Autonics

KPN SERIES MANUAL

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

■ Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;
⚠ **Warning** Serious injury may result if instructions are not followed.
⚠ **Caution** Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.
⚠caution:Injury or danger may occur under special conditions.

⚠ Warning

1. **In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.**
It may cause a fire, human injury or damage to property.
2. **Install the unit on the panel.**
It may cause electric shock.
3. **Do not connect, inspect or repair when power is on.**
It may cause electric shock.
4. **Wire properly after checking terminal number.**
It may cause a fire.
5. **Do not disassemble the case. Please contact us if it is required.**
It may cause electric shock or a fire.

⚠ Caution

1. **This unit shall not be used outdoors.**
It might shorten the life cycle of the product or give an electric shock.
2. **When connecting wire, AWG 20(0.50mm²) should be used and bolt should be screwed on terminal block with 0.74N·m to 0.90N·m strength.**
It may cause a malfunction or fire due to contact failure.
3. **For crimped terminal, select following shaped terminal M3.**

Max. 5.8mm   Max. 5.8mm
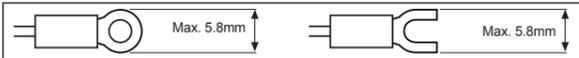
4. **Please observe the rated specifications.**
It might shorten the life cycle of the product and cause a fire.
5. **Do not use beyond of the rated switching capacity of relay contact.**
It may cause insulation failure, contact melt, contact failure, relay broken and fire etc.
6. **In cleaning unit, do not use water or an oil-based detergent and use dry towels.**
It may cause an electric shock or a fire.
7. **Do not use this unit in place where there are flammable or explosive gas, humidity, direct ray of the light, radiant heat, vibration and impact etc.**
It may cause a fire or an explosion.
8. **Do not inflow dust or wire dregs into the unit.**
It may cause a fire or a malfunction.
9. **Please wire properly after checking the terminal polarity when connecting temperature sensor.**
It may cause a fire or a malfunction.
10. **In order to install the units with reinforced insulation, use the power supply unit which basic insulation level is ensured.**

■ Ordering information

KPN5 5 0 0 - 0 0 0

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] 1 output type	0	Relay, Current, SSR drive voltage selection output
2 output type	1	OUT1: Current, SSR drive voltage selection output OUT2: Current, SSR drive voltage selection output
	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 ouptut	0	1 output type (Heating or Cooling type)
	1	2 output type (Heating&Cooling type)
Size	3	DIN W48×H96mm
	5	DIN W96×H96mm
Item	KPN5	Temperature / Process Controller

※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 switching 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 without notice.**

■ Specifications

Series	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)	7.0×14.6mm	11.0×22.0mm
	SV(W×H)	6.0×12.0mm	6.0×12.0mm
Input type	RTD	JPt 100Ω, DPt 100Ω, DPt 50Ω, Cu 100Ω, Cu 50Ω, Nikel 120Ω(6types)	
	TC	K, J, E, T, L, N, U, R, S, B, C, G, PLII(13types)	
	Analog	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	• At room temperature(23℃±5℃): (PV ±0.3% or ±1℃, select the bigger one) ±1Digit[※1] • Out of range of room temperature: (PV ±0.5% or ±2℃, select the bigger one) ±1Digit	
	TC		
	Analog	• At room temperature(23℃±5℃): ±0.3% F.S. ±1Digit, • Out of range of room temperature: ±0.5% F.S. ±1Digit	
	CT input	±5% F.S. ± 1Digit	
Control output	Relay	OUT1, OUT2: 250VAC 5A 1a	
	SSR	11VDC ±2V 20mA Max.	
	Current	DC4-20mA or DC0-20mA (Max. Load 500Ω)	
Alarm output	Relay	AL1, AL2, AL3 Relay: 250VAC 3A 1a	
Option output	Transmission	DC4-20mA (Max. Load 500Ω, Output accuracy: ±0.3% F.S. ±1 Digit)	
	Communication	RS485 communication output (Modbus RTU)	
Option input	CT	0.0 to 50.0A(Primary heater current value measuring range) ※CT ratio = 1/1000	
	Remote SV	1-5VDC or DC4-20mA (Current input: using external resistance 250Ω)	
	Digital input	• Contact Input: On-Max. 2kΩ, OFF-Min. 90kΩ • Non-contact Input: ON-Residual votage max. 1.0V, OFF-leakage current max. 0.1mA	
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID control mode	
	Heating&Cooling		
Hysteresis	• Thermocouple / RTD: 1 to 100℃/℉(0.1 to 100.0℃/℉ 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	Over 10,000,000 times	
	Electrical	Over 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	-10 to 50℃, storage: -20 to 60℃	
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH	
Insulation resistance	Over 100MΩ(at 500VDC megger)	
Protection	IP65(Front part)	
Insulation type	Double insulation or reinforced insulation (Mark: ▣ Dielectric strength between the measuring input part and the power part : 2kV)	
Weight	Approx. 230g (approx. 160g)	Approx. 316g (approx. 220g)

