

GARG ELECTROHEAT

**Induction Melting Machine
Owner's Manual**

GIM05SR

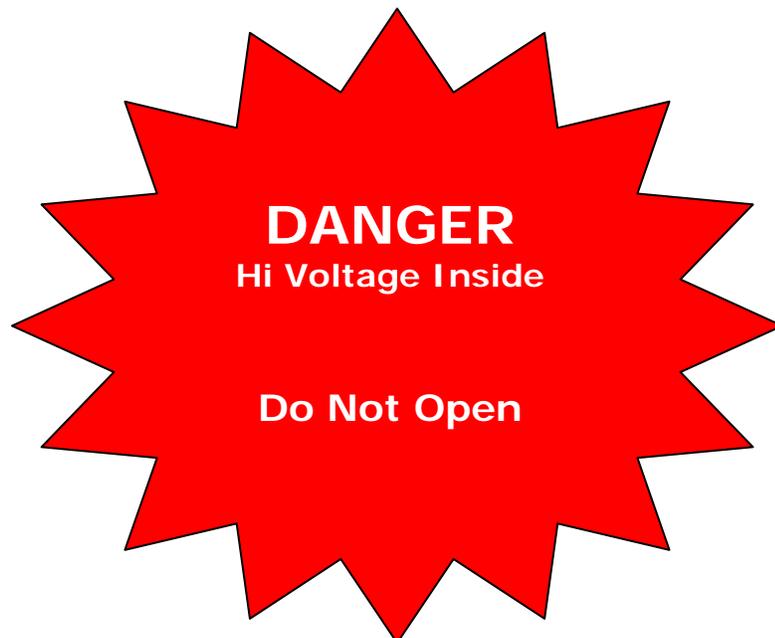
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Note of Thanks

We take the opportunity to thank you for vesting your interest in our product. We strongly recommend that you study carefully the operating instructions before attempting to operate the unit. We also recommend noting and displaying the precautions where the machine is installed.

Warning : Please do not attempt to open the machine when it is running. It may be extremely hazardous, as very high voltage exists inside the machine. Trained professionals only should open this machine.



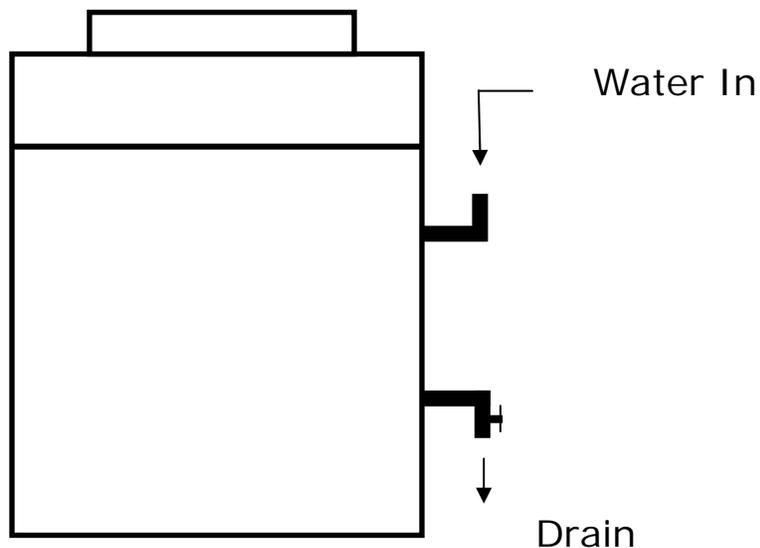
Machine Specifications

Voltage	:	230 Volts
Current	:	16 A (Max)
Power	:	4.0 KW (Approx.)
Capacity	:	500g. (Gold 24 Carat)
Max. Temp.	:	1200°C
Frequency	:	Medium Frequency
Crucible	:	Graphite/Jacketed Graphite
Time to first Melt	:	3 - 5 Minutes (Approx.)
Water Temperature	:	45°C (Max.)
Weight	:	60 Kg. (Approx)
Dimensions	:	18" X 18" X 30" (WXDXH)
Water Tank	:	6 Ltrs
Water Pump	:	¼ HP

Machine Settings

Please follow the steps as below to set up the machine

- Place the machine in airy place (if possible) at least 6" from the wall.
- Please fill Approx. 2 Ltr water in the machine initially.
- Always check for "Water Level" indicator. If it glows, please add some water till it puts off.
- When Water temperature rises above permissible limits you will see "Over Heat" Indicator.
- **If the electricity fails in the middle of the operations (or for any other reason water pump stops) when the crucible is hot please take out the hot crucible and place any cold crucible in place.**
- **Please do not use hard water.**



