INSTRUCTION MANUAL

FOR

Cool Block HC200

The 1st Edition

Yamato Scientific Co., Ltd.

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Tokyo 103-8432 JAPAN

Congratulations on your selection of Yamato Scientific's Cool Block HC200!
Please read these operating instructions, user notes and the warranty card thoroughly before the initial operation of your HC200. This will ensure proper operating procedures and extended life for the unit. Please keep the operating instructions together with the warranty card for easy access whenever you need them.

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MEANING OF ILLUSTRATED SYMBOLS

Illustrated Symbols

Various symbols are used in this safety manual in order to use the unit without danger of injury and damage of the unit. A list of problems caused by ignoring the warnings and improper handling is divided as shown below.Be sure that you understand the warnings and cautions in this manual before operating the unit.

⚠ **Warning**	If the warning is ignored, there is the danger of a problem that may cause a serious accident or even fatality.
⚠ **Caution**	If the caution is ignored, there is the danger of a problem that may cause injury/damage to property or the unit itself.

Meaning of Symbols

This symbol indicates items that urge the warning (including the caution).
A detailed warning message is shown adjacent to the symbol.

This symbol indicates items that are strictly prohibited.
A detailed message is shown adjacent to the symbol with specific actions not to perform.

This symbol indicates items that should be always performed.
A detailed message with instructions is shown adjacent to the symbol.

WARNING

⃠ Do not use the unit in an area where there is flammable or explosive gas.

- Never use the unit in an area where there is flammable or explosive gas.
  The unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result.

❗ Always ground the unit.

- Always ground the unit on the power equipment side in order to avoid electrical shock due to a power surge.

❗ If a problem occurs, you should:

- If smoke or strange odor should come out of the unit for some reason, **turn off** the power key right away, then **turn off** the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result.
  Never perform repair work yourself, since it is dangerous and not recommended.

⃠ Do not use the power cord if it is bundled or tangled.

- Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.

⃠ Do not process, bend, wring, or stretch the power cord forcibly.

- Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.

⃠ Substances that can not be used.

- Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in the unit. Explosion or fire may occur.

⃠ Do not disassemble or modify the unit.

- Do not reconfigure the unit. Fire or electrical shock may be caused.

CAUTION

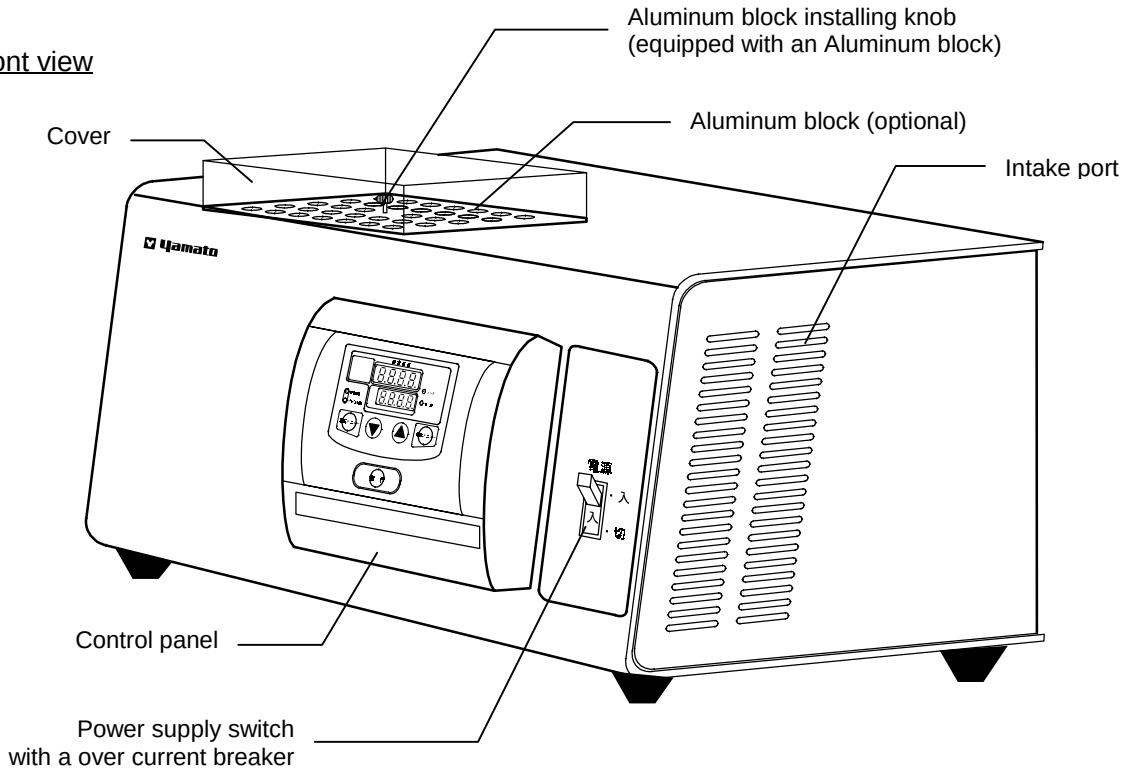
❗ During a thunder storm

- During a thunder storm, **turn off** the power key immediately, then **turn off** the circuit breaker and the main power.
  If this procedure is not followed, fire or electrical shock may be caused.

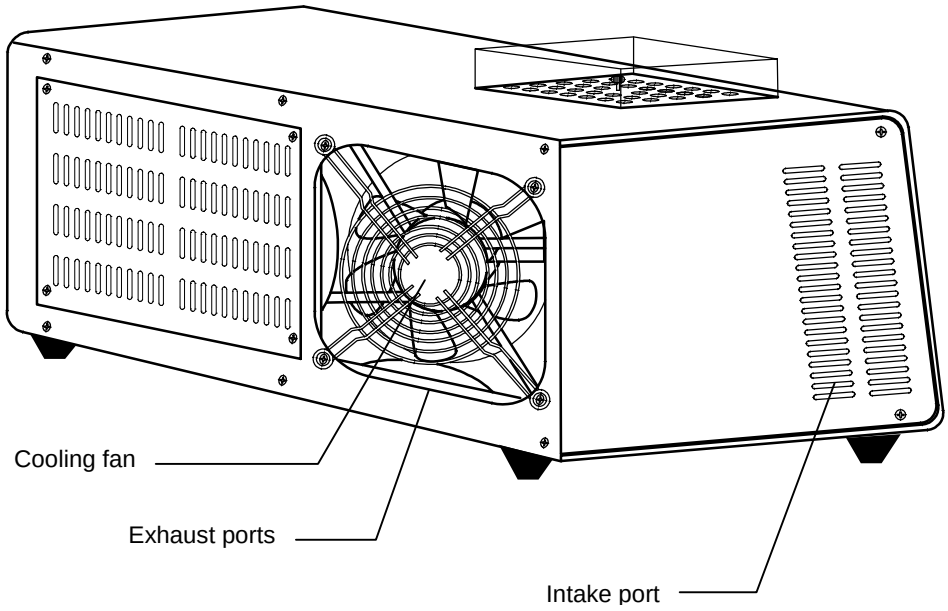
DESCRIPTION AND FUNCTION OF EACH PART

Main unit

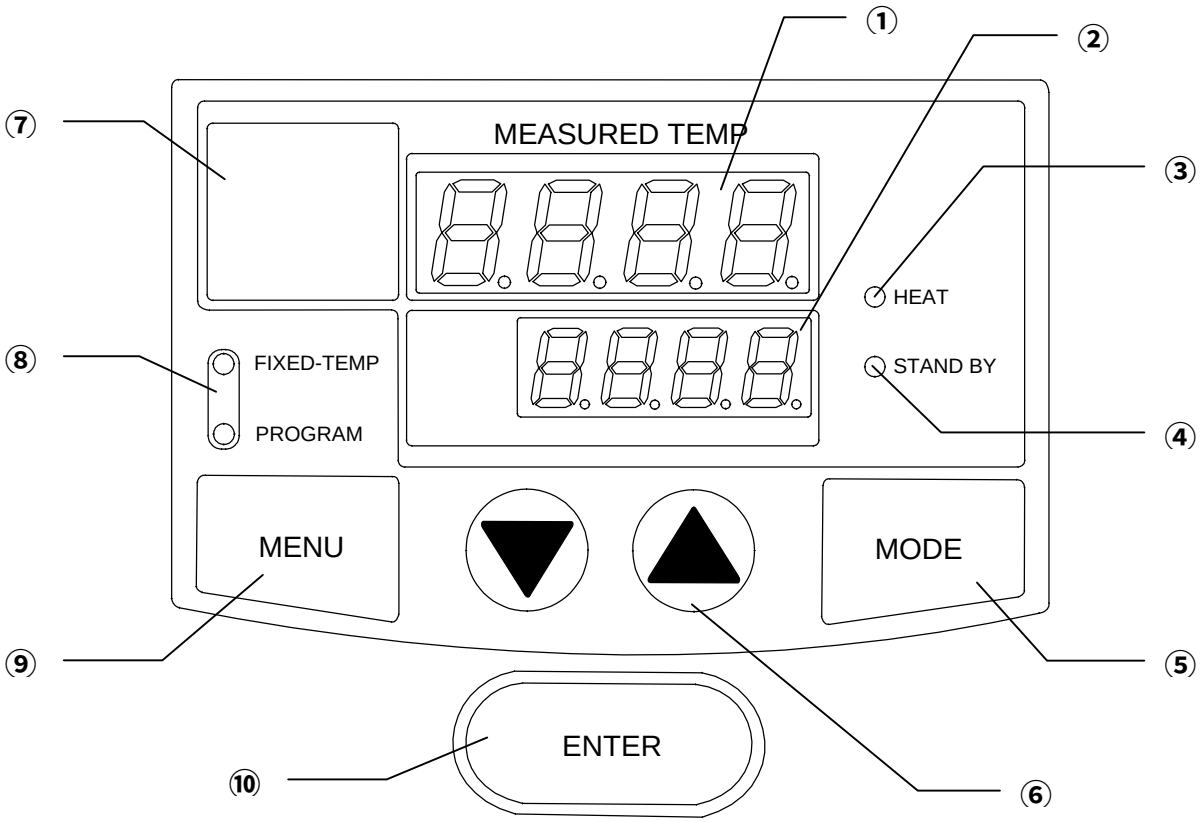
Front view



Rear view



Control Panel

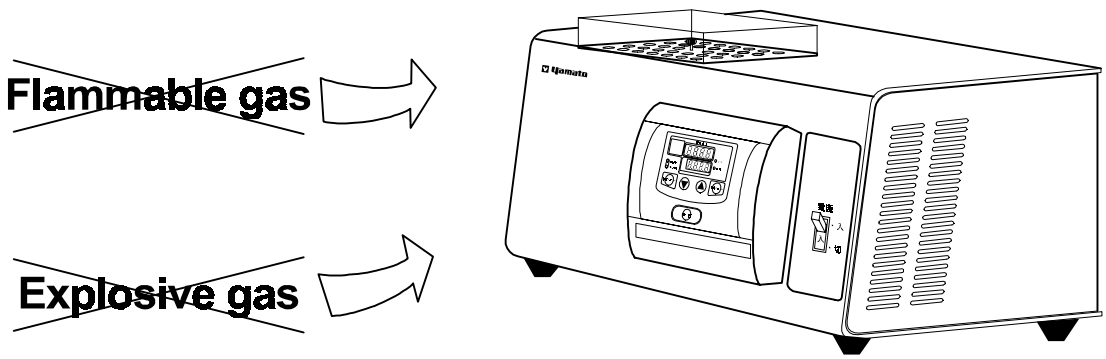


① Main Display:	Normally shows the aluminum block's temperature.
② Sub Display:	Shows the preset temperature, remaining time and ongoing program number
③ Heater (**HEAT**) lamp:	Lights up when electric power is supplied to the heater.
④ Standby (**STANDBY**) Lamp	Lights up when HC200 is ready for the program operation.
⑤ Function menu (**MODE**) key:	Use this key when you select a desired function.
⑥ Up/Down key:	Use these keys when you change the parameters.
⑦ Blind Window:	Blank in normal operation. "TROUBLE" lamp lights up when HC200 has a problem, and "REMOTE" lamp lights up when the optional communication system is in use.
⑧ Operation Mode Indicator:	Indicates if HC200 is on the fixed temperature operation or the program operation.
⑨ Operation Menu (**MENU**) key:	Use this key when you change operation mode.
⑩ **ENTER** key:	Use this key when you accept a modified parameter.

⚠ Warning

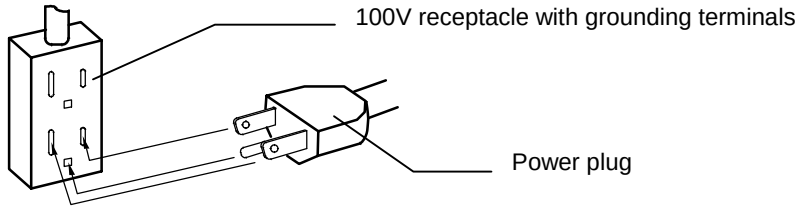
Do not use the unit in an area where there is flammable or explosive gas.

- Never use the unit in an area where there is flammable or explosive gas. The unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result.

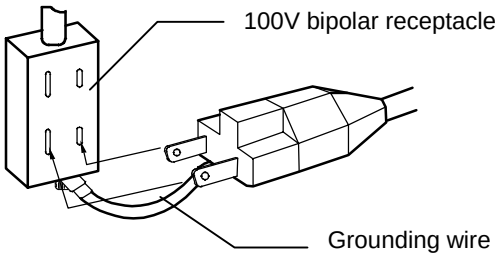


Always ground the unit.

- Connect HC200's power plug to a receptacle with grounding connectors.
- Do not forget to ground HC200, to protect you and the unit from electrical shock in case of power surge. Choose a receptacle with grounding connectors as often as possible.
- Do not connect the grounding wire to a gas pipe, or by means of a lightning rod or telephone line. A fire or electrical shock will occur.



- If only bipolar receptacles are available for HC200, connect an optional grounding adapter to HC200's power plug. Check the polarity of the receptacle before connecting the adapter to the receptacle. Connect the adapter's grounding wire (green) to a grounding terminal to the power supply. Contact our sales representative in your vicinity or our service center for additional information or assistance.

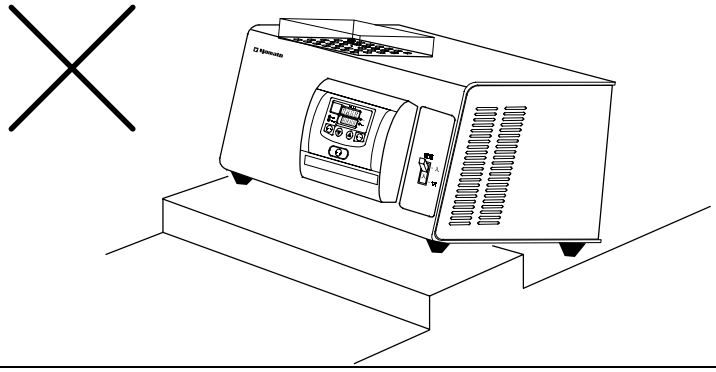


Choose a correct power distribution board or receptacle.

