

Operation Manual

Rev.3

Cryo Calibrator Model ISIS_B

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<u>No.</u>	<u>Contents</u>	<u>Page</u>
1	Introduction	3
2	Unpacking and Initial Inspection	4
3	Alarm	5
4	Caution	6
5	Introduction	7
6	Apparatus Appearance	8
7	Operating Mode	10
8	Normal Procedure	16
9	Calibration Task by ISIS	17
10	Specification	18
11	Maintenance Procedure	19
12	Daily Operation	21
13	Communication	22
14	Standard Packing List	23

1. Introduction

Thank you for operating this Cryo calibrator ISIS.

This operation manual shows caution, operation procedure and maintenance procedure.

We are always willing to give technical advices and assistance where appropriate.

We would like you to read all of this manual before use, and keep this hand book.

We use custom designed cardboard box to send out your unit.

You have to use this box for transportation.

So we would like you to save it carefully.

This product meets the Restriction of Hazardous Substances.

This product meets the requirements of the European Directive on Electromagnetic Compatibility (EMC) 89/336/EEC as amended by EC Directive 92/31/EEC and the European Low Voltage Directive 73/25/EEC, amended by 93/68/EEC.

2. Unpacking and Initial Inspection

After unpacking the unit, please check if there is any damage during transportation, and confirm that accessories are in accordance with the packing note. In case you find any damage or missing item, please immediately notify our agent or us.

If the unit is damaged, please keep the package as it is for the inspection by insurance company.

When receiving the unit, and after unpacking the unit, we would like you to confirm that your delivery is in accordance with the packing note, and inspect it for any sign of shipping damage.

If you find any damage or the part of delivery is missing, we would like you to notify our agent or us.

While this apparatus has already been inspected at the factory, please check as follows

- Turn on power switch after connecting power cable to the electricity supply.
(Power switch is positioned at the above of the power supply inlet.)
- A sound of cooling fan can be heard from the back panel.
- Set SV at -100°C and $+40^{\circ}\text{C}$, and confirm that the PV temperature reaches and stabilizes at the temperature respectively.

(The controller PV displays the temperature in the thermal block.)

If the apparatus operates normally as above, you may use it. If anything wrong, please contact our agent or us.

3. Alarm

- (1) In the process of the apparatus operation, a Metal Block Bath temperature turns to be very cold. And so caution must be taken to prevent from burn injury.

Following seal shows the caution position.



- (2) Do not dismantle the apparatus.
- (3) Bring the apparatus with holding 2 handles steadily. In particularly, if using any groves or hand cream, so caution, handle with care.
Apparatus may slip off, and this trouble may be related to the injury, or the instrument anything trouble.
- (4) Set the apparatus on the steady place. And so caution, do not fell it down.
- (5) Keep the exhaust outlet at the rear panel free for ventilation. Please keep the distance between the apparatus and the back wall be more than 5cm.
- (6) Do not insert fingers and so on, for preventing from injury and any trouble.
- (7) Use the power cable appropriate one. Ground line must be correctly earthed.
And Use accessory cable for power supply.
- (8) Do not use the apparatus at the place where it is hard to connect with the power cable.
Because after taking off the power cable, the apparatus is easy to power down.
- (9) If putting the easy vaporizing alcohol at room temperature into the calibration hole, so caution, handle the alcohol according to manual and documents.
When you experience the accident of spilling alcohol over the calibration hole, so caution, set the power discontinuity ASAP and put off the power cable.
And please contact our local agent or us.
- (10) Do not block up the air vent of the apparatus. And so caution, set the apparatus more than 5 cm away from the near wall for exhaust heat.