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

■ Parts description

KPN5510
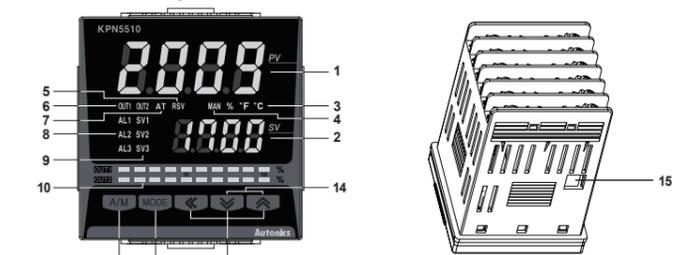
1. **Measured value (PV) display part:** RUN mode: It displays currently measured value (PV).
Setting mode: It displays the parameter.
2. **Set value (SV) display part:** RUN mode: It displays the set value (SV).
Setting mode: It displays the set value of the parameter.
3. **Unit (℃/℉/%) indicator:** It displays the unit set at display unit [D.UNT] in parameter 3 group.
4. **Manual control indicator:** It turns ON during manual controlling.
5. **Remote SV control indicator:** It turns ON during remote SV controlling.
6. **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.
7. **Auto tuning indicator:** It flashes by 1 sec. when executing auto tuning.
8. **Alarm output (AL1, AL2, AL3) indicator:** It turns ON when the alarm output is ON.
9. **.Multi SV indicator:** The SV 1 to 3 indicator turns ON when using multi SV function.
10. **Bar graph for control output:** It displays control output MV as bar graph. The KPN5□00 as 1 output type has one bar graph (OUT1), and the KPN5□1□ as 2 output type has two bar graphs (OUT1, OUT2).
11. **A/M key:** It is used when switching auto control to manual control.
12. **MODE key:** It is used when entering parameter setting group, returning to RUN mode, moving parameter, saving the set value.
13. **◁, ▽, △ keys:** It is used when entering the set value changing mode and moving or changing up/down digit.
14. **Digital input key:** When pressing ▽ + △ 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.
15. **PC loader port:** It 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 to Serial converter, sold separately).

※**The display part is different by options.**

■ Connections

※ Standard model has shaded terminals only.
⋯⋯⋯⋯ is option specification.

● KPN5□00

⚠ ▣ SOURCE
100-240VAC, 50/60Hz

※1: Set relay output [RLY], current [CUR], or SSR drive voltage output [SSR] at OUT1 control output [OUT1] 4~20mA in parameter 3 group.

● KPN5□1□

⚠ ▣ SOURCE
100-240VAC, 50/60Hz

※2: OUT1, OUT2

Model	OUT1 control output	OUT2 control output
KPN5□11	Current, SSR drive voltage selection output	Current, SSR drive voltage selection output
KPN5□13	Current, SSR drive voltage selection output	Relay output
KPN5□17	Relay output	Current, SSR drive voltage selection output
KPN5□19	Relay output	Relay output

■ Front Panel Display when power is ON

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

① Flashes whole display part
② Model type display
③ Flashes input type twice
④ Run mode

■ Installation

※Insert product into a panel, fasten the bracket by pushing with tools.

