


SINCE 1889



Vacuum Drying Oven

Model DP83C/104C

Third Edition

- Thank you for purchasing "DPC Series Vacuum Drying Oven" of Yamato Scientific America Co., Ltd.
 - To use this unit properly, read this "Instruction Manual" thoroughly before using this unit. Keep this instruction manual around this unit for referring at any time.
-  **WARNING:** Carefully read and thoroughly understand the important warning items described in this manual before using this unit.

Yamato Scientific America Inc.

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1. Cautions in using with safety


Explanation

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.

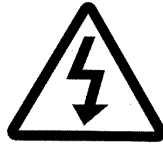
1. Cautions in using with safety

Table of Illustrated Symbols

Warning



Warning,
generally



Warning,
high voltage



Warning,
high temperature



Warning,
drive train



Warning,
explosive

Caution



Caution,
generally



Caution,
electrical shock



Caution,
scald



Caution,
no load heating



Caution,
not to leak



Caution,
water only



Caution,
deadly poison

Prohibit



Prohibit,
generally



Prohibit,
inflammable



Prohibit,
to disassemble



Prohibit,
to touch

Compulsion



Compulsion,
generally



Compulsion,
connect to the
grounding
terminal



Compulsion,
install on a flat
surface



Compulsion,
disconnect the power
plug



Compulsion,
periodical
inspection

1. Cautions in using with safety

Fundamental Matters of "WARNING!" and "CAUTION!"

Warning

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

Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result. (Refer to page 48 "13. List of Dangerous Substances".)

Always ground this unit

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

If a problem occurs

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and 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 cannot be used

Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur. (Refer to page 48 "13. List of Dangerous Substances".)

Do not touch high-temperature parts

The inside of the body or the door may become hot during and just after operation. It may cause burns.

Do not disassemble or modify this unit

Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

Caution

During a thunder storm

During a thunderstorm, 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.

2. Before using this unit

Requirements for Installation

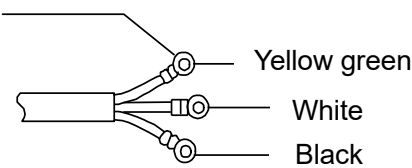
Warning

1. Always ground this unit



- In order to avoid electric shock caused by electric leakage, be sure to connect the earth wire (the green cable of power cord) to the grounding wire or ground terminal.
- This unit uses single-phase 220V power source. Please entrust your local electrical contractor for power connecting work, grounding as per electrical device technical benchmark.
- Do not connect the earth wire to gas or water pipes. If not, fire disaster may be caused.
- Do not connect the earth wire to the ground wire of telephone or lightning conductor. If not, fire disaster or electric shock may be caused.

M6 type O-terminal



- The power plug is not accessory. Please correctly connect the ground wire as per the power source device.

DP103C specification is 3-phase 480V, please connect with matched distributor

2. Choose a proper place for installation

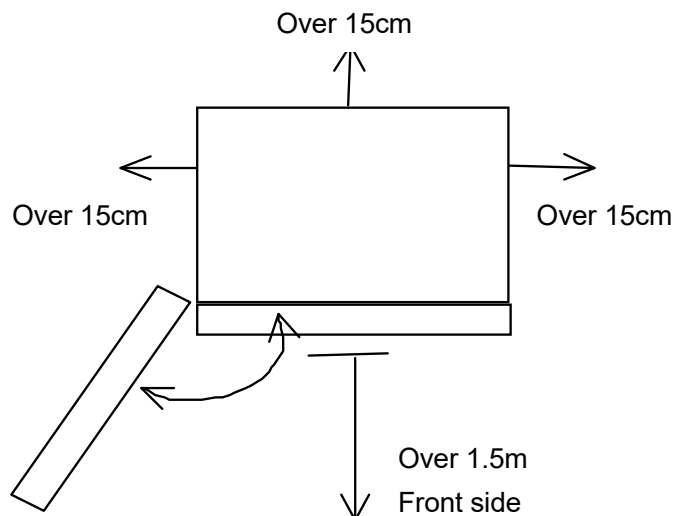


Do not install this unit at a place where:

- ◆ Rough or dirty surface.
- ◆ 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 a constant vibration.



Install this unit on a stable place with the space as shown below.



2. Before using this unit

Requirements for Installation

Warning

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

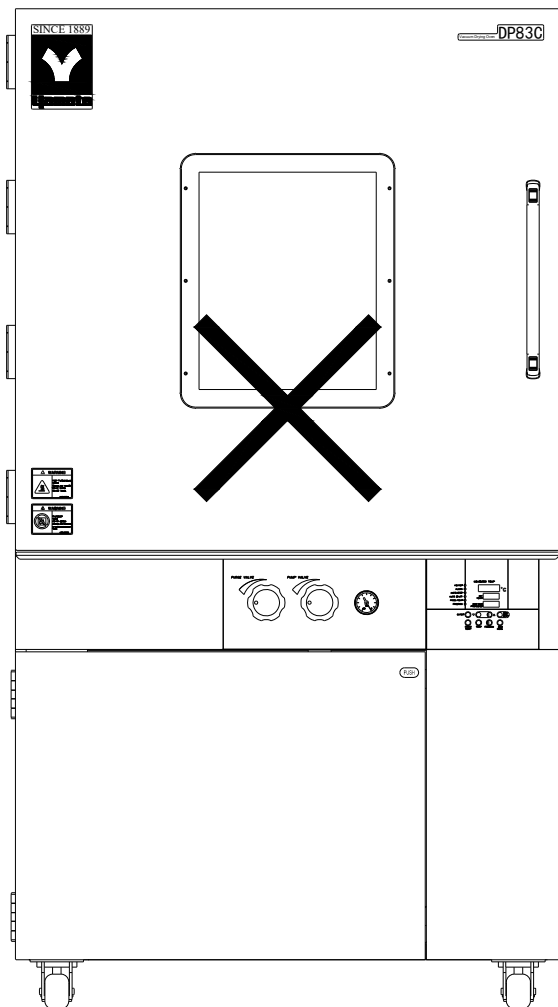
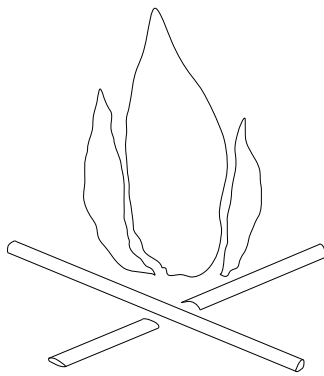
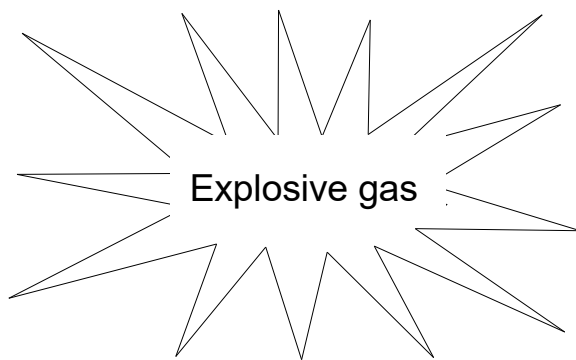
(Refer to page 48 "13. List of Dangerous Substances".)



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



fire/explosion may result.




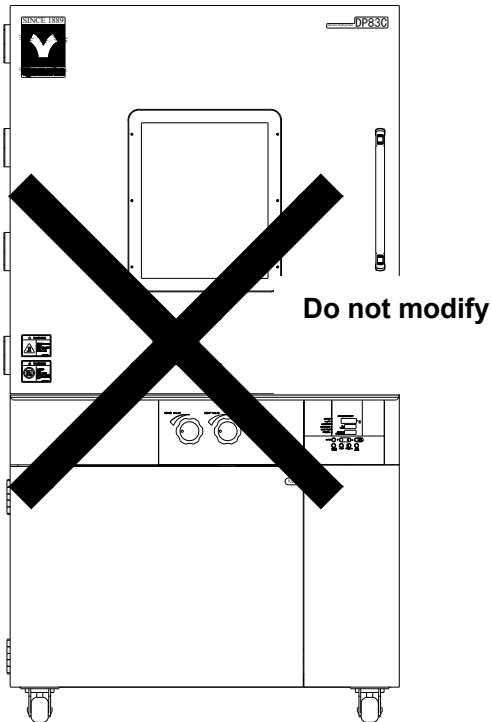
2. Before using this unit

Requirements for Installation


 **Warning**

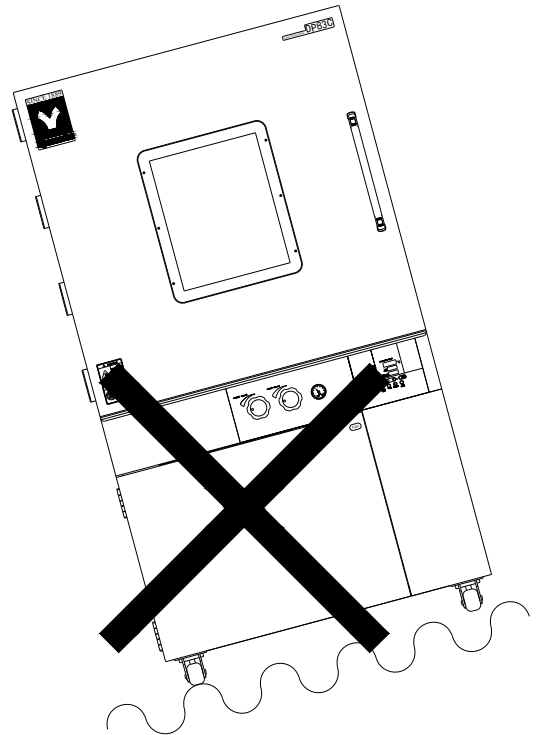
4. Do not modify

 Modification of this unit is strictly prohibited. It may cause a failure.




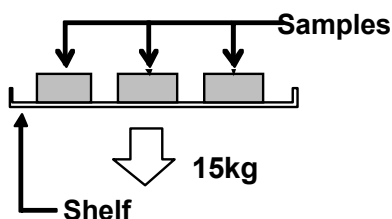
5. Installation on horizontal surface

 Set this unit to the flattest place. Setting this unit on rough or slope place could cause the vibration or noise, or cause the unpredictable trouble or malfunction.




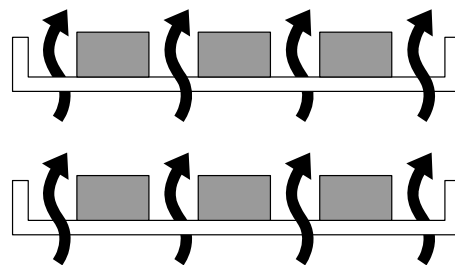
6. Do not make an overload

 The withstand load of shelf is 15kg (uniform load). Set the samples apart each other.



7. Do not set samples in close formation

 The temperature in furnace cannot be controlled if too much samples are set there. Make sure to use the shelf and set samples apart each other so as to make the free space of 30% or more to the furnace to acquire accuracy of temperature.