4. Caution

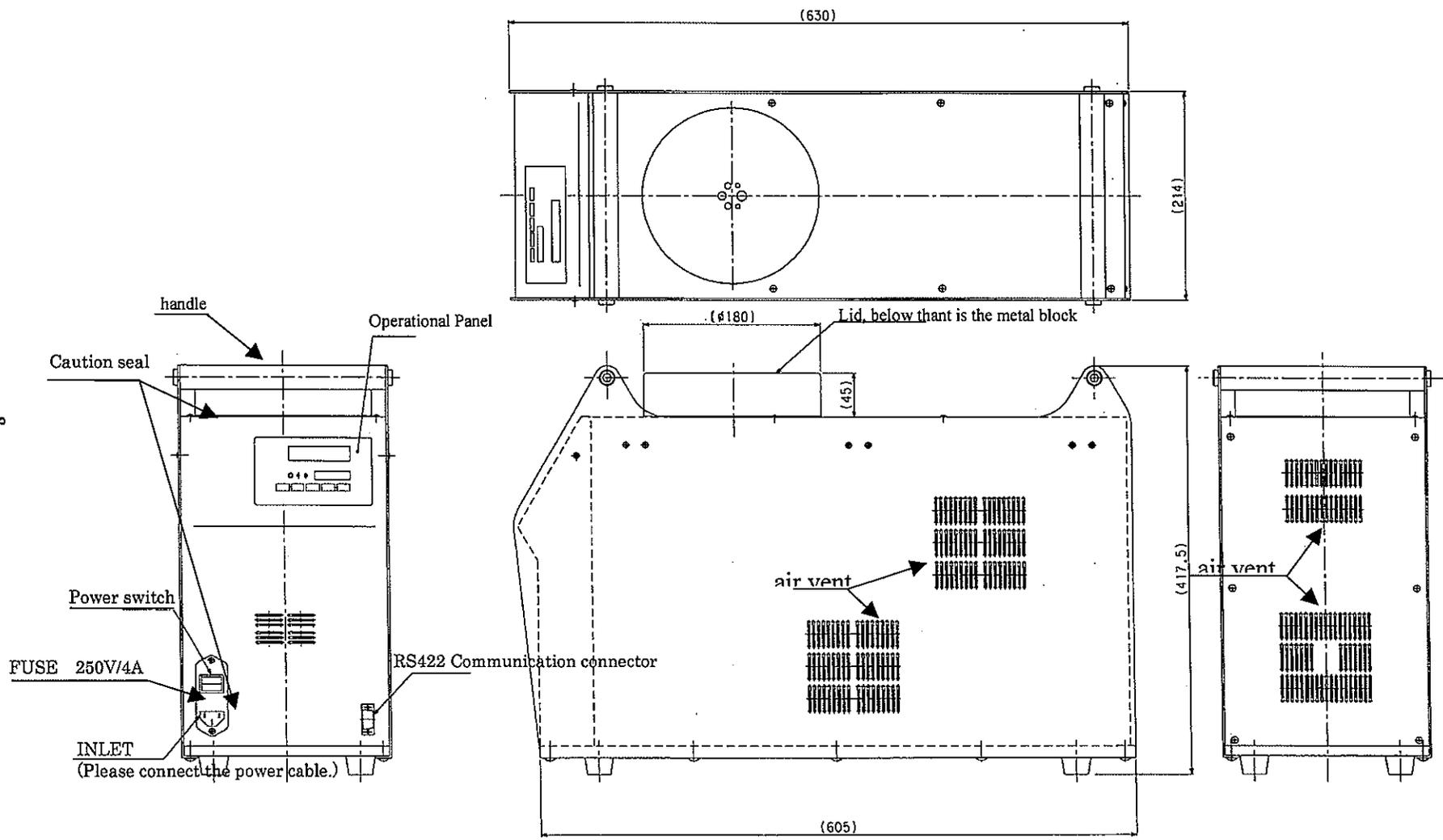
- (1) Please use the lid during the apparatus operation.
- (2) Do not insert the thicker sensor into the calibration hole than the hole size.
- (3) Do not push the button on the operational panel too excessive.
- (4) Do not give the apparatus a shock and a vibration.
- (5) Be careful for extracting sensor, as the sensor may be stuck the block especially at very low temperature.
- (6) Do not put the apparatus under the circumstances of intense electric noise and organic solvent. In these circumstances, this apparatus may turn to be out of order, or deteriorating cool down performance.
- (7) For your safety, Do not put anything on the apparatus and around the inlet.
- (8) Do not fill too much alcohol or antifreeze liquid, so as not to flow out of the apparatus.
- (9) Replace antifreeze liquid regularly, as its deterioration may affect the performance.
- (10) Do not use the apparatus for jobs other than those for which was designed.
- (11) Use the apparatus in the following environments.
 - Indoor use
 - At less than 1000m attitude.
 - Around temperature 0~35C, Humidity 30~85%RH
 - No corrosive gas, no inflammable gas in other word explosive atmosphere
 - No condensation, no water dropper nor not any liquid in the place
 - Hard to occur the trouble by inductive interference, nor hard to occur the trouble by electrostatic induction and magnetic interference.
 - Power supply voltage is assured to be between the nominal voltage +/-10%
 - Over voltage Category II
 - Applicable RATED POLLUTION degree II
 - Any interference must not be excluded from the apparatus.

5. Introduction

ISIS can realize temperature from -100C to $+40\text{C}$, and can be used as a Metal Block Bath for comparison calibration, which is to compare sensor to be calibrated with the standard probe which is already calibrated.

This bath can be used as a calibration bath to compare with the controller PV reading being already calibrated as standard temperature. The controller PV readings have already calibrated at our factory by comparison method with the standard probe.