(-)driver

■ Dimensions

(Unit:mm)

● KPN53□□

Bracket   Terminal cover

48   64.5

96   91.5

● KPN55□□

Bracket   Terminal cover

□96   64.5

91.5

● Panel cut-out

(Unit:mm)

Model	Unit	A	B	C	D
KPN53□□		Min. 65	Min. 115	92 +0.8 0	92 +0.8 0
KPN55□□		Min. 115	Min. 115	45 +0.8 0	92 +0.8 0
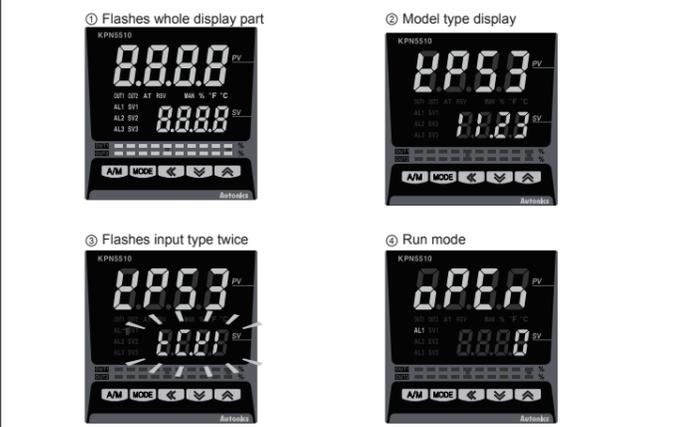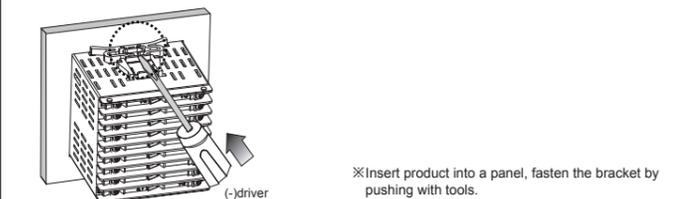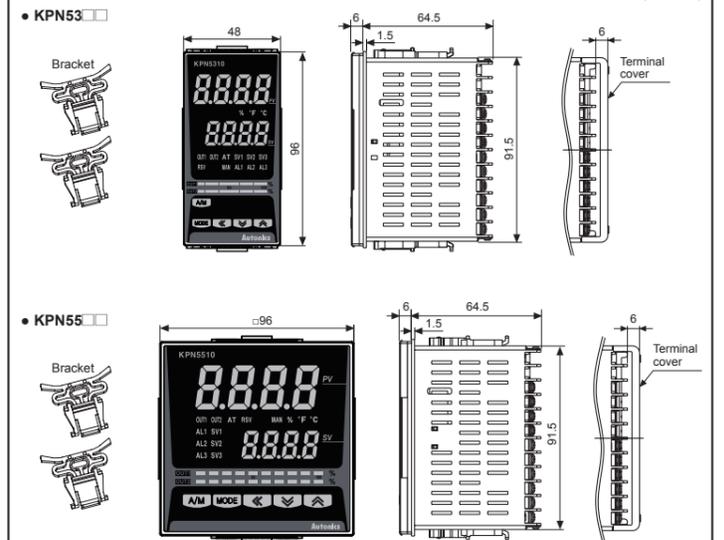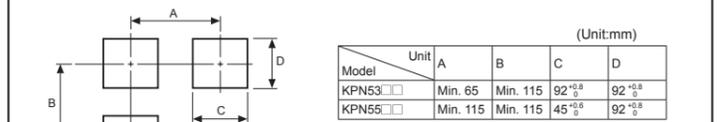
● Terminal cover(Sold separately)
• RHA-COVER(48×96mm)   • RLA-COVER(96×96mm)

