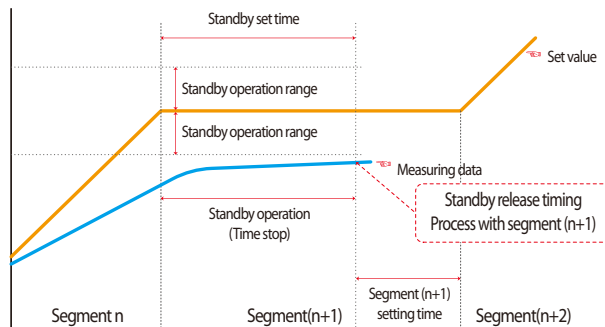
[Fig. 6-10] Standby operation setting screen

- | | |
|---|--|
| ① | It sets Y/N of standby operation. |
| ② | It sets the temperature range to be applied for standby operation. |
| ③ | It sets the humidity range to be applied for standby operation. |
| ④ | <p>It sets the standby time to be applied when the indicated data for temperature or humidity does not enter into the standby operation range (TEMP PV or HUMI PV).</p> <ul style="list-style-type: none"> It standbys indefinitely for entry to the standby operation range when the standby operation time is set in "00.00." <p>It decides either of "Entire" and "Maintain SEG" for standby operation method.</p> <ul style="list-style-type: none"> Entire : The standby operation is applied to the set entire segment in [6-1 Program pattern setting] Maintain SEG : The standby operation is applied only to the set maintain range segment in [6-1 Program pattern setting] |

Parameter	Setting range	Unit	Initial value
WAIT USE	UNUSE, USE	ABS	UNUSE
TEMP ZONE	T.EUS(0.00~100.00%)	T.EUS	T.EUS(0.00%)
HUMI ZONE	H.EUS(0.0~100.0%)	H.EUS	H.EUS(0.0%)
WAIT TIME	00.00~99.59 (UNUSE, USE)	ABS	00.00
WAIT USE METHOD	ALL, SEG	ABS	ALL



In case of standby operation release within standby time (Wait time)



In case of no entry of the measuring data into standby operation range within the standby time (Wait time)

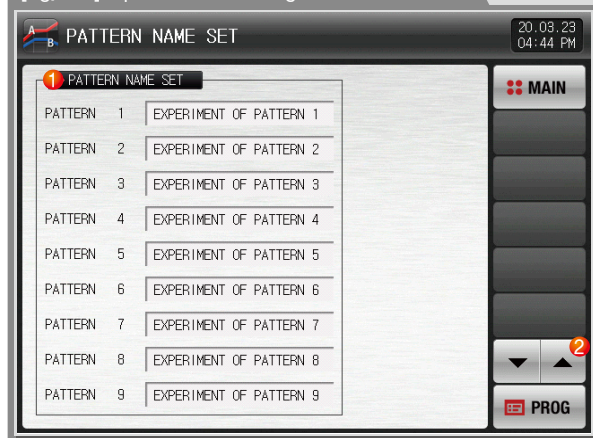
References

- ▶ It is a graph for interactive relation between standby operation and standby time.
- ▶ Standby operation range : It displays the humidity standby operation range for temperature standby operation range for temperature and humidity standby operation range for humidity.

6-6. Experiment name setting

- The experiment name can be set for each pattern. Refer to [4-2(2) Program operation #1 operation screen]

[Fig. 6-11] Experiment name setting screen



- Input the experiment name of each pattern.
- Converting to the next or previous experiment name screen.



[Fig. 6-12] Experiment name setting screen



References

- The input key to set the experiment name is displayed when is touched by.