Operating the Machine

- First set up the machine as discussed above.
- Please fill two liter of soft water in the machine.
- Turn ON the POWER from Plug. A fan will start at the backside.
- Turn ON the Tripper. The water pump will turn on, the red "POWER OFF" indicator will glow. The red "WATER LEVEL" indicator will glow. The temperature controller will boot and will display room temperature in some moments.
- Please add enough water in the machine so that "WATER LEVEL" indicator turns off.
- If the water is flowing and red LED/Buzzer of "WATER FAIL" still sounds then check the water pressure switch settings.
- Confirm that the crucible is in the place (Very Very Important). Without Crucible Machine will not start and the "NO CRUCIBLE" signal will remain ON. As you will put the crucible in place it should turn off.
- Set the required temperature as detailed in temperature controller's manual and marked.
- Press "POWER ON" green push button to start the machine.
- The ampere meter will display the current taken by the machine and temperature controller will start displaying the rise in the temperature.
- The machine reaches 1000⁰C within 3 - 5 Minutes (Approx).
- When the melting is done turn the machine off by pressing red "POWER OFF" push button.
- Now you may take out the crucible for casting or any other application.
- For next melting place the crucible in its place and press green "POWER ON" push button.
- When the work is done and red "POWER OFF" push button is pressed, keep the crucible outside the coil. Now you can turn off the machine.

Troubleshooting

Please note that a trained electrician should open the machine. Please disconnect the machine from Power before opening. Always discharge the capacitors first and then proceed for repairing.

1. Machine does not start no display on temperature controller and no LED indication.
 - * Wire from tripper is disconnected.
 - * Wire from mains connector is open or loose.
 - * Check the three-pin plug for wire connections.
 - * Check the mains chord continuity.
2. Machine stops in the mid of melting and water fail LED glows.
 - * Check the output of the water for proper pressure.
 - * Check the water line for clogging.
 - * If everything is fine set the screw on water pressure switch and adjust for that pressure.
3. Machine starts, current builds and then machine trips.
 - * Check that crucible is in place.
 - * If it is in place check that it is not very thin if so please replace by a new one.
 - * Reduce the power by power-adjustment knob and restart.
 - * if the problem persists again reduce the power and restart.
4. Machine Turns ON but current does not built, Temperature controller shows some odd display.
 - * Sensor is open. Replace it.

5. Machine Turns ON but current does not built, Temperature controller shows Room Temperature.

* Fuse is open. Replace it.

* Check the connections at diode bridge.

6. Machine Shows "OVER HEAT" indicator and stops heating.

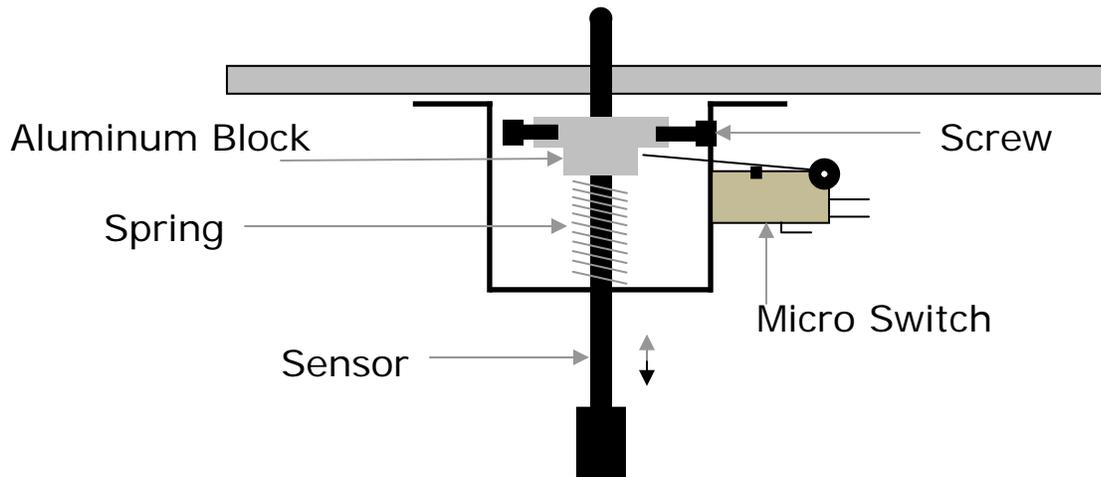
* The water Temperature is very high. Either we can wait for water to cool down, or we can change the hot water.