47.2   94
91.5   91.5

● 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%

Ta=25℃   F=50Hz
Ta=25℃   F=50Hz
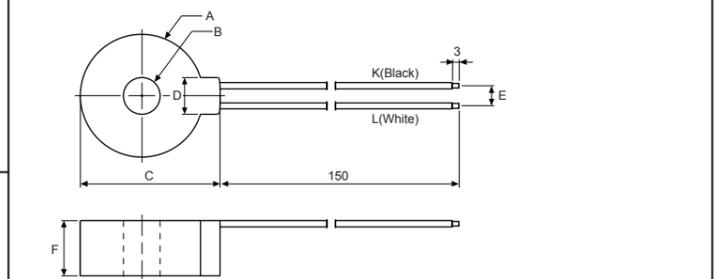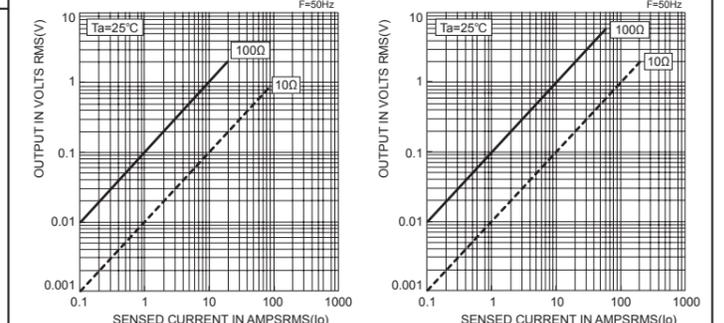
Model	A	B	C	D	E	F
CSTC-E80LN	Ø23.3	Ø7	26.5	7	3.8	10.5
CSTC-E200LN	Ø37.1	Ø13	40.8	10	4.5	13.5

(Unit:mm)

※When using CT, do not supply primary current with open CT output. High voltage occurs at CT output part.
※The current for above two CTs is 50A same but inner hole sizes are different. Please use this for your environment.

■ Flow chart for setting group

Run mode

Press any key among ◁, ⊻, ⋀ once. / MODE 2sec. / MODE 3sec.

PASS ※1 / PASS ※1 / PASS ※1

MODE — When PW is valid,

Su — Set the setting value

PAr-U ※2 → PAr1 → PAr2 → PAr3 → PAr4 → PAr5

H-ñu (Heating MV Monitoring) / C-ñu (Cooling MV Monitoring)

Automatically saves after 5 sec.

User parameter set in DAQMaster

PAr1:
- Control output RUN/STOP[r-S]
- Multi SV number[Su-n]
- Heater current monitoring[H-A]
- Alarm output1 low-limit value[AL1L]
- Alarm output1 high-limit value[AL1H]
- Alarm output2 low-limit value[AL2L]
- Alarm output2 high-limit value[AL2H]
- Alarm output3 low-limit value[AL3L]
- Alarm output3 high-limit value[AL3H]
- SV-0 set value[Su-0]
- SV-1 set value[Su-1]
- SV-2 set value[Su-2]
- SV-3 set value[Su-3]

PAr2:
- Auto-tuning RUN/STOP[At]
- Heating proportional band[H-P]
- Cooling proportional band[C-P]
- Heating integral time[H-I]
- Cooling integral time[C-I]
- Heating derivative time[H-d]
- Cooling derivative time[C-d]
- Dead band[db]
- Manual reset[rESt]
- Heating hysteresis[H.HYS]
- Heating OFF offset[Ho5t]
- Cooling hysteresis[C.HYS]
- Cooling OFF offset[Co5t]
- MV low-limit[L-ñu]
- MV high-limit[H-ñu]
- RAMP-Up change rate[rñU]
- RAMP-Down change rate[rñd]
- RAMP unit[r.Unt]

PAr3:
- Input type[n-t]
- Sensor temperature unit[Unit]
- Analog low-limit input value[rrL]
- Analog high-limit input value[rrG]
- Decimal point[dot]
- Low-limit scale value[L-SC]
- High-limit scale value[H-SC]
- Display unit[d.Unt]
- Input correction[n-b]
- Input digital filter[ñAU.F]
- SV low-limit value[L-Su]
- SV high-limit value[H-Su]
- Control output operation mode[o-Ft]
- Control type[C-ñd]
- Auto-tuning mode[Att]
- OUT1 control output[oUt1]
- OUT1 current output range[o1rA]
- OUT2 current output range[o2rA]
- Heating control time[H-t]
- Cooling control time[C-t]

PAr4:
- Alarm output1 operation mode[AL-1]
- Alarm output1 option[AL1t]
- Alarm output1 hysteresis[A1HY]
- Alarm 1 N.O./N.C.[A1.n]
- Alarm 1 ON delay time[A1.on]
- Alarm 1 OFF delay time[A1oF]
- Alarm output2 operation mode[AL-2]
- Alarm output2 option[AL2t]
- Alarm output2 hysteresis[A2HY]
- Alarm 2 N.O./N.C.[A2.n]
- Alarm 2 ON delay time[A2.on]
- Alarm 2 OFF delay time[A2oF]
- Alarm output3 operation mode[AL-3]
- Alarm output3 option[AL3t]
- Alarm output3 hysteresis[A3HY]
- Alarm 3 N.O./N.C.[A3.n]
- Alarm 3 ON delay time[A3.on]
- Alarm 3 OFF delay time[A3oF]
- Analog trans. output 1[roA1]
- Trans. output low-limit value[F5-L]
- Trans. output high-limit value[F5-H]