- Choose a correct power distribution board or receptacle that meets HC200's rated electric capacity. **Electric capacity : 100 VAC, 3A**
- Do not connect HC200 to an outlet that differs from the above specifications because a fire or electrical shock will occur.

Install on a level area.

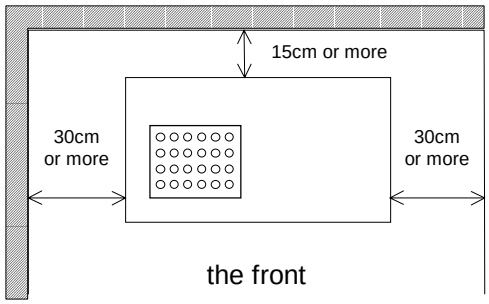
- Do not installation HC200 on a non level surface. This will cause hazards to the operator and create problems during actual operation.



Choose a proper place for installation.

- Do not install HC200 in a place where:
  - Flammable gas or corrosive gas is generated.
  - Ambient temperature exceeds 35°C.
  - Ambient temperature fluctuates violently.
  - There is direct sunlight.
  - There is excessive humidity and dust.
  - There is constant vibrations.

- Keep the following clearance around HC200.



⚠ Caution

Handling of power code.

- Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.
- Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.
- Do not put the power cord under the desk, chair, etc., or through an object. Fire or electrical shock may be caused.
- Do not run the power cord next to heating equipment such as a heater. The cover of the cord may melt and fire or electrical shock may result.
- When the power cord is damaged (exposure of the core wires, disconnection, etc.), turn OFF the power key right immediately, then turn OFF the circuit breaker and the main power. Contact customer service for a replacement immediately. If this procedure is not followed, fire or electrical shock may be caused.

Wipe off the condensation

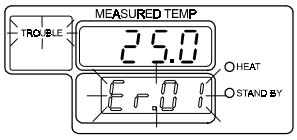
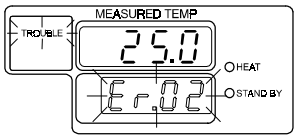
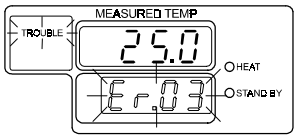
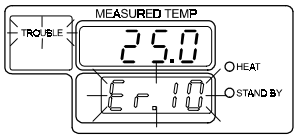
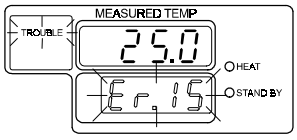
- The condensation may appear on aluminum block when temperature rises after a cooling device works. Wipe off the condensation with a cloth in that case.

Install an aluminum block

- Install an aluminum block correctly in the depression of main unit.

SELF-DIAGNOSTIC FUNCTIONS

HC200 has self-diagnostic functions. Whenever there is a problem in operation or system performance, the sub display on the control panel flashes an abbreviation of the problem and its corresponding error code, while HC200 sounds an alarm buzzer. If this happens, check the error code on the display and shut down HC200 immediately.

Problem and Error Code/Cause		Solutions
	Temperature sensor is out of order. TROUBLE flashes. Er.01 flashes.	• When one of these error codes has appeared on the display, turn "**off**" the power switch, on the front of HC200. • These error codes indicate a replacement part or a thorough inspection is necessary. Contact our sales representative in your vicinity or our service center. Tell them the error code.
	TRAIC circuit is out of order. TROUBLE flashes. Er.02 flashes.	
	Heater is disconnected. TROUBLE flashes. Er.03 flashes.	
	Main relay is defective. TROUBLE flashes. Er.10 flashes.	
	Electronic circuitry is defective. TROUBLE flashes. Er.15 flashes.	

FIXED TEMPERATURE OPERATION

Start up

After setting up HC200, follow the procedure below to start operation

NOTE: When turned on power, HC200 will automatically select the behavior in accordance with the following cases.

- When you use HC200 for the first time:
- When stopped by using the abort function:
- When stopped during the program operation and the quick auto-stop operation with the resume function inactive: (rSUn is set to off)

⇒ When you turn on the power switch, HC200 automatically selects the fixed temperature operation mode and is in standby condition. The main display shows the latest measured temperature, while the sub display shows the previously preset temperature.

⇒ The **STANDBY** lamp lights up and the **FIXED TEMP** lamp starts flashing.

- When turned off power during the Fixed temperature operation:

⇒ When you turn on the power switch, HC200 automatically starts the fixed temperature operation toward the temperature that has been set before turning off. The main display shows the latest measured temperature, while the sub display shows the previously preset temperature.

⇒ The **FIXED TEMP** lamp is lit.

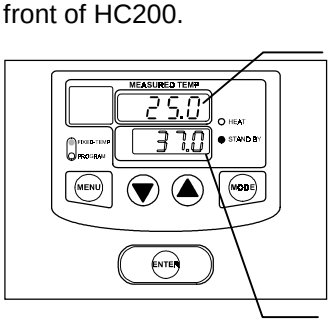
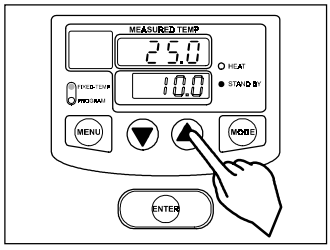
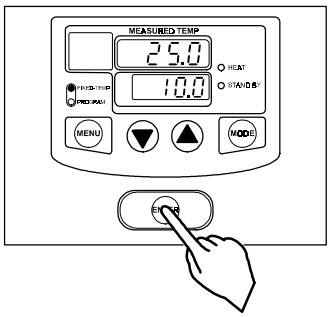
⇒ When changing the set temperature, see "Changing Preset Temperature during Operation" on page 11.

- When stopped during the program operation and the quick auto-stop operation with the resume function activated: (rSUn is set to on)

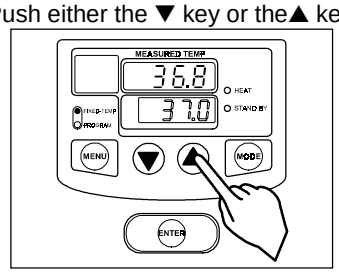
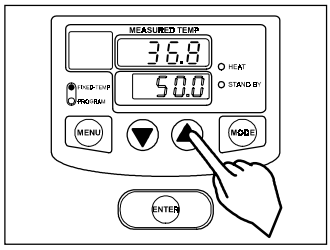
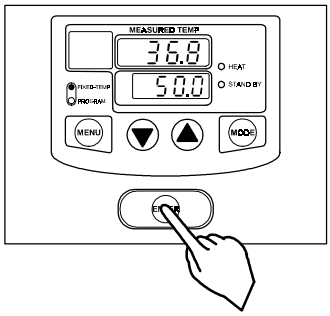
⇒ When you turn on the power switch, HC200 automatically starts the fixed temperature operation toward the preservation temperature that has been set before turning off. However, in case of the quick auto-stop operation, HC200 starts the quick auto-stop operation from the first in the condition that has been set before a black out. The main display shows the latest measured temperature, while the sub display flashes rSUn

⇒ The **PROGRAM** lamp is lit.

⇒ When changing to the fixed temperature operation, bring HC200 to the standby condition in the fixed temperature operation by pushing the **MENU** key.

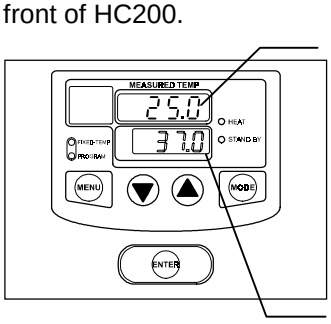
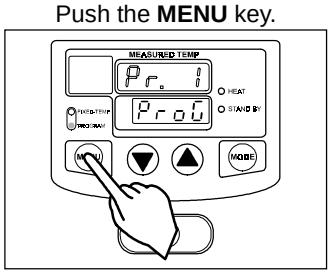
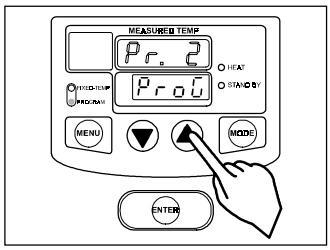
Indication after Step/Step Procedure	Explanation
1. Turn **ON** the power switch provided on the front of HC200.  	⇒ When you turn on the power switch, HC200 automatically selects the fixed temperature operation mode. The main display shows the latest measured temperature, while the sub display shows the previously preset temperature. ⇒ The **STANDBY** lamp lights up. ⇒ The **FIXED TEMP** lamp starts flashing.
2. Ex., fixed temperature operation at 10°C (Previously preset temperature was 25°C). Push either the ▼ key or the ▲ key.  	• Push either the ▼ key or the ▲ key until the flashing value on the sub display reaches your desired temperature. ! ▼ key decreases the temperature, while the ▲ key increases it.
3. Push the **ENTER** key.  	• When the value on the sub display has reached your desired temperature, push the **ENTER** key. ⇒ The temperature on the sub display turns from flashing to steady lit, and HC200 starts the fixed temperature operation toward the temperature. ⇒ The **STANDBY** lamp goes out, and the **FIXED-TEMP** lamp turns from flashing to lighting. ⇒ If the preset temperature is higher than the measured temperature, the **HEAT** lamp lights up to indicate that the heater has been turned on. These are all for the fixed temperature operation. ! The cooling function(Peltier cells) becomes effective when setup temperature is under 40℃.

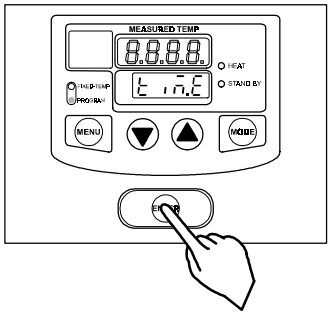
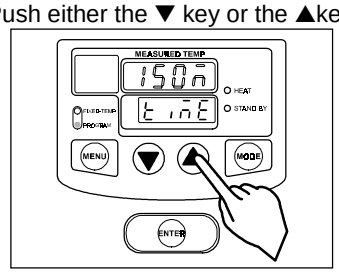
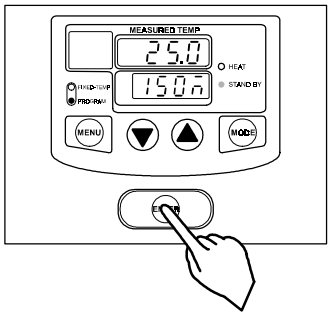
Changing Preset Temperature during Operation

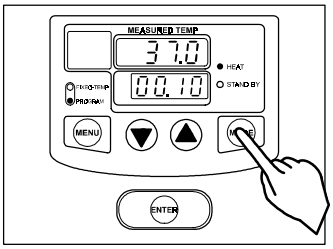
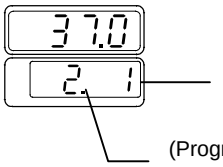
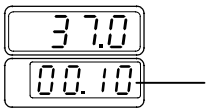
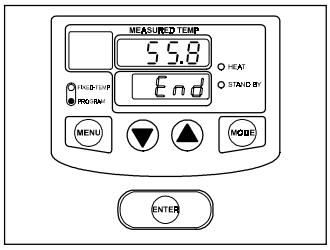
Indication after Step/Step Procedure	Explanation
1. (Ex., changing a preset temperature of 37°C to 50°C during the fixed temperature operation.) Push either the ▼ key or the▲ key.  	• Push either the▼ key or the▲ key. ⇒ The controller turns to the temperature setting mode, and the sub display starts flashing the preset temperature.
2. Push either the ▼ key or the▲ key.  	• Push either the ▼ key or the ▲ key until the flashing value on the sub display reaches your desired temperature.
3. Push the **ENTER** key.  	• When the value on the sub display has reached your desired temperature, push the **ENTER** key. ⇒ The temperature on the sub display turns from flashing to steady lit, and HC200 starts the fixed temperature operation toward the newly preset temperature. All these steps are for the fixed temperature operation.
4. **Shutting down** Turn OFF the power switch provided on the front of HC200.	• Turn **OFF** the power switch provided on the front of HC200. ⇒ All the circuits are closed and indication lamps go out.

Start up

After setting up HC200, follow the procedure described below to start operation.

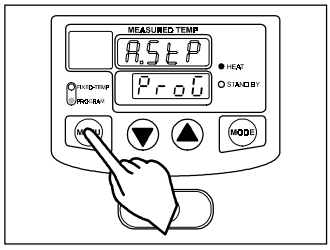
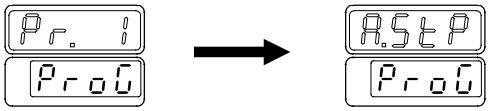
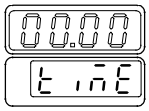
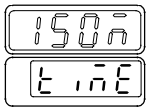
Indication after Step/Step Procedure	Explanation
1. Turn **ON** the power switch provided on the front of HC200. 	⇒ When you turn on the power switch, HC200 automatically selects the fixed temperature operation mode. The main display shows the present preset temperature, while the sub display shows the previously preset temperature. ⇒ The **STANDBY** lamp lights up. ⇒ The **FIXED TEMP** lamp starts flashing.
2. Ex., loading Program 2 for operation. Push the **MENU** key. 	⇒ The main display flashes Pr. 1 (Ex. Program 1). ⇒ The sub display shows Prog. ⇒ The **FIXED-TEMP** lamp goes out. ⇒ The **PROGRAM** lamp starts flashing. ⇒ If there is no program registered, the main display flashes - - - - ! See on "How to Compose a Program" page 35 for composing a new program.
3. Push either the ▼ key or the ▲key. 	• Push either the ▼ key or the ▲key until the program number on the main display reaches your desired program. Pr. 2 (Ex. Program 2)

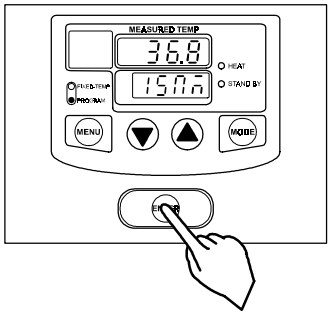
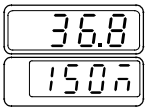
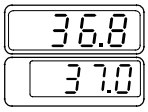
Indication after Step/Step Procedure	Explanation
4. Push the **ENTER** key. 	• When the program number on the main display has reached your desired number, push the **ENTER** key. ⇒ The controller turns to the start time setting mode, and the main display flashes 00.00 ⇒ The sub display shows tinE (time). • Follow the procedure below and set the operation start time.
5. Ex., starting operation in 2 hours 30 minutes. Push either the ▼ key or the ▲key. 	• Push either the ▼ key or the▲ key to flash the start time of the loaded program. ! You can set the start time in the range from 1 second to 999 minutes. However, when the start time is more than 100 minutes later, seconds cannot be set. Ex : 99 hours and 59 minutes later: 99.59 100 minutes: 100
6. Push the **ENTER** key. 	• Push the **ENTER** key. ⇒ The main display shows the latest measured temperature. ⇒ The sub display shows the remaining time before operation starts. ⇒ The **STANDBY** lamp starts flashing to indicate that HC200 is ready for operation. ⇒ The **PROGRAM OPERATION** lamp turns from flashing to steady lit.