For changing the Hot Water, please place a bucket below the drain pipe and open the valve. Let all the hot water drain from the machine. Then close the valve and put about 2 Ltrs normal soft water in the machine. Then turn on the machine and put more water until water level signal turns off.

7. For any other reason please let your maintenance person open the machine and run it and note the status of LEDs on the PCB and contact us at the address and telephone nos. provided.

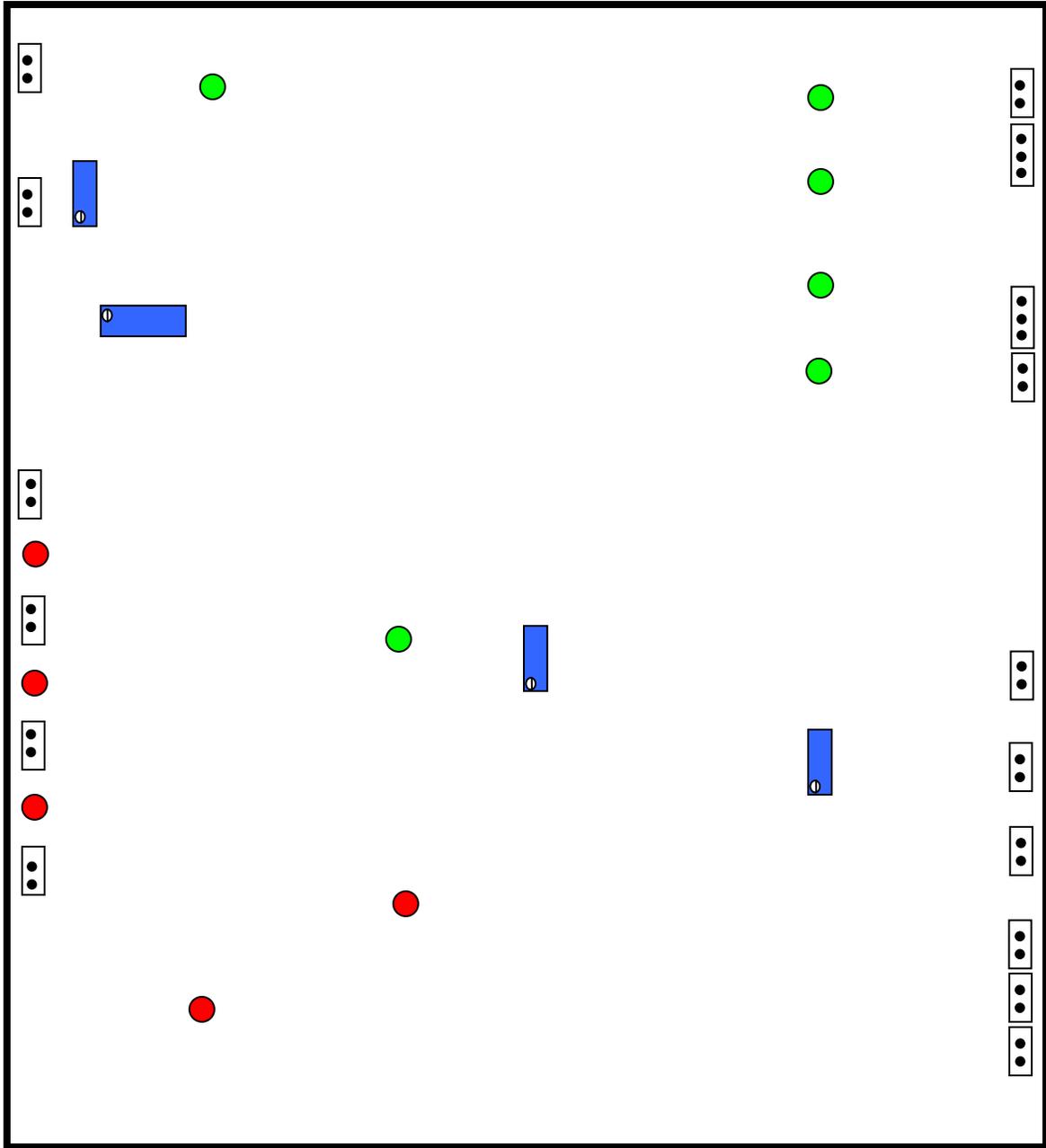
8. When you place the crucible but “NO CRUCIBLE” indicator does not put off and machine does not start.