6. Apparatus appearance

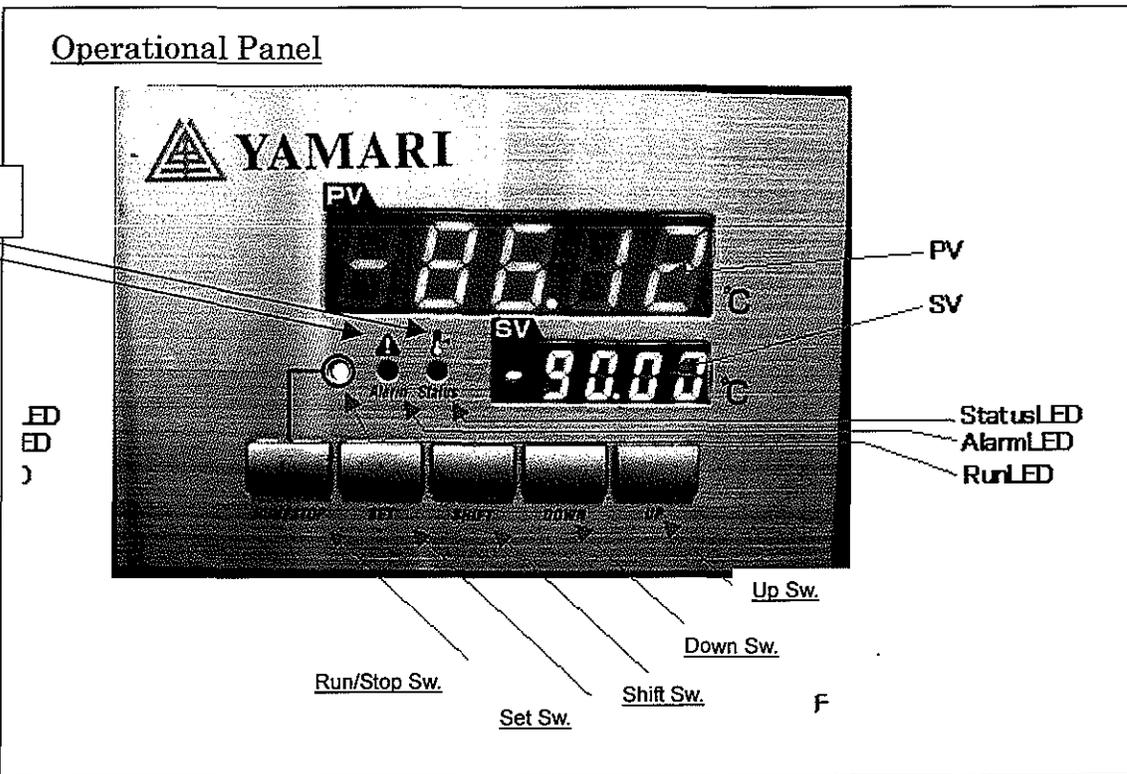
7. Operation Mode

Items	Operations
PV (Upper Readout)	The upper indicator displays the temperature in a Metal Block Bath. OVERLINE is indicated at the temperature above 50C. UNDERLINE is indicated at the temperature below -114C.
SV (Lower Readout)	Desired preset temperature
StatusLED	In cooling operation, StatusLED goes "ON" while the temperature is within +/- 0.3C of preset temperature for 3 minutes, and goes "OFF" while out of the above conditions.
AlarmLED	In cooling operation, AlarmLED goes "ON" when FPSC is overheated or is operated outside of the PV temperature range between -114C and 50C for 3 minutes.
RunLED	RunLED goes "ON" during FPSC operating, and goes "OFF" at stop mode. RunLED blinks on and off during auto-tuning mode.
Run/Stop Switch	<ol style="list-style-type: none"> (1) In the Pre-Control mode, cooling operation can be set "ON" or "OFF" by holding down a key for over 5 seconds. (2) In the SV setting mode, not any control output does not change. (3) In the Input Settings mode, the set data can be saved by holding down a key for over 5 seconds, and then return to Input Setting Mode.
Set switch	<ol style="list-style-type: none"> (1) In the Pre-Control mode, it can be set to Input SV Mode by holding down a key for over 5 seconds. (2) In the Input SV mode, the set data are saved by this switch, and then return to the normal operation mode. (3) In the Input Settings mode, it can move from set selection to Input Setting. Return to set selection mode, when this key is pushed during the Input Setting mode.
Shift switch	<ol style="list-style-type: none"> (1) In the Pre-Control mode, auto-tuning can be set "ON" or "OFF" by holding down a key for over 5 seconds. (2) In the Input SV mode, it can move the cursor to the right, and move to the

	<p>highest-order digit when cursor is at the right edge.</p> <p>(3) In the Input Setting mode, it can move the cursor to the right for Input Setting, and move to the highest-order digit when cursor is at the right edge.</p>
Down switch	<p>(1) In the Pre-Control mode, not any control output does not change.</p> <p>(2) In the Input SV mode, it can decrement the number at the cursor.</p> <p>(3) In the Input Settings mode, it can move to the previous setting while in the set selection mode. It can decrement the number at the cursor.</p>
Up switch	<p>(1) In the Pre-Control mode, not any control output does not change.</p> <p>(2) In the Input SV mode, it can increment the number at the cursor.</p> <p>(3) In the Input Settings mode, it can move to the next setting while in the set selection mode. It can increment the number at the cursor.</p>

Operational Panel

要図の説明



8. Normal Operation Procedure

(1) Basic operation

Step 1. Power on

Step 2. Initializing the apparatus

Upper bar and AlarmLED go "ON" for 5 seconds.

Step 3. The temperature measured in a Metal Block Bath is displayed on PV at the front panel.

Step 4. Set temperature of SV is displayed.

Step 5. After setting SV by Run/Stop switch, cooling or heating operation starts.

RunLED goes "ON".

