



# ↑ DANGER! Caution! Electric Shock!

1. Do not touch the AC terminals while the power is supplied to the controller to prevent an 2. Make sure power is disconnected while checking the unit inside 

# This controller is an open-type temperature controller. Make sure to evaluate any

dangerous application in which a serious human injury or serious property damage 1. Always use recommended solder-less terminals: M3.0 Bolt and width is less than 7.2mm

- and tightening torque is 0.4N.m(4kgf.com). 2. Do not allow dust or foreign objects to fall inside the controller to prevent it from malfunc-
- 3. Never modify or disassemble the controller.
- 4. Do not connect anything to the "No used" terminals.
- 5. Make sure all wires are connected to the correct polarity of terminals.
- 6. Do not install and/or use the controller in places subject to:
- · Dust or corrosive gases and liquid. · High humidity and high radiation.
- · Vihration and shock
- · High voltage and high frequency
- 7. Must turn power off when wiring and changing a temperature sensor. 8. Be sure to use compensating wires that match the thermocouple types when extending or
- connecting the thermocouple wires. 9. Please keep the wire as short as possible when wiring a platinum resistance thermometer(RTD) to the controller and please route power wires as far as possible from
- load wires to prevent interference and induced noise 0. This controller is an open-type unit and must be placed in an enclosure away from high temperature, humidity, dripping water, corrosive materials, airborne dust and electric
- shock or vibration. 1. Please make sure power cables and signals from instruments are all installed properly before energizing the controller, otherwise serious damage may occur.
- 2. Please do not touch the terminals in the controller or try to repair the controller when power is applied to prevent an electric shock. 3. Wait at least one minute after power is disconnected to allow capacitors to discharge, and
- please do not touch any internal circuit within this period. 14. Do not use acid or alkaline liquids for cleaning. Please use a soft, dry cloth to clean the con-
- 15. This instrument is not furnished with a power switch or fuse. Therefore, if a fuse or power switch is required, install the protection close to the instrument. Recommended fuse rat-
- ing: Rated voltage 250 V, Rated current 1 A. Fuse type: Time-lag fuse ■Ordering Information

## KT - (1) (2) (Economical Type)

KI (Ceconomical Type)						
1	Front size	4: W48 × H48mm	2:W48×H96mm	7 : W72 × H72mn		
2	Output Selection	t Selection 7 : Relay + Voltage for driving SSR				

	Product Selection					
Size		Part No.	Output			
	4896	KT270	Relay + SSR			
	4848	KT470	Relay + SSR			
	7272	KT770	Relav + SSR			

■ Sheci	IICation				
Input	Power	100~240VAC 50/60Hz			
Operat	ion Voltage Range	90%~110%, rated voltage			
Powe	r Consumption	5VA Maximum			
Displ	ay Method	7-segment LED : PV in red, SV in green			
Sens	or Type	Thermocouple : K,E,J,N,S,T,R,B Platinum resistance : PT100			
Analo	og Input	Voltage: 0~20mV, 0~50mV			
Displ	ay Accuracy	Normal temperature ( $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ): (PV $\pm$ 0.5% or $\pm$ 1°C, select the higher one) $\pm$ 1digit Out of normal temperature range: (PV $\pm$ 0.5% or $\pm$ 2°C, select the higher one) $\pm$ 1digit			
Cont	rol Mode	On/Off Control, PID Control			
Cont	rol Output	Relay output: 250vac 3A Voltage Pulse output			
Samp	oling Rate	250ms			
Vibra	tion Resistance	0.7mm amplitude at 10~55Hz in each 3 directions for 1.5 hours			
Amb	ient Temperature	-10~50℃ ( with no icing)			
Stora	ge Temperature	-12~60°C ( with no icing)			
Relat	ive Humidity	35~85%RH, Storage: 35~85%RH			

pv parameter list and the current temperature display

Parameter setting value and control temperature setting Turn on when the main control output is generated

Turn on when run the Auto-tuning of PID control. Turn on when the alarm output is generated

, of Display the Temperature Unit (Celsius, Fahrenheit)

Display the Percentage of main output value

Move forward for parameter and save the set value. ve digit of character and move backward for

ease a number and release the function of contro Decrease a number and set the function of controll stop

