

Autonics

Bar Graphic Temperature Controllers KPN SERIES

INSTRUCTION MANUAL



Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

Safety Considerations

⚠ Please observe all safety considerations for safe and proper product operation to avoid hazards.
⚠ symbol represents caution due to special circumstances in which hazards may occur.

Warning Failure to follow these instructions may result in serious injury or death.
Caution Failure to follow these instructions may result in personal injury or product damage.

Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in personal injury, fire or economic loss.
- Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present. Failure to follow this instruction may result in explosion or fire.
- Install on a device panel to use. Failure to follow this instruction may result in electric shock.
- Do not connect, repair, or inspect the unit while connected to a power source. Failure to follow this instruction may result in fire or electric shock.
- Check 'Connections' before wiring. Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit. Failure to follow this instruction may result in fire or electric shock.

Caution

- When connecting the power input and relay output, use AWG 20 (0.50mm²) cable or over and tighten the terminal screw with a tightening torque of 0.74 to 0.90N m. When connecting the sensor input and communication cable without dedicated cable, use AWG 28 to 16 cable and tighten the terminal screw with a tightening torque of 0.74 to 0.90N m. Failure to follow this instruction may result in fire or malfunction due to contact failure.
- Use the unit within the rated specifications. Failure to follow this instruction may result in fire or product damage.
- Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire or electric shock.
- Keep metal chip, dust, and wire residue from flowing into the unit. Failure to follow this instruction may result in fire or product damage.

Ordering Information

Item	Model	Temperature / Process Controller
Power supply	0	100-240VAC 50/60Hz
Option input/output	0	None
	3	Transmission output+Remote SV
Option communication output	0	None
	2	RS485
Control output ^{※1}	0	Relay, Current, SSR drive voltage selection output
1 output type	1	OUT1: Current, SSR drive voltage selection output OUT2: Current, SSR drive voltage selection output
2 output type	3	OUT1: Current, SSR drive voltage selection output OUT2: Relay output
	7	OUT1: Relay output OUT2: Current, SSR drive voltage selection output
	9	OUT1: Relay output OUT2: Relay output
The number of control output	0	1 output type (Heating or Cooling type)
	1	2 output type (Heating&Cooling type)
Size	2	DIN W96×H48mm
	3	DIN W48×H96mm
	5	DIN W96×H96mm

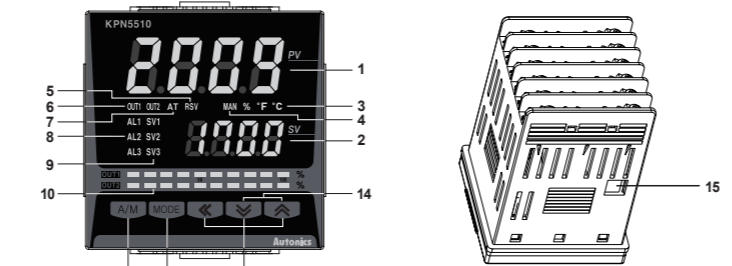
※1: The 1 output type is heating or cooling output type and the 2 output type is heating&cooling output type. The 1 output type is able to use only one output among relay, current, SSR drive voltage outputs. OUT1 of the 2 output type is fixed as heating output and OUT2 of the 2 output type is fixed as cooling output. If you select the SSR drive voltage or current output model, you can select the appropriate control output.
※ The above specifications are subject to change and some models may be discontinued without notice.
※ Be sure to follow cautions written in the instruction manual, user manual and the technical descriptions (catalog, homepage).