Parameter	Setting range	Unit	Initial value
PATTERN NAME SET 1~120	0~9, A~Z, Special letter (Maximum 24 letters)	ABS	EXPERIMENT OF PATTERN 1~120

Part **07**

Appointed operation setting 66





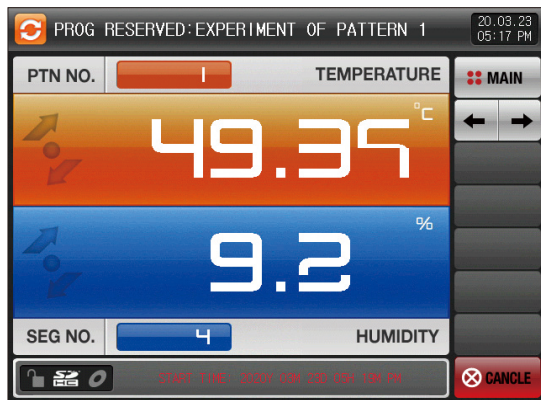
07. Appointed operation setting

- It converts to [Fig. 7-1 Time setting screen] when the appointed operation setting button is touched by in [Fig. 2-1 Main screen].
- It is a screen to set the current time and appointed operation time.

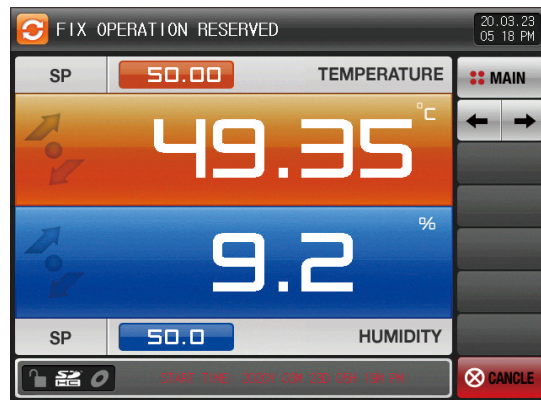


- ① It sets the year, month, day and hour.
 - The current time is not changeable during recording the measured data and operating.
- ② It sets the year, month, day and hour for appointed operation.

The operation is possible in the set appointed time when  is touched by.
- ③ The appointed time is displayed on the operation screen as shown in [Fig. 7-2 Operation appointed setting screen] when  is touched by.



[Fig. 7-2] Operation appointed setting screen (Program operation)



[Fig. 7-3] Operation appointed setting screen (Stationary operation)

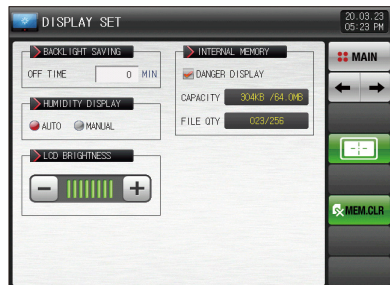
Parameter		Setting range	Unit	Initial value
CURRENT TIME	YEAR	2000~2099	ABS	-
	MONTH	1~12	ABS	-
	DATE	1~31	ABS	-
	AM/PM	AM, PM	ABS	-
	HOUR	1~12	ABS	-
	MIN	0~59	ABS	-
RESERVE TIME	YEAR	2000~2099	ABS	2012
	MONTH	1~12	ABS	1
	DATE	1~31	ABS	1
	AM/PM	AM, PM	ABS	AM
	HOUR	1~12	ABS	12
	MIN	0~59	ABS	0
Appointment		Click for appointment.		

※ AM12:00 : Night 00:00 / PM12:00 : PM 12:00

Part 08

Screen display setting

8-1 Setting display setting	71
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[Fig. 8-1] Screen display setting screen



[Fig. 8-8] D1 error creation history screen



08. Screen display setting

8-1. Screen display setting

- It converts to [Fig. 8-1 Screen display setting screen] when the screen display setting button is touched by in [Fig. 2-1 Main screen].

[Fig. 8-1] Screen display setting screen





References

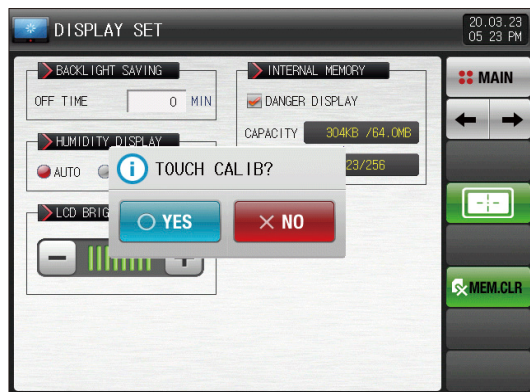
- The files to be saved into the internal memory are limited to 256 files.
Use after deletion of the files from the internal memory when it exceeds 256 files.