SET 【 🔰 🛕

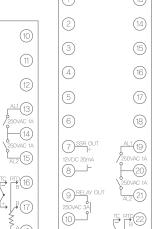
KACON



KT770

■Terminal Definition KT470

KT270



# ■Setting mode 1

Press SET up to 3 sec for parameter group 1



	ess <b>SET</b> more than 3 s	ec for initial disp	14 I(ACON)	
Symbol	Name	Range	1#	Description
RE	Auto Tuning	NO or YES	NO	YES: Auto Tuning on NO: Auto Tuning off
AL I	Alarm 1	-1999~9999	0	Set the alarm value for alarm 1 . Alarm differential gap=AH1
RL2	Alarm 2	-1999~9999	0	Set the alarm value for alarm 2 Alarm differential gap=AH2
SE	PV bias	-199~199	0	Sensor correction is made by adding bias value to measured value(PV).
ρ	Proportional band	0.0~200.0	20	Proportional band in PID with unit for OUT1 P=0.0, ON/OFF control Please set P1=2.0 when analog input.
HYS	Control Hysteresis	0~999	1.0	Control out differential gap=HYS Only for ON/OFF action when P=0.0
1	Integral time	0~3600s	210	Set the time of integral action to eliminate the offset occurring in proportional control.
d	Derivative time	0~3600s	30	Set the time of derivative action to improve control stability by preparing for output changes.
EBF	Proportioning Cycle	0~999s	20	Proportioning cycle time for PID control
۲S٤	Proportional reset	-999~200	-5	Proportional reset for overshoot protection when first power on. (Auto setting after autotuning)
רנה	Set data lock	0~2	0	LCK 0 : Allow to modify any parameter and SV LCK 1 : SV Only allow to modify SV and AT.

LCK 2 : Not allow to modify any parameter and SV

Press the key while pressing the SET key for 3 s to PASS, set PASS=0101. Then press set key to parameter group 2

to return the instrument to the normal display.

SSR drive outpu

method

Power frequency 50, 60 60 50H-

LBA monitoring time 0~9999 sec 0 Set the alarm time of the Disconnection alarm

After the value be registered, when no parameter setting is required, Press the



Symbol Name Range 1# Description Main input ■Password Mode K Temperature sensor table reference type select Decimal point creation 0,1 : for TC or RTD or analog type AP Decimal point 2,3: Only for Linear analog type input Set lower setting limite **L SPL** Low setting -1999~9999 Set high setting limiter Lower point of transmission **USPL** High setting -1999~9999 400 Higher point of transmission Temperature unit set : Centigrade Display scale C,F,A E: Fahrenheit 8: without scale PV variable-value control. 0~60 PV input filter 0-30: for general, 31-60: for enhanced Lowest value display when linear analog AN: I -199~9999 PV display inputs. Such as 4-20mA input. Highest value display when linear analog -1999~9999 2000 PV display inputs Such as 4-20mA input Select the type of alarm 1 See ALG I Alarm1 mode 00~16 (\*\*ALARM TYPE TABLE) 0.0~100.0 0.4 Alarm1 differential gap setting differential gap Select the type of alarm 2 See #1.d≥ Alarm2 mode 00~16 (\*\*ALARM TYPE TABLE) 0.0~100.0 0.4 Alarm2 differential gap setting differential gap Control action HEAT, COOL HEAT HERE: Reverse action (Heating)

r L 当: Relay drive output

5೬೧ರ : Normal control

PHR5: Phase control

Stnd [ [YEL : Cycle control

LBA monitoring  $\left| \begin{array}{c|c} 0 \sim 9999 & 0 \end{array} \right|$  Set the temperature value of the Disconnection alarm.

55c: SSR relay drive output

# Symbol Name Range IIII D1-K=0 RUN / STOP Disable d I-V RUN / STOP 0 or 1 0 D1-K=1 RUN / STOP Enable rest Parameter reset 0 or 1 0 Parameter reset to factory value Press the SET button along with enter the password mode. Use the A buttons to change the numbers, and press the buttor to change the cipher numbers.

Set PASS = '0202' then press state key to parameter group 3.

Symbol Name Range 1#

### ■Input Sensor Type and Setup Type'0101' at the password mode to enter the parameter 2 group.

ne letters 'iNPI' will appear at the PV window, while the letter '---K' at the SV window ('---K' is the initial setup value of the K-type thermocouple).