Specifications

Series	KPN52 □	KPN53 □	KPN55 □
Power supply	100-240VAC~ 50/60Hz		
Allowable voltage range	90 to 110% of rated voltage		
Power consumption	Max. 15VA		
Display method	7-segment (red, green), control output bar graph: red, green		
Character size	PV (W×H) SV (W×H)	8.5×17.0mm 6.0×12.0mm	7.0×14.6mm 6.0×12.0mm
Input type	RTD TC Analog	JPt 100Ω, DPt 100Ω, DPt 50Ω, Cu 100Ω, Cu 50Ω, NiKel 120Ω (6types) K, J, E, T, L, N, U, R, S, B, C, G, PLII (13types) Voltage: 0 to 100mV, 0 to 5V, 1 to 5V, 0 to 10V (4types) / Current: 0 to 20mA, 4 to 20mA (2types)	
Display accuracy	RTD TC Analog	At room temperature (23°C±5°C): (PV ±0.3% or ±1°C, select the bigger one) ±1-digit ^{※1} Out of range of room temperature: ±0.5% F.S. ±1-digit At room temperature (23°C±5°C): ±0.3% F.S. ±1-digit Out of range of room temperature: ±0.5% F.S. ±1-digit	
Control output	Relay SSR Current	OUT1, OUT2: 250VAC~ 5A 1a Max. 11VDC±2V 20mA DC4-20mA or DC0-20mA (max. load 500Ω)	
Alarm output	Relay	AL1, AL2, AL3: 250VAC~ 3A 1a	
Option output	Transmission Communication	DC4-20mA (max. load 500Ω, output accuracy: ±0.3% F.S. ±1-digit) RS485 communication output (modbus RTU)	
Option input	CT Remote SV Digital input	0.0 to 50.0A (primary heater current value measuring range) ※CT ratio = 1/1000 1-5VDC or DC4-20mA (current input: using external resistance 250Ω) Contact input: ON - max. 2kΩ, OFF - min. 90kΩ Non-contact input: ON - residual voltage max. 1.0V, OFF - leakage current max. 0.1mA	
Control type	Heating, Cooling Heating&Cooling	ON/OFF, P, PI, PD, PID control mode	
Hysteresis		Thermocouple / RTD: 1 to 100°C/°F (0.1 to 100.0°C/°F) variable • Analog: 1 to 100Digit	
Proportional band (P)		0.1 to 999.9% (0.1 to 999.9%)	
Integral time (I)		0 to 9999 sec	
Derivative time (D)		0 to 9999 sec	
Control period (T)		0.1 to 120.0 sec (※relay output and SSR drive output only)	
Manual reset value		0.0~100.0%	
Sampling period		50ms	
Dielectric strength		2000VAC 50/60Hz for 1min (between power source terminal and input terminal)	
Vibration		0.75mm amplitude at frequency of 5 to 55Hz (for 1min) in each X, Y, Z direction for 2 hours	
Relay life cycle	Mechanical Electrical	Min. 10,000,000 times Min. 100,000 times (250VAC 3A resistance load)	
Insulation resistance		Over 100MΩ (at 500VDC megger)	
Noise resistance		Square shaped noise by noise simulator (pulse width 1μs)±2kV R-phase, S-phase	
Memory retention		Approx. 10years (when using non-volatile semiconductor memory type)	
Environ-ment	Ambient temperature Ambient humidity	-10 to 50°C, storage: -20 to 60°C 35 to 85%RH, storage: 35 to 85%RH	
Protection		IP65 (front panel, IEC standard)	
Insulation type		Double insulation or reinforced insulation (mark: dielectric strength between the measuring input part and the power part : 2kV)	
Protection structure		CE	
Weight		Approx. 230g (approx. 160g)	Approx. 316g (approx. 220g)

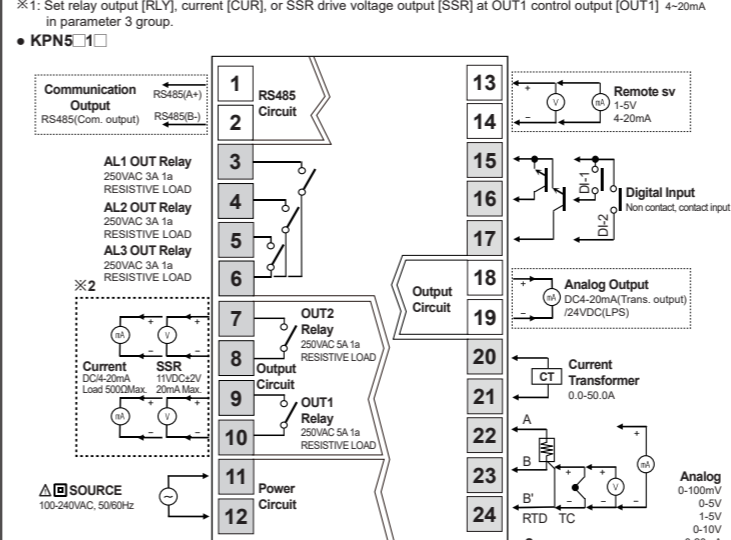
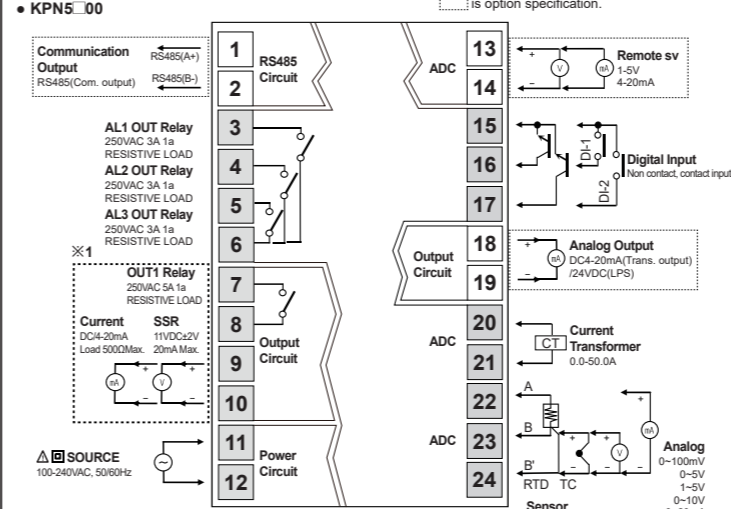
※1: ○ At room temperature (23°C±5°C)
- TC K, J, T, N, E type, below -100°C / TC L, U, PL°C, RTD Cu50Ω, DPt 50Ω: (PV ±0.3% or ±2°C, select the bigger one)±1-digit
- TC C, G type/TC R, S type, below 200°C: (PV ±0.3% or ±3°C, select the bigger one)±1-digit
- TC B type, below 400°C, there is no accuracy standards.
○ Out of range of room temperature
- RTD Cu50Ω, DPt50Ω: (PV ±0.5% or ±3°C, select the bigger one) ±1-digit
- TC R, S, B, C, G: (PV ±0.5% or ±10°C, select the bigger one) ±1-digit
- Others, below -100°C: within ±5°C
※ The weight is with packaging and the weight in parenthesis is only unit weight.
※ Environment resistance is rated at no freezing or condensation.