Make the free space of 30% or more

2. Before using this unit

Requirements for Installation



Caution

8. Choose a correct socket



Choose a correct power socket that meets the unit's rated electric capacity.

Electric capacity DP83C AC220V 18.5A (not contain vacuum pump current)
DP104C 3-phase 480V 17.5A (not contain vacuum pump current)

There could be the case that the unit does not run even after turning ON the power. Inspect whether the voltage of the main power is lowered than the specified value, or whether other device(s) uses the same power line of this unit. If the phenomena might be found, change the power line of this unit to the other power line. This unit does not have plug, please consult your dealer or a local electrical contractor for power connection.

9. Installation and layout



It may cause injure to a person if this unit falls down or moves due to earthquake or impact.

To prevent, take measures that the unit cannot fall down, and not install at a busy place.

The unit is equipped with casters, check if the casters are locked.

Hang the caster handle, in front of the caster, over its tyre from side.

10. First use



When first using the unit, it may stink once there is high temperature. The odor is generated from insulation materials decomposing. It is not machine failure. It's better to have a high-temperature operation before using.

11. Handling of power cord



- Do not entangle the power cord. This will cause overheating and possibly a fire.
- Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
- Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.



- Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.

- If the power cord becomes damaged (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.

- Connect the power plug to the receptacle which is supplied appropriate power and voltage.

12. Use of vacuum pump



Place the vacuum pump horizontally.

Regularly spot check the vacuum pump as per its instruction manual.



This unit does not have vacuum breaker system and vacuum pump anti oil backstreaming system. Please buy the anti oil backstreaming accessories from the vacuum pump agent.



For the purge/pump valve and vacuum pump usage, please carry on as per P34 Vacuumizing and air inflow.

2. Before using this unit

Requirements for Installation

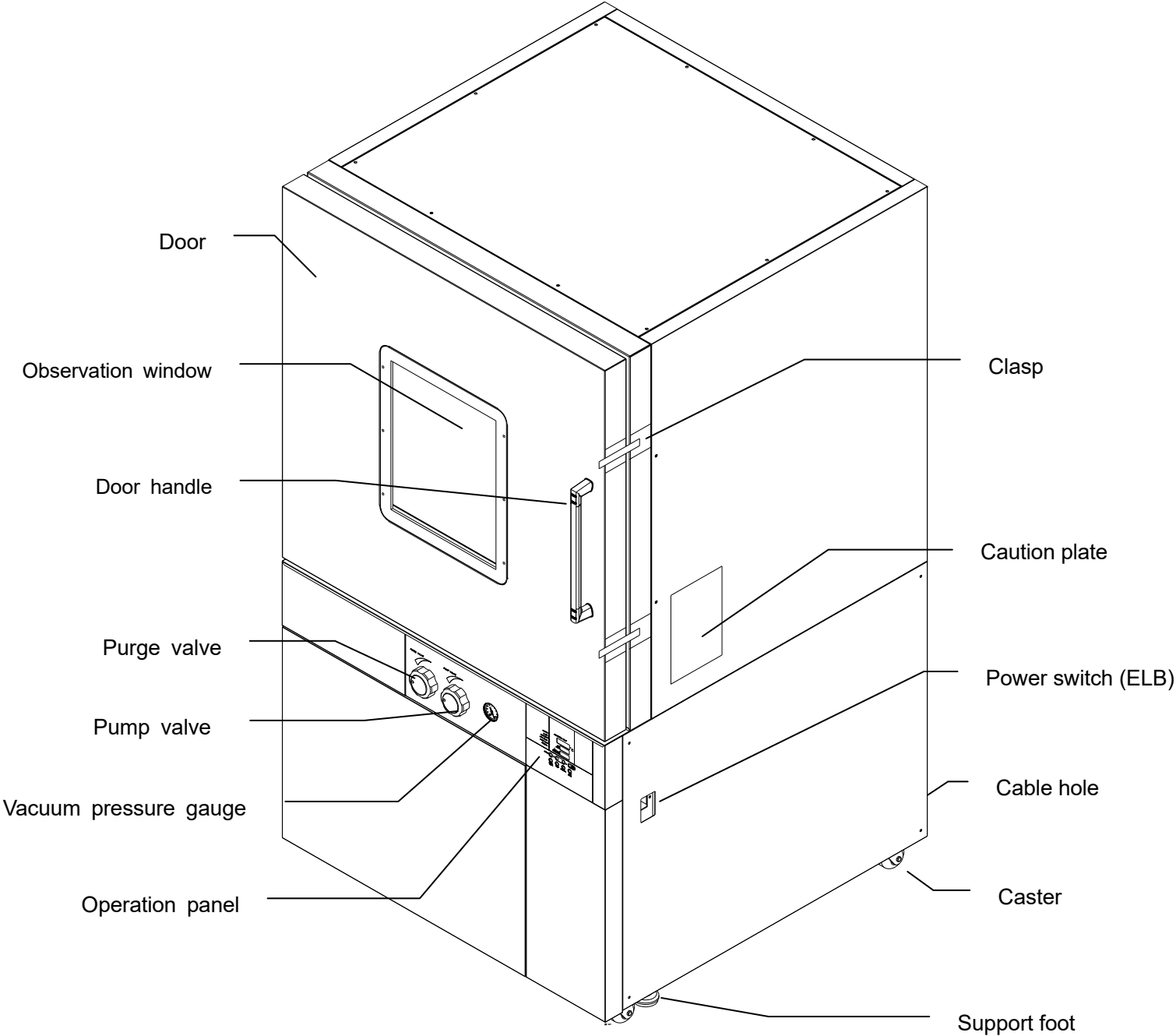
13. List of vacuum pump piping

Item Model	Manufacturer	Vacuum pump model	Suction port of pump	Necessary piping part
DP83/104C (40NW flange)	Yamato	PD(PX)136 ^{*1} PD(PX)201 ^{*1}	Φ30mm	ID Φ25mm vacuum rubber hose 1pc Vacuum quick-release adapter 1pc Clamp (25KF) 1pc Clamp (40KF) 1pc Center ring with O-ring (25KF) 1pc Center ring with O-ring (40KF) 1pc Vacuum quick-release reducer joint (25-40KF) 1pc
	SIEG	2ZX-4B,220V	25KF flange	Stainless steel vacuum rubber hose 1pc Clamp (25KF) 1 pc Clamp (40KF) 1 pc Center ring with O-ring (25KF) 1pc Center ring with O-ring (40KF) 1pc Vacuum quick-release reducer joint (25-40KF) 1 pc
	Mitsubishi	VP-SW -A200(S) -A310(S)	25KF flange	Stainless steel vacuum rubber hose 1 pc Clamp (25KF) 2 pc Clamp (40KF) 1 pc Center ring with O-ring (25KF) 2 pc Center ring with O-ring (40KF) 1pc Vacuum quick-release reducer joint (25-40KF) 1 pc
	Oerlikon Leybold	D8C D16C	25KF flange	Stainless steel vacuum rubber hose 1 pc Clamp (25KF) 1 pc Clamp (40KF) 1 pc Center ring with O-ring (25KF) 1pc Center ring with O-ring (40KF) 1pc Vacuum quick-release reducer joint (25-40KF) 1 pc