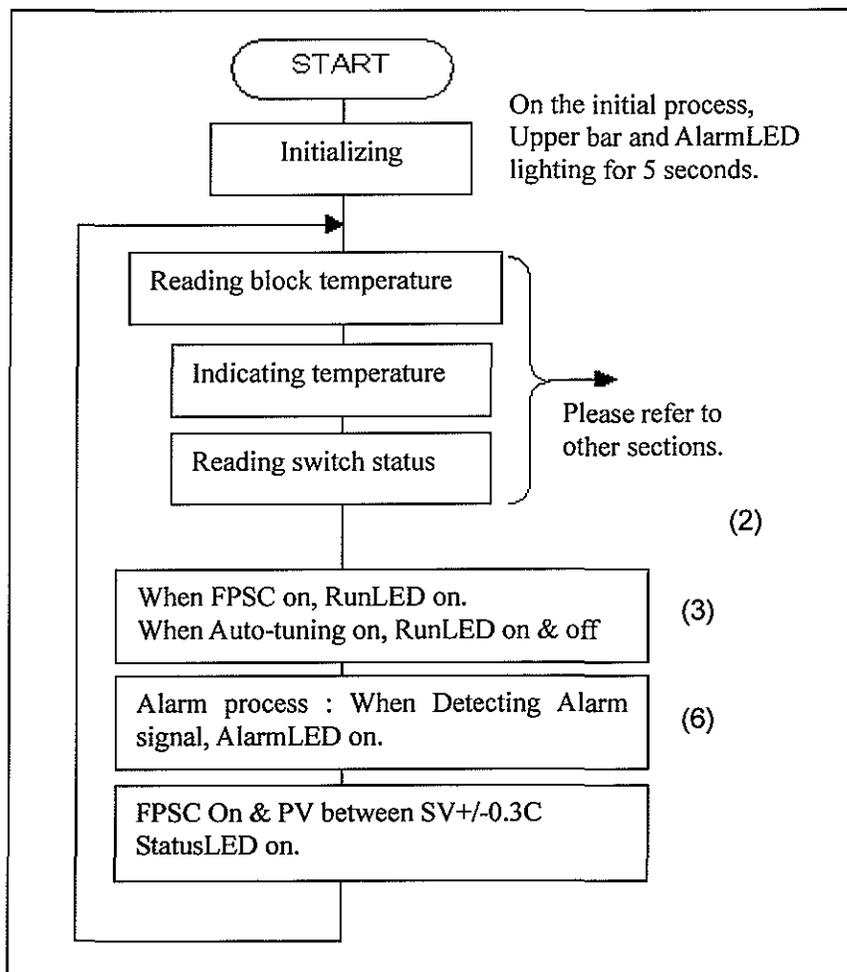
Step 6. Auto-tuning starts by the Shift switch.

RunLED blinks on and off.

(PID data originally set at our factory is recommended.)

(Always watching the FPSC signals, if detecting the alarm status, Alarm LED is lightning.)

On the cooling process, when PV holding between desired temperature $\pm 0.3C$ for 3 minutes.
And so Status LED is lightning.



(2) Operation on the Control Panel

Step 1. Power on

Step 2. This apparatus is initialized.

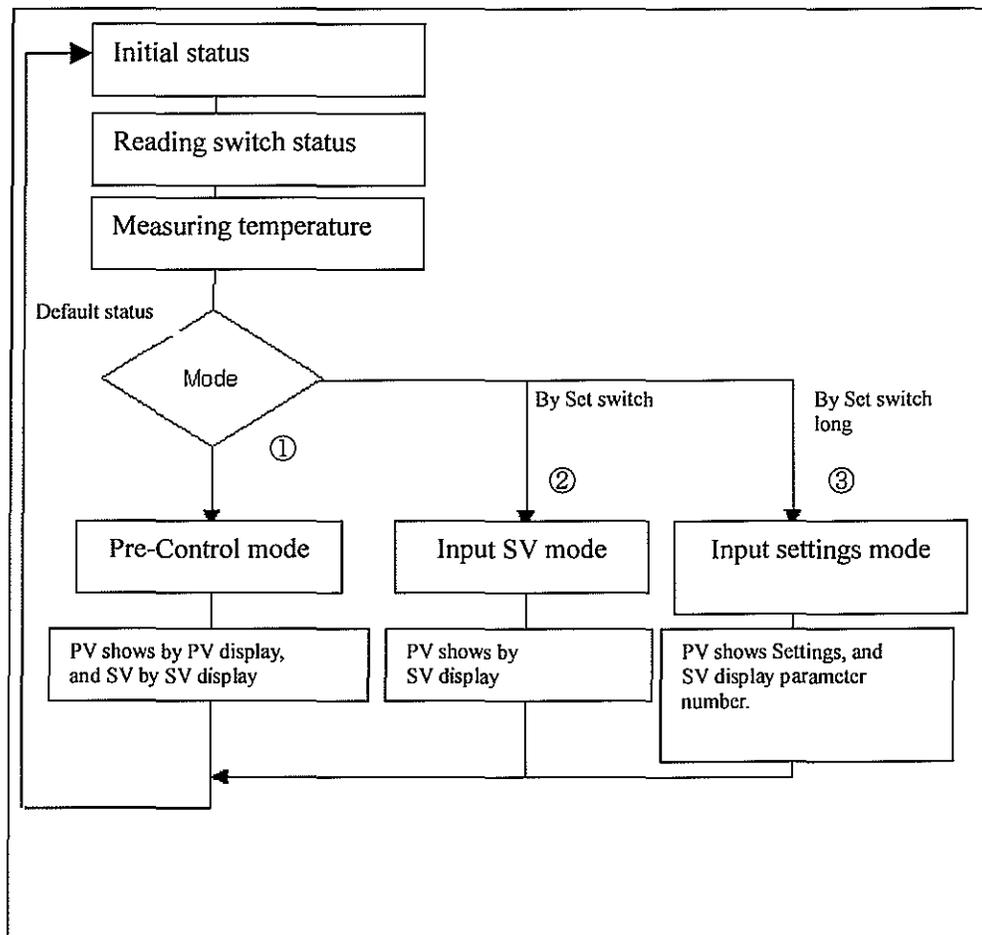
On the initial process, the upper bar & the Alarm LED is lighting for 5 seconds.