Unit Description



- Measured value (PV) display part RUN mode: It displays currently measured value (PV). Setting mode: t displays the parameter.
- Set value (SV) display part RUN mode: It displays the set value (SV). Setting mode: t displays the set value of the parameter.
- Unit (°C/°F/%) indicator It displays the unit set at display unit [D.UNT] in parameter 3 group.
- Manual control indicator t turns ON during manual controlling.
- Remote SV control indicator t turns ON during remote SV controlling.
- Control output (OUT1, OUT2) indicator It turns ON when the control output is ON.
※When using current output, in case that for manual control MV is 0.0%, the control output indicator turns OFF but the other cases it turns ON always. In case that for auto control MV is over 3.0%, it turns ON and the MV is below 2.0%, it turns OFF.
- Auto tuning indicator It flashes by 1 sec, when executing auto tuning.
- Alarm output (AL1, AL2, AL3) indicator t turns ON when the alarm output is ON.
- Multi SV indicator The SV 1 to 3 indicator turns ON when using multi SV function.
- Bar graph for control output t displays control output MV as bar graph. The KPN5100 as 1 output type has one bar graph (OUT1), and the KPN5110 as 2 output type has two bar graphs (OUT1, OUT2).
- [A/M] key It is used when switching auto control to manual control.
- [MODE] key It is used when entering parameter setting group, returning to RUN mode, moving parameter, saving the set value.
- [<] [>] [K] keys t is used when entering the set value changing mode and moving or changing up/down digit.
- Digital input key When pressing [D] + [K] keys for 3 sec, at the same time, it operates the function (RUN/STOP, alarm clear, auto tuning) set at digital input key [DI-K] in parameter 5 group.
- PC loader port t is the PC loader port for serial communication to set parameter and monitoring by DAQMaster installed in PC. Use this for connecting SCM-US (USB/Serial converter, sold separately).
※ The display part is different by options.

Connections



※2: OUT1, OUT2

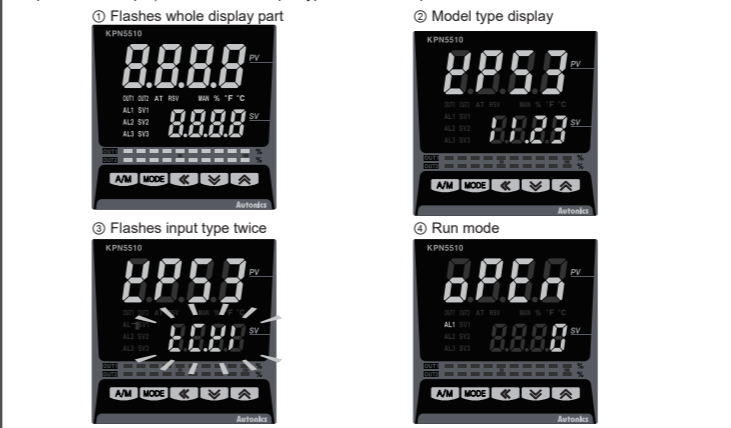
Model	OUT1 control output	OUT2 control output
KPN5111	Current, SSR drive voltage selection output	Current, SSR drive voltage selection output
KPN5113	Current, SSR drive voltage selection output	Relay output
KPN5117	Relay output	Current, SSR drive voltage selection output
KPN5119	Relay output	Relay output

※Use terminals of size specified below.