3. Description and Function of Each Part

Main Unit

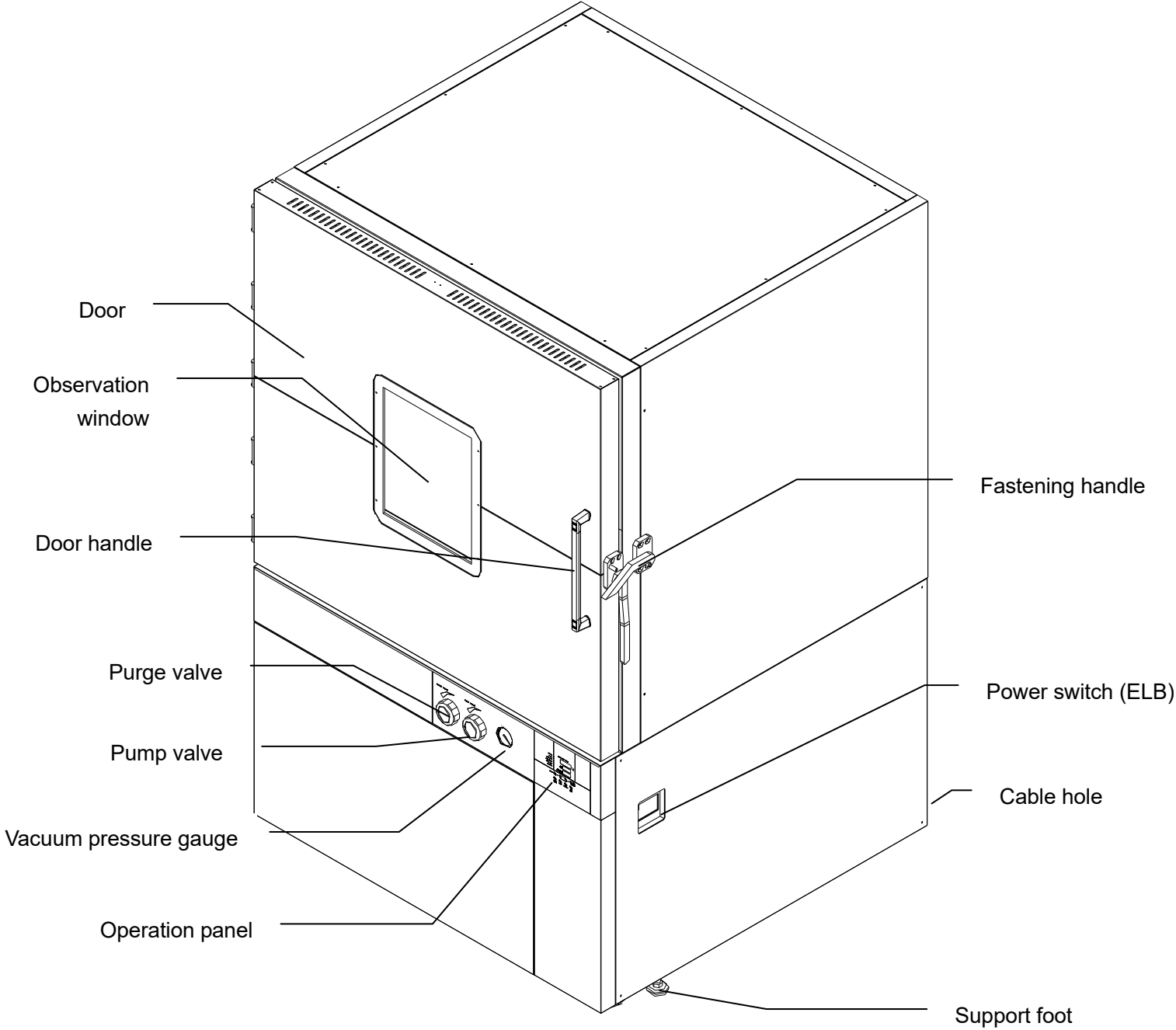
DP83C



3. Description and Function of Each Part

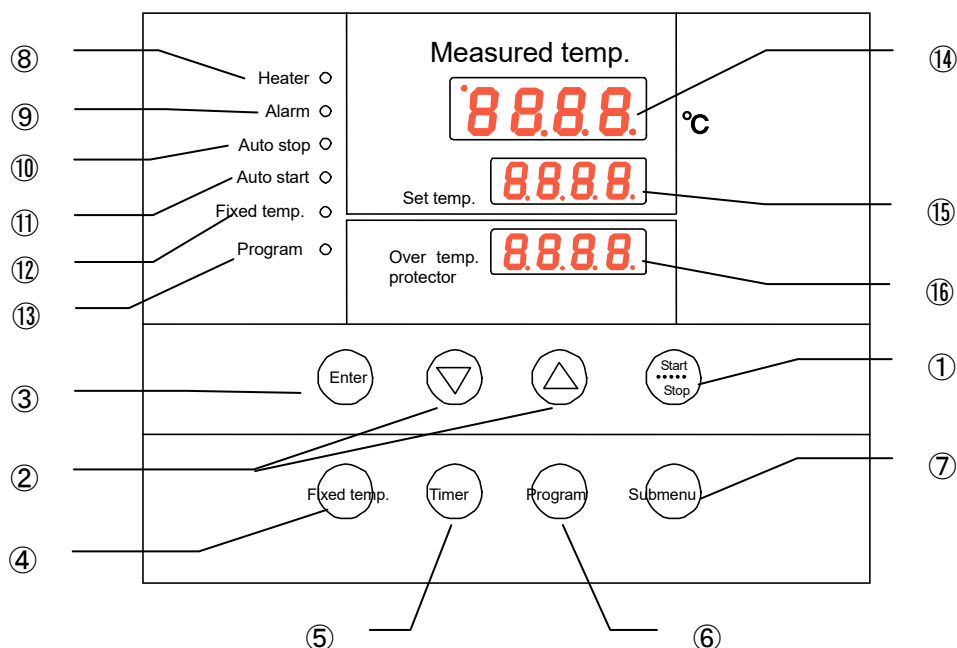
Main Unit

DP104C



3. Description and Function of Each Part

Operation Panel



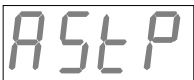

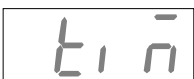


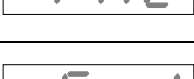
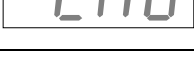





①	START/STOP Key	Start/stop the operation.
②	▲▼ Key	Use for rising UP/lowering DOWN the setting value.
③	ENTER Key	Settle the inputted value.
④	FIXED TEMP Key	Choose the fixed temperature operation.
⑤	TIMER Key	Choose the timer operation (Quick Auto Stop/Auto Stop/Auto Start).
⑥	PROGRAM Key	Choose the program operation or program creation mode. (3 types and 6 modes programs)
⑦	SUBMENU Key	Use for setting the overheating prevention temperature, calibration offset temperature, key lock function, or program repeat function.
⑧	HEATER Lamp	Light while the heater works.
⑨	ALARM Lamp	Light up when an error occurs. (Buzzer sounds simultaneously.)
⑩	AUTO STOP Lamp	Blink while setting quick auto stop timer or auto stop timer. Light while quick auto stop timer or auto stop timer is running.
⑪	AUTO START Lamp	Blink while setting auto start timer. Light while auto start timer is running.
⑫	FIXED TEMP Lamp	Blink while setting fixed temperature operation. Light while fixed temperature operation is running.
⑬	PROGRAM Lamp	Blink while setting program operation. Light while program operation is running.
⑭	Measurement Temp. Display	Display the measured temperature, setting character, alarm information.
⑮	Setting Temp. Display	Display the setting temperature, setting value for timer mode, remaining time.
⑯	Overheating Prevention Temp. Display	Display the setting temperature for overheating prevention device.

3. Description and Function of Each Part




Characters of the Controller

The explanation of VS6 controller characters are as below:

Character	Identifier	Name	Purpose
	Fix	Fixed Temperature Setting Mode	Used for starting the fixed temperature operation.
	Sv	Temperature Setting	Used for setting the temperature.
	AStP	Timer Setting Mode Display	Represents the setting of quick auto stop or auto stop operation.
	AStr	Timer Setting Mode Display	Represents the setting of auto start operation.
	tim	Time Setting	Used for setting the time.
	PrG3	Program Type	Used for choosing program type from 1 to 3. (Refer to Page 25" Program Operation".)
	PAt	Program Pattern	Used for choosing program pattern. (Refer to Page 25 " Program Operation".)
	End	Time Up	Displays when the timer operation is completed (Refer to Page 19, 22)
	Sv-1	Program Temperature Setting	Used for setting the temperature for each step in the program. (Sv-1 to Sv-30 is shown.)
	t-1	Program Time Setting	Used for setting the time for each step in the program. (t-1 to t-30 is shown.)
	PS-3	Step Number to be Repeated	Used for choosing the step number to be repeated under the program operation with repeat function. (Refer to Page 30 "Use program repeat function".)
	Pc-2	Repeating Times	Used for setting the repeating times under the program operation with repeat function. (Refer to Page 30 "Use program repeat function".)

3. Description and Function of Each Part

Characters of the Controller

Character	Identifier	Name	Purpose
	cAL	Calibration Offset Setting	Used for inputting the calibration offset temperature. (Refer to Page 33 "Other Function".)
	oH	Overheating Prevention Setting	Used for setting temperature for overheating prevention device. (Refer to Page 17 "Setting of Overheating Prevention Device".)
	Lock	Key Lock	Locks the keys on control panel to protect from unnecessary operation. (Refer to Page 34 "Other Function".)

※ Also refer to Page 16 "Operation Mode, Function Setting Key, and Characters".

4. Operation Method

Operation Mode and Function List

All the operation modes of this unit are as below:

No.	Name	Description	Page
1	Fixed Temperature Operation	Pressing the FIXED TEMP key enters into the fixed temperature operation setting mode. Pressing it again enters into the temperature setting mode. The "▲▼" are used to set temperature. Pressing the START/STOP key starts or stops operation.	P.18
2	Quick Auto Stop Operation	This operation is used to specify the period up to automatic stop during operation. The period up to operation stop can be set by pressing the TIMER key during fixed temperature operation. The "▲▼" are used to set the time. Pressing the START key starts the quick auto stop operation, activates the timer function and stops the operation automatically after specified period.	P.19
3	Auto Stop Operation	This operation is used to specify the automatic stop time in the fixed temperature operation. Pressing the TIMER key displays "AStp". The setting temperature "SV" can be set by pressing the ENTER key. The operation time "tim" can be set by pressing it again. Pressing the START/STOP key starts the auto stop operation.	P.21
4	Auto Start Operation	This operation is used to specify the period up to automatic start after power on. Pressing the TIMER key displays "AStr". The setting temperature "SV" can be set by pressing the ENTER key. The operation time "tim" can be set by pressing it again. Pressing the START/STOP key starts the auto start operation.	P.23
5	Program Operation	This operation is used to change the temperature according to the setting temperature and time. Pressing the PROGRAM key displays "PrG1". Press it again to select the program mode. Press the ENTER key to select the pattern "PA t". Press the ENTER key to display "End". Input the number of patterns to be used. Input the temperature and time of patterns "SV-n" and "t-n" respectively.	P.25
<p>※ This unit is impossible to change mode during the operation. If the mode requires to be changed, stop the operation.</p>			

4. Operation Method

Operation Mode and Function List

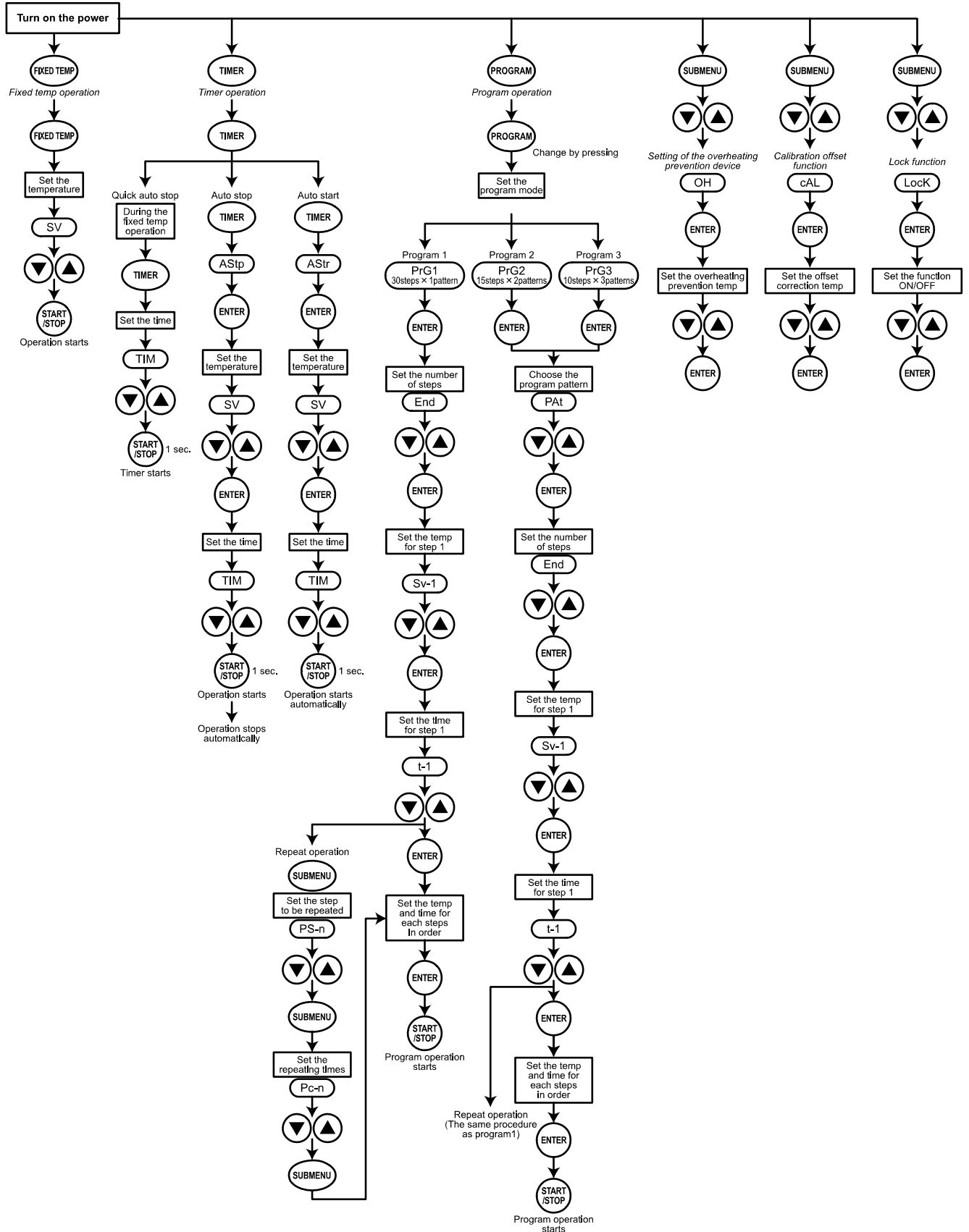
The operation functions of this unit are as below:

No.	Name	Description	Page
1.	Overheating prevention function	Auto overheating prevention function	P. 17
		Overheating prevention device	
2.	Calibration offset function	This calibration offset function is for calibrating the difference occurred between the required in- furnace temperature and control temperature (sensor temperature) of the controller. This unit can be calibrated toward either plus side or minus side of the whole temperature range.	P. 33
3.	Overheating prevention temperature calibration function	The temperature of overheating prevention device is automatically corrected when the temperature of controller is collected.	-
4.	Recovery at power failure	The unit starts operation with the same condition as just before power failure if it occurs during operation. Press the START/STOP key to start the unit again.	-
5.	Setting value locking	This function locks the established operation status. It can be set and cancelled with the SUBMENU key.	P. 34

4. Operation Method

Operation Mode, Function Setting Key, and Characters

The operation mode and function settings use the operational keys and characters as shown below.