Indication after Step/Step Procedure	Explanation
7. Switching the sub display information. Push the **MENU** key to set the sub display screen switching mode.  • Switched to the latest measured temperature.  (Preset temperature in use) • Switched to the ongoing program.  (Segment number on process) (Program number in use) • Switched to the remaining time.  (Remaining time of the ongoing segment)	⇒ When the start time is up, the **STANDBY** lamp goes out and HC200 starts the program operation. ⇒ When the start time is up, the sub display shows the latest parameters. Ex: In the example shown on the left, HC200 is on the first segment of Program 2, and the remaining time of the segment is 10 seconds. (During the program operation.) ! On the sub display screen switching mode, you can check 3 pieces of information; the remaining time before the ongoing segment finishes, the preset temperature, and the ongoing program number. See "Changing Sub Display Screens" on page 22.
8. When the program operation finishes  	⇒ HC200 stops regulating the temperature. ⇒ The main display shows the latest measured temperature. ⇒ The sub display flashes the word End. ⇒ The **HEAT** lamp goes out. ⇒ The **PROGRAM** lamp stays lit.

Changing to Quick Auto-Stop Mode

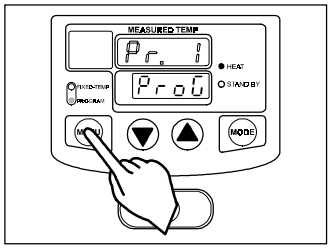
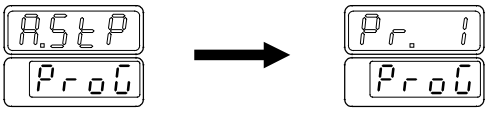
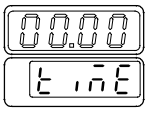
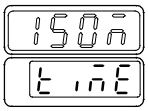
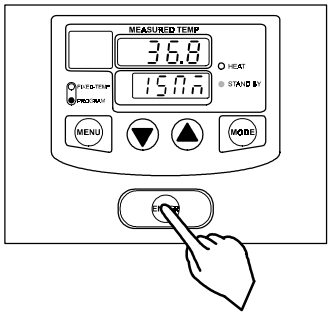
Use the quick auto-stop mode when you want to stop the ongoing fixed temperature operation after the desired time.

Indication after Step/Step Procedure	Explanation
1. Push the **MENU** key.  When the ongoing program number starts flashing, push either the ▼ key or the ▲ key.  (Ex. Only Program 1 is operational)	• Push the **MENU** key during the fixed temperature operation. ⇒ The main display flashes either the operation program number or A.StP (auto-stop). Ex: In the example on the left, A.StP flashes on the main display. • If the display flashes an operational program number, push either the ▼ key or the ▲ key to show A.StP. ⇒ The **PROGRAM** lamp starts flashing. ⇒ Since the fixed temperature operation is going on, the **HEAT** lamp keeps flashing, that indicates that HC200 is under temperature regulation.
2. Push the **ENTER** key.  	• Push the ENTER key. ⇒ The main display flashes 00.00 ⇒ The sub display flashes tiME
3. Ex., stopping operation in 2 hours 30 minutes. Push either the ▼ key or the ▲ key.  	• Push either the ▼ key or the ▲ key and set your desired time before operation stop.

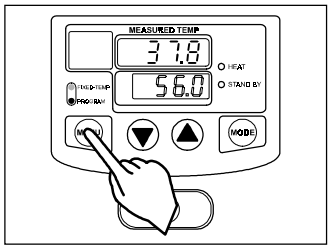
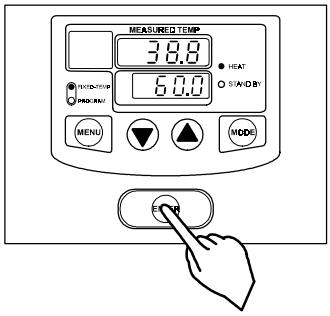
Indication after Step/Step Procedure	Explanation
4. Push the **ENTER** key.  (Display shows the remaining time)  Swich the sub display infomation (Display shows the preset temperature)  	⇒ Pushing the **ENTER** key changes the operation mode from the fixed temperature operation to the auto-stop operation. ⇒ The main display shows the latest measured temperature. ⇒ The sub display shows either the remaining time before operation stop or the preset temperature. Ex: In the example on the left -- the sub display shows the remaining time. ! When you want to check the preset temperature, switch the sub display information. (See "Changing Sub Display Screens" on page. 22) ⇒ The **PROGRAM** lamp turns from flashing to steady lit.
5. When the auto-stop operation finishes  	⇒ When the set time is up, HC200 stops regulating temperature. ⇒ The sub display flashes word End

Changing the Program Operation during Fixed Temperature Operation

(Ex. switching to Program 1 during the fixed temperature operation)

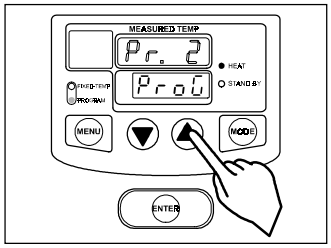
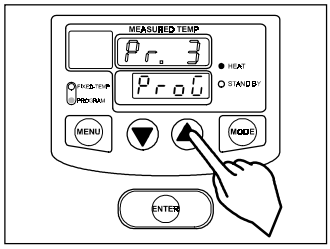
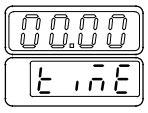
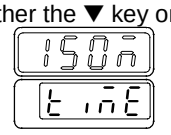
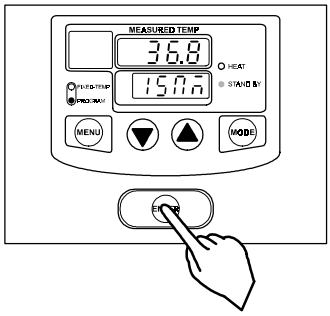
Indication after Step/Step Procedure	Explanation
1. Push the **MENU** key.  (When ASTP starts flashing, push either ▼key or ▲key.)  (Ex. Loading Program 1)	• Push the **MENU** key twice during the fixed temperature operation. ⇒ The main display flashes either operational program number or ASTP (auto-stop). Ex: In the example on the left, Pr. 1 (Program 1) flashes on the display. • If the display flashes ASTP, push either the ▼key or the ▲key to show your desired program number. ⇒ The **PROGRAM** lamp starts flashing. ⇒ Since the fixed temperature operation is going on, the **HEAT** lamp keeps flashing, which indicates that HC200 is under temperature regulation.
2. Push the **ENTER** key. 	• Push the ENTER key. ⇒ The main display flashes 00.00 indicating the operation start time setting mode. ⇒ The sub display flashes tiME
3. Ex., finishing operation after 2 hours and 30 minutes Push either the ▼ key or the ▲ key. 	• Push either the ▼key or the ▲key and set your desired time before operation start.
4. Push the **ENTER** key. 	⇒ Pushing the **ENTER** key changes the operation mode from the fixed temperature operation to the program operation. ⇒ The main display shows the latest measured temperature. ⇒ The sub display shows the remaining time before operation start. ⇒ The **STANDBY** lamp starts flashing, indicating that HC200 is ready for operation. ⇒ The **PROGRAM** lamp goes from flashing to steady lit.
5. Starting the program operation.  (Ex. Preset desired temperature in use)	⇒ When the set time is up, the **STANDBY** lamp goes out and HC200 starts the program operation. ⇒ The sub display shows the latest parameters. See “Changing Sub Display Screens” on page. 22.

Changing from Program Operation to Fixed Temperature Operation

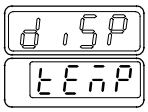
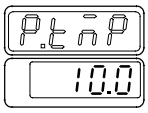
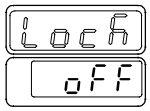
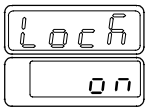
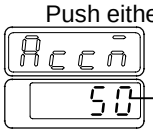
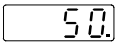
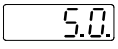
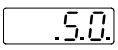
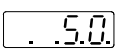
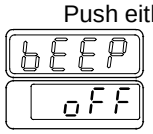
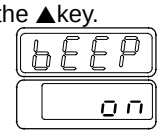
Indication after Step/Step Procedure	Explanation
1. Push the **MENU** key.  	• Push the **MENU** key during the program operation. ⇒ HC200 changes to the fixed temperature operation's desired temperature setting mode. ⇒ The sub display flashes the preset desired temperature of the latest fixed temperature operation. Ex. In the example on the left, the sub display shows that the previously preset temperature was 56 °C.
2. Ex., setting the temperature at 60°C. Push either the ▼ key or ▲ key.  	• Push either the ▼ key or ▲ key and set your desired temperature on the sub display. ! If you do not change the previously preset temperature; proceed to Step 3.
3. Push the **ENTER** key.  	• After you set your desired temperature on the sub display, push the **ENTER** key. ⇒ Pushing the **ENTER** key stops the ongoing program operation, and operation mode switches to the fixed temperature operation. ⇒ The temperature on the sub display changes from flashing to steady lit, and HC200 starts the fixed temperature operation. ⇒ The **PROGRAM** lamp goes out, and the **FIXED-TEMP** lamp turns from flashing to steady lit.

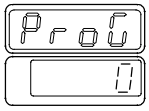
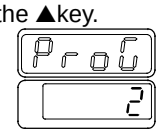
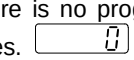
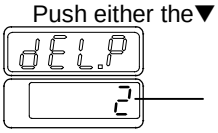
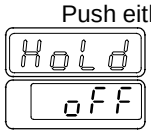
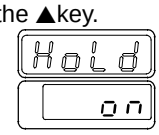
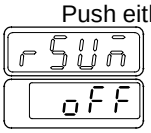
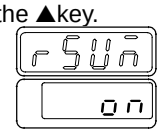
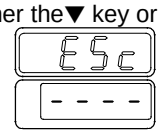
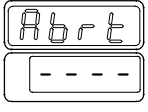
Changing from Program Operation to Other Program Operation

You can change the operation program number, and can set the operation start time during the program operation.

Indication after Step/Step Procedure	Explanation
1. Push either the ▼ key or ▲ key. 	• Push either the ▼ key or ▲ key during the program operation. ⇒ The main display flashes the ongoing program number. ⇒ The sub display shows ProG. Ex. In the example on the left, the main display shows ongoing program 2.
2. Push either the ▼ key or ▲ key. 	⇒ If an operational program is in the plural, the main display flashes an operational program number to reel an order. • Push either the ▼ key or the ▲ key to show your desired program number. ! If you want to edit only the operation start time, skip this step.
3. Push the **ENTER** key. 	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key stops the ongoing program operation. ⇒ The **STANDBY** lamp lights. ⇒ The main display flashes 00.00 indicating the operation start time setting mode.
4. Ex., starting operation in 2 hours and 30 minutes Push either the ▼ key or ▲ key. 	• Push either the ▼ key or the ▲ key to set your desired operation start time.
5. Push the **ENTER** key. 	• Push the **ENTER** key. ⇒ The main display shows the latest measured temperature. ⇒ The sub display shows the remaining time before operation start. ⇒ The **STANDBY** lamp starts flashing, indicating that HC200 is ready for operation. ⇒ The **PROGRAM** lamp goes from flashing to steady lit.

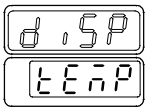
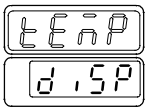
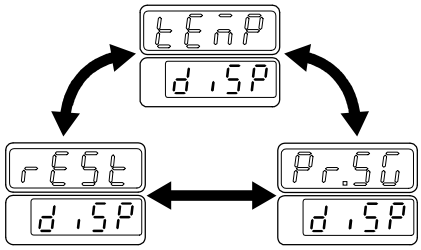
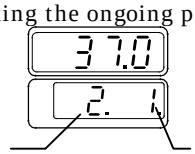
This paragraph discusses the useful functions contained in the menu. However, discussion is limited to the indication on the displays with brief explanation when you activate each function. See corresponding paragraphs for setting and editing those functions.

Indication after Step/Step Procedure	Explanation
1. Sub display switching function.  Push the **MODE** key Sample indication of the sub display information switching mode.	• Push the **MODE** key. ⇒ If you push the **MODE** key during the operation, the controller turns to the sub display screen switching mode. See "Changing Sub Display Screens" on page. 22.
2. Temperature presetting function  Push the **MODE** key Sample indication of the preset temperature registration mode	⇒ If you push the **MODE** key when HC200 is ready for operation or after the operation, the display shows the parameter set on the preset temperature registration mode. See "How to Use Temperature Presetting Function" on page. :28.
3. Panel key locking system Push either the▼ key or the ▲key.  **or**  Locking system off Locking system on	• Push either the▼ key or the ▲key several times. ⇒ The controller turns to the panel key lock selection mode. ⇒ Panel key locking system is provided to prevent accidental or unauthorized change of the parameters when HC200 is ready for operation or during the operation. When the panel key locking system is turned ON, the keys on the control panel, except the **MODE** key, do not work. See "Setting and releasing Panel Locking System" on page 23.
4. Integrated time indicating function Push either the▼ key or the ▲key.  (Ex. Integrated time at present) When the integrated time exceeds 10,000 hours  : 10,050hours  : 20,050hours  : 30,050hours  : 40,050hours	• Push either the▼ key or the ▲key several times. ⇒ The controller turns to the integrated time indication mode, and the main display flashes  (accumulation for integrated time) ⇒ The sub display shows the integrated service time of HC200. ! The display show an integrated service time up to 4,999 hours, that cannot be reset. ! When the integrated time exceeds 9,999 hours, as shown in the example on the left, the dot after each digit lights up one after another at excess of every 10,000 hours. In other words, one dot light indicates 10,000 hours.
5. Alarm sound ON/OFF function Push either the▼ key or the ▲key.  **or**  Alarm sound off Alarm sound on	• Push either the ▼ key or the ▲ key several times. ⇒ The controller displays the alarm sound ON/OFF selection mode. ! This function is provided to activate the alarm sound when something abnormal happens on HC200. See "Setting and releasing the Alarm" on page 24.