① After measuring temperature at a Metal Block Bath, PV is displayed at the front panel.

This condition is in the pre-Control mode.

② In the pre-Control mode, by Set switch, SV is displayed at the PV indicator, and so tuning to the Input SV mode.

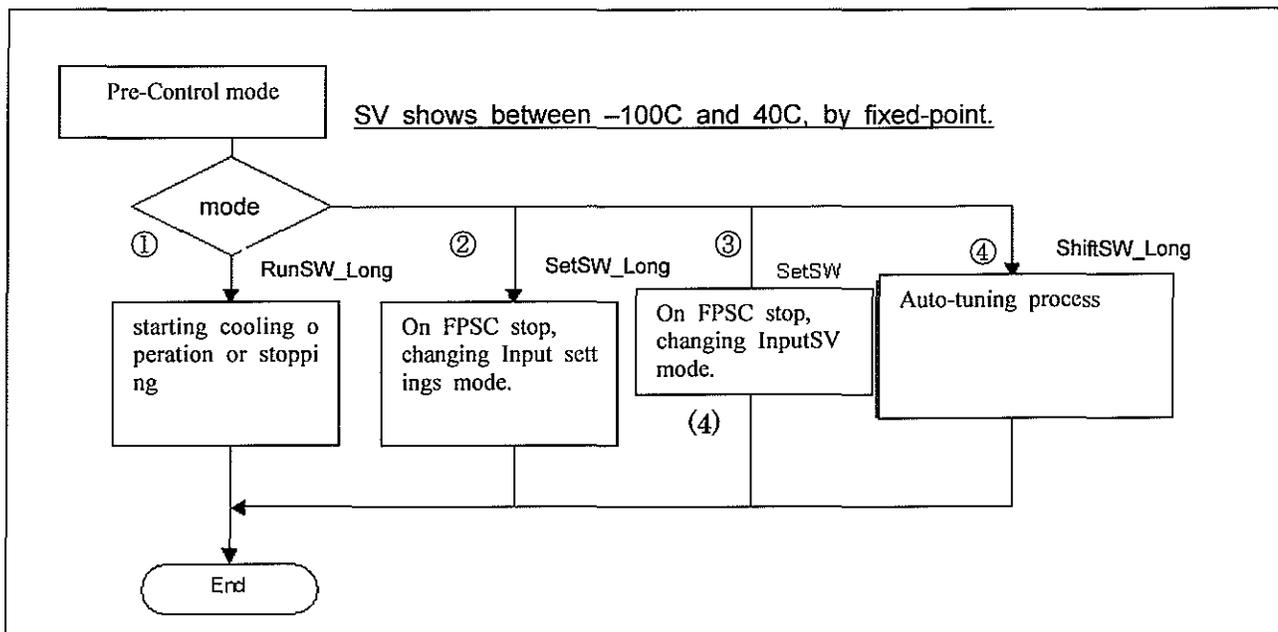
③ In the pre-Control mode, by Set switch for more than 5 seconds, and so turning to the Input Settings mode. This procedure is used for the maintenance.



(3) Pre-Control mode,

Pre-Control mode:

- ① By Set switch for more than 5 seconds, when FPSC stop, Starting cooling operation or stop.
- ② By Set switch for more than 5 seconds, when FPSC stop, changing Input settings mode.
- ③ By Set switch for a short time, when FPSC stop, changing Input SV mode.
- ④ By Shift switch more than 5 seconds, on difference between SV & PV more than 6C, starting the Auto-tuning process, in spite of FPSC status.
When on the process of Auto-tuning, after Shift switch more than 5 seconds, stopping the Auto-tuning process.