4. Operation Method

Setting of Overheating Prevention Device

The unit has the overheating prevention device (manual reset) that consists of independent temperature measurement circuit, CPU, sensor and output circuit (it shares power source, display, and key input with the controller) in addition to the automatic overheating prevention function (auto reset) in the controller.

Setting range/function

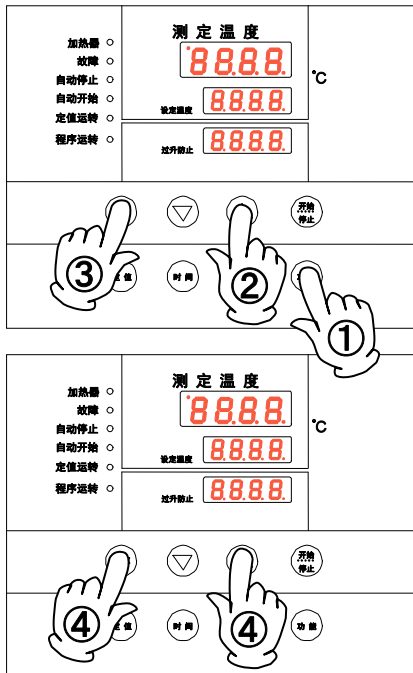
The unit has failsafe functions against overheating. One of them is built in the controller and previously set at factory shipment so to be automatically activated when the temperature exceeds the setting temperature of temperature controller by 12°C, where the heater repeats on and off.

The other is united with the controller, which can be set by operating the keys on the controller.

The setting range of latter is from 0°C to max set temperature of main controller + 50°C.

In case the temperature in furnace exceeds the setting temperature of controller to reach to that of overheating prevention device, the circuit is shut off and "Er19" is displayed with blinking on the screen of controller with buzzer sound. If the device is once activated, "Er19" continues to be displayed until the power is newly turned on.

Temperature setting procedure



1. Turn on the power (turn on the ELB)

The default value is displayed for about 4 seconds after turning on the power. The screen then displays the initial setting. The current temperature in furnace, operation mode character and setting temperature of overheating prevention device are displayed on respective screens.

2. Set the temperature for overheating prevention

- ① Press the SUBMENU key.
- ② Press the "▼▲" several times to select the setting character of overheating prevention temperature "OH" .
- ③ Press the ENTER key. The current setting temperature is displayed with blinking on the setting temperature screen.
Note: To prevent improper operation, set the value 20°C or more over the setting temperature of controller.
- ④ Select the value using the "▼▲" and then press the ENTER key. This completes the setting.

Caution

- ① The standard setting temperature of device is "the maximum setting temperature of unit + 20°C" or "setting temperature + 20°C". If the unit performs improper operation, increase it 5°C more.
- ② Improper setting of temperature may cause inoperative of unit, malfunction of device, e.g. it is activated during increasing in temperature in furnace, or unexpected accidents such as fire disaster. To prevent such matters, set a proper value.
The temperature of DP83C/104C is set to 220°C at factory shipment.
- ③ The purpose of overheating prevention device is to protect the unit from overheating. It does not intend to protect the samples, or to protect them from the accident caused by the use of explosive or inflammability.

4. Operation Method

Fixed Temperature Operation

Fixed temperature operation procedure



1. Turn on the power (turn on the ELB)

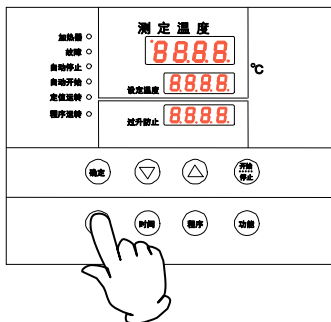
The default value is displayed for about 4 seconds after turning on the power. The screen then displays the initial setting. The current temperature in furnace, operation mode character and setting temperature of overheating prevention device are displayed on respective screens.

Measurement temperature screen: Displays the current temperature in furnace.

Setting temperature screen: Displays the operation mode character.

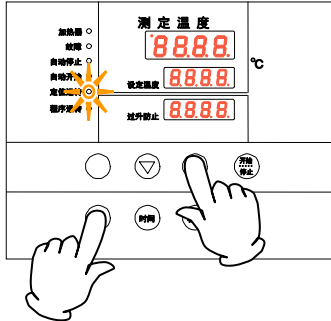
Overheating prevention screen: Displays the setting temperature of overheating prevention device

(Refer to Page 16 about operation mode characters)



2. Select the operation mode

Press the FIXED TEMP key to display "FIX", which indicates the fixed temperature operation, on the center display screen.

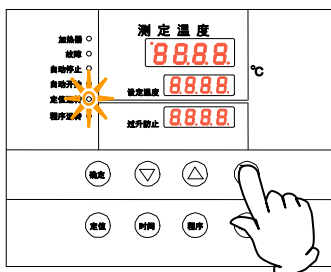


3. Set the temperature

Press the FIXED TEMP key again.

The setting temperature screen displays the character "SV" which indicates the temperature setting. Also it displays the current setting temperature with blinking. The FIXED TEMP lamp blinks, too.

Set the temperature by pressing the "▼▲".



4. Start operation

Press the orange START/STOP key for about 1 second. The unit starts operation and the blinking FIXED TEMP lamp lights on.

5. Stop operation

Press the orange START/STOP key for about 1 second. The unit stops operation and the FIXED TEMP lamp lights off. The screen returns to the initial setting screen.

To correct or check setting...

Press the FIXED TEMP key again to correct or check the setting.

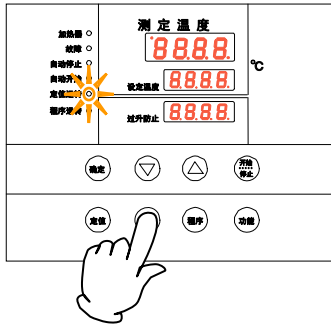
Changing the setting temperature during operation is also possible by pressing the FIXED TEMP key.

4. Operation Method

Quick Auto Stop Operation

Quick auto stop operation procedure

This operation is used to specify the period up to automatic stop, i.e., sets the auto stop timer during operation.

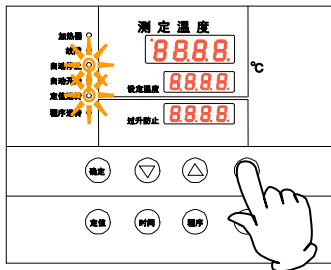


1. Set the time up to stop during fixed temperature operation

- Check that the FIXED TEMP lamp lights on and that the unit is under operation.
- Press the TIMER key.
- The measurement temperature display screen displays the character "tim", which indicates the timer setting. The setting temperature display screen displays the current setting time with blinking.
- Select the time by pressing the "▼▲".

Timer function:

- The maximum setting time is "999hours and 50 minutes".
- The time can be set in increments of a minute under 99 hours and 59 minutes.
- It can be set in increment of ten minutes over 100 hours.
- The "▼▲" can change the setting time quickly when it is pressed continuously. Press them discontinuously when fine adjustment is needed.



2. Start timer operation

- Press the START/STOP key for 1 second after deciding the time.
- Timer operation starts with the FIXED TEMP and AUTO STOP lamps lighting on.
- The timer is activated at the point when the START/STOP key is pressed.

3. Stop/terminate timer operation

- The operation stops automatically at setting time.
- Buzzer continues to sound for about 5 seconds at operation stop.
- The setting temperature screen displays the character "End", which indicates termination of operation, with the FIXED TEMP and AUTO STOP lamps lighting on. Press the START/STOP key to terminate the timer operation mode. The screen returns to the initial setting screen.

4. Operation Method

Quick Auto Stop Operation

Change the set temp. and set time, confirm the set value

If need to change the set temp. during quick auto stop operation, press FIXED TEMP key to enter the setting mode.

If need to change the set time during quick auto stop operation, press TIMER key to enter the setting mode.

① After changing the time, press TIMER.

The remaining time on the timer is the time subtracting the elapsed time.

For example: set timer as 1hr30min, conduct quick auto stop operation, after 20min, change the set time to be 2hr, set it by TIMER, the remaining time is 1hr40min.

② After changing the time, press START/STOP for 1sec.

The quick auto stop operation proceeds again as per the changed time.

For example: set timer as 1hr30min, conduct quick auto stop operation, after 20min, change the set time to be 2hr, press START/STOP to set, the remaining time is 2hr.

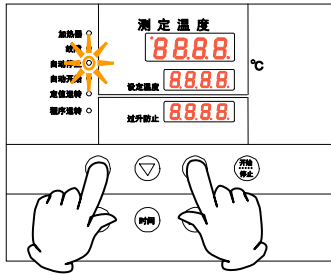
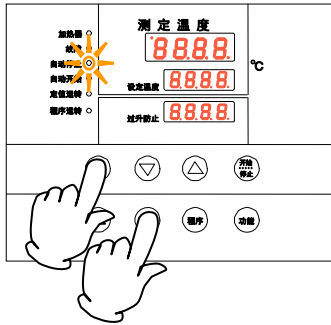
Press ▼ key; switch over to display the set temp., operation mode and remaining time of set temp. displayer.

4. Operation Method

Auto Stop Operation

Auto stop operation procedure

This operation is used to specify the automatic stop time in the fixed temperature operation.

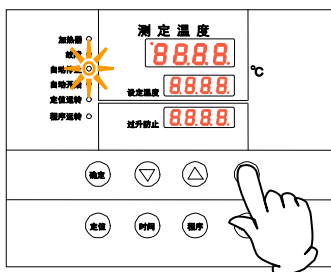


1. Set stop time

- ① Press the TIMER key on the initial screen.
Press the TIMER key again. The setting temperature display screen displays the character "AstP", which indicates the auto stop operation, with blinking.
- ② Press the ENTER key.
The measurement temperature screen displays the character "SV", which indicates the temperature setting. The setting temperature screen displays the current setting temperature with blinking. The AUTO STOP lamp blinks, too.
- ③ Set the temperature using the "▼▲".
- ④ Press the ENTER key again.
The measurement temperature display screen displays the character "tim", which indicates the timer setting. The setting temperature display screen displays the current setting time with blinking.
- ⑤ Set the time using the "▼▲".