- It sets the backlight electricity saving time.
 - The electricity saving time sets the operation timing of backlight OFF when there is not key operation.
- It sets the humidity display pattern on operation screen.
In case of the below cases, the humidity data (PV) is displayed. However, except below cases, "—" is displayed.
 - Automatic
 - In case that temperature set data (SP) in in the range of relative humidity display condition(DRY LIMIT)
 - In case that temperature indicated data (PV). Is in 0.0°C to 100.0°C range
 - In case that humidity set data (SP) is not set to 0.0%
 - Manual
 - The humidity is displayed depending on the set value (SP) and indicated value(PV) as in the automatic mode and the humidity is displayed even when the humidity set value (SP) is set to 0.0%.
- The brightness of LCD is controlled by , button.
- Total capacity of internal memory, used capacity, total files to be saved and display of saved files
 - Warning : set to the usage of warning (shortage of memory capacity, excess of saved files) using the button ,
- Moving from current screen to next screen
- Touch screen calibration
- It deletes every file saved in the internal memory.

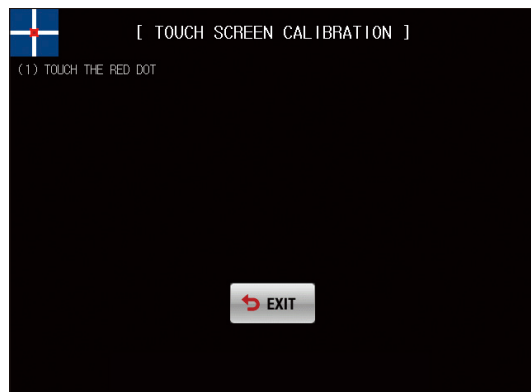
Parameter	Setting range	Unit	Initial value
OFFTIME	0~99 MIN	ABS	10
HUMIDITY DISPLAY	AUTO, MANUAL	ABS	AUTO
LED BRIGHTNESS	1 ~ 8	ABS	8 steps
TOUCH SCREEN CALIBRATION	When you calibrate the touch screen, click.		

8-2. Touch screen calibration Setting

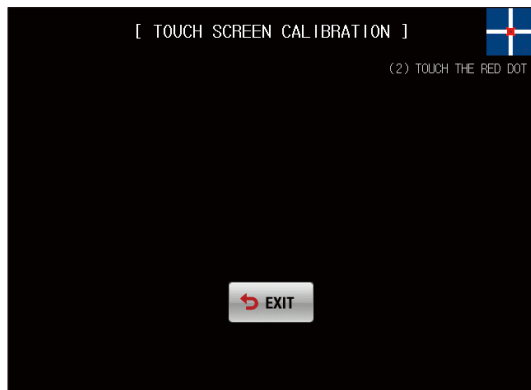
- Press  the red dot at the left / right upper, left / right bottom and center of the touch screen calibration screen, you can calibrate the touch screen.
- Press  on the touch screen calibration screen is not touch screen calibration is stored and stops will move to [Figure 8-1 Screen display setting screen]



[Fig.8-2] Touch screen calibration #1



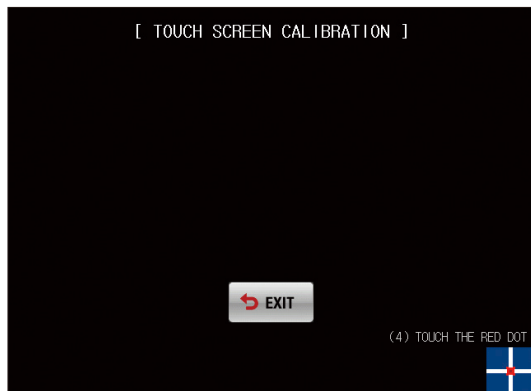
[Fig.8-3] Touch screen calibration #2



[Fig.8-4] Touch screen calibration #3



[Fig.8-5] Touch screen calibration #4



[Fig.8-6] Touch screen calibration #5



[Fig.8-7] Touch screen calibration #6

8-3. DI error creation history view

- It is a screen to display the type, date and time of error created DI.
- The error history is saved up to 30 cases and the later history is saved after deletion of the saved history.