In this case you will have to adjust the sensor of the machine as directed in diagram below.



- A] Loosen the screw on Aluminum Block so that sensor can move.
- B] Place the crucible and adjust the sensor so that sensor lifts the crucible by 5 - 8 mm.
- C] Now tighten the screws. In this case when you place the crucible the spring is pressed by 5-10 mm and the micro switch will record that crucible is in place.
- D] Make sure that when you place the crucible the No Crucible signal stops.

Electrical Diagrams



Main Board

Warranty Conditions

1. We Warrantee the Induction Gold Melting Machine of 500g against all manufacturing defects during 12 months from the date of sale by us or through our dealers.
2. The warrantee will become INVALID
 - a) If the machine is not operated as per instruction given in the manual.
 - b) If the agreed payment terms and other conditions of sale are not followed.
 - c) If the customer resale the machine to other party.
 - d) If the customer tries to open the machine and creates any fault deliberately.
3. The non-working of the machine is to be communicated to us immediately giving full details of the complaints and defects noticed. On receipt of this, we will give suitable instructions regarding the repair of machine and will send our representative for service.

User's Manual

Digital PID Controller



48×48



96×48



72×72



48×96



96×96

1 Notice

Please confirm the specification of controllers is totally with your requirement before using it, also read this users manual in detail.

⚠ Danger

1. Danger ! Electric Shock !
DON'T touch AC power wiring terminal when controller has been powered !
Keep the power off until all of the wiring are completed !

⚠ Warning

1. Please confirm the AC power wiring to controller is correct, otherwise it would be caused aggravated damage on controller.
(48×48 connecting with Pin 1 and 6, 96×48/72×72/48×96/96×96 with Pin 1 and 2).
2. Be sure to use the rated power supply(AC85~265V or DC24V),otherwise it would be caused aggravated damage on controller.
3. Please confirm wires are connected with correct terminal (Input, Output).
4. Use M3 screw-compatible crimp-on terminals with an insulation sleeve, as shown below



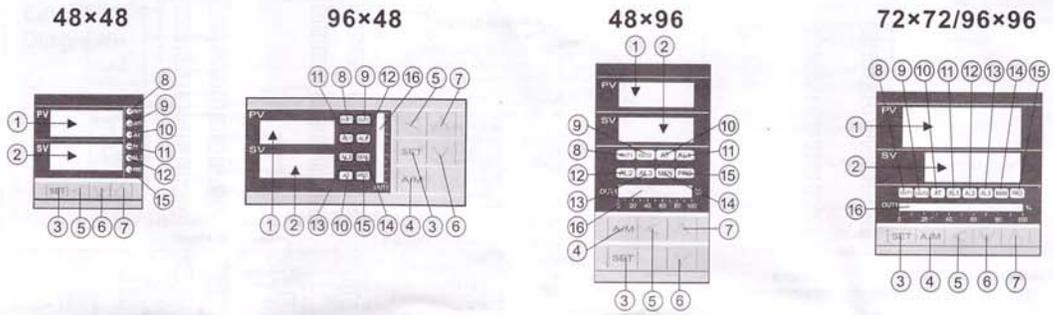
Torque : 0.4 N.m (4kgf.cm)

5. Avoid to install controller in following spaces:
 - I. A place where the ambient temperature may reach beyond the range from 0 to 50°C
 - II. A place where the ambient humidity may reach beyond the range from 50 to 85% RH.
 - III. A place where the the controller likely to come into contact with water,oil,chemicals,steam and vapor.
 - IV. A place where the controller is subject to interface with static electricity,magnetism and noise.
6. For thermocouple(TC) input, use shield compensating lead wire.
7. For RTD input, use shield wires which have low resistance and no resistance difference between the 3 wires.