6. Program inputting and editing function Push either the▼ key or the ▲key.  No program available **or**  Program available (Ex. 2programs)	• Push either the ▼ key or the ▲ key several times. ⇒ The controller displays the program input/edit mode. See “How to Compose a Program” on page 35. ⇒ If there is no program registered, the main display flashes.  ⇒ When more than one program has been registered, the sub display shows the number of those operational programs.
7. Program deleting function(Loading is limited.) Push either the▼ key or the ▲key.  (Ex. 2programs available)	• Push either the ▼ key or the ▲ key several times. ⇒ The controller displays the program delete mode. See “Deleting a Program” on page 47. ! The function works only when more than one program has been registered. If there is no program registered, the sub display is blank, and the controller proceeds to the next function selection mode.
8. Temperature holding function (Loading is limited.) Push either the▼ key or the ▲key.  Holding function OFF **or**  Holding function ON	• Push either the ▼ key or the ▲ key several times. ⇒ The controller displays the temperature holding selection mode. See “Setting and releasing the Temperature Holding Function” on page 25. ! With this function, you can hold the temperature measured at the time of setting. This function can work only during the quick auto-stop operation or the program operation, and when HC200 is ready for the program operation. In other operation modes, the controller proceeds to the next function selection mode.
9. Resume function Push either the▼ key or the ▲key.  Resume function OFF **or**  Resume function ON	• Push either the ▼ key or the ▲ key several times. ⇒ The controller displays the resume function selection mode. See “Resume Function” on page 31.
10. Escape function Push either the▼ key or the ▲key. 	• Push either the ▼ key or the ▲ key several times. ⇒ The controller displays the escape function selection mode. ! “Escape” means to cancel the selected function or to repeat inputting or editing a program from the beginning before pushing the **ENTER** key. See “The Escape Function” on page 26.
11. Abort function Push either the▼ key or the ▲key. 	• Push either the ▼ key or the ▲ key several times. ⇒ The controller display the abort function selection mode. ! This function is for putting the ongoing fixed temperature operation or quick auto-stop operation or program operation to a stop, and changing to the standby condition that no operation is selected. See “The Abort (Forced Stop) Function” on page 27.

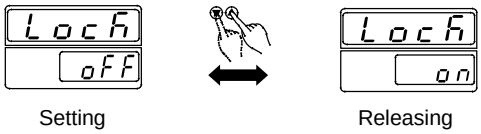
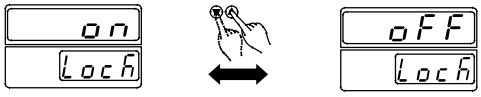
Changing Sub Display Screens

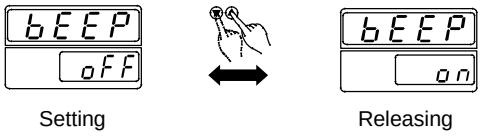
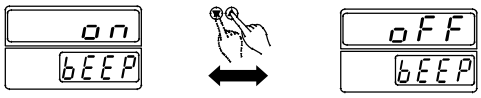
- ♦ You can switch the screen on the sub display when HC200 is in the quick auto-stop operation or the program operation.
- ♦ You can select/check the preset temperature along with the remaining time before the operation stop during the quick auto-stop operation. Other selections maybe -- the preset temperature, the remaining time before the ongoing segment finishes, the parameters of the ongoing segment, and the remaining number of repeat cycles (possible only during the repeat operation).

Indication after Step/Step Procedure	Explanation
1. Push the **MODE** key.  Ex. Information on the preset temperature display mode.	• Push the **MODE** key during the quick auto-stop operation or the program operation. ⇒ The controller turns to the sub display screen changing mode, and the main display flashes (display). d.SP ⇒ The sub display shows the description of the presently set mode.
2. Push the **ENTER** key  	• Push the **ENTER** key. ⇒ The controller turns to the sub display setting mode, and the main display flashes the description that was shown on the sub display. ⇒ The sub display shows d.SP
3. Push either the ▼ key or the ▲ key.  	• Push either the ▼ key or the ▲ key. ⇒ Every time you push the key, the main display switches from rESt (rest for remaining time) and Pr.SG (ongoing program and ongoing segment) to tEnP (preset temperature) in this order while flashing them. ! If HC200 is in the repeat operation of a program, pushing the ▼ key or the ▲ key allows you to check the remaining number of repeat cycles. In this instance, the main display flashes r.cnt (repeat count for remaining number of repeat cycles).
4. Push the **ENTER** key Indicating the ongoing program  (Ongoing Program Number) (Ongoing Segment Number)	• When the sub display shows the information you need, push the **ENTER** key. ⇒ The main display shows the latest measured temperature. ⇒ The sub display shows the information of the set parameters. Ex: The example on the left -- the sub display shows the ongoing program number and the ongoing segment number.

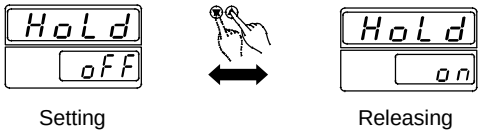
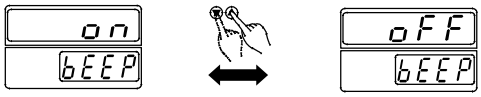
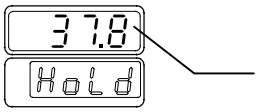
Setting and releasing Panel Locking System

The Panel Locking System is provided to prevent accidental or unauthorized changes of the parameters during the operation or when HC200 is ready for operation. With the Locking System turned on, the function keys, except the **MODE** key, do not work.

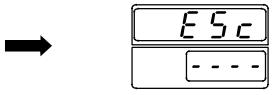
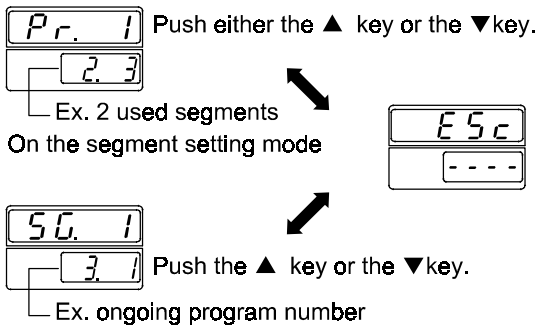
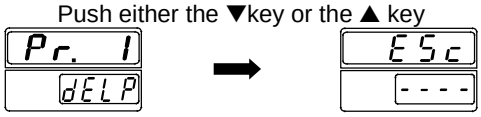
Indication after Step/Step Procedure	Explanation
1. Select "Panel Lock" selection mode  Setting Releasing Select the corresponding function. See "Menu Functions" on page 20.	• Select "Panel Lock" selection mode by pressing the **MODE** key. ⇒ The sub display shows the present status of the panel lock:. ⇒ When the key lock has been set, it shows on and when the lock has been released it shows oFF.
2. Push the **ENTER** key  Releasing Setting	• Push the **ENTER** key. ⇒ The controller turns to the panel lock ON/OFF mode. ⇒ The sub display shows LocK
3. Push either the ▼ key or the ▲ key.  Setting Releasing	• Set the main display at ON for setting and OFF for releasing. Push the ▼ key or the ▲ key to flash ON or OFF on the display.
4. Push the **ENTER** key Screen just before pushing the **MODE** key.	• Push the **ENTER** key. ⇒ The panel lock is turned on or off, according to your selection. ⇒ The display returns to the screen shown just before you have pushed the **MODE** key.
5. Push the **MODE** key How to check the status of the panel locking system.	• Push the **MODE** key. ⇒ The sub display flashes LocK with the alarm.

Indication after Step/Step Procedure	Explanation
1. Select "Alarm" selection mode  Setting Releasing Select the corresponding function. See "Menu Functions" on page 20.	• Select "Alarm" selection mode by pressing the **MODE** key. ⇒ The sub display shows the present status of the alarm: when the alarm is in inactivity, it shows oFF and when the alarm is in activity, it shows on.
2. Push the **ENTER** key  Releasing Setting	• Push the **ENTER** key. ⇒ The controller turns to the alarm ON/OFF mode. ⇒ The sub display shows bEEP
3. Push either the ▼ key or the ▲ key.  Setting Releasing	• Set the main display at ON for setting and OFF for releasing. Push the ▼ key or the ▲ key to flash ON or OFF on the display.
4. Push the **ENTER** key Screen just before pushing the **MODE** key.	• Push the **ENTER** key. ⇒ The display returns to the screen shown just before you have pushed the **MODE** key.

Setting and releasing the Temperature Holding Function

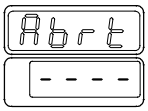
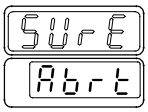
Indication after Step/Step Procedure	Explanation
1. Select "Hold function" selection mode  Setting Releasing Select the corresponding function. See "Menu Functions" on page 21.	• Select "Hold Function" selection mode by pressing the **MODE** key. ⇒ The sub display shows the present status of the hold function: when the function has been released, it shows oFF and when the function has been set, it shows on.
2. Push the **ENTER** key  Releasing Setting	• Push the **ENTER** key. ⇒ The controller turns to the hold function ON/OFF mode. ⇒ The sub display shows HoLd
3. Push either the ▼ key or the ▲ key.  Setting Releasing	• Set the main display at ON for setting and OFF for releasing. Push the ▼ key or the ▲ key to flash ON or OFF on the display.
4. Push the **ENTER** key  (Latest measured temperature) or Screen just before pushing the **MODE** key.	• Push the **ENTER** key. • When you turn on the hold function: ⇒ The display shows the temperature measured at the execution of the hold function. ⇒ The sub display flashes. • When you turn off the hold function: ⇒ The display returns to the screen shown just before you have pushed the **MODE** key.

- Use the ESCAPE function when you want to cancel the function menu, inputting or editing a program to repeat it from the beginning.
- You can use the ESCAPE function when the controller is on the program number setting mode for the following: a) inputting or editing a program, b) the segment setting mode for editing a program, and c) the program delete mode for deleting a program.
- When you activate the ESCAPE function and push the ENTER key, the display returns to the screen shown just before your setting action.

Indication after Step/Step Procedure	Explanation
1. (When you want to cancel the function menu.) Push either the ▼key or the ▲ key, after pushing the **MODE** key. 	• Push the **MODE** key to set the function selection mode, and push either the ▼key or the ▲ key. ⇒ The main display flashes ESc • Push the **ENTER** key. ⇒ Pushing the **ENTER** key releases the function selection mode, and the display return to the screen shown just before your setting action.
2. (When you want to cancel inputting or editing a program.) On the program number setting mode – 	
3. (When you want to cancel deleting a program) Push either the ▼key or the ▲ key 	

The Abort (Forced Stop) Function

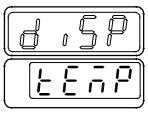
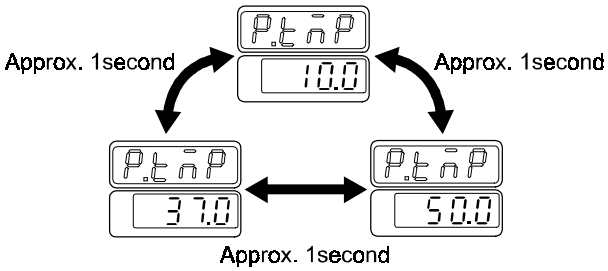
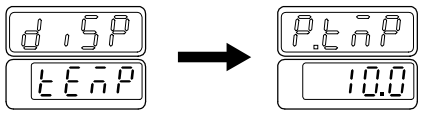
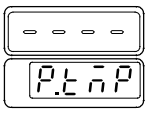
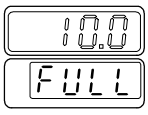
Forced Stop Function is for putting the ongoing fixed temperature operation or quick auto-stop operation or program operation to a stop, and changing to the standby condition that no operation is selected.

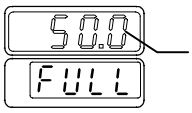
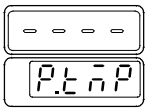
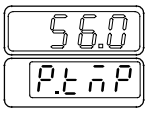
Indication after Step/Step Procedure	Explanation
1. Push the MODE key and either the ▼ key or the▲ key. 	• .Push the MODE key and press either the ▼ key or the▲ key several times to flash AbrE on the main display.
2. Push the **ENTER** key 	• Push the **ENTER** key. ⇒ The main display flashes SurE, while the sub display shows AbrE.
3. Push the **ENTER** key In the standby condition before slecting operation	• Push the **ENTER** key. ⇒ HC200 will be in the standby condition before selecting operation.

How to Use Temperature Presetting Function

Register Preset Temperature

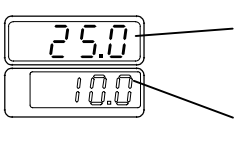
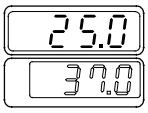
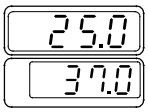
- You can register preset temperatures any time, except during the remote operation option and a problem. Follow the procedure below when you register the temperatures.
- You can register up to 10 different preset temperatures.

Indication after Step/Step Procedure	Explanation
1. Push the **MODE** key. (Pushing the key during the operation)  	• Push the **MODE** key. ⇒ The controller turns to the sub display screen switching mode. The main display flashes (display) d ,SP. ⇒ The sub display shows tEnP temperature.
(Pushing the key when HC200 is ready for operation or after finishing a program.)  Ex., 10ºC, 37 ºC, and 50ºC have been registered.	⇒ The controller turns to the preset temperature registration mode. The main display flashes P.tnP (preset temperature). ⇒ The sub display shows the registered preset temperatures, one after another in descending order every 1 second. If there is not temperature registered, the display shows - - - -. ! If this is the case, proceed to Step 3.
2. On the sub display screen switching mode. Push either the ▼key or the ▲ key.  Indication on the sub display screen switching mode	• Push either the ▼key or the ▲ key several times to flash P.tnP on the main display.
3. Push the **ENTER** key. (When the registered temperatures are less than 9)  	• Push the **ENTER** key. ⇒ The controller turns to the preset temperature registration mode. The main display flashes - - - -. ⇒ The sub display shows P.tnP. • Proceed to Step 6 and register temperatures.
(When the registered temperatures are already 10)  	⇒ The controller turns to the preset temperature overwriting mode. The main display flashes a registered temperature. ⇒ The sub display shows FuLL (full).

Indication after Step/Step Procedure	Explanation
4. (When the registered temperatures are less than 9)	• Skip this step.
(When the registered temperatures are already 10.) Push either the ▼ key or the ▲ key.  Ex: a temperature can be overwritten	• Push either the ▼ key or the ▲ key to flash a temperature that can be overwritten on the main display. Ex: In the example on the left, 50°C was selected as a temperature to be overwritten.
5. (When the registered temperatures are less than 9)	• Skip this step.
(When the registered temperatures are already 10.) Push the **ENTER** key.  	• Push the **ENTER** key. ⇒ The controller turns to the present temperature registration mode. The main display flashes - - - -. ⇒ The sub display shows PtnP.
6. Push either the ▼ key or the ▲ key.  Ex. registering 56°C	• Push either the ▼ key or the ▲ key to flash a temperature to be registered on the main display. In the example on the left, 56°C is registered.
7. Push the **ENTER** key.	• Push the **ENTER** key. ⇒ The displays return to the screen shown just before you have pushed the **MODE** key, that is before Step (1). **All these steps are for the registration of preset temperatures.**

Loading a Preset Temperature

You can load a preset temperature and use it as a desired temperature for the fixed temperature operation.