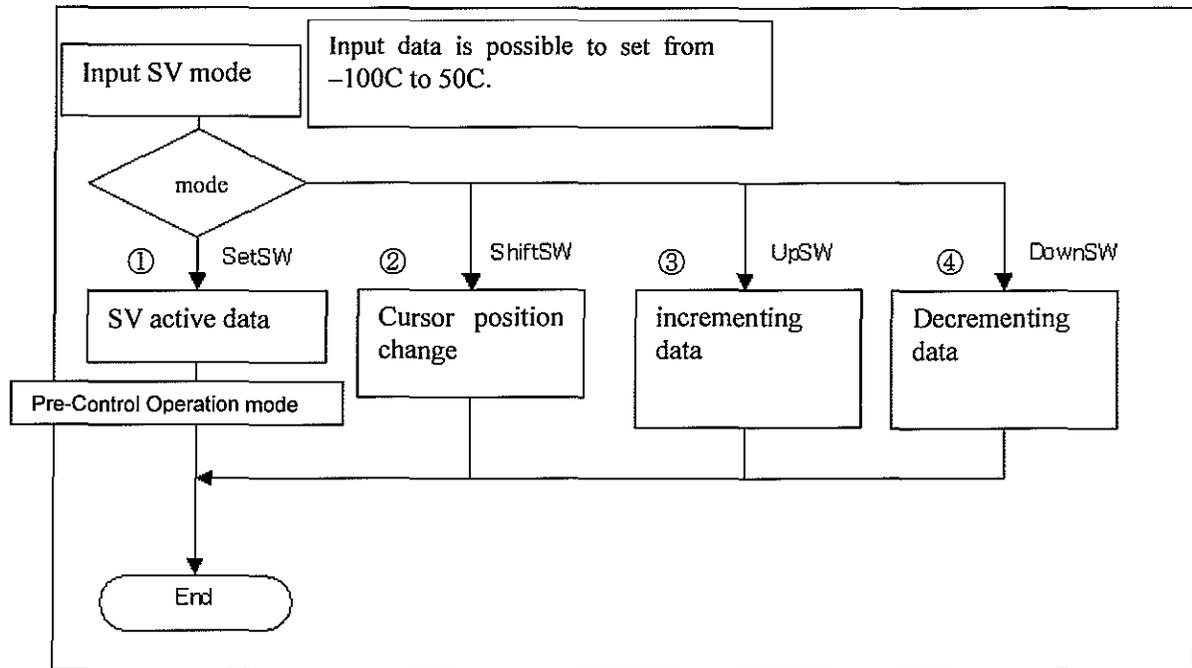


(4) Input SV mode

At the input SV mode, showing SV by means of the PV display.

Mode:

- ① By Set switch, setting, and changing.
- ② By Shift switch, changing the cursor position to the lower column of SV.
- ③ By Up switch, at the cursor.
- ④ By Down switch, decrementing data at the cursor.



(5) Input Settings mode

(While maintenance procedure only, this mode is used)

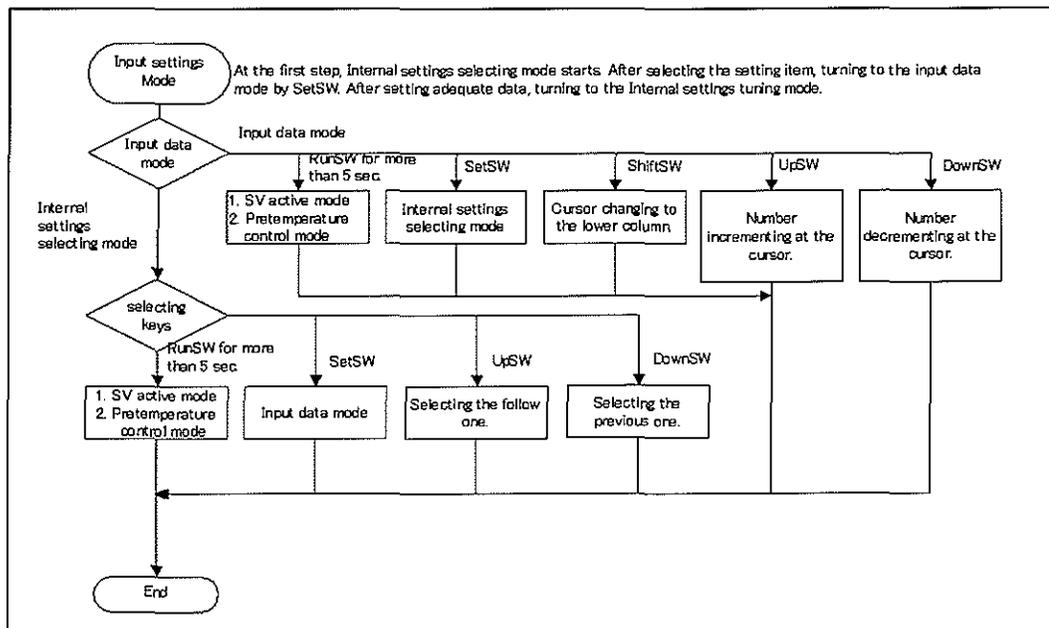
By Set switch of more than 5 seconds, Input Data mode turning to Input mode.

Input data mode:

- Step 1. At pre temperature control operation mode, by Run/Stop switch for more than 5 seconds, setting SV active data, and returning to the pre temperature control operation mode.
- Step 2. By Set switch, changing to the Internal settings selecting mode.
- Step 3. By Shift switch, changing the cursor position of SV to the lower column.
- Step 4. By Up switch, incrementing data at the cursor.
- Step 5. By Down switch, decrementing data at the cursor.

Internal settings selecting:

- Step 6. By Run switch for more than 5 seconds, saving tuning data into the internal memory, and returning to pre-Temperature control mode.
- Step 7. By Set switch ,selecting the desired settings, and possible to tune them.
- Step 8. By Up switch, selecting the following one.
- Step 9. By Down switch, selecting the previous one.