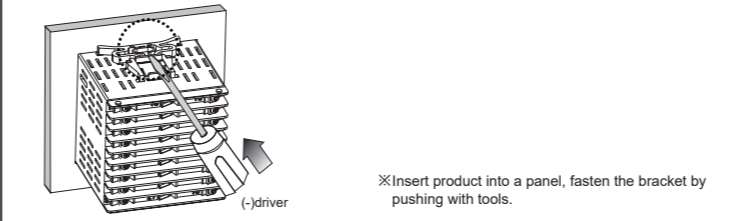
Terminal Type	a	b
<Round>	Min. 3.0mm	Max. 5.8mm
<Forked>	Min. 3.0mm	Max. 5.8mm

Front Panel Display When Power Is ON

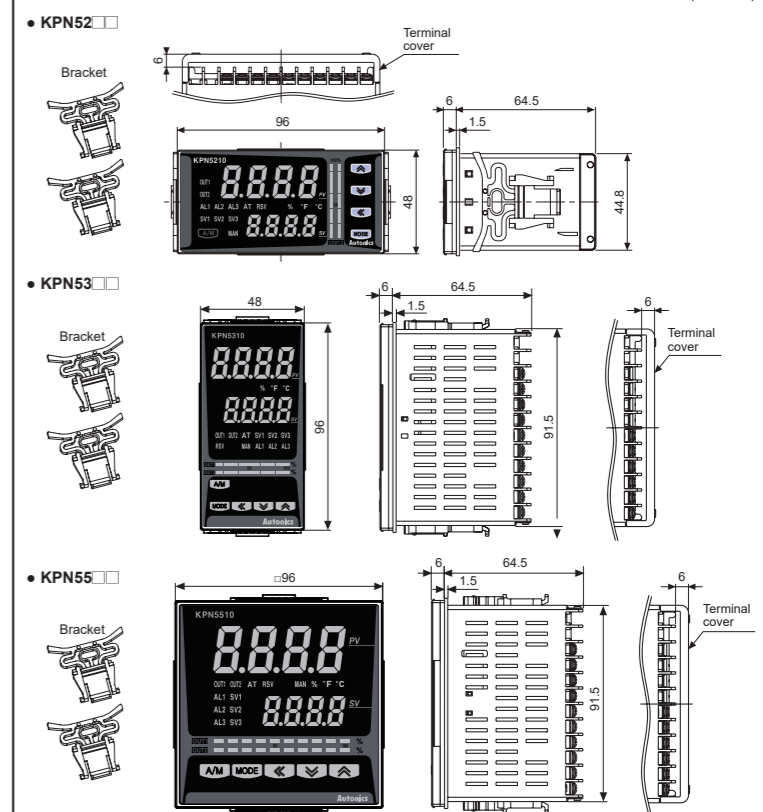
When supplying the power to the product, the display part flashes for 1 sec. t displays the model type (option output, control output) and flashes the input type twice and it operates in RUN mode.



Installation



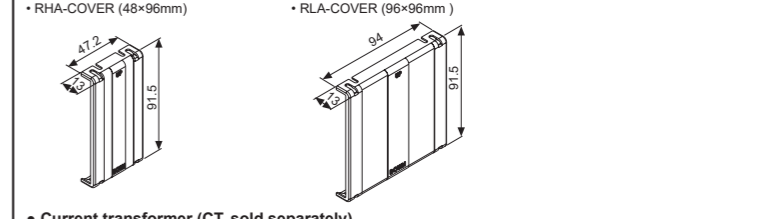
Dimensions



(unit: mm)

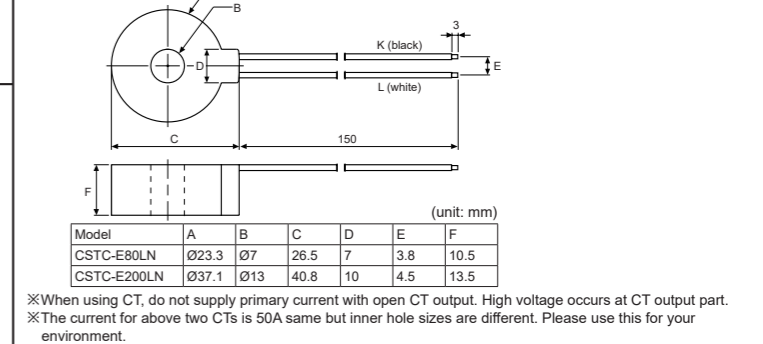
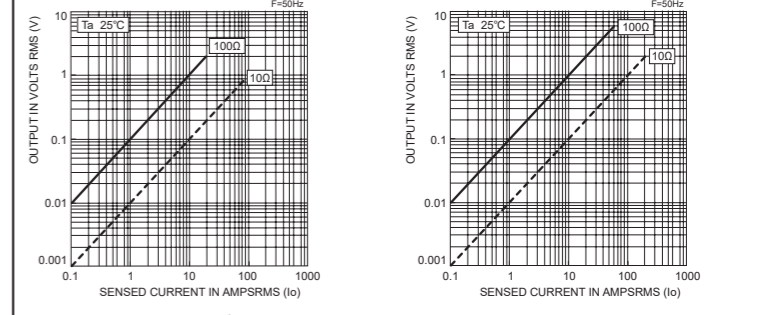
Model	Unit	A	B	C	D
KPN52□	Min. 115	Min. 65	92 ^{±0.8}	45 ^{±0.8}	
KPN53□	Min. 65	Min. 115	92 ^{±0.8}	92 ^{±0.8}	
KPN55□	Min. 115	Min. 115	45 ^{±0.8}	92 ^{±0.8}	