Indication after Step/Step Procedure	Explanation
1. Loading a preset temperature for the fixed temperature operation. Push both the ▼key and the ▲ key simultaneously for more than 1 second.  Ex. a measured temperature of 25℃ Ex. a registered preset temperature of 10℃	• Push both the ▼key and the ▲ key simultaneously for more than 1 second. ⇒ The controller turns to the preset temperature loading mode. The sub display flashes a registered temperature.
2. Push either the ▼ key or the ▲ key.  Ex. loading 37℃	• Push either the ▼key or the ▲ key to flash a temperature to be loaded on the sub display. In the example on the left, 37°C is loaded.
3. Push the **ENTER** key  	• Push the **ENTER** key. ⇒ HC200 starts the fixed temperature operation toward the loaded temperature.

Canceling to Load a Preset Temperature

You can cancel loading a preset temperature before pushing the **ENTER** key. Follow the procedure below. After the cancellation, the displays return to the previous screens in about 1 minute even without pushing the **ENTER** key again.

Indication after Step/Step Procedure	Explanation
Temperature setting mode before loading a preset temperature. Push both the ▼key and the ▲ key simultaneously for more than 1 second.	• When you want to cancel a registered preset temperature after loading, push both the ▼key and the ▲ key simultaneously for more than 1 second. ⇒ The controller returns to the temperature setting mode before your loading action.

Resume Function

If a blackout occurs, which includes a instantaneous blackout, during the quick auto-stop operation and the program operation, the resume function works to bring HC200 to the specified state after the power restoration.

If a blackout occurs during the fixed temperature, HC200 goes on running in the condition before a blackout in spite of the setting of the resume function after the power restoration.

⇒ When shipping from the factory, the resume function is set to ON.

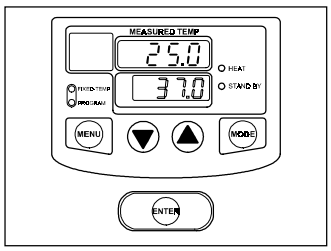
When the setting of the resume function is set to off:
If a blackout occurs, which includes a instantaneous blackout, HC200 is in the standby condition after the power restoration.

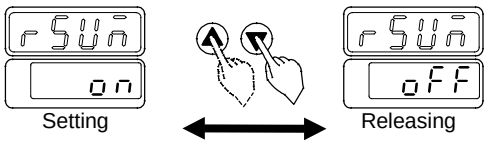
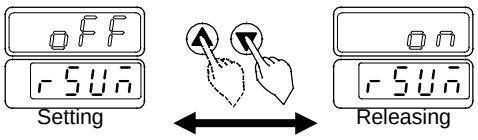
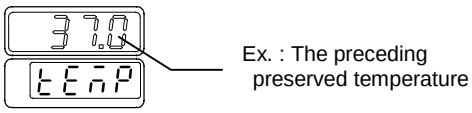
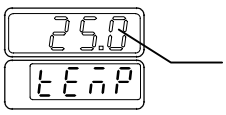
When the setting of the resume function is set to on:
If a blackout occurs, which includes a instantaneous blackout, HC200 resumes the operation after the power restoration.

- **If a blackout occurs during the quick auto-stop operation:**
  HC200 starts the quick auto-stop operation from the first in the same conditions as before having a blackout. In this case, HC200 does not run at the preserved temperature set by using the resume function but the temperature set before having a blackout. The auto-stop time after the power restoration does not include a lapse of the operation time before having a blackout and during a blackout. HC200 starts to run from the first at a period of auto-stop time set before having a blackout.
- **If a blackout occurs during the program operation:**
  After the power restored, HC200 automatically changes over from the program operation to the fixed temperature operation at the preserved temperature set by using the resume function. In this case, the progress of the program operation and a lapse of time during a blackout are canceled.

⇒ When shipping from the factory, the preserved temperature is set to 0°C .

The behavior after turning on the power switch

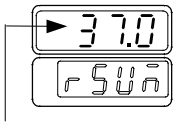
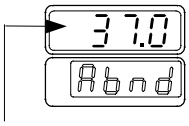
Indication after Step/Step Procedure	Explanation
Turn on the power switch  	**There are three behaviors below after turning on the power switch.** • When running at the first time after delivery / When running after putting HC200 to a stop by using the abort function / If a blackout occurs during the program operation and quick auto-stop operation without activating the resume function: (rSUn has been set to off) ⇒ After turned on the power switch, HC200 is in the standby state of the fixed temperature operation and the main display shows the present measured temperature and the sub display flashes the preset temperature. ⇒ The STANDBY lamp lights up and the FIXED TEMP lamp starts flashing. • If a blackout occurs during the fixed temperature operation: ⇒ After turned on the power switch, HC200 goes on running in the condition before a blackout and the main display shows the present measured temperature and the sub display flashes the preset temperature. ⇒ The FIXED TEMP lamp lights up and HC200 starts the fixed temperature operation toward the preceding set temperature. • If a blackout occurs during the program operation and quick auto-stop operation when the resume function is in activity: (rSUn has been set to on) ⇒ After the power restored, HC200 automatically changes over from the ongoing operation to the fixed temperature operation at the preserved temperature. ⇒ In case of the quick auto-stop operation, HC200 starts from the first in the same conditions as before having a blackout. ⇒ The main display shows the present measured temperature and the sub display flashes rSUn. ⇒ The PROGRAM lamp lights up. ! When changing to the fixed temperature operation, bring HC200 to the standby state by pushing the MENU key.

Indication after Step/Step Procedure	Explanation
1. Select "Resume" selection mode  Select the corresponding function. See "Menu Functions" on page 21.	• Select "Resume" selection mode by pressing the **MODE** key. ⇒ The sub display shows the present state of the resume function. ⇒ When the resume function is in inactivity it shows oFF. ⇒ When the resume function is in activity, it shows on.
2. Push the **ENTER** key  	• Push the **ENTER** key. ⇒ T The controller turns to the resume function setting / releasing mode. ⇒ The sub display shows rSUn.
3. Push either the ▼ key or the ▲ key.  	• Set to on when you activate the resume function and set to oFF when you inactivate the resume function. • When pushed either the ▲ key or the ▼ key, the main display flashes on and oFF alternately.
4. Push the **ENTER** key (When set the resume function)  Ex. : The preceding preserved temperature (When released the resume) The display returns to the screen shown just before you have pushed the **MODE** key	• Push the **ENTER** key. ⇒ When set the resume function: The main display shows the preceding preserved temperature. The sub display flashes tEnP. ⇒ When released the resume function: The display returns to the screen shown just before you have pushed the MODE key.
When you set the resume function:	
5. Push either the ▼ key or the ▲ key.  Ex. :The preserved temperature you need	• Push either the ▼ key or the ▲ key until the flashing value on the sub display reaches your desired temperature. In the example shown on the left, the preserved temperature is set to 25°C.
6. Push the **ENTER** key The display returns to the screen shown just before you have pushed the **MODE** key	• Push the **ENTER** key. ⇒ The display returns to the screen shown just before you have pushed the MODE key.

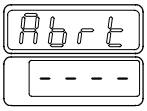
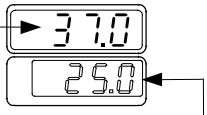
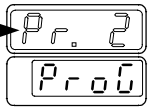
How to release from the state after the power restoration

If a blackout, which includes a instantaneous blackout, occurs during the quick auto-stop operation and the program operation with the resume function activated, in case of the quick auto-stop operation, HC200 starts the quick auto-stop operation from the first and in case of the program operation, HC200 runs the fixed temperature operation at the preserved temperature.

When you select the operation mode again in this state, you need HC200 released from the state after the power restoration by operating below. Note that you can not release HC200 from the present state if you only turn off and on the power switch. Because, to turn off the power switch makes the controller recognized that it is in a blackout.

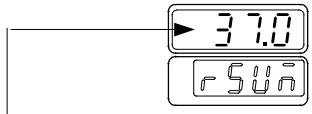
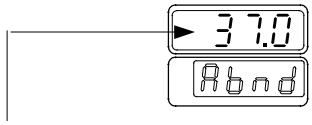
Indication after Step/Step Procedure	Explanation
The display after the power restoration when the resume function has been set to on  Ex. ;The temperature in the chamber>  Ex.;The temperature in the chamber	• When the power restored, the display shown on the left appears when the resume function has been set to on.

There are three ways to release from the above state.

Indication after Step/Step Procedure	Explanation
1. Use the abort function  Press the **MODE** key and push either the ▲ key or the ▼ key	• Press the **MODE** key and push either the ▲ key or the ▼ key until Abrt appears on the main display. • Then press the **ENTER** key.
2. Per form the fixed temperature operation  The preceding set temperature in the fixed temperature operation Press **MENU** key and change to the fixed temperature operation and then press **ENTER** key. Ex. ;The temperature in the chamber>	• Change to the fixed temperature operation mode by pushing the MENU key and press the **ENTER** key. When once you change to the program operation, HC200 can release from the state after the power restoration.
3. Per form the program operation  Ex. ;Select the program #2 Select the program number you need by pushing either the ▲ key or the ▼ key and press the **ENTER** key	• Select the program number you need by pushing either the ▲ key or the ▼ key and press the **ENTER** key. • The program operation that you have selected starts from the first.

The display after the power restoration when the resume function is in activity.

If a blackout, which includes a instantaneous blackout, occurs during the quick auto-stop operation and the program operation when the resume function has been set to on, after the power restored, the sub display flashes the information of having a blackout after the quick auto-stop operation or during the program operation. If you turn off and on the power switch (circuit breaker) during the quick auto-stop operation or the program operation, the same screen appears.

Indication after Step/Step Procedure	Explanation
In case that a blackout occurs during the quick auto-stop operation or the quick auto-stop operation and then HC200 goes on running the operation after the power restoration / In case that a blackout occurs during the program operation and then HC200 goes on running the fixed temperature operation at the preserved temperature after the power restoration  <Ex. ; The measured temperature in the chamber>	• The sub display flashes rSUn whatever the screen has appeared on it. During the quick auto-stop operation, you can switch the screen on the sub display from rSUn to the preset temperature or the remaining time before the operation stop by using the sub display screen switching function.(d ,SP) • You can also select and set the other function modes during the quick auto-stop operation or the program operation.
In case that a blackout occurs during the quick auto-stop operation and then the quick auto-stop operation has come to an end after the power restoration  <Ex. ; The measured temperature in the chamber>	• Ordinarily, the sub display flashes End when finished the quick auto-stop operation. However, if a blackout occurs during the operation, the sub display flashes Abnd (Abnormal end) • You can select and set the function modes other than d ,SP mode.

Program Composition

One program is composed of segments and a repeat command. Each segment comprises ramp time, ramp level, soak time, and end segment. On the other hand, a repeat command comprises repeat start segment and repeat frequency.

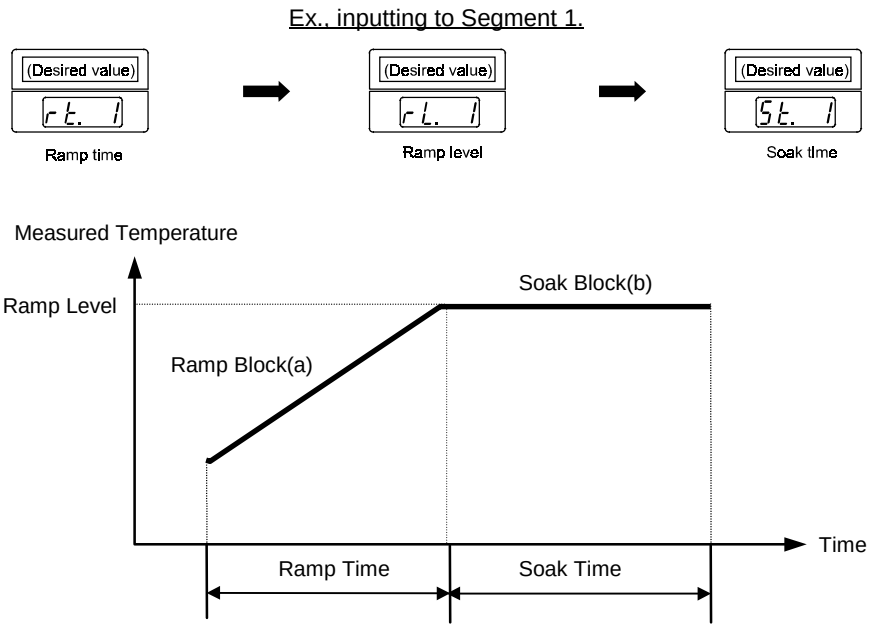
Contents of a Segment

Components of a Segment

- A program is composed of segments, and the pattern of each segment is set by the following 3 elements.
  1. Ramp level : Desired set temperature
  2. Ramp time : Time required to reach the ramp level
  3. Soak time : Holding time of the ramp level

- In ramp Operation (See Figure 1)
  1. In the ramp block (a), HC200 conducts the ramp operation for the specified ramp time toward a temperature set on the ramp level.
  2. In the soak block (b), HC200 holds the temperature set on the ramp level for the specified soak time.

⇒ Follow the procedure below for setting the parameters. (See “Inputting a Program” on page 39.)

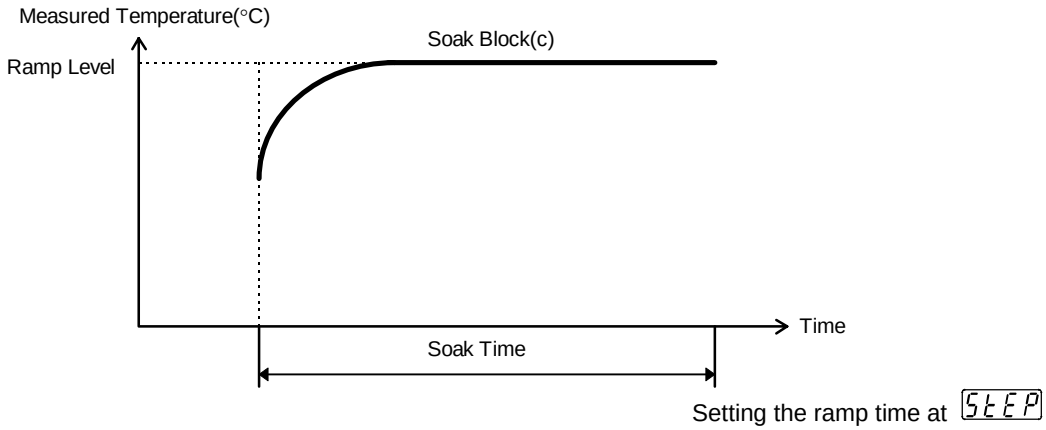


(Fig. 1: Schematic of a Segment in Ramp Operation)

Contents of a Segment

- Not in Ramp Operation (See Figure 2).