Settings contents

Parameter Description	Indicator	Upper limit	Lower limit
SV	tref	50.0	-100.0
Proportional Gain	prop	50.0	00.0
Integral Gain	iteg	5000	0
Derivative Gain	deri	5000	0
Proportional Band	regi	100	0
Temperature Offset	offs	9.99	-9.99
Gain Adjust	gain	5000	-5000

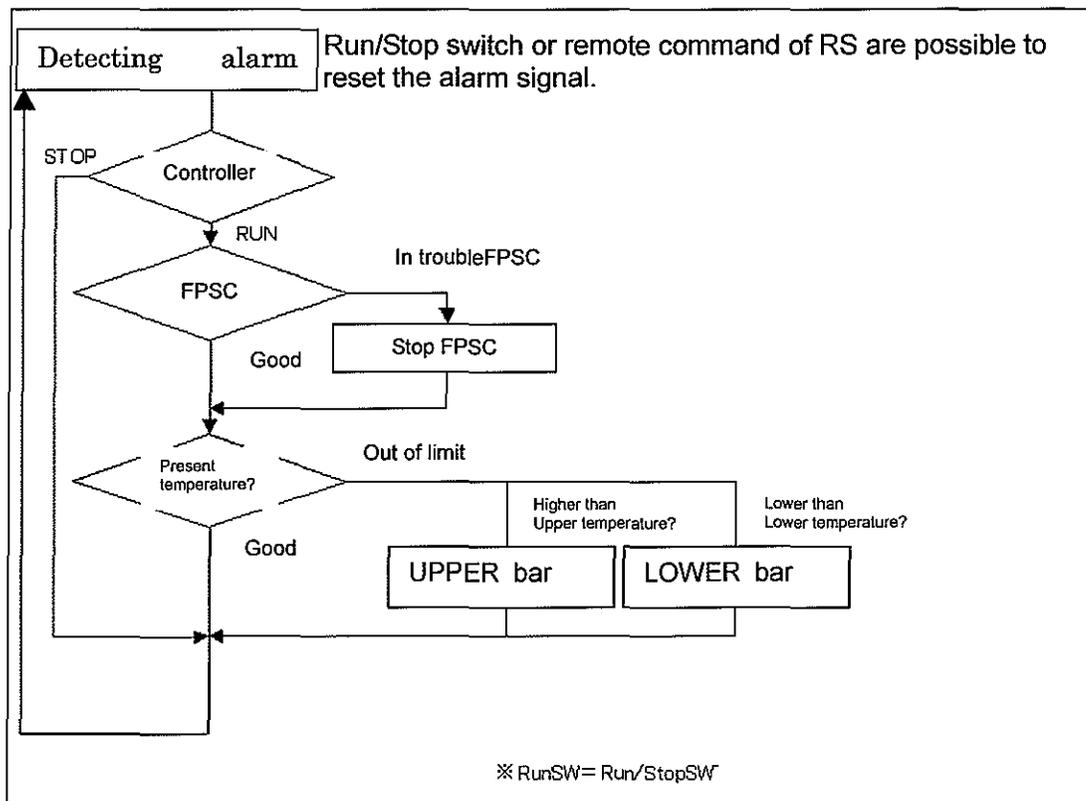
(6) Detecting Alarm Signals

Alarm output is latched. After clearing the trouble cause, by Run/Stop switch or remote command of RS, possible to reset the alarm output.

Detail contents are as follows,

- Watching the controller status.
- Watching the FPSC signal.
- Watching PV. Is it more than 50C?
- Watching PV. Is it less than -114C?

When the alarm phenomena occurs frequently, examples Alarm output, we would appreciate it if you could ask our local dealer or us.



(7) Resetting procedure of PID settings

By Shift switch, the Auto-tuning process starts.

We recommend the initial data by us will be used. Initial ID is bigger than by Auto-tuned.

If you try to execute the Auto-tuning process, please write down the present settings, just in case.

Before executing the Auto-tuning process, you have to fix the temperature for this process. So if you set this temperature fairly low, this process may need to complete for a few hours.

Auto-tuning temperature, SV, is recommended lower than 0C.

If difference between SV and PV is smaller than 6C, Auto-tuning process is impossible to start.

While the auto-tuning process, RunLED is turning ON & Off.

9. Calibration task by ISIS

Calibration task by ISIS is executed with the controller, which measures the calibration block.

Controller (on the operational panel)

Controller realizes the desired temperature of calibration block, and remains a fixed temperature on purpose of thermometer comparison calibration.

Comparison calibration

Using the controller as the “calibrated standard”, this method means that ISIS controller has been calibrated by comparing to a calibrated standard placed in the bath.

10. Specification

Voltage : 100~240 \pm 10% Vac

Power : 200VA

Supply Frequency : 50/60Hz

Maximum Operating Temperature : 40C

Minimum Operating Temperature : -100C

Calibration Volume : ϕ 35mm \times 160mm deep(extract possible)

Sensor insert Hole Dimension : ϕ 9.5 mm \times 1pc + ϕ 8 mm \times 1pc

ϕ 6.4 mm \times 2pc + ϕ 4.5 mm \times 2pc

Hole depth is 157 mm.

Operation temperature : 0~35C

Operation Relative humidity : 30~85%RH (non condensing)

Storage temperature : 10~50C

Temperature Display resolution : 0.01C

Dimensions : Height 420mm

Width 215mm

Depth 630mm

Weight : 20 Kg

11. Maintenance

There is not any daily task for maintaining the apparatus in good condition.

But following tasks are recommended.

1. Please keep clean at the inner and the outer apparatus.

- (1) If any dirt on the outer apparatus

Clear them according to the following procedure.

Step1. Dilute mild detergent with water.