PAr5:
- Multi SV[ñt.Su]
- Digital input key[di-t]
- DI-1 input terminal function[di-1]
- DI-2 input terminal function[di-2]
- Remote SV[rES.u]
- Remote SV low-limit value correction[r-1.ñu]
- Remote SV high-limit value gradient correction[r-SPn]
- Bar graph[bAr]
- Manual control, initial manual MV[1.ñu]
- Manual control, preset manual MV[Pr.ñu]
- Sensor error, MV[Er.ñu]
- Control stop, MV[5t.ñu]
- Control stop, alarm output[5t.AL]
- User level[USEr]
- SV setting lock[L.C.5u]
- Parameter 1 group lock[L.CP1]
- Parameter 2 group lock[L.CP2]
- Parameter 3 group lock[L.CP3]
- Parameter 4 group lock[L.CP4]
- Parameter 5 group lock[L.CP5]
- Password setting[Pyd]
- Comm. address[Adr5]
- Comm. speed[bP5]
- Comm. parity bit[Prty]
- Comm. stop bit[5tP]
- Comm. response wating time[rSEt]
- Comm. write[CoñY]

※1: [PASS] 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 ◁, ⊻, ⋀ to return to password entering window. Press MODE key to return to RUN mode.
If you forgot 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 ⊻, ⋀ 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 temperature range

Input type		Dot	Display	Input range(°C)	Input range(°F)
Thermocouple	K(CA)	1	tCt1	-200 to 1350	-328 to 2463
		0.1	tCt2	-199.9 to 999.9	-199.9 to 999.9
	J(IC)	1	tCJ1	-200 to 800	-328 to 1472
		0.1	tCJ2	-199.9 to 800.0	-199.9 to 999.9
	E(CR)	1	tCE1	-200 to 800	-328 to 1472
		0.1	tCE2	-199.9 to 800.0	-199.9 to 999.9
	T(CC)	1	tCt1	-200 to 400	-328 to 752
		0.1	tCt2	-199.9 to 400.0	-199.9 to 752.0
	B(PR)	1	tC-b	0 to 1800	32 to 3272
	R(PR)	1	tC-r	0 to 1750	32 to 3182
	S(PR)	1	tC-5	0 to 1750	32 to 3182
	N(NN)	1	tC-n	-200 to 1300	-328 to 2372
	C(TT)※1	1	tC-C	0 to 2300	32 to 4172
	G(TT)※2	1	tC-G	0 to 2300	32 to 4172
	L(IC)	1	tCL1	-200 to 900	-328 to 1652
		0.1	tCL2	-199.9 to 900.0	-199.9 to 999.9
	U(CC)	1	tCU1	-200 to 400	-328 to 752
		0.1	tCU2	-199.9 to 400.0	-199.9 to 752.0
RTD	Platinel II	1	tC-P	0 to 1390	32 to 2534
	Cu 50Ω	0.1	CU50	-199.9 to 200.0	-199.9 to 392.0
	Cu 100Ω	0.1	CU10	-199.9 to 200.0	-199.9 to 392.0
	JPt 100Ω	1	JPt1	-200 to 650	-328 to 1202
		0.1	JPt2	-199.9 to 650.0	-199.9 to 999.9
	DPt 50Ω	1	dPt1	-200 to 650	-328 to 1202
		0.1	dPt5	-199.9 to 600.0	-199.9 to 999.9
	DPt 100Ω	1	dPt1	-200 to 650	-328 to 1202
		0.1	dPt2	-199.9 to 650.0	-199.9 to 999.9
	Nickel 120Ω	Last dot	ni.12	-80 to 200	-112 to 392
Analog	Voltage	0-10V	A-u1		
		0-5V	A-u2	-1999 to 9999	
		1-5V	A-u3	(Display range is variable according to decimal point position.)	
		0-100mV	A.u1		
	Current	0-20mA	A.A1		
		4-20mA	A.A2		

※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 ▮▮▮▮▮▮▮▮▮▮ (GreenLED)
50   100

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.