Terminal cover (sold separately)

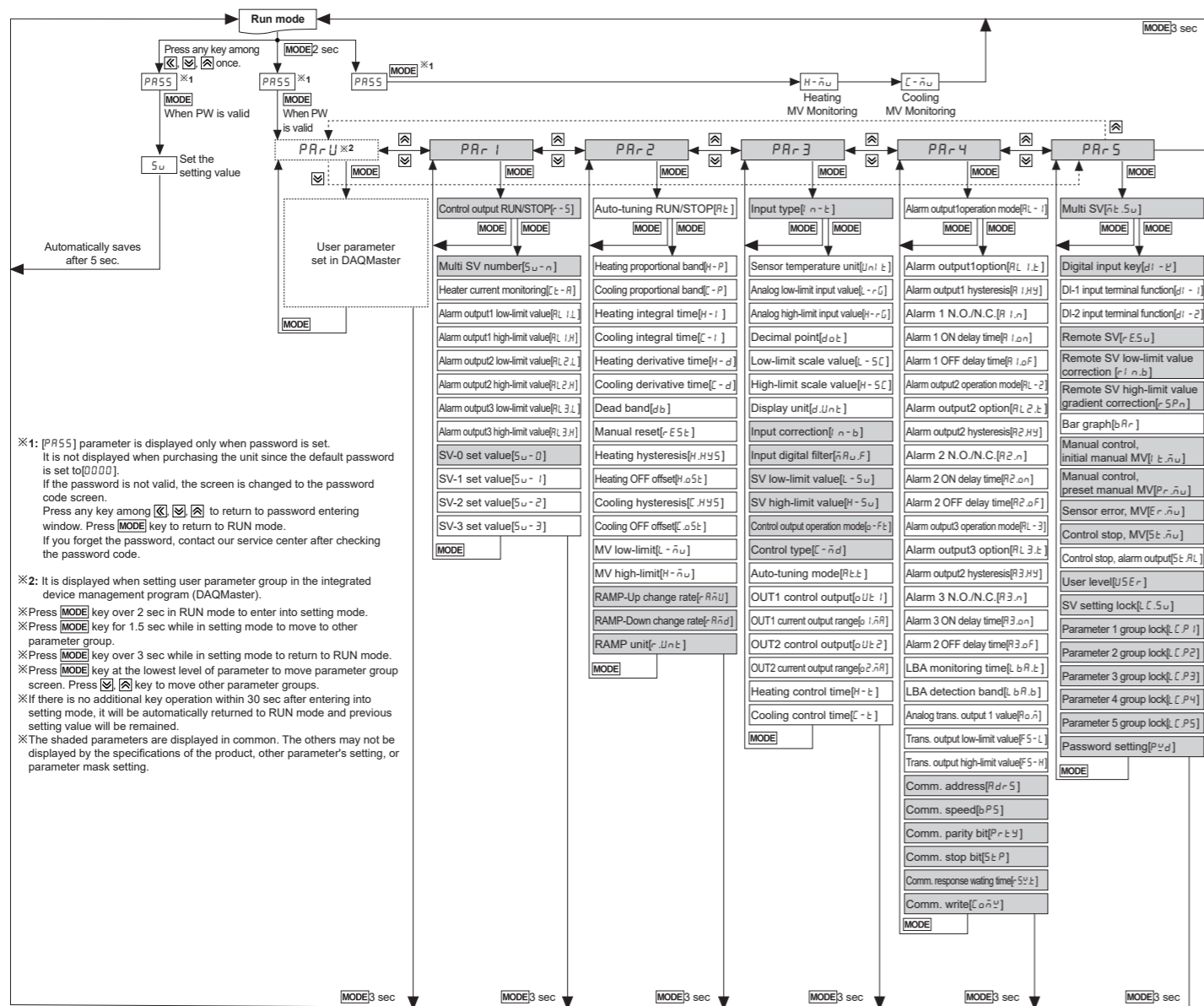


Current transformer (CT, sold separately)

- CSTC-E80LN
Max. load current: 80A (50/60Hz)
※ Max. load current for KPN Series is 50A.
Current ratio: 1/1000,
Wire wound resistance: 31Ω±10%
- CSTC-E200LN
Max. load current: 200A (50/60Hz)
※ Max. load current for KPN Series is 50A.
Current ratio: 1/1000,
Wire wound resistance: 20Ω±10%