2 External Dimension and Panel Cutout < Unit : mm >

48×48			
96×48			
72×72			
48×96			
96×96			

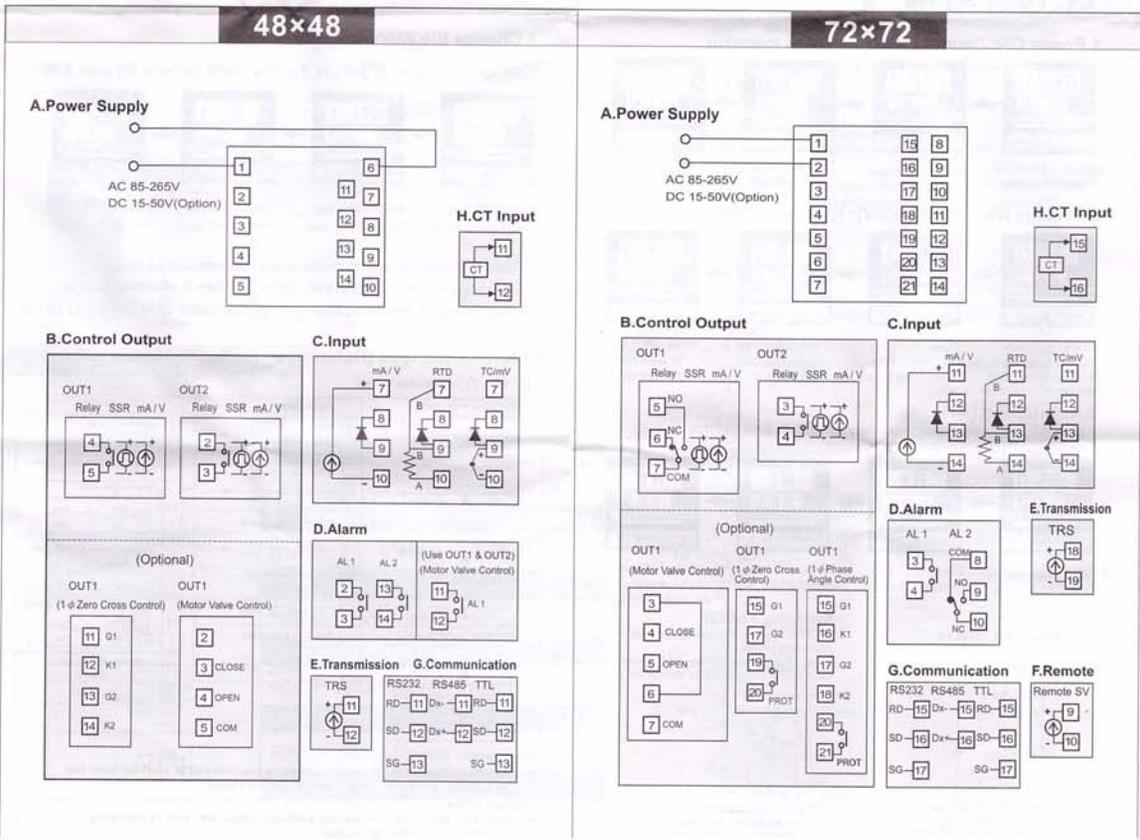
3 Parts Description

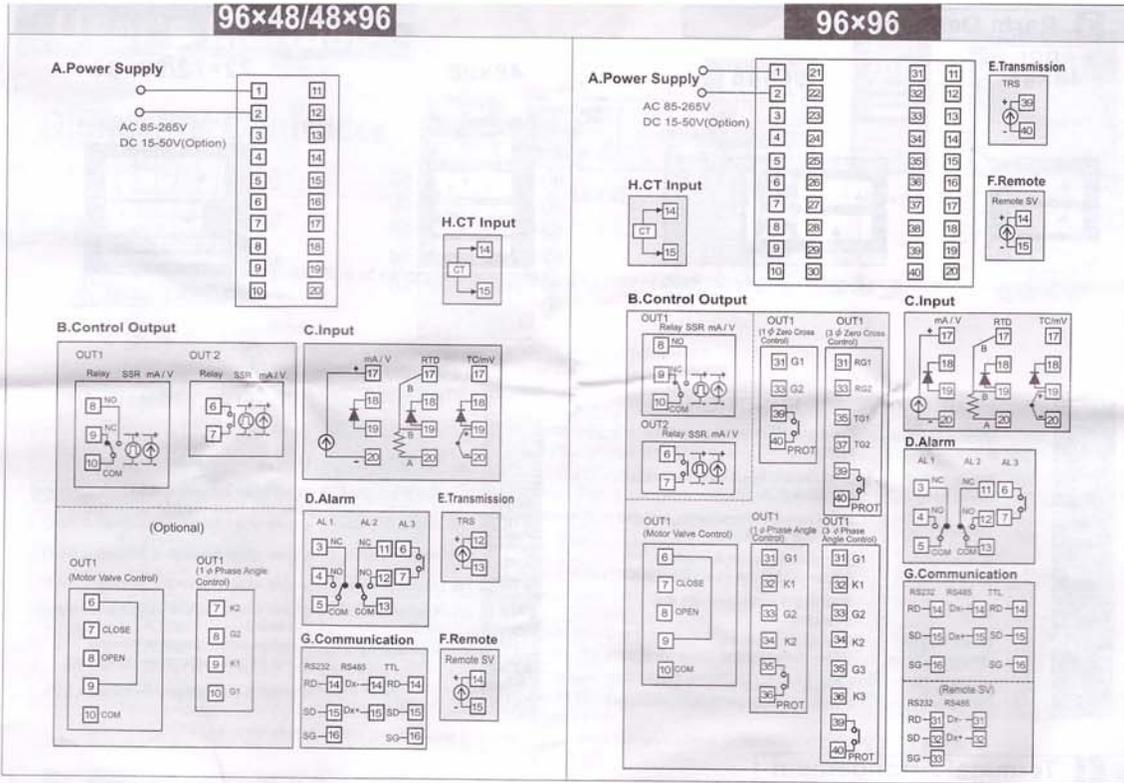


SYMBOL	NAME	FUNCTION
PV ①	Measured value (PV)display	Displays PV or various parameter symbols(Red)
SV ②	Setting value (SV)display	Displays SV or various parameter set values(Green)
SET ③	Set Key	Used for parameter calling up and set value registration
A/M ④	Auto/Manual key	Switches between Auto(PID) output mode and Manual output
< ⑤	Shift Key	Shift digits when settings are changed
∨ ⑥	Down Key (*Program Hold)	Decrease numbers (*Only for programmable controller)
∧ ⑦	Up Key (*Program Run)	Increase numbers (*Only for programmable controller)

SYMBOL	NAME	FUNCTION
OUT1 ⑧	OUT1 lamp	Lights when OUT1 is on(Green)
OUT2 ⑨	OUT2 lamp	Lights when OUT2 is on(Green)
AT ⑩	Autotuning lamp	Lights when Autotuning is activated(Orange)
AL1 ⑪	Alarm 1 lamp	Lights when Alarm 1 is activated(Red)
AL2 ⑫	Alarm 2 lamp	Lights when Alarm 2 is activated(Red)
AL3 ⑬	Alarm 3 lamp	Lights when Alarm 3 is activated(Red)
MAN ⑭	Manual output lamp	Lights when manual output is activated (Orange)
PRO ⑮	Program Running lamp	Flashes when program running (Only for programmable controller)
OUT% ⑯	Output % Bar-Graph display	Output % is displayed on 10-dot LEDs