■ Flow chart for SV setting

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

① Press any key among ◁, ⊻, ⋀ in RUN mode to enter into SV setting mode. Last digit(10⁰ digit) on SV display part flashes.

② Press ◁ key to move digit. (10⁰→10¹→10²→10³→10⁰)

③ Press ⊻, ⋀ key to raise or lower the setting.

④ 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 [rES.u] 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. Visit our website (www.autonics.com) to download the DAQmaster program and the user manual.

Before applying mask: PAr2 → At → H-P → C-P → H-I → C-I → H-d → C-d ···
After applying mask: PAr2 → H-P → H-I → H-d ···

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

■ User parameter group [PAr-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.
Visit our website (www.autonics.com) to download the DAQmaster program and the user manual.

Run mode

PAr-U → PAr1 ··· PAr-5

AL1L → AL1H → Su-0 → H.HYS → C.HYS → 1-n-b → A1HY → A2.HY

The above is setting user parameter group in the DAQMaster with alarm output 1 low-limit value [AL1L], alarm output 1 high-limit value [AL1H], SV-0 set value [Su-0] parameter of parameter 1 group, heating hysteresis [H.HYS], cooling hysteresis [C.HYS] parameters of parameter 2 group, input correction [n-b] parameter of parameter 3 group, alarm output 1 hysteresis [A1HY], alarm output 2 hysteresis [A2HY] parameters of parameter 4 group.

■ Auto-tunning

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-ñd] 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 [oPEn] 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
duCC	Deviation high-limit alarm	High deviation: Set as 10°C / Set as -10°C	If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.
JJdu	Deviation low-limit alarm	Low deviation: Set as 10°C / Set as -10°C	If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.
Jduc	Deviation high/low-limit alarm	Low deviation: Set as 10°C, High deviation: Set as 20°C	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be ON.
CduJ	Deviation high/low-limit reserve alarm	Low deviation: Set as 10°C, High deviation: Set as 20°C	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be OFF.
PuCC	Absolute value high limit alarm	Absolute-value: Set as 90°C / Absolute-value: Set as 110°C	If PV is higher than the absolute value, the output will be ON.
JJPu	Absolute value low limit alarm	Absolute-value: Set as 90°C / Absolute-value: Set as 110°C	If PV is lower than the absolute value, the output will be ON.
LbA	Loop break alarm	—	It will be ON when it detects loop break.
SbA	Sensor break alarm	—	It will be ON when it detects sensor disconnection.
HbA	Heater break alarm	—	It will be ON when CT detects heater break.

※[H: Alarm output ☐ hysteresis[A☐HY]]

● Alarm option

Mode	Name	Description
AL-A	Standard alarm	If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.
AL-b	Alarm latch	If it is an alarm condition, alarm output is ON and maintains ON status.
AL-C	Standby sequence 1	First alarm condition is ignored and from second alarm condition, standard alarm operates. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, standard alarm operates.
AL-d	Alarm latch and standby sequence 1	If it is an alarm condition, it operates first 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, standard alarm operates.
AL-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.
AL-F	Alarm latch and standby sequence 2	Basic operation is 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 [AL1, AL2] or alarm operation [AL-1, AL-2], switching STOP mode to RUN mode.

■ Parameter initialization

It initializes all parameters to factory default values. Press front ◁, ⊻, ⋀ keys for 5 sec. at the same time and [ni t] parameter is displayed. Select 'YES' 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 [Su]

Parameter	Default
Su	0

● Password input parameter

Parameter	Default
PASS	0001

● Parameter 1group [PAr1]

Parameter	Default	Parameter	Default	Parameter	Default
r-S	rUn	AL1L	1550	AL3L	0000	Su-2	0000
Su-n	Su-0	AL1H	1550	AL3H	0000	Su-3	0000
Ct-A	0.0	AL2L	1550	Su-0	0000		
AL1L	1550	AL2H	1550	Su-1	0000		

● Parameter 2group [PAr2]