Flow Chart for Setting Group



- ※1: [PR5] parameter is displayed only when password is set. It is not displayed when purchasing the unit since the default password is set to 0000.
- If the password is not valid, the screen is changed to the password code screen.
- Press any key among [OK], [F1], [F2], [F3] to return to password entering window. Press [MODE] key to return to RUN mode.
- If you forget the password, contact our service center after checking the password code.
- ※2: It is displayed when setting user parameter group in the integrated device management program (DAQMaster).
- ※Press [MODE] key over 2 sec in RUN mode to enter into setting mode.
- ※Press [MODE] key for 1.5 sec while in setting mode to move to other parameter group.
- ※Press [MODE] key over 3 sec while in setting mode to return to RUN mode.
- ※Press [MODE] key at the lowest level of parameter to move parameter group screen. Press [F1] key to move other parameter groups.
- ※If there is no additional key operation within 30 sec after entering into setting mode, it will be automatically returned to RUN mode and previous setting value will be remained.
- ※The shaded parameters are displayed in common. The others may not be displayed by the specifications of the product, other parameter's setting, or parameter mask setting.

Input Type and Range

Input type	Decimial point	Display	Input range (°C)	Input range (°F)		
Thermocouple	K (CA)	1	E C L 1	-200 to 1350	-328 to 2463	
		0.1	E C L 2	-199.9 to 999.9	-199.9 to 999.9	
	J (IC)	1	E C J 1	-200 to 800	-328 to 1472	
		0.1	E C J 2	-199.9 to 800.0	-199.9 to 999.9	
	E (CR)	1	E C E 1	-200 to 800	-328 to 1472	
		0.1	E C E 2	-199.9 to 800.0	-199.9 to 999.9	
	T (CC)	1	E C T 1	-200 to 400	-328 to 752	
		0.1	E C T 2	-199.9 to 400.0	-199.9 to 752.0	
	RTD	B (PR)	1	E C B	0 to 1800	32 to 3272
			R (PR)	1	E C R	0 to 1750
		S (PR)	1	E C S	0 to 1750	32 to 3182
			N (NN)	1	E C N	-200 to 1300
C (TT)※1		1	E C C	0 to 2300	32 to 4172	
G (TT)※2		1	E C G	0 to 2300	32 to 4172	
Analog	L (IC)	1	E C L 1	-200 to 900	-328 to 1652	
		0.1	E C L 2	-199.9 to 900.0	-199.9 to 999.9	
	U (CC)	1	E C U 1	-200 to 400	-328 to 752	
		0.1	E C U 2	-199.9 to 400.0	-199.9 to 752.0	
	Platine II	1	E C P	0 to 1390	32 to 2534	
		Cu 50Ω	0.1	E C U 50	-199.9 to 200.0	-199.9 to 392.0
	Cu 100Ω	0.1	E C U 100	-199.9 to 200.0	-199.9 to 392.0	
	JPT 100Ω	1	d P E 1	-200 to 650	-328 to 1202	
	DPT 50Ω	0.1	d P E 50	-199.9 to 650.0	-199.9 to 999.9	
	DPT 100Ω	1	d P E 1	-200 to 650	-328 to 1202	
Nickel 120Ω	0.1	d P E 2	-199.9 to 650.0	-199.9 to 999.9		
Voltage	0 - 10V	R - u 1	-1999 to 9999			
		R - u 2				
	1 - 5V	R - u 3				
		R - u 4				
Current	0 - 20mA	R - a 1				
	4 - 20mA	R - a 2				

※1: Same as existing W5 (TT) type sensor ※2: Same as existing W(TT) type sensor

Bar Graph

MV of control output (OUT1, OUT2) is displayed as the bar graph in real-time. According to bar graph setting in parameter 5 group, it displays bar graph by control output or does not display it.

OUT1 [Red LED]

OUT2 [Green LED]

One LED is 10% (total 10 LEDs: 100%). If control output MV is 0.1 to 10%, one LED turns ON. If MV is 90.1 to 100%, 10 LEDs turn ON.

The 1 output type (heating or cooling control) model has one OUT1 bar graph (red). The 2 output type (heating & cooling control) model has two bar graphs: OUT1 bar graph (red), OUT2 bar graph (green). OUT1 is for heating MV and OUT2 is for cooling MV.

Set Value (SV) Setting

You can set the temperature to control with [OK], [F1], [F2], [F3] keys. Set range is within SV low-limit value [L-SV] to SV high-limit value [H-SV]. Ex) In case of changing set temperature from 210°C to 250°C.

Press any key among [OK], [F1], [F2], [F3] in RUN mode to enter into SV setting mode. Last digit (10⁰ digit) on SV display part flashes.

Press [OK] key to move digit. (10⁰→10¹→10²→10³→10⁰)

Press [F1] key to raise or lower the setting

Press [MODE] key to save the setting value. If there is no additional key operations in 3 sec., the changed SV is automatically saved.