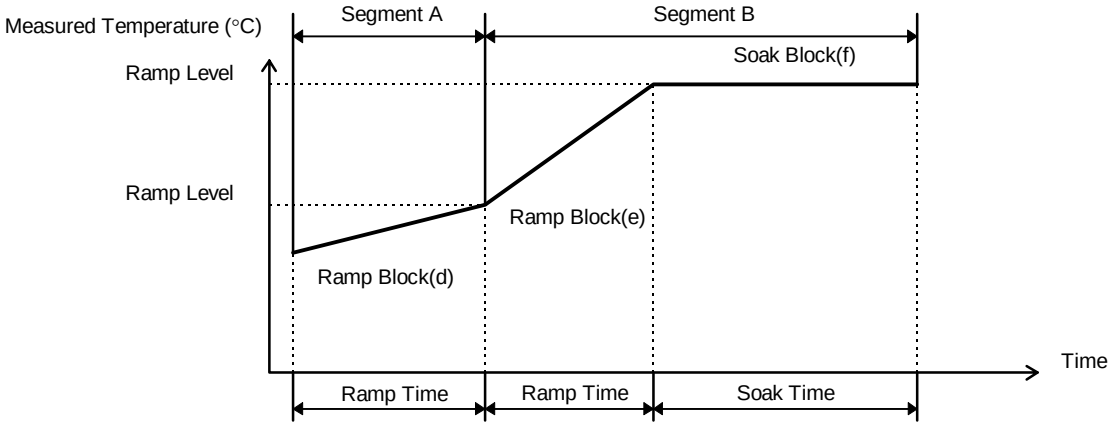
  1. When you want to achieve the ramp level in a ramp block as soon as possible, set the ramp time at STEP



(Fig. 2: Schematic of a Segment Not in Ramp Operation)

- Combining Ramp Operation (See Figure 3.)

  1. When you want to continue more than two ramp operations of different constant ratios, set the soak time of the preceding segment (Segment A) at 0 (zero) to eliminate its soak block.



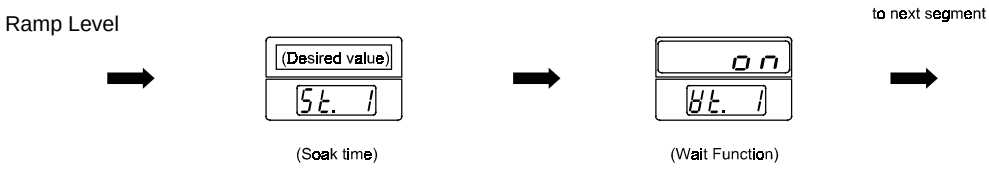
(Fig. 3: Schematic of Combining Segments in Ramp Operations)

Contents of a Segment

- Other Elements relating to Segment

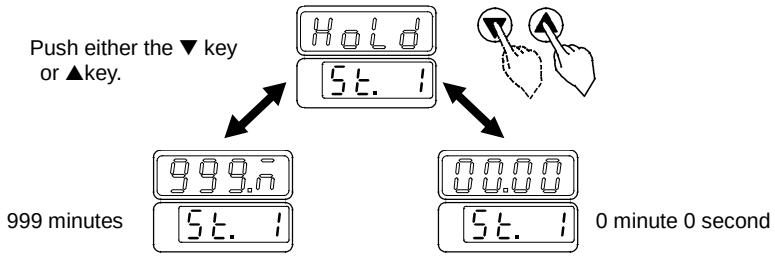
1. Wait Function (See the following example for setting the wait function).
   If unexpected additional load or disturbance prevents measured temperatures from reaching the desired temperature, this function keeps the operation in a block until the desired temperature is achieved. After inputting the soak time, set ON or OFF.
2. End Segment
   At the end of inputting a new program, set End in the ramp time of the last segment. When you have composed a program up to the fifth segment, you do not need to set End

Turning ON the wait function



3. Hold
   If you set HoLd in the soak time, the controller holds the desired temperature (ramp level) and closes the program input mode.
   If HoLd is set, the holding time between 0 minute 0 second and 999 minutes flashes when you select the soak time.

Indication when you have selected "Hold."



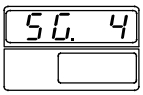
! Be aware that this is different from the temperature holding function in the function menu.

Contents of a Segment

Contents of a Repeat Command

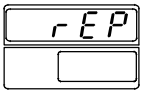
- Composition of a Repeat Command
  With the repeat command, you can repeat a series of segments as many times as you like. This command is composed of repeat start segment and repeat frequency.

1. Repeat Start Segment
   In the segment input mode, input the segment number from which you want to repeat the cycle. The controller repeats the cycle from your desired start segment to the segment immediately before the repeat start segment. (See example below for inputting the repeat command.)



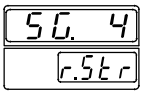
Example of the segment input mode.

Push either the ▼ key or ▲key



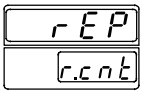
Example of the repeat command input mode.

Push the **ENTER** key.



Example of the repeat start segment number setting mode.

After selecting by the ▼ key or ▲key, push the **ENTER** key.



Example of the repeat frequency setting mode.

After selecting by the ▼ key or ▲key, push the **ENTER** key.

3. Repeat Frequency
   You can set any frequency in a range from 1 to 999 cycles. If you want to continue the repeat operation indefinitely, set the repeat frequency at 0 (zero). If this is the case, the controller closes the program input mode.

! You cannot repeat the segments that you have set after inputting the repeat command.

! You cannot set a repeat command within the repeat block or link repeat commands.

This paragraph discusses how to input a program. See Figure 4.

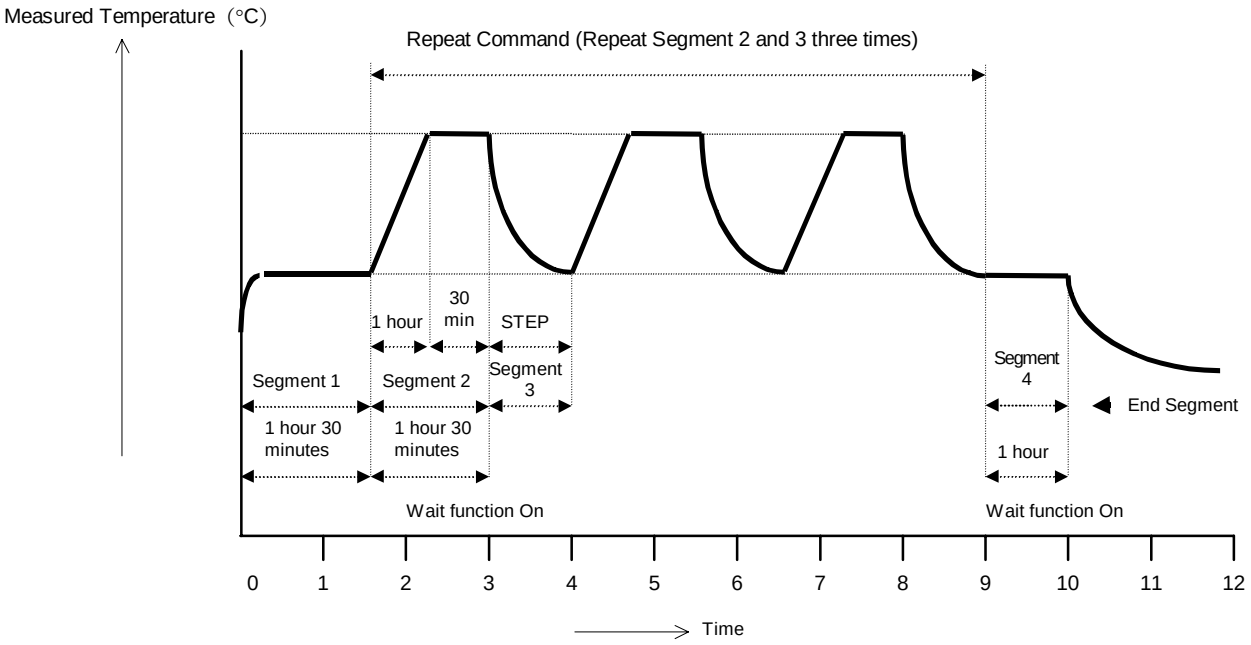
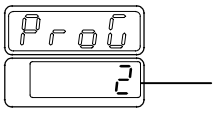
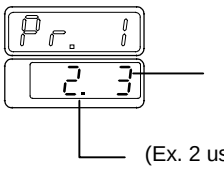
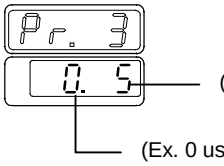
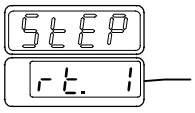
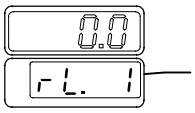
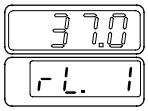
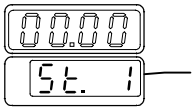
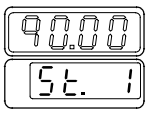
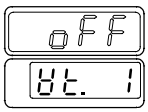
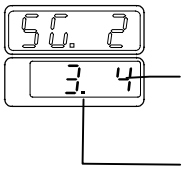
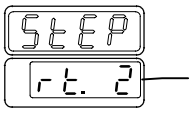
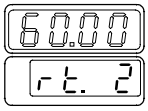
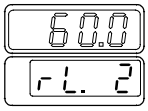
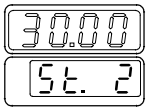
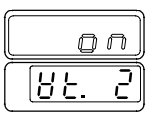
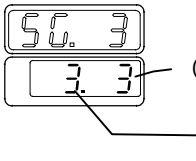
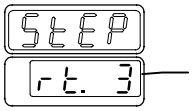
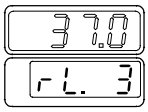
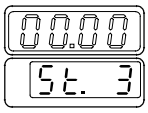
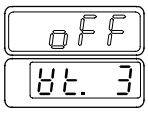
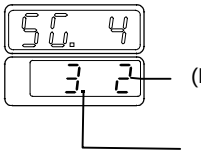
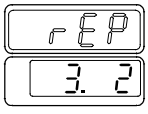
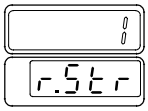


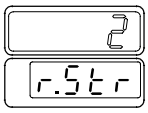
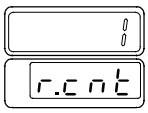
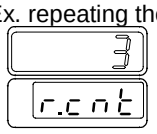
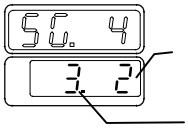
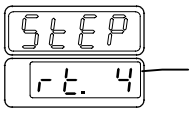
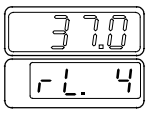
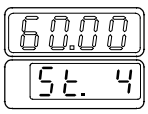
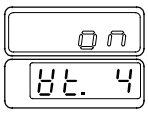
Fig. 4 : Inputting a Program

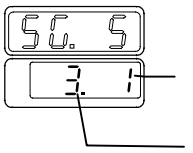
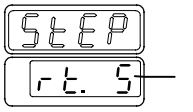
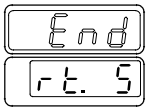
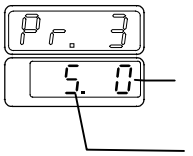
Indication after Step/Step Procedure	Explanation
Setting a Program Number	
1. Push either the ▼ key or the ▲ key after pushing the **MODE** key.  (Ex. 2 programs registered)	• Push the **MODE** key to activate the function selection mode, and push either the ▼ key or the ▲key. ⇒ The controller turns to the program input selection mode. The main display flashes ProG. ⇒ The sub display shows the number of registered programs.
2. Push the **ENTER** key  (Ex. 3 unused segments) (Ex. 2 used segments)	• Push the **ENTER** key. ⇒ The controller turns to the program inputting/editing mode. The main display flashes Pr. 1. ⇒ On the sub display, the left two digits show the number of used segments and the right two digits show the number of unused segments.
3. Push the ▲ key. Ex. Inputting into Program 3  (Ex. 5 unused segments) (Ex. 0 used segments)	• Push the ▲ key to show Pr. 3 (Program 3.). ⇒ Program 3 has not been programmed. On the sub display, the left two digits show 0 (zero) (no used segment) and the right two digits show 5 (the maximum number of available segments).

Indication after Step/Step Procedure	Explanation
Setting Segment 1	
4. Push the **ENTER** key Ex., inputting the step operation  (Ex. Ramp Time of segment 1)	• Push the **ENTER** key. The controller turns to the program input mode for Pr. 3. ⇒ The sub display shows rt. 1 requesting for input of the Ramp Time 1. ⇒ When you input a new program, the main display flashes StEP. ! In Figure 4, no step operation is designed in Segment 1. Accept StEP without change.
5. Push the **ENTER** key  (Ramp Level of Segment 1)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Ramp Time 1. ⇒ The sub display shows rt. 1 requesting for input of the Ramp Level 1. ⇒ When you input a new program, the main display flashes 0.0.
6. Push either the ▼ key or the ▲key. Ex., setting 37°C.  	• Push either the ▼ key or the ▲key to show 37°C on the main display.
7. Push the **ENTER** key  (Ex. Soak Time of segment 1)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Ramp Level 1. ⇒ The sub display shows St. 1 requesting for input of the Soak Time 1. ⇒ When you input a new program, the main display flashes 00.00.
8. Push either the ▼ key or the ▲key. Ex., Setting 1 hour 30 minutes.  	• Push either the▼ key or the ▲key to show 1 hour 30 minutes on the main display.
9. Push the **ENTER** key  	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Soak Time 1. ⇒ The sub display shows Wt. 1 requesting for input of the Wait Time 1. ⇒ When you input a new program, the main display flashes oFF. ! In Figure 4, the Soak Time includes the heating time. Turn off the Wait Function.

Indication after Step/Step Procedure	Explanation
Setting Segment 2	
10. Push the **ENTER** key Ex. inputting a constant ratio ramp operation.  (The number of unused segments) (The program number that you are working on.)	• Push the **ENTER** key. The controller turns to the program input mode for Pr. 3. ⇒ Pushing the **ENTER** key accepts the parameters of Segment 1 and activates the input mode of Segment 2. ⇒ The main display flashes SG. 2 (Segment 2), indicating that the controller is ready for input of Segment 2. ⇒ On the sub display, the left two digits show the program number that you are working on and the right two digits show the number of available segments.
11. Push the **ENTER** key  (Ramp time of Segment 2)	• Push the **ENTER** key. ⇒ The sub display shows rt. 2 requesting for input of the Ramp Time 2. ⇒ The main display flashes STEP. ! In Figure 4, Segment 2 is designed for the step operation. Set a desired value in the same manner as Segment 1.
In the same manner as Segment 1, input the ramp time, ramp level, soak time and wait function.	
12. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. inputting 1 hour)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Ramp Time 2.
13. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. inputting 60℃)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Ramp Level 2.
14. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. inputting 30 minutes)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Soak time 2.
15. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. turning ON the wait function)	• After selecting On of the wait function by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key turns on the wait function of Segment 2.