Timer function:

- The maximum setting time is "999hours and 50 minutes".
- The time can be set in increments of a minute under 99 hours and 59 minutes.
- It can be set in increment of ten minutes over 100 hours.
- The "▼▲" can change the setting time quickly when it is pressed continuously. Press them discontinuously when fine adjustment is needed.

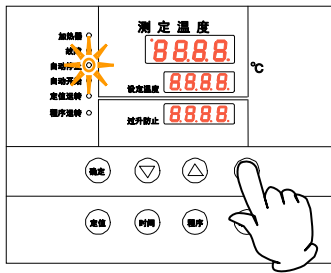


2. Start timer operation

- Press the START/STOP key for 1 second after deciding the time.
- Timer operation starts with the AUTO STOP lamp lighting on.
- The timer is activated at the point when the temperature in furnace (measurement temperature) reaches to the setting temperature.

4. Operation Method

Auto Stop Operation



3. Stop/terminate timer operation

- The operation stops automatically at setting time.
- Buzzer continues to sound for about five seconds at operation stop.
- The setting temperature screen displays the character "End", which indicates termination of operation, with the FIXED TEMP and AUTO STOP lamps lighting on. Press the START/STOP key to terminate the timer operation mode. The screen returns to the initial setting screen.

To correct or check setting...

Changing the setting temperature or time during operation is possible by pressing the TIMER key. Use the "▼▲" to change the setting value. Press the ENTER key respectively after changing the setting.

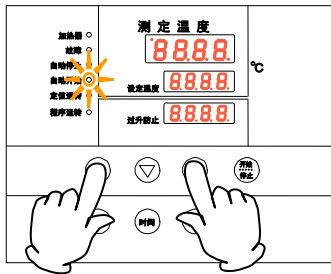
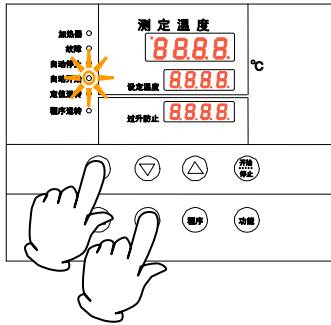
Press the "▼" to display the setting temperature, operation mode and residual time on the setting temperature screen.

4. Operation Method

Auto Start Operation

Auto start operation procedure

This operation is used to specify the period up to automatic start after power on.

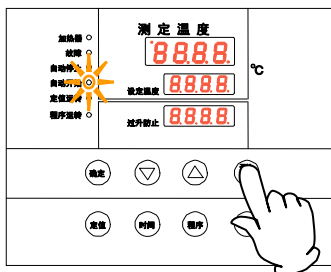


1. Set start time

- ① Press the TIMER key on the initial screen.
Press the TIMER key again. The setting temperature display screen displays the character "Astr", which indicates the auto start operation, with blinking.
- ② Press the ENTER key.
The measurement temperature screen displays the character "SV", which indicates the temperature setting. The setting temperature screen displays the current setting temperature with blinking. The AUTO START lamp blinks, too.
- ③ Set the temperature using the "▼▲".
- ④ Press the ENTER key again.
The measurement temperature display screen displays the character "tim", which indicates the timer setting. The setting temperature display screen displays the current setting time with blinking.
- ⑤ Set the time using the "▼▲".

Timer function:

- The maximum setting time is "999 hours and 50 minutes".
- The time can be set in increments of a minute under 99 hours and 59 minutes.
- It can be set in increment of ten minutes over 100 hours.
- The "▼▲" can change the setting time quickly when it is pressed continuously. Press them discontinuously when fine adjustment is needed.

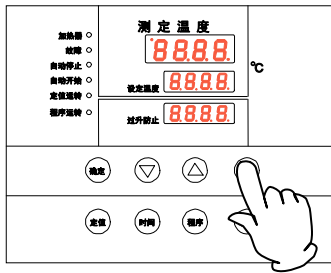


2. Start timer operation

- Press the START/STOP key for 1 second after deciding the time.
- Timer operation starts with the AUTO START lamp lighting on.

4. Operation Method

Auto Start Operation



3. Stop/terminate timer operation

- The operation starts automatically at setting time.
- Press the START/STOP key for 1 second to stop or terminate operation. The screen returns to the initial setting screen.

To correct or check setting...

Changing the setting temperature or time during operation is possible by pressing the "TIME" key. Use the "▼▲" to change the setting value. Press the ENTER key respectively after changing the setting. They are not changeable after the unit starts operation. In this case, stop the operation by pressing the START/STOP key, then set the value again.

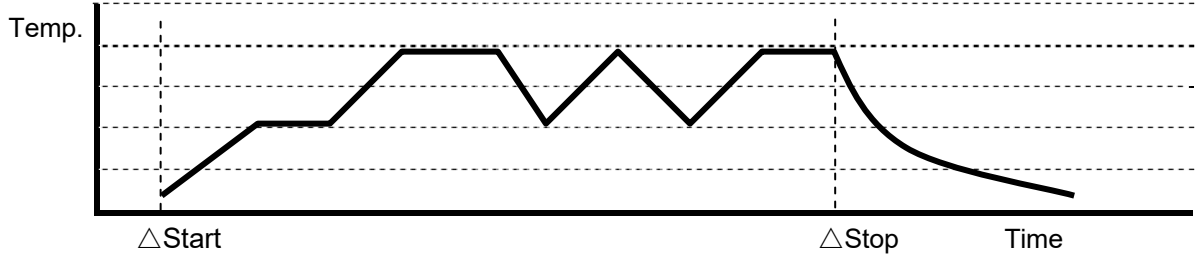
Press the "▼" to display the setting temperature, operation mode and residual time on the setting temperature screen.

4. Operation Method

Program Operation

Program operation

This operation is used to change the temperature according to the setting temperature and time.



Program types

Six patterns of program types maximum can be input.

PrG1	—	1 program pattern using 30 steps maximum can be created.
PrG2	PA t 1	2 program patterns using 15 steps maximum can be created.
	PA t 2	
PrG3	PA t 1	3 program patterns using 10 steps maximum can be created.
	PA t 2	
	PA t 3	

Before program

inputting Input program patterns before program operation.

- ① Check the number of steps in a created program and their setting temperature/time. Refer to page 25~27.
- ② Check the temperature rise/fall capability of the unit. Set the time within the capability above. Suppose, for instance, that in the unit which has capability of increasing or decreasing temperature by 50°C within 15 minutes, about 30 minutes is needed to increase or decrease temperature by 100°C from current temperature

Repeat function

Repeat function is useful in case the operation uses the program repeating the same program steps. Refer to page 29 for the function.

- ③ Check if the controller has sufficient free pattern for the number of steps to be created. The steps, however, using the repeat function mentioned above are not counted.

4. Operation Method

Program Operation

DPC type temp. rise / fall time

The DPC type temp. rise / fall time is as below:

This value is the time needed to reach each temperature (eg. DP83C needs about 15min rising temperature from 100 °C to 150 °C). However, the constant temperature time reaching each set temperature needs to be counted separately, so make sure to set proper time to carry on test run.

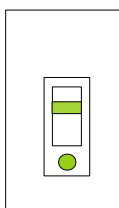
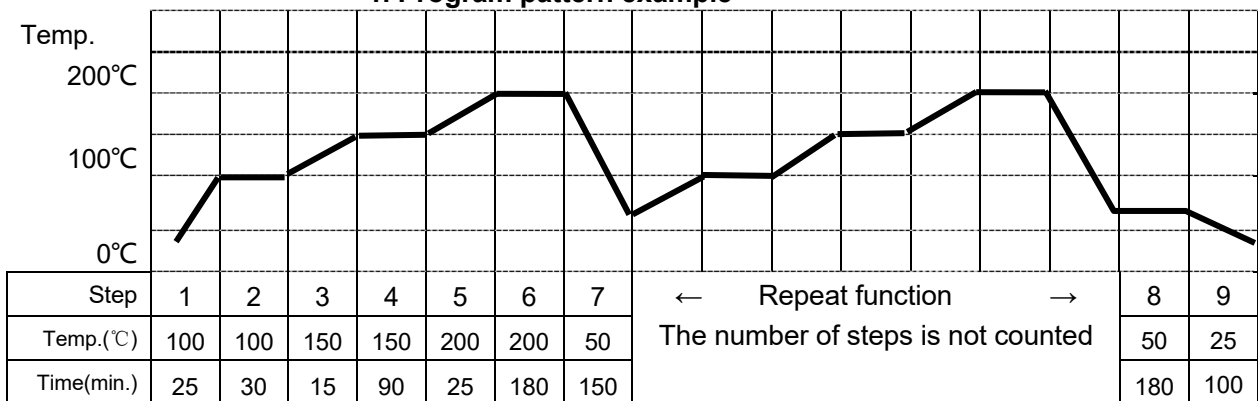
Condition: RT23°C humidity 65RH±20% unloaded (unit: min)

	DP83C	
	Rise time	Fall time
200°C	45	60
150°C	35	180
100°C	25	450
50°C	15	-

Program creation

The program pattern below is explained as an example.

1. Program pattern example

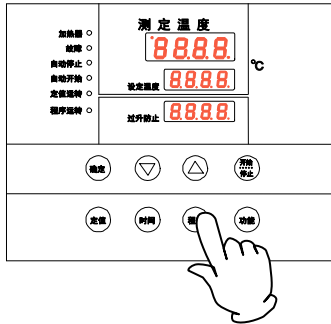


2. Turn on the power

- Turn on the power switch of the unit.
- The display on the controller lights on.
- The initial screen is displayed for about 4 seconds, then the measurement temperature (temperature in furnace) is displayed.

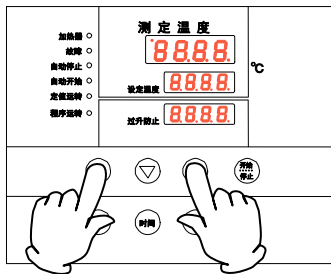
4. Operation Method

Program Operation



3. Select program mode/program pattern

- ① Press the PROGRAM key once.
The measurement temperature display screen displays the previous program mode.
Press the PROGRAM key again to display the next program mode.