Use the ▲ ★ buttons to select the proper sensor type, and then press the sat button to save the setup value.					
Sensor Classification	Display Form	Sensor Type	Range(°C)		
	٤	K	1300 ℃		
	ε	E	600 ℃		
	J	J	00 %		
	n	N	1300 ℃		
Thermocouple	ū	Wu3-Re25	2000 ℃		
	5	S	1600 ℃		
	Ł	Т	400 ℃		
	r	R	1700 ℃		
	ь	В	1800 ℃		
	ลกฯ	-			
Analan	AN3	-			
Analog	AUS.	0~50mV			
	AU i	0~20mV			
RTD	ዖと	ΡΤ100Ω	00 ℃		

### ■Parameter Moving ,0505, SET + $\blacktriangleleft$ Setting mode2 Setting mode1 Setting mode3 SĔT ומחו 8H2 Alarm2 hysteresis d | - - Enable Factory reset Temperature sensor Selection SET ↓ ↑ 【 3 se 8006 Contro Alarm 1 ethod Cooling Enable manual co SET ↓ ↑ **3** sec SET | ↑ 3 sec Output selection Relay / SSR AL2 Alarm 2 Limit of low setting value SET ↓ ↑ **《** 3 sec SET ↓ ↑ **《** 3 sec Limit of High setting value 55-E SSR output SET ↓ ↑ **3** sec SET ↓ ↑ **《** 3 sec Unit of temperature. SET ↓ ↑ **《** 3 sec 1 3 sec Hysteresis P'FE PV value filter L BA Time for LBA monitoring SET | ↑ 3 sec SET ↓ ↑ **《** 3 sec ARL I Minimu Temperature range for LBA monitoring Integral value SET ↓ ↑ 【 3 sec SET ↓ ↑ **《** 3 sec Maximum indication value for analog input Integral value SET ↓ ↑ **《** 3 sec PID output control time Alarm1 output mode SET ↓ ↑ **《** 3 sec SET ↓ ↑ **【** 3 sec Alarm1 hysteresis Overshooting control value s≢r ↓ ↑ **【** 3 sec SET | ↑ C 3 sec Alarm2 output mode LCE Locking

Press one of the front four buttons for 0.5 seconds, and then release the button. The image will flicker, and the status will change to allow the temperature setup. Use the up and down buttons to select the temperature to control, and then press the state button to save it. If no buttons are pressed for approximately 15 seconds at the temperature setup mode, the temperature will be automatically saved, and the blinking will stop.

## ■Temperature Correction

at the PV, press the SET button three times to enter the 'SE' parameter. The 'SE' value is initially set at '0'. Enter the temperature value to be corrected, and press the state button to save i For example, if the actual temperature is 50°C, while the PV displays 48°C, replace the value '0' of the 'S[' with '2'. The actual temperature '50°C' will appear at the PV window.

### ■Heating and Cooling Control This controller will regulate two temperatures for both heating and cooling.

The product is initially set at the heating control, Therefore, go to the parameter group 2, and save either heating (HERE) or cooling (LooL) at the control direction setup parameter 'OUd'.

### ■ON/OFF Control Setup The ON/OFF control is designed with a simple control output type. The control output is

- turned on when the setup value is yet to be reached; otherwise, the control output is turned off when the setup value is reached.
- It can be first distinguished in the parameter group 1, wherein the letters 'AŁ' are first displayed at the PV window from the PID control mode, while the letter '5¢' is first shown at D Normal Control (לבהם) the ON/OFF control. Go to the parameter group 1 via the startup screen. The initial value of the control output
- type is set at the PID control. Therefore, the letters  $R_{\mathcal{E}}$ , which means auto tuning at the PID control mode, will be displayed at the PV window. Use the  $\overline{\bf s}$  buttons to select the parameters. The ' ${m p}$ ' parameter, which is the proportional
- PV window, will be displayed with the initial value '20' at the SV window. Replace '20' with '0', and press the state button to save the changed value. The ON/OFF

# ■Hysteresis Value Set-up

- In this function, deviations can be applied to the output of the ON/OFF control mode. Once the target control value is reached while in the ON/OFF control, the output may frequently turn on or off to maintain the target value. Deviations can be applied to the output in order to extend the output (
- Go to the parameter group 1, and use the set button to go to the '#y5' at the PV window. Replace the initial 'HYS' value to ' !..., and press the state button to save it. The Hysteresis value setup is complete

### ■PID Control Set-up

- The PID control takes a longer time to reach the target value, as compared with the ON/OFF control. Nevertheless, it can achieve the exact and precise control at various setup
- The factory setting of this product is set at the PID control mode; however, there are instances when it has been changed to the PID control in the ON/OFF control setup.

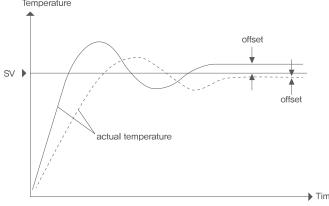
  While at the parameter group 1, the symbol 'RL' is first displayed at the PV window if the controller is set at the PID control mode, while the first word appears as '5£' at the ON/OFF
- Go to the parameter group 1 via the ON/OFF startup screen. Press the SET button to change the parameters, so that the proportional value P can be displayed at the PV window. Change the D value with a higher number at the SV window and save it.
- The PID control needs to set parameters consisted of a number of comprehensive equations. Such equations are too difficult to calculate immediately. Therefore, the automatic formula calculation function, which is called the auto tuning, is applied.