It displays the history of DI error creation.

①

- The name set in [11-2 Error name] in [Operation manual] is displayed.
- The change is impossible as it is only for reading.

②

It deletes the entire DI error creation.

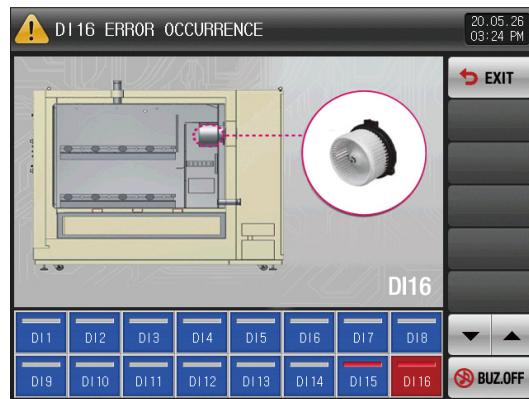
③

It checks the previous or next error history.

Parameter	Setting range	Unit	Initial value
ALL CLR	UNUSE, USE	ABS	UNUSE



[Fig. 8-9] Screen for DI error display method by letter



[Fig. 8-10] Screen for DI error display method by photo

References

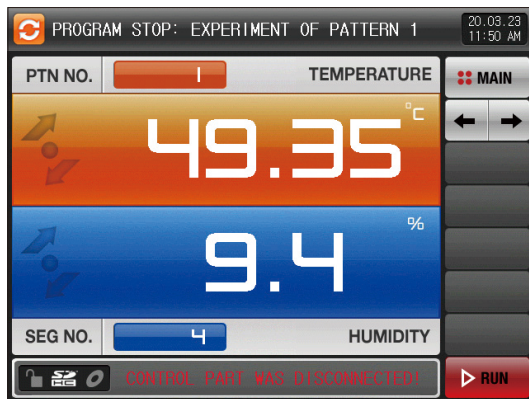
- ▶ It is a screen in case of DI error creation.
- ▶ The setting for letter and photo screen setting can be set in [11. DI function and operation setting] in [Installation manual].
- ▶ It is converted to the operation screen after escaping from the DI error screen when is touched by.
- ▶ The same DI error creation is neglected for 1 minute when the screen is changed by pressing button after DI creation. (Here, the neglecting means the DI error screen.)
EX) It neglects even DI1 is created by escaping with "Return" in the stat of DI1 creation and the DI error screen is displayed when DI1 has been created even after 1 minute.
- ▶ button is to block the alarming sound when DI error is created.
EX) Explanation depending on lamp state
 - DI error no creation ("OFF" state) (THE D11 ERROR OCCURRED letter, 1 photo)
 - DI error creation ("ON" state) (THE D11 ERROR OCCURRED letter, 1 photo)
 - Release after DI error creation ("ON" state after "OFF") (THE D11 ERROR OCCURRED letter, 1 photo)