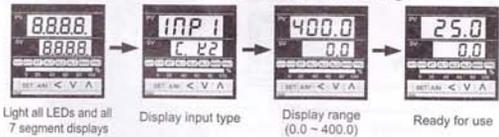
4 Terminal Arrangement





5 Operations

1. Power ON: Controller will display as following



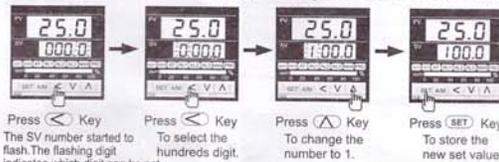
Light all LEDs and all 7 segment displays

Display input type

Display range (0.0 ~ 400.0)

Ready for use

2. Change the Set Value(SV): Change SV from 0.0 to 100.0



Press \leftarrow Key
The SV number started to flash. The flashing digit indicates which digit can be set.

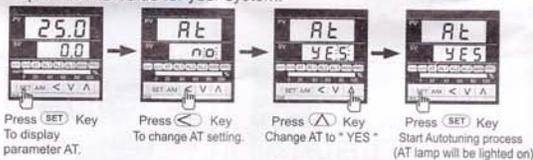
Press \leftarrow Key
To select the hundreds digit.

Press \triangle Key
To change the number to 1.

Press SET Key
To store the new set value.

3. Autotuning (AT):

Use AT function to automatically calculate and set the optimize PID value for your system.



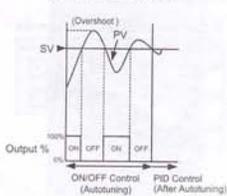
Press SET Key
To display parameter AT.

Press \leftarrow Key
To change AT setting.

Press \triangle Key
Change AT to "YES"

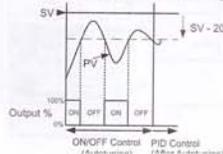
Press SET Key
Start Autotuning process (AT lamp will be lighted on)

Autotuning ATVL=0



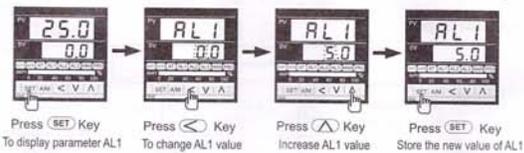
Autotuning ATVL=20

*Set ATVL to prevent overshoot occurred during autotuning process.
To set ATVL, press SET key for 5 seconds to enter Level 2 (PID Level) and then change the value.