### ■Filtering the Current Temperature Input Value

- Rapid changes in the temperature value may trigger frequent changes to the PV display value. Such will affect the control operation volume, and make it difficult to achieve a stable control However, the display value of the current temperature can be stabilized by applying the current temperature filter 'P' 'F' in the parameter group 1
- Increase the filter value to slow down the changing speed of the input display value, and to steadily display the current value.

### ■Proportional Value Reset

- If the proportional values are applied to the temperature control (PID/P), a certain deviation may occur even when control has been stabilized depending on the heater capacity and/or
- The proportional value reset 'r56' function in the parameter group 1 enables the correction of the For an automatic setup, execute the auto tuning 'AŁ' at the PID control mode.



OFFSET: It normally means a dislocation or deviation. In temperature control, the term refers to the degree of difference between the setup value (SV) at a state where the operation value is stabilized, and the current controlled temperature value (PV).

- This function automatically sets the proportional (P), integral (I), and differential (D) values at the PID control mode.
- group 1, and check if the letters '#\( \begin{align\*} '\text{RE'} \) appear at the PV window, and '\text{TO'} at the SV window, pectively. Use the direction buttons to change from 'NO' to 'YES', and save it by pressing the SET button. The auto tuning will start to repeat a number of over and under shooting
- The progress of the auto tuning can be checked through the blinking of the '#' lamp at the Press the set button for more than 3 seconds to enter the parameter group 1. If the letters 'At' appear display window.

# ■Relay and SSR Outputs

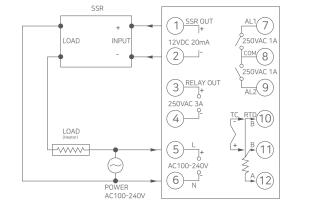
- The CARCON Temperature Controller KT Series is built in with the relay output and the SSR The parameter setup helps facilitate changes to the main output method
- Go to the parameter group 2, select the relay '-L y' or the SSR '55-', and save it as 'OUL' at In the case of 'SSR', the output methods consisted of three methods, which can be selected by the user depending on the control situation.

### ■SSR Output Method Select the output method of the controller with SSR to activate the SSR output type

③Status Control (PHRS)

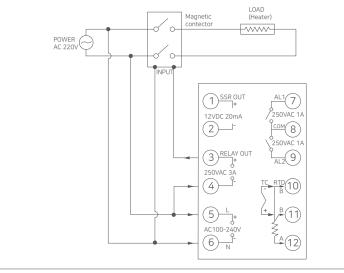
- The SSR output type has a total of three kinds, which can be selected by the user depending
- This function operates in the same way as the normal relay output in accordance with the ON/OFF ② Cycle Control ([Y[L]
- This function controls the output volume by adjusting the output numbers during a certain cycle, and the temperature will repeatedly flicker ON/OFF according to the output ratio. The output ratio can be observed through the (%) display lamp. The blinking number decreases when the current value approaches the target value, while the blinking number increases as the current value gets far from the target value. Depending on the case, if the output ratio becomes higher than the reference point, the OUT lamp will continuously flicker.
- This function controls the status within a half cycle of the AC power source, and produces a similar effect when using a power controller. However, such function is operative at a random cross SSR

# Example for Circuit configuration of SSR output



· SSR is set to single-phase, Also applicable to three-phase SSR · Examples of how to control the heat control for convenience heard

### Example for Circuit configuration of Relay output



Set the main power supply is AC220V and example output of the magnetic contact or Examples of how to control the heat control for convenience heard.