Indication after Step/Step Procedure	Explanation
Setting Segment 3	
16. Push the **ENTER** key  (Ex. The number of unused segments) (The program number that you are working on.)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the parameters of Segment 2 and activates the input mode of Segment 3.
17. Push the **ENTER** key  (Ex. Ramp Time of Segment 3)	• Push the **ENTER** key. ⇒ In Figure 4, Segment 3 is designed for the ramp operation. Accept STEP without change. ⇒ Pushing the **ENTER** key sets Ramp Time 3.
In the same manner as Segment 1, input the ramp time, ramp level, soak time and wait function.	
18. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. inputting 37°C)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Ramp Level 3.
19. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex., inputting 0 hour 0 minute)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Soak Time 3.
20. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. turning OFF the wait function)	• After selecting OFF of the wait function by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key turns off the wait function of Segment 3.
Setting a Repeat Command	
21.  (Ex. The number of unused segments) (The program number that you are working on.)	• Once the controller accepts the parameters of Segment 3, it is ready for input of Segment 4. ! Push the ▼ key or the ▲key to switch to the repeat command input mode.
22. Push either the ▼ key or the ▲key. 	• Push either the ▼ key or the ▲key to flash rEP (Repeat) on the main display. ⇒ The controller turns to the repeat command input mode.
23. Push the **ENTER** key. 	• Push the **ENTER** key. ⇒ The sub display shows r.Str (repeat start), requesting for input of the segment number that the repeat should start from. ⇒ The main display flashes the lowest number of the segments.

Indication after Step/Step Procedure	Explanation
24. Push either the ▼ key or the ▲key. (Ex. repeating a cycle from Segment 2) 	• Push either the ▼ key or the ▲key to show “2” (Segment 2) on the main display.
25. Push the **ENTER** key. 	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the segment number that the repeat should start from. ⇒ The sub display shows r.cnt (Repeat Count), requesting for input of the number of repeat cycles. ⇒ When you input a new program, the main display flashes 1.
26. Push either the ▼ key or the ▲key. (Ex. repeating the segments 3 times.) 	• Push either the ▼ key or the ▲key to show “3” (the number of repeat cycles) on the main display.
Setting Segment 4	
27. Push the **ENTER** key  (Ex. The number of unused segments) (The program number that you are working on.)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the number of repeat cycles and the parameters of the repeat command. ⇒ The displays return to the input mode of Segment 4 just before the repeat command.
28. Push the **ENTER** key  (Ex. Ramp Time of Segment 4)	• Push the **ENTER** key. ! In Figure 4, Segment 4 is not designed for the step operation. Accept StEP without change. ⇒ Pushing the **ENTER** key accepts the Ramp Time 4.
In the same manner as Segment 1, input the ramp time, ramp level, soak time and wait function.	
29. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex. inputting 37°C)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets the Ramp Level 4.
30. Push the **ENTER** key after selecting a value by the ▼ key or the ▲key.  (Ex., inputting 1 hour)	• After selecting your desired value by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key sets Soak Time 4.
31. Push the **ENTER** key after selecting ON or OFF by the ▼ key or the ▲key.  (Ex. turning ON the wait function)	• After selecting ON of the wait function by pushing the ▼ key or the ▲key, push the **ENTER** key. ⇒ Pushing the **ENTER** key turns on the wait function of Segment 4.

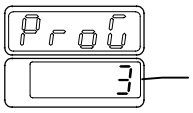
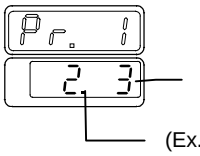
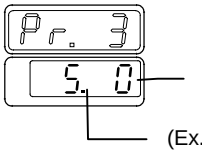
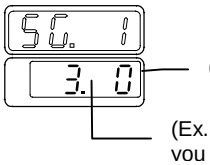
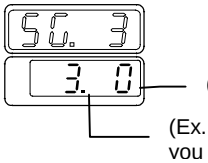
Indication after Step/Step Procedure	Explanation
Setting an End Segment	
32.  (Ex. The number of unused segments) (The program number that you are working on.)	• Once the controller accepts the parameters of segment 4, it is ready for input of segment 5.
33. Push the **ENTER** key.  (Ramp time of segment 5)	• Push the **ENTER** key. ⇒ The sub display shows rt. 5 requesting for input of Ramp Time 5. ! Push either ▼ key or ▲ key, push ENTER key to set the controller on the end segment input mode.
34. Push ENTER key after selecting ON or OFF by ▼ key or ▲ key.  	• Push either ▼ key or ▲ key to flash End on the main display. ⇒ The controller turns to the end segment input mode.
35. Push the **ENTER** key.  (Ex. The number of unused segments) (Ex. The number of the used segment 5)	• Push the **ENTER** key. ⇒ Pushing ENTER key accepts the end segment and completes setting all the parameters of Program 3. ⇒ The displays return to the screens of the program input mode.

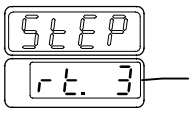
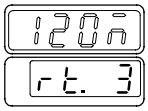
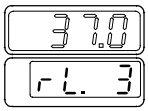
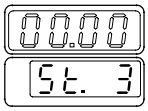
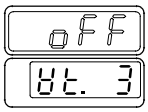
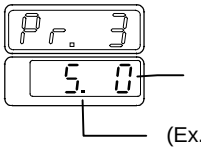
Editing a Program

With the program edit function, you can edit the registered ramp time, ramp level, soak time, wait function, repeat start segment and the number of repeat cycles on the segment basis.

CAUTION : You cannot delete the registered segments or the repeat command and insert new segments or a repeat command.

Based on Figure 4 of "Inputting a Program," this paragraph discusses how to edit Segment 3 from the step operation to the constant ratio ramp operation.

Indication after Step/Step Procedure	Explanation
1. Load the program number that you want to edit. Push either the ▼ key or the ▲ key after pushing the **MODE** key.  (Ex . 3 Programs registered)	• Push the **MODE** key to activate the function selection mode, and push either the ▼ key or the ▲ key. ⇒ The controller turns to the program input selection mode. The main display flashes PrOG.
2. Push the **ENTER** key  (Ex. 3 unused segments) (Ex. 2 used segments)	• Push the **ENTER** key. ⇒ The controller turns to the program input/edit mode. The main display flashes Pr. 1.
3. Push the ▲ key Ex., Editing Program 3  (Ex, 0 unused segments) (Ex. 5 used segments)	• Push the ▲ key to flash the program number that you want to edit on the main display (Pr. 3 in this example). ⇒ On the sub display, the left two digits show the number of used segments while the right two digits show the number of unused segments.
4. Push the **ENTER** key  (Ex. 0 unused segments) (Ex., the program number that you are working on)	• Push the **ENTER** key. ⇒ The main display flashes the first registered segment number of Program 3. ⇒ On the sub display, the left digit shows the program number that you are working on, and the right digit shows the number of unused segments.
5. Push the ▲ key Load Segment 3  (Ex, 0 unused segments) (Ex., the program number that you are working on)	• Push the ▲ key to flash the segment number that you want to edit on the main display (SG. 3 in this example).

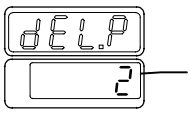
Indication after Step/Step Procedure	Explanation
Editing Segment 3	
6. Push the **ENTER** key  (Ramp time of segment 3)	• Push the **ENTER** key. ⇒ The displays show that the ramp time of Segment 3 is set for the step operation.
7. Push either the ▼ key or the ▲ key.  (Ex. inputting 2 hours)	• Push either the ▼ key or the ▲ key to set your desired time. ⇒ This setting changes Segment 3 from the step operation to the ramp operation.
8. Push the **ENTER** key.  (Ex., inputting 37℃)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the edited ramp time of Segment 3. ⇒ Left indication requests for input of the ramp level. As you do not need to edit the ramp level of Segment 3, push the **ENTER** key to accept the existing value.
9. Push the **ENTER** key.  (Ex. inputting 0 minute 0 second)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the existing ramp level of Segment 3. ⇒ The example on the left requests for the input of the soak time. As you do not need to edit the soak time of segment 3, push the **ENTER** key to accept the existing value.
10. Push the **ENTER** key.  (Ex., turning OFF the wait function)	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the existing soak time of Segment 3. ⇒ Left indication requests for turning on or off the wait function. As you do not need to turn on the function, push the **ENTER** key to accept the existing status.
11.  (Ex, 0 unused segments) (Ex. 5 used segments) Leave the displays for more than 1 minute . . . The displays return to the screens shown just before you have pushed the **MODE** key.	• Push the **ENTER** key. ⇒ Pushing the **ENTER** key accepts the set wait function of Segment 3. ⇒ When you finish editing a segment, the controller returns to the program edit mode. If you leave the controller for more than 1 minute, the displays return to the screens shown just before you have pushed the **MODE** key.

Deleting a Program

With the program edit function, you can delete the registered programs by their number.

CAUTION : With this function, you cannot check the parameters of the program that you are going to delete.

As an example, this paragraph discusses how to delete Program 1.

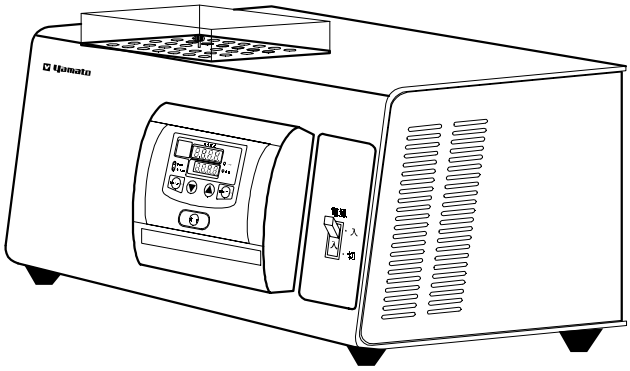
Indication after Step/Step Procedure	Explanation
Load the program number that you want to delete.	
1. Push either the ▼ key or the ▲ key after pushing the **MODE** key.  (Ex., 2 programs existing)	• Push the **MODE** key to activate the function selection mode, and push either the ▼ key or the ▲key. ⇒ The controller turns to the program delete selection mode. The main display flashes dEL.P. ⇒ The sub display shows the number of existing programs.
2. Push the **ENTER** key.  	• Push the **ENTER** key. ⇒ The controller turns to the program delete selection mode. The main display flashes the lowest program number registered. In the example on the left, the main display shows Pr. 1 (Program 1). ⇒ The sub display shows dEL.P.
3. Push the **ENTER** key. The display returns to the screens shown just before you have pushed the **MODE** key.	• Push the ▼ key to flash the program number that you want to delete, and push the **ENTER** key to accept your selection. ⇒ As you are going to delete Program 1 in this example, simply push the **ENTER** key. ⇒ The controller deletes Program 1, and the displays return to the screens shown just before you have pushed the **MODE** key.

Daily Inspection and Maintenance

⚠ Warning

Do not disassemble and modify.

- Do not disassemble HC200. There are parts in the unit with high voltage; therefore, if the unit is disassembled, electric shock and injury may result.
  Ask the Yamato Scientific office for inspection, adjustment, and repair of the inside of the unit.
- Unauthorized modification will be hazardous and cause problems in the operation of HC200.



⚠ Caution

Maintenance

- Before starting inspection or maintenance, turn off the power switch, and disconnect the power plug from the receptacle.
- Conduct inspection and maintenance only after an aluminum brook has cooled down.

Long Storage and Disposal

When you do not use HC200 for a long period of time.

- Turn off the power switch, and disconnect the power plug from the receptacle.

When you dispose of HC200.

- Do not leave it where children can access.

If you have any questions, contact our sales representative in your vicinity or our service office.

If a Service Call is required:

If a Service Call is required

- If a problem occurs with HC200, record the error code on the display and stop the operation immediately, turn off the power switch, and disconnect the power plug from the receptacle. Contact our sales or service representative.
- Check the warranty card or the name plate of your HC200 and give us the information below.
  - ■ Name of the product;
  - ■ Serial product number of the product;
  - ■ Date of purchase;
  - ■ Problem with the product (as detailed as possible).

Warranty Card (attached to your HC200)

- Please fill out completely and return the bottom portion of the warranty card when the unit is received. The completed top portion is your Registration Card that should be retained for your records.
- Warranty period is one (1) year after the date of your purchase. During this warranty period, we will offer free repair service on the basis of the conditions provided on the warranty card.
- If you need repair service after expiration of the warranty period, contact our sales or service representative in your vicinity or service office for advice.

Minimum Inventory Period of Repair Parts

- Repair parts will be available for at least 7 years after termination of our production of HC200. Repair parts mean the parts that are necessary to maintain the performance of HC200.

TROUBLESHOOTING

Problem	Cause/Solution
The display on the control panel is blank when the power switch is turned on.	• Check if the power cable is firmly connected to a receptacle. • Check for power failure.
Temperature fluctuates during the operation.	• Does ambient temperature fluctuate violently? • Are the specimens too many? • Is there any covering object by intake or exhaust port?
Temperature doesn't get cold.	• Is ambient temperature too high? Minimum reachable temperature is to {Room temperature - 25°C}. • Is the set temperature more than 37°C? Cooling function does not work when the set temperature is set up in more than 37°C • Are the specimens too many? • Is there any covering object by intake or exhaust port?

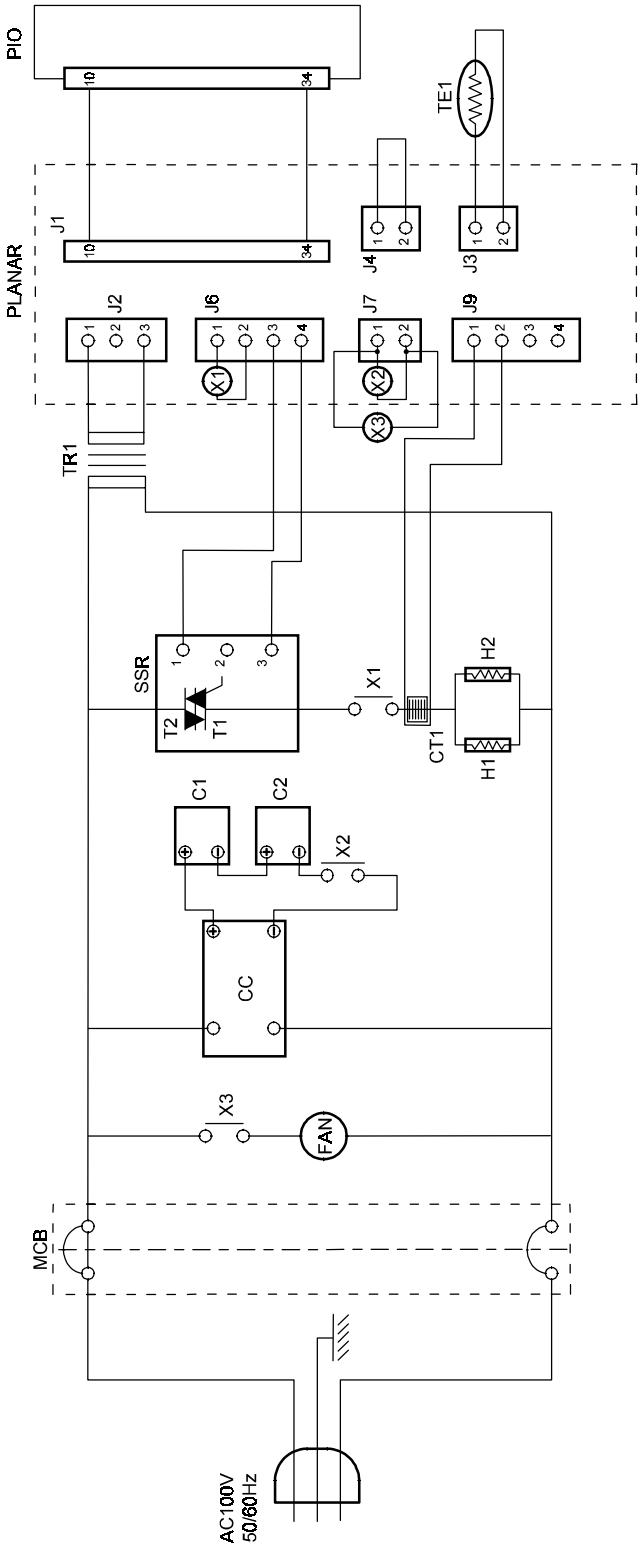
SPECIFICATIONS

Name of equipment	Cool Block
Model	HC200
Operating temperature range	0°C to 80°C (*1)
Temperature adjustment accuracy	±0.1°C (*2)
Cooing and heating system	Peltier cells and heater
Temperature control system	PID control by microcomputer
Temperature setting system	Digital setting system by ▲ and ▼ keys
Temperature indicating system	Digital display by green LED
Number of block holder	1
Internal dimensions(W x D x H mm)	112x 78 x 40
External dimensions(W x D x H mm)	375 x 210 x 160
Power supply(50/60Hz)	AC100V 3A
Weight	Approx. 7kg (included an Aluminum block)
Optional accessories	• Aluminum block (1.5ml micro tube x 20pcs.) • Aluminum block (0.5ml micro tube x 20pcs.) • Aluminum block (96-holes micro plate x 1pc.)