Parameter	Default	Parameter	Default	Parameter	Default
At	oFF	H-d	0000	Ho5t	000	rñU	000
H-P	0100	C-d	0000	C.HYS	002	rñd	000
C-P	0100	db	0000	Co5t	000	r.Unt	ñ1n
H-I	0000	rESt	0500	L-ñu	-1000		
C-I	0000	H.HYS	002	H-ñu	1000		

● Parameter 3group [PAr3]

Parameter	Default	Parameter	Default	Parameter	Default
1-n-t	tCt.H	H-SC	1000			HEAt	oUt1	55r
Unit	°C	dUnt	°o	o-Ft	o.1rA	4-20
L-rG	0000							oUt2	55r
H-rG	1000	ñAu.F	0001	C-ñd	P1d	o2rA	4-20
dot	0.0	L-Su	-200			Att	tUn1	0200 (Relay)
L-SC	0000	H-Su	1350			oUt1	rLY	0000 (SSR)

● Parameter 4group [PAr4]

Parameter	Default	Parameter	Default	Parameter	Default
AL-1	duCC	A2HY	001	A3.on	0000	bP5	96
AL1t	AL-A	A2.n	no	A3oF	0000	Prty	nonE
A1HY	001	A2.on	0000	LbAt	0000	5tP	2
A1.n	no	A2oF	0000	LbAb	002	rSYt	20
A1.on	0000	AL-3	AL-A	roA1	Pu	CoñY	En.A
A1oF	0000	AL3t	AL-A	F5-L	-200		
AL-2	AL-A	A3HY	001	F5-H	1350		
AL2t	AL-A	A3.n	no	Adr5	01		

● Parameter 5group [PAr5]

Parameter	Default	Parameter	Default	Parameter	Default
ñt.Su	1	rSPn	1000	5t.ñu	0000	LCP3	oFF
di-t	5toP	oUt1	5t.AL	Cont	LCP4	oFF
di-1	oFF		ALL	USEr	5tnd	LCP5	oFF
di-2	oFF	1.tñu	AUto	LC.5u	oFF	Pyd	0000
rES.u	oFF	Pr.ñu	0000	LCP1	oFF		
r1.ñb	0000	Er.ñu	0000	LCP2	oFF		

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

■ Manual

For the detail information and instructions, please refer to the user manual and the user manual for communication. Visit our homepage (www.autonics.com) to download manuals.

■ Integrated 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. Visit our website (www.autonics.com) to download it.

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 (9Pin), USB port

■ Caution for using

1. Please use separated line from high voltage line or power line in order to avoid inductive noise.
2. Please install power switch or circuit-breaker in order to cut power supply off.
3. The switch or circuit-breaker should be installed near by users.
4. This unit is designed for temperature controlling only. Do not apply this unit as a voltage meter or a current meter.
5. In case of using RTD sensor, 3-wire type must be used. If you need to extend the line, 3-wire must be used with the same thickness as the line.
   It might cause temperature difference if the resistance of line is different.
6. In case of making power line and input signal line close, line filter for noise protection should be installed at power line and input signal line should be shielded.
7. Keep away from the high frequency instruments. (High frequency welding machine & sewing machine, big capacitive SCR controller)
8. Installation environment
   ①It shall be used indoor.   ②Altitude Max. 2000m.   ③Pollution Degree 2.   ④Installation Category II.
※It may cause malfunction if above instructions are not followed.

■ Major products

■ Photoelectric sensors	■ Temperature controllers	■ Recorders	■ Thyristor units
■ Fiber optic sensors	■ Temperature/Humidity transducers	■ Indicators	■ Pressure transmitters
■ Door sensors	■ SSR/Power controllers	■ Converters	■ Temperature transmitters
■ Door side sensors	■ Counters	■ Controllers	
■ Area sensors	■ Timers		
■ Proximity sensors	■ Panel meters		
■ Pressure sensors	■ Tachometer/Pulse(Rate)meters		
■ Rotary encoders	■ Display units		
■ Connectors/Sockets	■ Sensor controllers		
■ Switching mode power supplies			
■ Control switches/Lamps/Buzzers			
■ I/O Terminal Blocks & Cables			
■ Graphic/Logic panels			
■ Field network devices			
■ Laser marking system(Fiber, CO₂, Nd:YAG)			
■ Laser welding/soldering system			

■ Parameter initialization (note reference continued)

It initializes all parameters to factory default values.