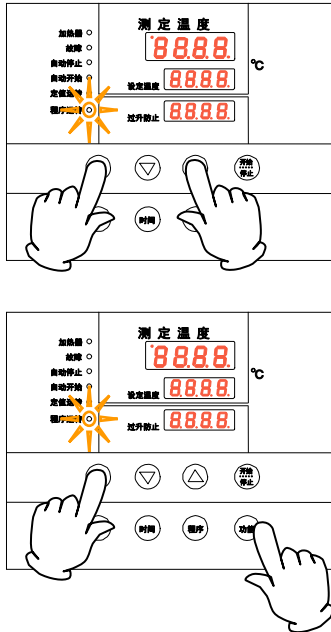
- ② Select the mode and press the ENTER key.
- When PrG1 is selected, the measurement temperature display screen displays "End".
 - When PrG2 is selected, the measurement temperature display screen displays the program pattern "PAT1". For the pattern of PrG2, select "1" or "2" using the "▲▼". Press the ENTER key again. The measurement temperature display screen displays "End".
 - When PrG3 is selected, the measurement temperature display screen displays "PAT1". For the pattern of PrG3, select "1", "2" or "3" using the "▲▼". Press the ENTER key again. The measurement temperature display screen displays "End".

Any of PrG1, PrG2 or PrG3 can be selectable in the program example above, where 8 steps maximum are used.

4. Operation Method

Program Operation

The example shown below explains the method of program registration using PrG3.



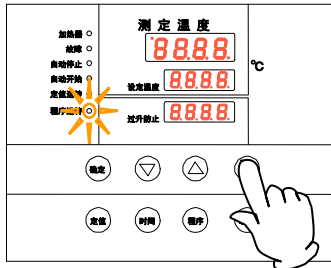
4. Register program

- ① Select PrG3 referring to 3 mentioned above..
- ② Input the number of steps, temperature and time for respective steps using the program creation sheet.
- ③ Press the ENTER key. The PA t 1 is displayed with blinking. ("End" is displayed if PrG1 is selected. In this case, go to ⑥)
- ④ Select the unused pattern from among Pat1, Pat2 and Pat3 using the "▲▼".
- ⑤ Press the ENTER key. "End" is displayed and the step number is also displayed with blinking. "End" is a character which indicates the total step number to be used. "8" will be input here.
- ⑥ INPUT "8", which is the total step number to be used here, using the "▲▼".
- ⑦ Press the ENTER key. The character "SV-1", which indicates the setting temperature of the first step, is displayed. The current setting temperature is also displayed with blinking.
- ⑧ Set the temperature of the first step using the "▲▼".
- ⑨ Press the ENTER key. The character "t-1", which indicates the setting time of the first step, is displayed. The current setting time is also displayed with blinking.
Before setting the time, check the temperature rise/fall capability of unit. For example, for DP83C, about 120 minutes is needed to increase the temperature from room temperature to 200°C. It takes about 1 minute to increase the temperature by 1.5°C. Add an extra considering the temperature stability time.
The setting time of timer in respective steps is 999 hours and 50 minutes maximum.
- ⑩ After the time is set, press the ENTER key.
- ⑪ The character "SV-2", which indicates the setting temperature of the second step, is displayed. In the same way, input the temperature and time for respective steps using the program creation sheet.
The different method is necessary where program repeat function is used. In this case, press the SUBMENU key after setting the time (t-7 in the example) in the step where the repeat operation is to be used (Step 7 in the example). This enters to the repeat function setting mode.
Follow the "Use program repeat function" in page 27 for the input method of program repeating function.
- ⑫ The screen returns to the initial setting screen after the setting of temperature and time in the final step is completed.

4. Operation Method

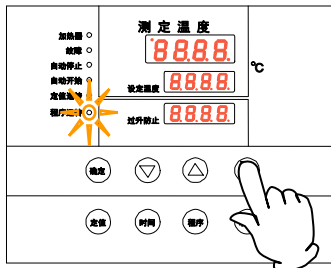
Program Operation

Make sure to check the setting temperature and time by operating the unit without load before performing actual run with samples.



5. Start program operation

- Press the START/STOP key for about 1 second. The program operation previously set starts.
- The PROGRAM lamp lights on and the setting temperature screen displays the step currently under operation.
- ❖ Press the "▼" to check the setting temperature and residual time of step currently under operation on the setting temperature screen.



6. End program operation

- Buzzer continues to sound for about five seconds at operation stop.
- The measurement temperature screen displays the character "END", which indicates the termination of program.
- Press the START/STOP key to return to the initial screen.

Timer function:

- The maximum setting time is "999 hours and 50 minutes".
- The time can be set in increments of a minute under 99 hours and 59 minutes.
- It can be set in increment of ten minutes over 100 hours.
- The "▼▲" can change the setting time quickly when it is pressed continuously. Press them discontinuously when fine adjustment is needed.

To correct or check setting...

Press the FIXED TEMP key to correct the created program or to check the setting value. The screen returns to the former one, where correction or check is possible.

Last screen is displayed when the FIXED TEMP key is once pressed.

Note: Correction or check should be made on the program setting screen.

Wait operation in program operation

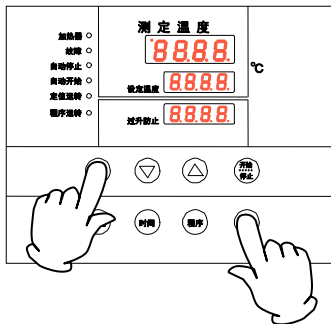
The succeeding step does not start in case the measurement temperature does not reach to, or exceeds the setting temperature when a program goes to the next step in program operation. This unit, however, is previously set to carry out the next step if the measurement temperature is within $\pm 3^{\circ}\text{C}$ of the setting temperature.

4. Operation Method

Program Repeat Function

Use program repeat function

This section explains how to register the program repeat (repeating a program pattern) in program operation.



This section explains the registration procedure of program using repeat function in "4. Register program" above.

The procedure sets the step number to be repeated "PS-n" and repeating times "Pc-n"(n: step number)

- ① Press the SUBMENU key in stead of the ENTER key after setting the time (t-7 in the example) in the step where the repeat operation is to be used (Step 7 in the example). This enters to the repeat function setting mode.
- ② The measurement temperature screen displays the character "PS-n", which indicates the step to be repeated in the program pattern. The measurement temperature screen indicates "PS-7" in the example because repeat function is used at the seventh step. The step number 1 to 7 can be input in the setting temperature display screen. Enter the number (1 in the example) using the "▲▼".
- ③ Press the SUBMENU key.
The measurement temperature screen displays the character "Pc-n", which indicates the repeating times. Enter the value of repeating times (2 in the example) with the "▲▼".
- ④ The screen goes to that for the next step when the SUBMENU key is pressed again.
The screen to input the Sv-8 is displayed next in the example.

To correct or check setting...

Correction of setting during the repeat setting mode is impossible.

To correct or check the setting, end the setting of step currently input. Press the FIXED TEMP key after the temperature setting screen for the next step appears. The screen returns to the former one and re-setting is possible.

Note: Correction or check should be made on the program setting screen.

4. Operation Method

Programming Preparation Form

Please use this form by making copies

Register with	PrG1 PrG2 PrG3 PA1 PA2 PA3	No.	
Project Name		Date	
		Programmer	

Input Value

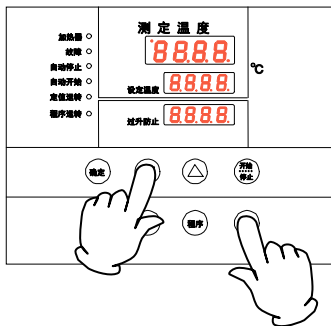
	Setting Temperature (°C)	Setting Time (min.)	Repeat Function To/Times
Step 1		:	:
Step 2		:	:
Step 3		:	:
Step 4		:	:
Step 5		:	:
Step 6		:	:
Step 7		:	:
Step 8		:	:
Step 9		:	:
Step 10		:	:
Step 11		:	:
Step 12		:	:
Step 13		:	:
Step 14		:	:
Step 15		:	:
Step 16		:	:
Step 17		:	:
Step 18		:	:
Step 19		:	:
Step 20		:	:
Step 21		:	:
Step 22		:	:
Step 23		:	:
Step 24		:	:
Step 25		:	:
Step 26		:	:
Step 27		:	:
Step 28		:	:
Step 29		:	:
Step 30		:	:

4. Operation Method

Other Functions (Calibration)

Use calibration offset function

Calibration offset is a function which corrects the difference between the temperature in furnace and that of controller (sensor temperature) if arises. The function parallel corrects the difference either to the plus or minus side within the whole temperature range of unit. The function can be set or cancelled by the SUBMENU key.



- ① Start operation with the target setting temperature. Check the temperature in furnace (temperature of sample) with a thermograph after it is stabilized.
 - ② Check the difference between the setting temperature and that in furnace (temperature of sample).
 - ③ Press the SUBMENU key. Select the character "cAL", which indicates the calibration offset, using the "▲▼", and then press the ENTER key.
 - ④ Input the difference using the "▲▼" and then press the ENTER key. This completes the setting.
- ❖ The setting range of offset correction temperature is +99°C to plus side and -99°C to minus side respectively.

When it is set to the minus side, the temperature on the measurement temperature display screen falls by the setting temperature, while the temperature on furnace rises.

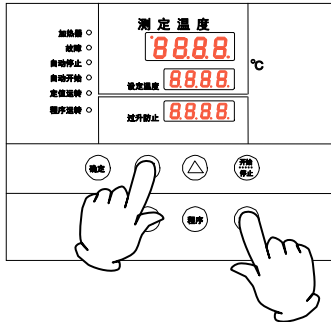
When it is set to the plus side, the temperature on the measurement temperature display screen rises by the setting temperature, while the temperature on furnace falls.

- ❖ The unit has two-point correction function, which performs offset between low-temperature zone and high-temperature zone. Please consult our local branch office when carrying out validation of temperature controller.

4. Operation Method

Other Functions (Lock)

Use lock function



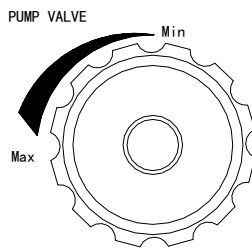
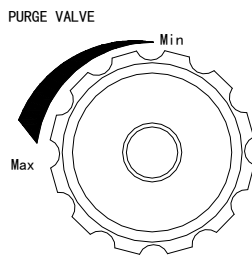
This function locks the operation status previously set. The function can be set or cancelled by the SUBMENU key.

- ① Press the SUBMENU key. Select the character "Lock", which indicates the lock of setting value, using the "▲▼", and then press the ENTER key.
- ② The setting temperature screen displays "oFF". The setting value is locked when it is turned to "on" using the "▲".
- ③ Press the SUBMENU key again to cancel the lock. Select the character "Lock", which indicates the lock of setting value, using the "▲▼", and then press the ENTER key. Select "oFF" with the "▼" and then press the ENTER key to cancel the function.

All keys other than the START/STOP and SUBMENU keys are lock when the lock function is on.

4. Operation Method

Vacuimizing and air inflow



Vacuimizing:

- 1) Turn the purge valve CW to its end (close);
- 2) Be sure the pump valve is close, turn on the vacuum pump.
- 3) Turn the pump valve CCW to its end, the exhaust speed is max. here. If the samples are powder or foaming objects, please slowly turn on or turn on part of exhaust valve.