Part **09**

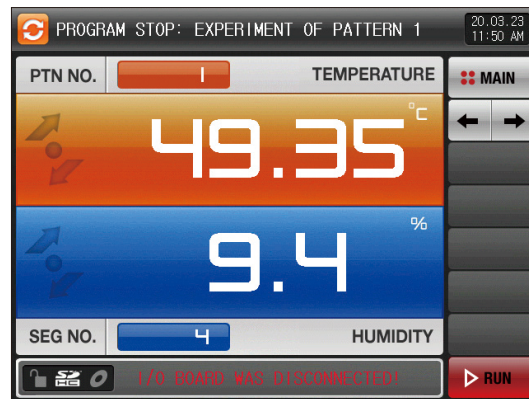
Communication error 77



09. Communication error



[Fig. 9-1] Screen for DI error display method by letter



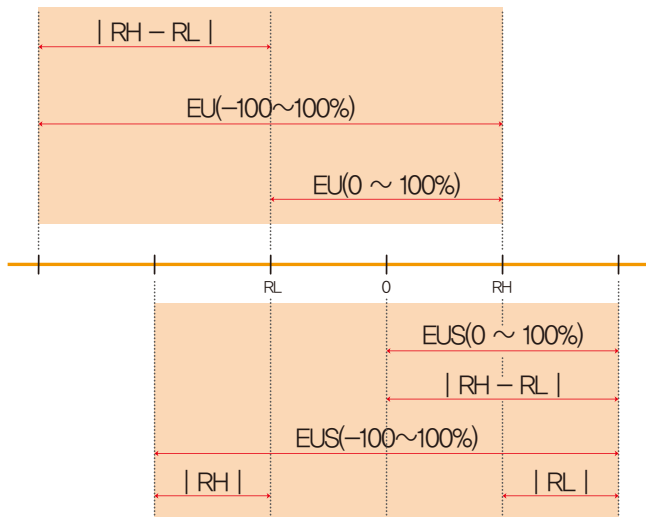
[Fig. 9-2] Screen for DI error display method by photo

References

- ▶ When there is an error between display and control unit The message, The control part is not connected, is displayed at the bottom of the screen as shown in [Fig. 9-1] Control unit communication error screen.
- ▶ When there is an error between control unit and I/O board communication The message, The I/O board is not connected" is displayed at the bottom of the screen as shown in [Fig. 9-2] I/O board communication error screen.
- ▶ Communication failure : Communication cable defect Communication cable connection defect

Engineering Units - EU, EUS

- When the sensor type (IN-T) or the upper limit, lower limit of input range is changed, the parameters expressed in EU(), EUS() are changed in proportion to current data. (However, the upper and lower range setting data is initialized.)
- Download the instruction manual and communication manual from the homepage.
- EU() : Value of engineering unit depending on the range of instrument
- EUS() : Value of engineering unit depending on the span of instrument



Range of EU() and EUS()

	Range	Center point
EU(0 ~ 100%)	RL ~ RH	$ RH - RL /2 + RL$
EU(-100 ~ 100%)	$-(RH - RL + RL) \sim RH$	RL
EUS(0 ~ 100%)	$0 \sim RH - RL $	$ RH - RL /2$
EUS(-100 ~ 100%)	$- RH - RL \sim RH - RL $	0

(Example)

▶ INPUT = PT_1

▶ RANGE = -90.00°C(RL) ~ 200.00°C(RH)

	Range	Center point
EU(0 ~ 100%)	-90.00 ~ 200.00°C	55.00°C
EU(-100 ~ 100%)	-380.00 ~ 200.00°C	-90.00°C
EUS(0 ~ 100%)	0 ~ 290.00°C	145.00°C
EUS(-100 ~ 100%)	-290.00 ~ 290.00°C	0.00°C

RL: Lower limit of input range

RH: Upper limit of input range

MEMO

MEMO



Queries related with after sales service for TEMI2000 series

Please inform the TEMI2000 model name, failure condition and contact point for queries of after sales service.

T : 82-32-326-9120

F : 82-32-326-9119



Customer contact for TEMI2000 series

Quotation request / Product request

Specification request / Data request/ Other request

■ Internet

www.samwontech.com

■ E mail

webmaster@samwontech.com

sales@samwontech.com



SAMWON TECHNOLOGY CO.,LTD.

(420-733) 202-703 Bucheon Techno-Park, #192 Yakdae-Dong,

Wonmi-Gu, Bucheon-City, Gyeonggi-Do, Korea

T +82-32-326-9120 **F** +82-32-326-9119 **E** webmaster@samwontech.com



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