Step2. Ensure that the detergent does not drop to the apparatus,

And clear them by scrubbing cloth and the above detergent,

Step3. Wipe the outer apparatus by dry cloth on purpose of drying.

- (2) If any dirt on the metal block

Clear them according to the following procedure.

Step1. Clear them softly by scrubbing cloth and isopropyl alcohol.

- (3) If any dirt on the inner sidewall of calibration hole

Clear them according to the following procedure.

Step1. Extract the metal block from the calibration hole by the adequate tool.

Step2. Ensure not to make any scratch on the hole.

And clear them softly by scrubbing cloth and isopropyl alcohol.

- (4) If any dirt on the bottom of calibration hole

Clear them according to the following procedure.

Step1. Extract the metal block from the calibration hole by the adequate tool.

Step2. Fasten scrubbing cloth to the short stick temporarily.

Step3. Ensure not to make any scratch on the hole.

And clear them softly by the above tool, scrubbing cloth and isopropyl alcohol.

Caution. When using mild detergent or isopropyl alcohol, first of all, please read their manual and important reminder carefully before practice.

2. Please do not drop any metal piece into the apparatus.

There are not any spare parts with the standard delivery.

If you need to repair the apparatus, please call our local agent or us.

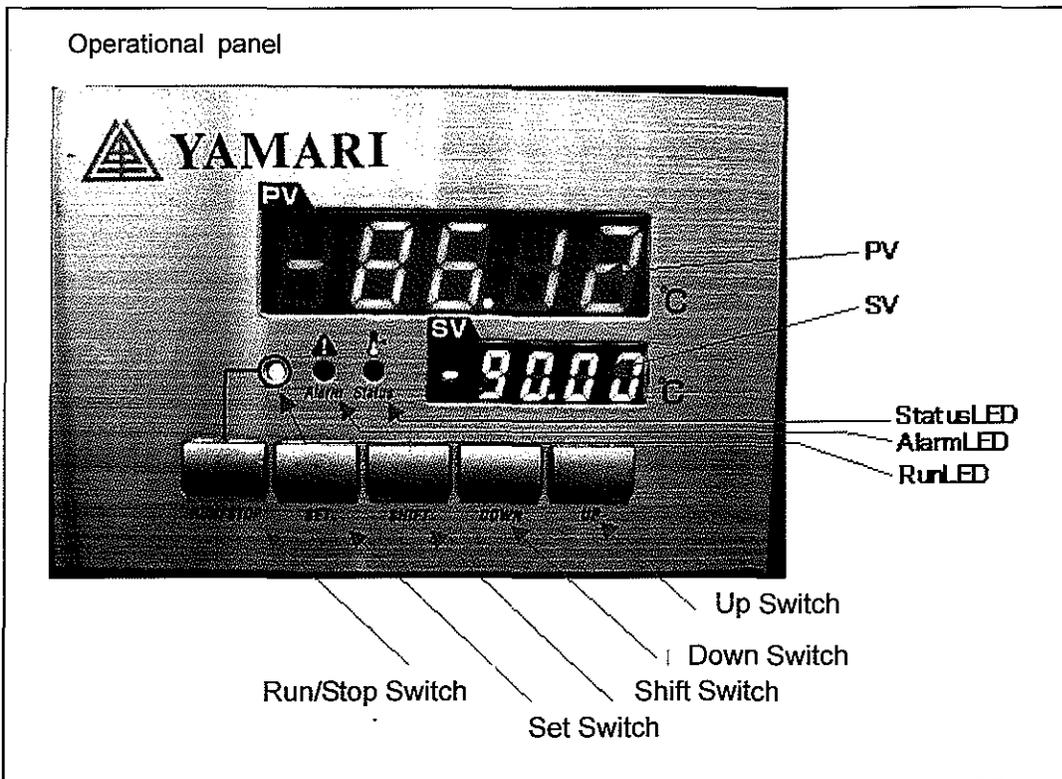
12. Daily Operation

1. Please connect to the electricity supply.

Please switch power on.

The power on switch is positioned at the above of the power supply inlet.

2. The display PV of Control panel on the front panel shows the nominal block temperature.



3. When RunLED off (if on, after operating Run/Stop switch, RunLED off.) , after operating Run/Stop switch, please tune SV by Up switch and Down switch, and so fix SV by Set switch.
4. After operating Run/Stop switch, temperature control function starts.

For purpose of upgrading temperature uniformity in calibration hole, pouring some alcohol or antifreeze liquid into calibration hole would be useful. So caution, don't spill any liquid over the calibration hole.

As a rough guide for liquid quantity, fluid level is the top of calibration metal block.

13. Communication

Communication settings	Contents
Communication	RS232C
Communication lines	3 lines
Control line	Non
Length of PC communication cable	10m (2m Recommended)
Baud rate	9600bps
Method	Half duplex
Communication parameter	8bit NonParity StopBit=1
Communication character	ASCII code
Connector	9pin Dsub male Connector
Pin Assign	2pin = RXD 3pin = TXD 5pin = GND 7pin, 8pin Jumped

Regarding the detail specification and usage, please ask our local agent or us.

14. Standard Packing list

1. Body
2. Power cable
3. Metal insert block
4. Extracting tool for insert block
5. Lid for the metal block
6. Operation Manual