Air inflow:

- 1) Turn the pump valve CW to its end (close);
- 2) Turn the purge valve CCW to its end, the inflow speed is max. here. If the samples are powder or foaming objects, please slowly turn on or turn on part of intake valve.
- 3) The door of chamber is unable to be opened when the inside pressure resumed to atmosphere pressure.

※ **This unit does not have vacuum breaker system and vacuum pump anti oil backstreaming system. Please buy the anti oil backstreaming accessories from the vacuum pump agent.**

※ **Turn on or off the vacuum pump when the exhaust valve is close, or else the lube oil of vacuum pump would back stream to contaminate chamber and sample. (unless there is vacuum breaker)**

※ **If there is power cut, please turn off the exhaust valve right away, or else the lube oil of vacuum pump would back stream to contaminate chamber and sample. (unless there is vacuum breaker)**

※ **The above operations must be strictly carried on as per the procedures. Our company is not responsible for the loss due to incorrect operation.**

【Notes】


Before the pressure of suction port of pump recovers to atmosphere pressure, do not turn off the power switch of vacuum pump. If turn off the vacuum pump directly, the oil may back stream.

5. Handling Precautions




Warning

1 Substances that cannot be used

-  Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur. (Refer to page 47 "13. List of Dangerous Substances".)


2. If a problem occurs

-  If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and 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.




Caution


1. Do not put anything on this unit

-  Do not step on this unit. It will cause injury if this unit fall down or break.


2. During a thunder storm

-  During a thunderstorm, 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.


3. When open/close door

-  Do not get close to the traveling range of door when opening or closing it. It may hit your hands or head and result in an injury.


4. Keep door close during operation

-  • The heater is heated abnormally if the door is left opened during operation. Make sure to operate the unit with the door closed.
• Do not leave the door open after operation in order to cool down the samples quickly. The heat in furnace may cause deformation of control panel or breakdown of control devices.

5. Do not use corrosive sample

-  Stainless steel SUS304 is used for interior; however, it may be corroded by strong acid etc. And the door packing made of silicon rubber may be corroded by some kind of solvent, e.g. alkaline, oil, halogen etc. Do not use the samples including those substances.

6. Use under proper temperature range


-  Operational temperature range is room temperature +5°C ~ 200°C. .
Never set the temperature out of that.

5. Handling Precautions




Caution


7. Setting of sample

-  Since the withstand load of the attached shelf plate is about 15kg per one plate, do not set heavier sample than 15kg. When setting several sample, set them as dispersed as possible. Too much sample setting could cause the improper control of the temperature. For keeping the proper temperature, keep more than 30% space against whole size of the shelf plate, and set the sample.



8. Do not put sample on the chamber surface

-  If sample is put directly on the chamber surface, device performance will be disturbed. Furthermore, internal temperature will abnormally rise and it will cause trouble. Never put sample on the chamber surface. Fix the shelf on the bracket then set sample on it.


9. Recovering after power failure

-  When power is supplied after a power failure, the device automatically starts operation again with the same state as just before the power failure. It is danger that the device starts unattached operation after a power failure. We recommend for you to turn off the switch of this unit if a power failure occurs during operation.

10. Double stacking

-  Use the specified fittings included in the optional accessory for double stacking.
-  Do not make direct double stacking.

11. After installation

-  It may cause injure to a person if this unit falls down or moves by earthquake or impact. To prevent, take measures that the unit cannot fall down.

6. Maintenance Method

Daily Inspection and Maintenance

Warning

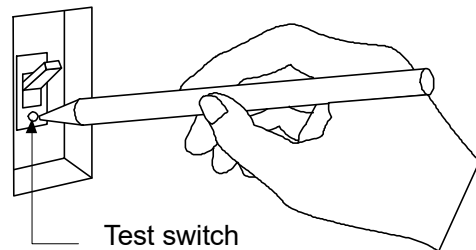
- Be sure to pull out the power cord except under special circumstances before trying to do inspection and maintenance works.
- Start these works after the device has returned to the normal temperature.
- Never try to disassemble the unit.

Caution

Wipe off the dirt on resin parts or operation panel with a tightly wrung soft cloth. Never clean the unit with gasoline, banana oil or detergent, otherwise it may result in deformation, deterioration or discolor.

Every month

- Please inspect the ELB performance regularly.
Power on to test
Firstly, turn ELB on
Then, use a tip (like pencil tip) to press the test switch of ELB. If ELB breaks off, it's normal.



7. Long storage and disposal

When not using this unit for long term / When disposing



Caution

When not using this unit for long term

- Turn off the power and disconnect the power cord.



Warning

When disposing

- Keep out of reach of children.
- Remove the door and driving parts.
- Treat as large trash.

Disposal Notice

Environmental protection should be considered

We request you to disassemble this unit as possible and recycle the reusable parts considering to the environmental protection. The feature components of this unit and materials used are listed below.

Main Component Name	Material
Main Components of structure	
Exterior	Cold rolled steel plate with coating
Interior	Stainless steel SUS304
Insulating materials	Glass wool
Door packing	Foam silicon rubber
Handle	Stainless steel
Identification plates	PET resin film
Main Electrical Parts	
Heater	Stainless steel heating plate
Circuit boards	Board, condenser, resistance, transformer and other
Power cord, wiring and others	Synthetic rubber or resin coated wiring materials

8. In the Event of Failure

Safety Device and Error Code

This unit has an automatic diagnosis function built in the controller and safety devices independent of the controller. The table below shows the cause and the solution method when the safety device operates.

Error Code

When an abnormal condition occurs, an error code appears and the alarm lamp lights in the controller, the buzzer sounds simultaneously. Record the error code and turn off the power of device immediately.

Safety Device	Notify	Cause/Solution
Sensor trouble detection	"ALARM" lamp lights on, "Er.01" appears	<ul style="list-style-type: none">• Temperature sensor is broken or disconnected.• Make a call for service.
SSR short-circuit detection	"ALARM" lamp lights on, "Er.02" appears	<ul style="list-style-type: none">• Triac is in short-circuit• Make a call for service.
Heater disconnecting detection	"ALARM" lamp lights on, "Er.03" appears	<ul style="list-style-type: none">• Heater is disconnected.• Make a call for service.
Memory error	"ALARM" lamp lights on, "Er.15" appears	<ul style="list-style-type: none">• Failure in internal memory.• Make a call for service.
Internal communication error	"ALARM" lamp lights on, "Er.17" appears	<ul style="list-style-type: none">• Failure in internal communication or temperature inputting circuit.• Make a call for service.
Overheating	"ALARM" lamp lights on, "Er.19" appears	<ul style="list-style-type: none">• Overheating prevention device is in operation.• Reset the power supply, and then adjust the setting temperature of the overheating protection device.• If the state does not recover, make a call for service.
Measurement temperature error	"ALARM" lamp lights on, "----" appears	<ul style="list-style-type: none">• Measurement value is out of display range.• Make a call for service.

8. In the Event of Failure

Trouble Shooting

If any of the symptoms below occurs:

Symptom	Check
Turning the ELB to on will not activate the unit.	<ul style="list-style-type: none">● If the power cord is connected to the power supply securely.● If power outage is not occurring.
Temperature does not rise.	<ul style="list-style-type: none">● If the set temperature is below that in the chamber.● If the power supply voltage has declined.● If the ambient temperature is low.● If cooling load inside the chamber is too large.
Temperature fluctuates during operation.	<ul style="list-style-type: none">● If the set temperature is appropriate.● If the power supply voltage has declined.● If ambient temperature fluctuates widely.● If the load inside the chamber is getting large.
Displayed temperature differs from the measurement.	<ul style="list-style-type: none">● If the calibration offset setting is not other than "0". Set it to "0." Confirm settings in "Other Functions (Calibration)" on page 32.

- ◆ In the case if the error other than listed above occurred, turn off the power switch and primary power source immediately. Contact the shop of your purchase or Yamato Scientific.

9. After Service and Warranty

When requesting a repair

When requesting a repair

If any trouble occurs, immediately stop operation, turn the ELB off, pull out the power plug and contact your dealer or our sales office.

Information necessary for requesting a repair

- ◆ Model name of the product
 - ◆ Serial number
 - ◆ Date (y/m/d) of purchase
 - ◆ Description of trouble (as in detail as possible)
- } Confirm on the warranty card or the nameplate installed on the unit.

Be sure to indicate the warranty card to our service representative.

Warranty card (attached separately)

- Warranty card is given by your dealer or one of our sales offices and please fill in your dealer, date of purchase and other information and store securely.
- Warranty period is one full year from the date of purchase. Repair service for free is available according to the conditions written on the warranty card.
- For repairs after the warranty period consult your dealer or one of our sales offices. Paid repair service is available on your request when the product's functionality can be maintained by repair.

Minimum holding period of repair parts

The minimum holding period of repair parts for this product is seven years after end of production.

Repair parts here refer to parts necessary for maintaining performance of the product.

10. Specification

Model		DP83C	DP104C
System		Pressure relief and wall heating radiation	
Performance	Temp. control range	RT+20°C~200°C	
	Temp. adjustment accuracy	±1°C (at 200°C)	
	※1 Temp. rise time (RT°C~180°C)	Approx. 132min	
Structure	Exterior	Cold rolled steel plate with coating	
	Insulation materials	Glass wool	
	Heater materials	Heating plate	
	Heater	4.0KW	14.4KW
	Observation window	19mm toughened glass	
	Air outlet	NW40 flange	
	Air inlet	Rc3/8	
Control part	Controller	VS6 program controller	
	Control method	PID control for heater output by microcomputer	
	Setting method	Digital setting by menu key and up/down keys	
	Display method	Measured temp. display: green 4-line LED digital display	
		Setting temp. display: red 4-line LED digital display	
	Time	1min-99hr 59min and 100hr-999.5hr (attached with timing function)	
	Time resolution	1 min and 10 min	
	Operation	Fixed temp. operation, program operation, quick auto stop operation , auto stop operation, auto start operation	
	Program mode	Program operation 3 modes 30 segments, program repeat	
	Sensor	Controller and overheat protector sensors use the thermocouples of the same model	
Additional functions	Lock function, Auto recovering after power failure, Calibration offset		
Safety device	Self-diagnosis function	Failure of sensor, heater, display, SSR, automatic overheating prevention device, measured temperature	
	Safety device	ELB, overheat protector	
Spec.	External dimensions ※ 2 (W×D×H mm)	1020×1020×1850	1300×1280×2110
	Internal dimensions ※ 2 (W×D×H mm)	800×800×800	1000×1000×1000
	Capacity	512L	1000L
	Standard load of Shelf plate	15kg/piece	
	Shelf rest step No.	4 steps	8 steps
	Shelf rest pitch	190mm	120mm