	10 or 00	No alarm			during setup.  While the main control output runs 100%, an alarm signal will sound when it considers
	11 H	High limit Alarm	AL≥0	AH1 Alarm ON	that the heater is abnormally connected, as there are no changes made with the setup temperature (LbAb) during the setup time (LbAt).  For example, if the LbAt is set at 100 seconds, while the LbAb is set at 10°C, an alarm sign will go off due to slight changes made to the temperature that are not exceeding 10°C.
		TilgiTillilit AlaiTil	AL<0	Alarm ON SV+AL1 SV	
	12 Low limit A	Low limit Alarm	AL≥0	Alarm ON AHT	
Nomal		LOW III III CAIAI III	AL<0	Alarm ON AH1	
Action	13	High-low limit Alarm		Alarm ON AH1 AH1 Alarm ON SV-AL1 SV SV SV+AL1	Alram on
	14	Band alarm		Alarm ON SV-AL1 SV SV+AL1	100 Sec LbAt
	15	Absolute high alarm		AH1 Alarm ON	Factory reset  This function initializes the controller. It is useful for cases when unable to pinpoint which parameters were changed.
	16	Absolute low alarm		Alarm ON AH1	Use this function to initialize all parameters, and to restart from the beginning.  Go to the password mode. Press the sale button with the symbol '0202' to revert changes made to the parameter group 3. The letters 'd 1-P' will appear at the PV window. Press the sale button
	01	1 High limit Alarm —	AL≥0	AH1 Alarm ON SV ASV+AL1	once more, and $\ r \in S $ will be displayed at the 'PV' window.  Change ' $\mathcal{G}$ ' to ' $I$ ' at the 'SV' window in order to activate the initialization function.
			AL<0	AHI Alarm ON at the same ti	Once the initialization function is activated, go to the startup screen and press the  buttons at the same time for more than three seconds until the screen has changed several times, and then the parameters are initialized.
	02	2 Low limit Alarm	AL≥0	Alarm ON AHI	The parameters can be initialized only when the setup value of the '-\nable 5\mathcal{E}' of the parameter group 2 is at ' \mathcal{I}'. Such initialization will not be possible while the value is set at '\mathcal{I}'.
	UZ	LOW HITH AIGHT	AI <0	Alarm ON AH1	

Operation Type Set Value Alarm Type Specification (Example for alarm 1)

High-low limit Alarm

Band alarm

Absolute low alarm

\*Example of the output of the holding operation

\* With holding action: When holding action is ON, the alarm action is supperessed at

The output, which can be used a supplement output other than the main output that

This product consisted of two alarm-relay contacts. Refer to the alarm setup table to

The alarm 2 setup can be established in the same method as the alarm 1. This can be achieved by selecting the alarm 2 parameter (AL d2).

Go to the parameter group 1, select either AL1 or AL2 at the PW window, enter the

Go to the parameter group 2 to select the alarm setup 1 parameter (RL d 1) at the PV window.

Once the alarm function is set, the reference value for the output (i.e. the alarm setup value) is required. This setup value determines the time when the output occurs, and may differ

no alarm. Refer to the alarm setup table to enter the function code to be used, and

The product is initially set to show the value '  $\mathbf{m}'$  at the SV window, which suggests that

controls the temperature, is called an alarm output or warning output.

epending on the alarms with the deviation value or the absolute value.

start-up until the measured value enters the non-alarm range

09 Break loop alarm

Holding Zone

■Alarm (Warning) Set-up

produce various types of alarms.

ress the **SET** button to save it.

### Absolute high alarm parameter group 3. The letters 'd !- L' will be shown at the 'PV' window and 'D' at the 'SV'

sv-al1∆ sv. A S

Alarm ON AH1

High Limit Alarm

SET button to change the setup value. Once the function is activated, return to the startup screen, and then press the 'V' button fo

more than 3 seconds to set the func-To relieve the function-stop, press the '\(\inft\)' button for more than 3 seconds.

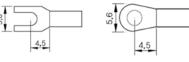
When the symbol 'd !- L' is changed to ' !, the conversion between 'RUN/STOP' function v be performed. However, if 'd !-L' is changed to 'D', the conversion between 'RUN/STOP' will

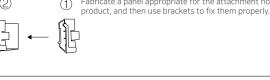




### ■Error display I. 公共社会: This function indicates that the temperature sensors are not properly connected. 2. OLL 0: This function indicates that the temperature sensors are connected; however,

its temperature sensor setup is inaccurate. (Example: The case in which the thermo-coupler is actually connected, and the temperature





Deviation value: This means that the value, as well as the deviated temperature, is based on the main setup temperature value. If the main setup temperature value changes, the value will automatically change the alarm output time accordingly.

Example) Main setup temperature : 100°C

Action

Upper deviation limit of the deviated alarm value: 5°C Absolute value: The alarm setup value itself that matches the value at the output time

> regardless of the main setup temperature value. If the current temperature value matches the setup value, the alarm output will occur. Such values of the alarm output time will not change even though the main setup temperature values have changed.

## the controller. It is useful for cases when unable to pinpoint which lize all parameters, and to restart from the beginning. ode. Press the str button with the symbol '9292' to revert changes made

This function determines the heater disconnections depending on the temperature changes



# Enter '0202' using the buttons at the password mode. Press the set button to go to the

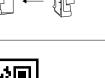
o activate the RUN/STOP function, change the 'SV' value '3' to '1', and then press the

not be performed









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KASYS PYKO