4. Change the Alarm value:

Change AL1 value to "5.0" (AL1 active, if PV exceeds SV over 5.0)



Press SET Key
To display parameter AL1

Press \leftarrow Key
To change AL1 value

Press \triangle Key
Increase AL1 value

Press SET Key
Store the new value of AL1

* There are total 16 alarm mode types, referenced as below:

* To change Alarm mode, press $\text{SET} + \leftarrow$ key 5 seconds to enter Level 3 (Input Level) and then change the value of ALD1/ALD2/ALD3.

5. Alarm mode type (Referenced for ALD1/ALD2/ALD3)

(\triangle : SV \triangle : Alarm set value)

01	Deviation high alarm with hold action* OFF ON \triangle HIGH \triangle PV	04	Band alarm OFF ON \triangle LOW \triangle ON \triangle HIGH \triangle PV	07	Segment End alarm (Only for Programmable controller) (1) ALD1-3, set 07 (2) ALD1-3 Alarm Segment (3) ALD1-3 defines as follows: 0 = Rickler alarm 99.99 = continued alarm = alarm ON time
11	Deviation high alarm OFF ON \triangle HIGH \triangle PV	05	Process high alarm with hold action* OFF ON \triangle LOW \triangle HIGH \triangle PV	17	Program Run alarm (Only for Programmable controller) Run Stop
02	Deviation low alarm with hold action* ON \triangle OFF \triangle HIGH \triangle PV	15	Process high alarm OFF ON \triangle LOW \triangle HIGH \triangle PV	08	System failed alarm* (ON) Normal Failed
12	Deviation low alarm ON \triangle OFF \triangle HIGH \triangle PV	06	Process low alarm with hold action* ON \triangle OFF \triangle LOW \triangle HIGH \triangle PV	18	System failed alarm* (OFF) Normal Failed
03	Deviation high/low alarm with hold action* ON \triangle OFF \triangle LOW \triangle ON \triangle HIGH \triangle PV	16	Process low alarm ON \triangle OFF \triangle LOW \triangle HIGH \triangle PV	09	Heater Break Alarm (HBA)
13	Deviation high/low alarm ON \triangle OFF \triangle LOW \triangle ON \triangle HIGH \triangle PV			10	No alarm

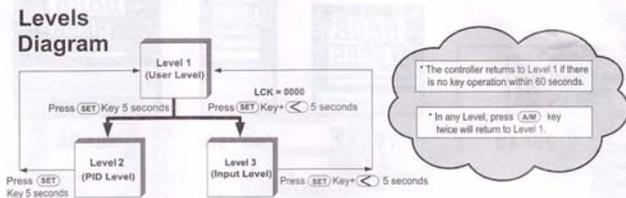
*Hold action:

When Hold action is ON, the alarm action is suppressed at start-up until the measured value(PV) enters the non-alarm range.

*System failed:

It means that the controller display error message with one of the following :

6 Parameter List



Level 1 (User Level)

Process Value Set Value	P1 5.0
Output Limit	OUTL 100.0
Autotuning	RT YES/NO
Alarm 1 set value	AL1 0.0
Heater current display HBA set value	C 0.0
Alarm 2 set value	AL2 0.0
Alarm 3 set value	AL3 0.0

Level 2 (PID Level)

P1	3.0	Proportional band 1 (For output 1)	Range : 0.0-200.0% ON/OFF control if set to 0 (0.0)
I1	24.0	Integral time 1 (For output 1)	Range : 0-3600 seconds PD control if set to 0
D1	6.0	Derivative time 1 (For output 1)	Range: 0-900 seconds PI control if set to 0
DB1	0	Dead-band time	Don't care
RT1	0	Auto tuning offset value	Range : 0-USPL
CYT1	1.0	Output 1 cycle time	Range : 0-150 seconds Relay output :10 Voltage pulse output : 1, mA output :0
HYS1	1	Hysteresis for output 1 ON/OFF control	Range : 0-1000
P2	3.0	Proportional band 2 (For output 2)	The same with P1
I2	24.0	Integral time 2 (For output 2)	The same with I1
D2	6.0	Derivative time 2 (For output 2)	The same with D1
CYT2	1.0	Output 2 Cycle time	The same with CYT1
HYS2	1	Hysteresis for output 2 ON/OFF control	The same with HYS1
GAP1	0	Control gap 1 (For output 1)	Set point of output 1 (Heating side) =SV - GAP1
GAP2	0	Control gap 2 (For output 2)	Set point of output 2 (Cooling side) =SV + GAP2
LCK	0000	Function lock	