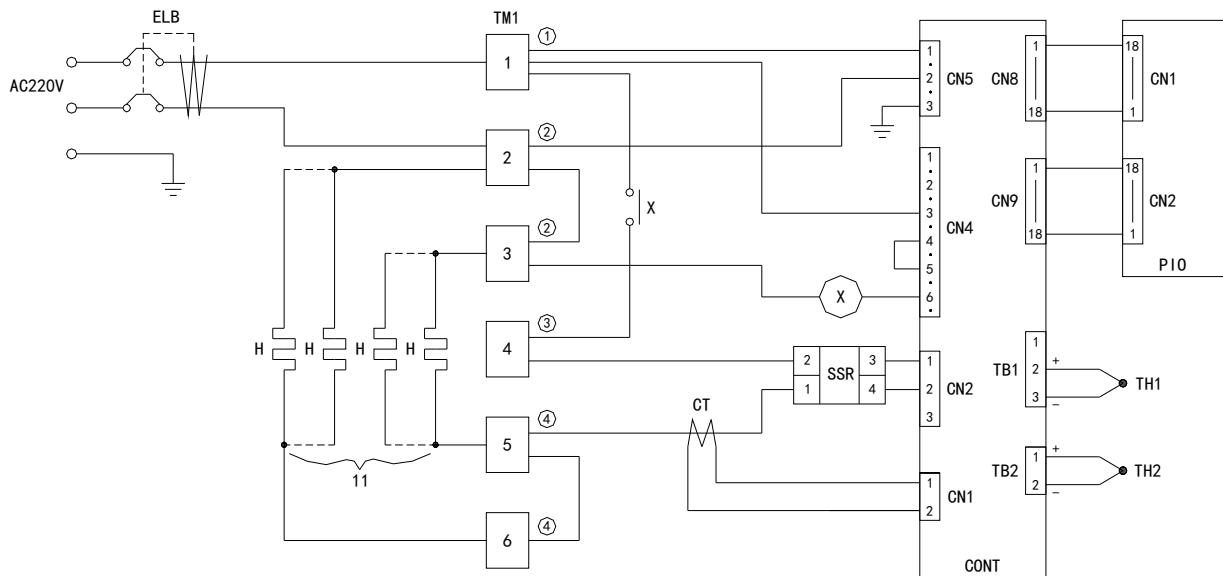
10. Specification

Model		DP83C	DP104C
Spec.	Power source	AC220V 31.5A	3-phase 480V 17.5A
	Weight	Approx. 450kg	Approx. 1000kg
Accessories	Shelf plate	Stainless steel SUS304	
		2pcs	4pcs
	Instruction manual, warranty	1 copy for each	

- ※1 The performance is under the condition of AC 220V (DP104C is 3-phase 480V) power source, RT 23°C ±5°C, humidity 65%RH ±5%, unloaded. The operating ambient temperature of the unit is from 5°C to 35°C.
- ※2 Exclude bulges.

11. Wiring Diagram

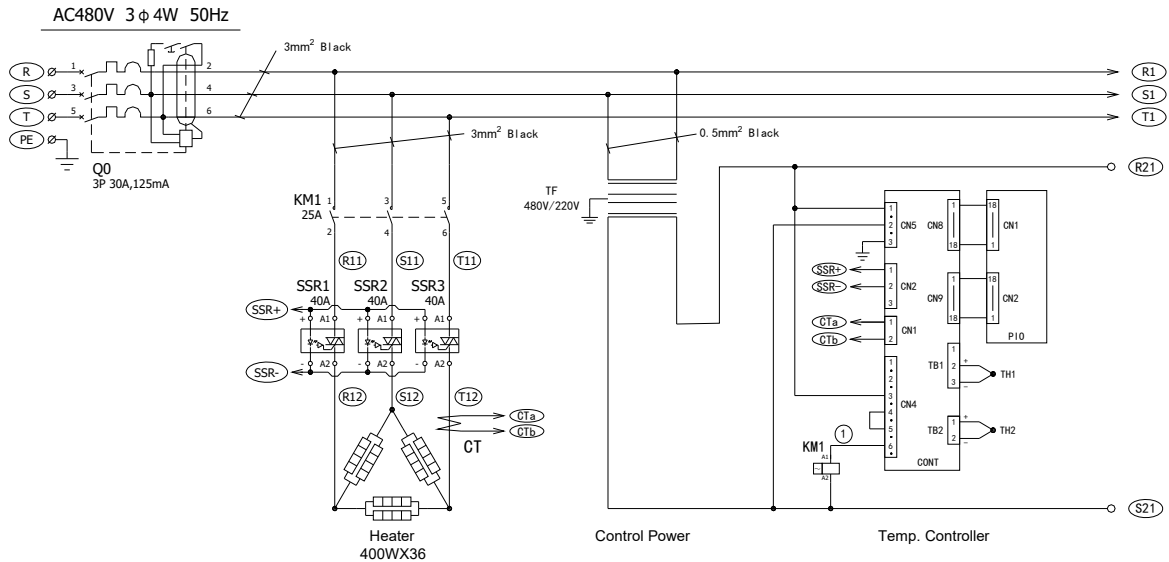
DP83C



Symbol	Part name	Symbol	Part name
ELB	Earth Leakage Breaker	CONT	Control board
TM1	Terminal block	PIO	Display board
H	Heater	TH1	Sensor for control
X	AC relay	TH2	Sensor for overheating prevention
SSR	Solid state relay	CT	Current transformer

11. Wiring Diagram

DP104C



Symbol	Part name	Symbol	Part name
Q0	Earth Leakage Breaker	CONT	Control board
TF	Transformer	PIO	Display board
H	Heater	TH1	Sensor for control
KM1	AC contactor	TH2	Sensor for overheating prevention
SSR1,2,3	Solid state relay	CT	Current transformer

12. Replacement Parts Table

DP83C/104C Common replacement parts

Symbol	Part Name	Specification	Manufacturer	Code No.
TH1,	Sensor	T0304.01-16Φ3.2*55*3000	YSJ	H020401095
TH2	Sensor	T0304.01-16Φ3.2*55*2000	YSJ	H020401001
CONT	VS6 control board	VS6	YSJ	B011401053
PIO	VS3, 4 display board	VS3,4	YSJ	B011402007
	Signal cable	VS1.VS2 300L	YSJ	B011299002
CT	Current transformer	URD CTL-6-S-4	YSJ	B010509001
SSR	Solid state relay	G3NB-240B-1 DC5-24V	YSJ	A011006014

DP83C Replacement parts

ELB	Earth Leakage Breaker	NV-L22TZU 24A 2P 30mA	YSJ	B010410018
KM	AC relay	HF116F-2/220AL1HSTFW	YSJ	A011002002
H	Heating plate	DP83C_01_02-01(AC220V 360W)	YSJ	H020401080

DP104C Replacement parts

Q0	Earth Leakage Breaker	EW125JAGU-3P030B	YSJ	B010515007
KM	AC contactor	LC1-D25M7C	YSJ	A011003008
H	Heating plate	DP103A_01_02-01 (AC480V 400W)	YSJ	H020401096
TF	Transformer	DP103AT02_03_01	YSJ	K010648001

13. List of Dangerous Substances



Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit.

EXPLOSIVE

EXPLOSIVE:	Ethylene glycol dinitrate (nitro glycol), Glycerin trinitrate (nitroglycerine), Cellulose nitrate (nitrocellulose), and other explosive nitrate esters
	Trinitrobenzene, Trinitrotoluene, Trinitrophenol (picric acid), and other explosive nitro compounds
	Acetyl hidroperoxide (peracetic acid), Methyl ethyl ketone peroxide, Benzyl peroxide, and other organic peroxides

FLAMMABLE

IGNITING:	Lithium (metal), Potassium (metal), Sodium (metal), Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid compounds, Calcium carbide, Lime phosphate, Magnesium (powder), Aluminum (powder), Powder of metals other than magnesium and aluminum, Sodium hydrosulfite
OXIDIZING:	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorate
	Potassium perchlorate, Sodium perchlorate, Ammonium perchlorate, and other perchlorate
	Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxide
	Potassium nitrate, Sodium nitrate, Ammonium nitrate, and other nitrate
	Sodium chlorite and other chlorites
	Calcium hypochlorite and other hypochlorites
INFLAMMABLE LIQUID:	Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide, and other flammable substances having a flash point of lower than -30°C
	Normal hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone, and other flammable substances having a flash point of -30°C or higher but lower than 0°C
	Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substances having a flash point of 0°C or higher but lower than 30°C
	Kerosene, Light oil (gas oil), Oil of turpentine, Isopentyl alcohol (isoamyl alcohol), Acetic acid, and other flammable substances having a flash point of 30°C or higher but lower than 65°C
FLAMMABLE GAS:	Hydrogen, Acetylene, Ethylene, Methane, Propane, Butane, and other flammable substances which assume a gaseous state at 15°C and 1 atm

14. Installation Manual

※ Install the product according to the following: (Confirm separately for optional items or special specifications)

Model	Serial number	Date	Installation mgr. (company name)	Installation mgr.	Judgment

No.	Item	Implementation method	TOC No. Reference page of the operating instruction manual	Judgment
Specifications				
1	Included items	Check for number of staffs against the included item field	10. Specifications field P.43	
2	Installation	<ul style="list-style-type: none"> Visual check of environmental conditions Caution: Take care for environment 	2. Before operating the unit <ul style="list-style-type: none"> On the installation site P.4	
		<ul style="list-style-type: none"> Securing a space 		
Operation-related matters				
1	Source voltage	<ul style="list-style-type: none"> Measure the user side voltage (outlet) with a tester Measure voltage during operation (shall meet the standard) Caution: Always use a plug that meets the specification for attaching to the ELB. 	2. Before operating the unit P.4 <ul style="list-style-type: none"> Be sure to connect the ground wire. P.7 Power supply is P.43 10.Specifications <ul style="list-style-type: none"> Specification-power supply 	
2	Operation start	<ul style="list-style-type: none"> Starts operation Performs fixed value operation, auto stop operation or auto start operation 	2.Before operating the unit P.4~8 <ul style="list-style-type: none"> Installation procedure P.14~ 4.Operating procedures 35	
Description				
1	Operational descriptions	Explain operations of each component according to the operational instructions	4.Operating procedures P.14~ <ul style="list-style-type: none"> Operating procedures 35 1.Safety precautions~ P.1~ 13. List of dangerous materials 48 	
2	Error codes	Explain the customer about error codes and procedures for release according to the operational instructions	8.Troubleshooting ~ 9. After sales service and warranty P.40~42	
3	Maintenance and inspection	Explain operations of each component according to the operational instructions	6.Maintenance procedures <ul style="list-style-type: none"> Daily inspection/ maintenance P.38 	
4	Completion of installation Record items	<ul style="list-style-type: none"> Fill in the installation date and the installation mgr. on the nameplate of the main unit Fill in necessary information items to the warranty card and hand it over to the customer Explanation of the route for after-sales service 	9. After sales service and warranty P.42	

Responsibility

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply. Never conduct what this document forbids. Unexpected accidents or breakdown may result in.

Note

- ◆ The contents of this document may be changed in future without notice.
- ◆ Any books with missing pages or disorderly binding may be replaced.

Instruction Manual for

Vacuum Drying Oven

DP83C/104C

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