(*1) Less than room temperature - 25°C. When is ambient temperature more than 25°C, minimum reachable temperature is to {Room temperature - 25°C}.

(*2) Center point of an Aluminum block.

WIRING DIAGRAM



Symbol	Part Name
CT1	Current detector
MCB	Circuit breaker
H1,H2	Heater
C1,C2	Peltier cells
CC	Circuit board for peltier
FAN	Cooling fan
PIO	Display circuit board
PLANAR	Control circuit board
SSR	Solid-state relay
TR1	Transformer
TE1	Thermistor
X1,X2,X3	Relay

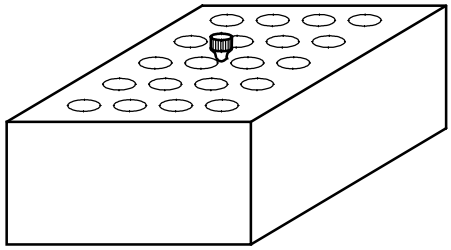
REPLACEMENT PARTS TABLE

Symbol (in wiring diagram)	Part Name	Code No.	Specifications	manufacturer
CT1	Current detector	2170010002	CLT-6-P-400	URD
MCB	Circuit Breaker	A0194	BS2021 15A	Matsushita
H1,H2	Heater	HC200H	AC100V 56W	Yamato Scientific
PIO	Display circuit board	1240000028	Model HITECH-IV_{FR} PIO-2	Yamato Scientific
PLANAR	Control circuit board	1240000035	Model HITECH-IV_{FR}	Yamato Scientific
FAN	Cooling fan	HC200FAN	MU123BA-11B	Yamato Scientific
SSR	Solid-state relay	2160000010	SSR-01	Yamato Scientific
TR1	Transformer	1013200005	for HITECH-IV_{FR}, 100V	Yamato Scientific
TE1	Thermistor	1160050010		Yamato Scientific
X1,X2,X3	Relay	2050000013	JR1aF-TM-DC6V	Matsushita
C1,C2	Peltier cells	HC200CU		Yamato Scientific
CC	Circuit board for peltier	HC200CC		Yamato Scientific

Aluminum Blocks

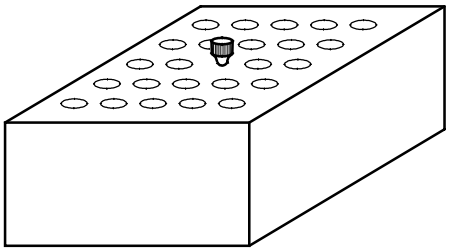
1. For a micro tube (1.5ml x 20pieces)

- 20 micro tubes of 1.5ml are able to attach.
- Diameter of the hole is 11 mm.
- When there are many specimens in the micro tube, the volume may swell if you run the unit at high temperature, and it may cause an overflow of the tubes. Make the amount of specimens little and attach it to the unit.



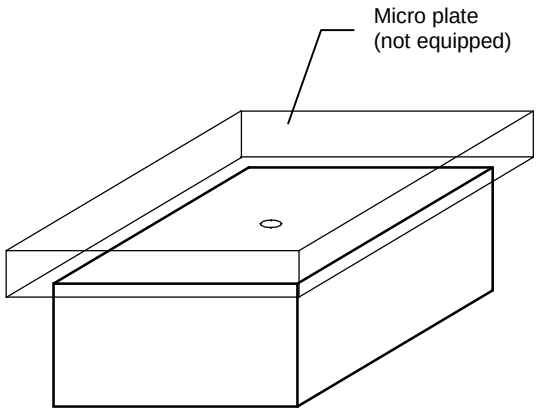
2. For a micro tube (0.5ml x 20pieces)

- 20 micro tubes of 0.5ml are able to attach.
- Diameter of the hole is 8 mm.
- When there are many specimens in the micro tube, the volume may swell if you run the unit at high temperature, and it may cause an overflow of the tubes. Make the amount of specimens little and attach it to the unit.



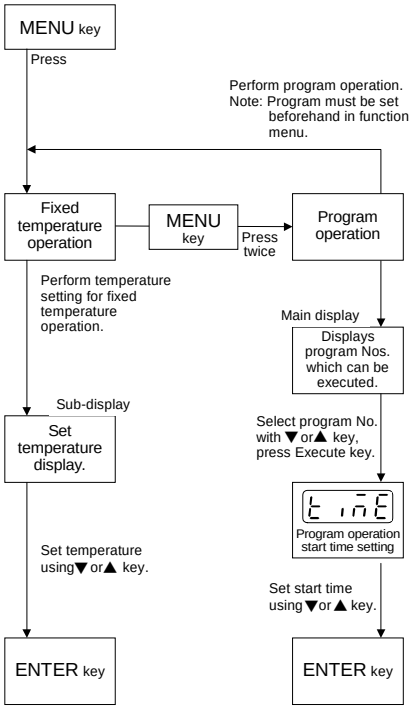
3. For a micro plate

- 1 micro plate of 96 holes is able to attach.
- When there are many specimens in the micro plate, the volume may swell if you run the unit at high temperature, and it may cause an overflow of the plate. Make the amount of specimens little and attach it to the unit.

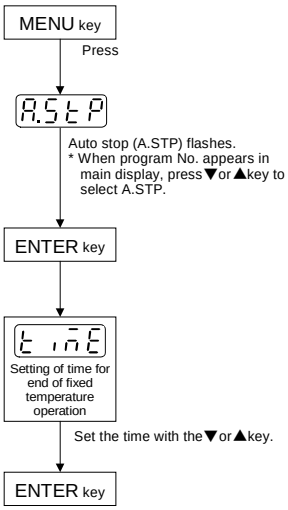


Flowchart on the Operating Procedure

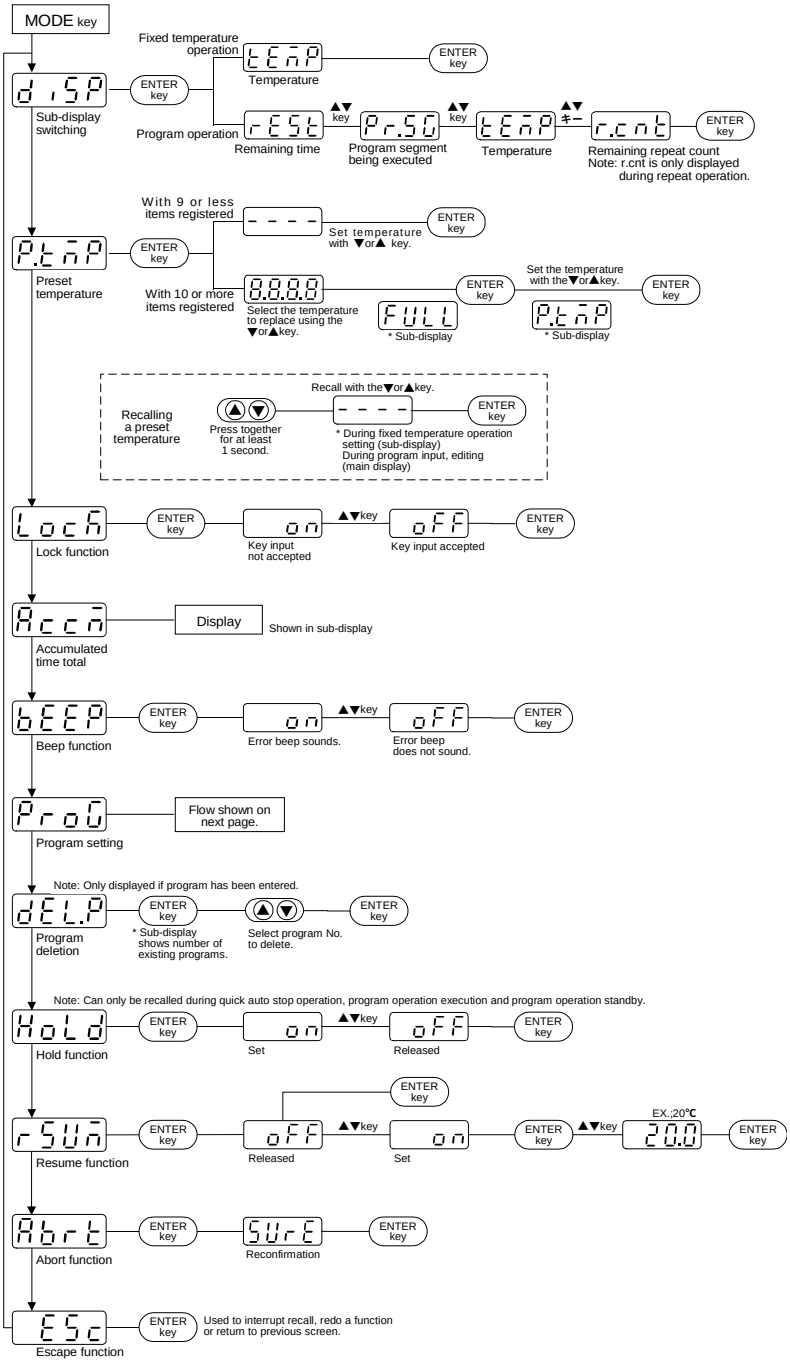
To start operation



Changing to Quick Auto Stop Operation



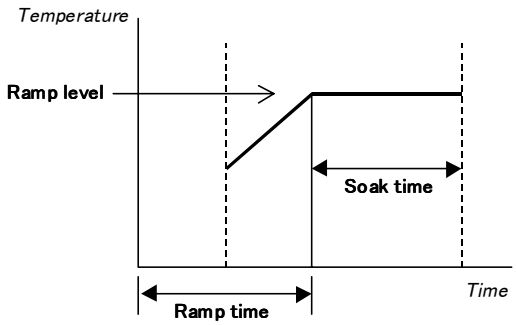
Setting and editing Menu Functions



Inputting and editing a program

Components of a Segment

A program is composed of the following elements. When you put together a program, you should input in accordance with the following procedure.



Ramp Time : [rt. 1]

Time required to reach the ramp level

Ramp Level : [rL.]

Desired set temperature

Soak Time : [St.]

Holding time of the ramp level

Wait Function : [Wt.]

Select ON or OFF.

When the wait function has been set to ON, the oven goes on running the operation until it reaches the ramp level. When the wait function has been set to OFF, the operation changes to the next segment when the ramp time is up.

Setting and editing Menu Functions

Procedure for inputting and editing a program

MODE key Press	
▲▼ Key	
[ProG]	Select and activate the program input selection mode.
ENTER key	
▲▼ Key	
[Pr. 1]	Select the program number that you want to register.
ENTER key	
▲▼ Key	
[SG. 1]	Indication of segment number. Select the segment number that you want to overwrite.
ENTER key	
▲▼ Key	
[rt. 1]	Input a ramp time. Note : Select "**StEP**" when you want to bring the oven to the ramp level in a ramp block as soon as possible.
ENTER key	
▲▼ Key	
[rL. 1]	Input a ramp level.
ENTER key	
▲▼ Key	
[St. 1]	Input a soak time. Note : Select "0" when you want to combine two ramp operations. Select "**HoLd**" when you want to hold the desired temperature (ramp level)
ENTER key	
▲▼ Key	
[Wt. 1]	Select the wait function.
ENTER key	
▲▼ Key	
[SG. 2]	The main display shows the next segment number. Note : If you want to perform the repeat operation, select "**rEP**" on the main display by pushing either the ▲key or the ▼key and select the repeat command input mode by pushing the ENTER key. After then, input a repeat start segment and a repeat frequency.
ENTER key	
▲▼ Key	
[rt. 2]	When you have composed a program, select "END" in the ramp time of your last segment and push the ENTER key.
ENTER key	
▲▼ Key	
[Pr. 1]	End of setting
ENTER key	

HC200 has the controller with the 4-digit LED display. The meaning of Character on the display is shown in the following chart.

Capital	Character	Meaning of Abbreviation	Meaning of Character on the display
A	Abnd	abnormal end	Irregular end in the quick auto-stop operation
	Abrt	abort	Forced stop function (Abort Function)
	Accn	accumulation	Integrated time
	ASTP	auto stop	Quick auto stop operation
B	bEEP	beep	Alarm sound setting mode
D	dELP	delete program	Deleting a program
	d ISP	display	Sub display switching mode
E	End	end	Setting mode for program end
	Er. ##	error ##	Error code number
	ESc	escape	Escape function mode
F	FULL	full	The number of the registered temperatures is full
H	HoLd	hold	Hold function mode
L	LocK	lock	Panel locking mode
O	oFF	off	Make a function inactive
	on	on	Make a function active
P	Pr. ##	program ##	Program number
	ProG	program	Program mode
	Pr.SG	program, segment	Ongoing program and ongoing segment
	PtmP	preset temperature	Preset temperature registration mode
R	r.cnt	repeat count	Repeat frequency setting mode
	rEP	repeat	Repeat command mode
	rESt	rest time	Rest for remaining time
	rSUn	resume	Resume function
	rL. ##	ramp level	Ramp level of Segment ##(Desired set temperature)
	r.Str	repeat start	Repeat start segment setting mode
	rt. ##	ramp time	Ramp time of Segment ## (Time required to reach the ramp level)
S	SG. ##	segment	Segment number
	St. ##	soak time	Soak time of Segment ## (Holding time of the ramp level)
	StEP	step	Full power rise/down
	SUrE	sure	Confirmation of performing the abort function
	t mE	time	Time mode
W	WAit	wait	Wait function (Keep the operation until the desired temperature is achieved)
	Wt. ##	wait ##	Wait function of Segment ##