Remote SV Setting

This function is to set SV by inputting analog (DC4-20mA, 1-5VDC) signal to 13, 14 terminals. (Set that remote SV [E.SV] is ON in parameter 5 group.) Input analog signal is changed to between SV low-limit value and SV high-limit value. This changed signal sets the SV.

※When using remote SV, you cannot select SV setting by front keys and multi SV setting by digital input.

Parameter Mask

This function is able to hide unnecessary parameters to user environment or less frequently used parameters in parameter setting group. You can set this in the integrated device management program (DAQMaster). Though masked parameters are not displayed in parameter setting group, the parameter setting values are applied. For more information, refer to the DAQMaster user manual.

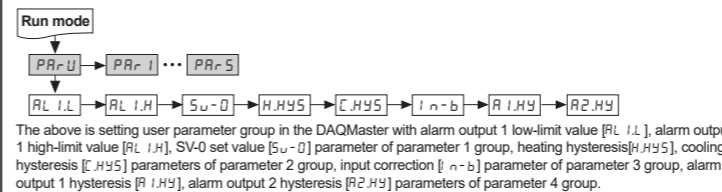
Before applying mask [PR-2] → [AL] → [H-P] → [C-P] → [H-I] → [C-I] → [H-d] → [C-d] ...

After applying mask [PR-2] → [H-P] → [H-I] → [H-d] ...

The above is masking auto tuning [P-t], cooling proportional band [C-P], cooling integral time [C-I], cooling derivative time [C-d] parameters in parameter 2 group.

User Parameter Group [PR-U] Setting

This function is able to set the frequently used parameters to the user parameter group. You can quickly and easily set parameter settings. User parameter group can have up to 30 parameters in the integrated device management program (DAQMaster). For more information, refer to the DAQMaster user manual.



Auto-tuning

Auto-tuning measures the control subject's thermal characteristics and thermal response rate, and then determines the necessary PID time constant. Application of the PID time constant realizes fast response and high precision temperature control. (When setting control type [C-nd] to P1-d, it appears.) Set [AT] parameter to [on] in parameter 2 group to start auto-tuning. To stop auto-tuning, change the set as [off]. (It maintains P, I, D values of before auto-tuning.) If sensor break error [o.PE-n] occurs during auto-tuning, it stops this operation. If the measured temperature is over or below the input range, it operates continuously. During auto-tuning operation, whole parameters are only available to check.

Alarm

Alarm operation

Mode	Name	Alarm operation	Description
off	—	—	No alarm output
d u C C	Deviation high-limit alarm	OFF → ON (High deviation) / ON → OFF (Low deviation)	If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.
J J d u	Deviation low-limit alarm	ON → OFF (Low deviation) / OFF → ON (High deviation)	If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.
J d u C	Deviation high/low-limit alarm	ON → OFF (Low deviation) / OFF → ON (High deviation)	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be ON.
C d u J	Deviation high/low-limit reserve alarm	OFF → ON (Low deviation) / ON → OFF (High deviation)	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be OFF.
P u C C	Absolute value high limit alarm	OFF → ON (Absolute-value: Set as 90°C) / ON → OFF (Absolute-value: Set as 110°C)	If PV is higher than the absolute value, the output will be ON.
J J P u	Absolute value low limit alarm	ON → OFF (Absolute-value: Set as 90°C) / OFF → ON (Absolute-value: Set as 110°C)	If PV is lower than the absolute value, the output will be ON.
L b A	Loop break alarm	—	It will be ON when it detects loop break.
S b A	Sensor break alarm	—	It will be ON when it detects sensor disconnection.
H b A	Heater break alarm	—	It will be ON when CT detects heater break.

※H: Alarm output [hysteresis] [P.HYS]

Alarm option

Mode	Name	Description
RL - A	Standard alarm	If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.
RL - b	Alarm latch	If it is an alarm condition, alarm output is ON and maintains ON status.
RL - C	Standby sequence 1	First alarm condition is ignored and from second alarm condition, standard alarm operates.
RL - d	Alarm latch and standby sequence 1	If it is an alarm condition, it operates both alarm latch and standby sequence. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, alarm latch operates.
RL - E	Standby sequence 2	First alarm condition is ignored and from second alarm condition, standard alarm operates. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, standard alarm operates.
RL - F	Alarm latch and standby sequence 2	Basic operation is same as alarm latch and standby sequence1. It operates not only by power ON/OFF, but also alarm setting value, or alarm option changing. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, alarm latch operates.

※Condition of re-applied standby sequence for standby sequence 1, alarm latch and standby sequence 1: Power ON
Condition of re-applied standby sequence for standby sequence 2, alarm latch and standby sequence 2: Power ON, changing set temperature, alarm temperature [RL-1, RL-2] or alarm operation [RL-1, RL-2], switching STOP mode to RUN mode.