LCK	Levels entering available			Parameters which can be changed
	Level 1 (User Level)	Level 2 (PID Level)	Level 3 (Input Level)	
0000	⊙	⊙	⊙	All parameters (Factory set value)
1111	⊙	⊙	----	All parameters
0100	⊙	⊙	----	All parameters except Level 3
0110	⊙	⊙	----	Parameters in Level 1
0001	⊙	⊙	----	SV* and *LCK*
0101	⊙	⊙	----	Only *LCK*

7 Error Displays

IN1E	IN1E : Input 1 Error	Check whether input loop is opened or wiring incorrect.
CJCE	CJCE :Cold Junction Compensation Failed	Check the compensation diode outside controller.
UUU1	UUU1 : PV is above USPL	Check whether the input value is correct or not.
NNN1	NNN1 : PV is below LSPL	Check whether the input value is correct or not.
ADCF	ADCF :A/D Convert Failed	Controller needs to be repaired.
RAMF	RAMF :RAM Failed	Controller needs to be repaired.

Level 3 (Input Level)

INP1	Input type selection	
ANL1	Analog input low limit calibration (Used for mA and V input)	Range : -1999 ~ 9999
ANH1	Analog input high limit calibration (Used for mA and V input)	Range : 0 ~ 9999
dP	Decimal point position (Available for mA and V input)	0000 · 000.0 · 00.00 · 0.000
LSPL	Lower Set-Point Limit	Scaling Low Limit
USPL	Upper Set-Point Limit	Scaling High Limit
ANL2	Remote input low limit calibration	Range : -1999 ~ 9999
ANH2	Remote input high limit calibration	Range : 0 ~ 9999
ALd1	Alarm mode of AL1	Range:00-19 Refer to "Alarm mode type"
ALt1	Alarm time of AL1	Range : 0-99 Min 59 Secs 0=Flicker Alarm · 99-59=Continued Others=On delay time (If ALD=07, ALt means alarm on time)
ALd2	Alarm mode of AL2	The same with ALD1
ALt2	Alarm time of AL2	The same with ALT1
ALd3	Alarm mode of AL3	The same with ALD1
ALt3	Alarm time of AL3	The same with ALT1
HYSR	Hysteresis of all Alarm	Range : 0-1000
CLD1	Output 1 low limit calibration (Used for mA and V output)	Range : 0 ~ 9999
CHO1	Output 1 high limit calibration (Used for mA and V output)	Range : 0 ~ 9999
CLD2	Output 2 low limit calibration (Used for mA and V output)	The same with CLO1
CHO2	Output 2 high limit calibration (Used for mA and V output)	The same with CHO1
CLO3	Retransmission low limit calibration	The same with CLO1
CHO3	Retransmission high limit calibration	The same with CHO1
rULY	Full run time of proportional motor (Used for proportional motor valve control output)	Range : 5-200 seconds
GRt	Used for programmable controller to wait continued operation	0=Not wait Others=Wait value
SELR	Communication Protocol Selection	MODBUS RTU / MODBUS ASCII / TAIE
bLS	Communication Bits Configuration	O_81/O_82 / E_81 / E_82
IDNO	ID number	Range : 0 ~ 255
BAUD	Baudrate	2400 / 4800 / 9600 / 19200 / 38400 bps
SVCS	SV compensation	Range : -1000-1000
PVCS	PV compensation	Range : -100.0-500.0
UNIT	Unit of PV & SV	C(°C) / F(°F) / A(Analog)
PVFT	PV Filter	PV will response faster if PVFT is smaller.
CRSC	Reserved	
OUd	Action mode	Heat / Cool
OPRd	Control algorithm	PID / Fuzzy
HZ	Frequency	50 / 60HZ

Return to "INP1"

Our contact Details

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**Email : gargelectroheat@gmail.com
Web : www.gargelectroheat.com**

Youtube :

**Installation Video :
<https://www.youtube.com/watch?v=IHdc3ULC7n4>**

**How to Change Sensor :
<https://www.youtube.com/watch?v=WU8HykPxpec>**

**How to Adjust Flow Alarm :
<https://www.youtube.com/watch?v=Za0xacf3d-8>**