Parameter Initialization

It initializes all parameters to factory default values. Press front [OK], [F1], [F2], [F3] keys for 5 sec. at the same time and [ni-t] parameter is displayed. Select [E5] to initialize all parameters. If the password is set, you must enter the password. After initialing the parameters, the password parameter is also initialized.

Factory Default

SV setting [5u]		Password input parameter			
Parameter	Default	Parameter	Default	Parameter	Default
5u	0	PR55	0001		
Parameter 1group [PR-1]					
Parameter	Default	Parameter	Default	Parameter	Default
r-5	rUn	AL LL	1550	AL 3L	0000
5u-n	5u-0	AL LH	1550	AL 3H	0000
Ct-A	00	AL 2L	1550	5u-0	0000
AL LL	1550	AL 2H	1550	5u-1	0000

Parameter 2group [PR-2]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
AL	oFF	H-d	0000	HoSt	000	rARU	000
H-P	0 100	C-d	0000	CHYS	002	rARd	000
C-P	0 100	db	0000	CoSt	000	rUnE	ni n
H-I	0000	rESt	0500	L-ru	+000		
C-I	0000	KHYS	002	H-ru	1000		

Parameter 3group [PR-3]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
in-t	ECRH	H-Sc	1000	o-ft	HEAL	oUt 1	55r
Un-t	oC	dUnE	oPo	H-C	o LAR	4-20	
L-rG	0000	in-b	0000	PI d	oUt 2	55r	
H-rG	1000	ARuF	000.1	C-nd	PP	o2AR	4-20
d-oE	00	L-5u	-200	ALt	tUn 1	H-t	0200 (RS4)
L-5C	0000	H-5u	1350	oUt 1	rLy	C-t	0000 (RS4)

Parameter 4group [PR-4]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
AL - 1	duCC	ARHy	00 1	ARon	0000	bP5	96
AL Lt	AL - A	ARn	no	ARoF	0000	PrTy	nonE
ARHy	00 1	ARon	0000	LbRt	0000	5tP	2
AR	no	ARoF	0000	LbRb	002	r5Yt	20
ARon	0000	AL - 3	LbR	ARn	Pu	CoAr	EnR
ARoF	0000	AL 3t	AL - A	F5-L	-200		
AL - 2	JJdu	ARHy	00 1	F5-H	1350		
AL 2t	AL - A	ARn	no	ARdS	0 1		

Parameter 5group [PR-5]

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
nt5u	1	r5Pn	1000	5tRu	0000	LCP3	oFF
d1 - 5	5tOP	bAr	oUt 1	5tAL	CoNt	LCP4	oFF
d1 - 1	oFF	RL	USEr	5tnd	LCP5	oFF	
d1 - 2	oFF	1tRu	RUo	Lc5u	oFF	Pyd	0000
rE5u	oFF	PrRu	0000	LCP 1	oFF		
r1nb	0000	ErRu	0000	LCP2	oFF		

※Shaded parameters are the factory default of heating&cooling model.

User Manual

For the detail information and instructions, please refer to user manual and user manual for communication, and be sure to follow cautions written in the technical descriptions (catalog, homepage).

Comprehensive Device Management Program[DAQMaster]

DAQMaster is the integrated device management program. It is available for parameter setting, monitoring, and user group, parameter mask function setting only for KPN series.

Item	Recommended requirement
System	IBM PC compatible PC, Intel Pentium III above
Operating system	Microsoft Windows 98/NT/XP/Vista/Window 7
Memory	Above 256MB
Hard disk	1GB of Hard disk space or more
VGA	Resolution display above 1024x768
Other	RS-232 Serial port (9-pin), USB port

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Check the polarity of the terminals before wiring the temperature sensor. For RTD temperature sensor, wire it as 3-wire type, using cables in same thickness and length. For thermocouple (CT) temperature sensor, use the designated compensation wire for extending wire.
- Keep away from high voltage lines or power lines to prevent inductive noise. In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line. Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Do not apply excessive power when connecting or disconnecting the connectors of the product.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Do not use the unit for other purpose (e.g. voltmeter, ammeter), but temperature controller.
- When changing the input sensor, turn off the power first before changing. After changing the input sensor, modify the value of the corresponding parameter.
- Do not overlapping communication line and power line. Use twisted pair wire for communication line and connect ferrite bead at each end of line to reduce the effect of external noise.
- Make a required space around the unit for radiation of heat. For accurate temperature measurement, warm up the unit over 20 min after turning on the power.
- Make sure that power supply voltage reaches to the rated voltage within 2 sec after supplying power.
- Do not wire to terminals which are not used.
- This unit may be used in the following environments.
 - ① Indoors (in the environment condition rated in 'Specifications')
 - ② Altitude max. 2,000m
 - ③ Pollution degree 2
 - ④ Installation category II