



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**
  - 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.
  - Install the unit on a panel. It may cause an electric shock.
  - Do not connect, inspect or repair when power is on. It may cause an electric shock.
  - Wire properly after check terminal number. It may cause a fire.
  - Do not disassemble the case. Please contact us if it is required. It may cause an electric shock or a fire.

### Caution

- This unit shall not be used outdoors. It might shorten the life cycle of the product or give an electric shock.
- When connect wire, AWG 20(0.50mm<sup>2</sup>) should be used and screw bolt on terminal block with 0.74N-m to 0.90N-m strength. It may cause a malfunction or fire due to contact failure.
- For crimped terminal, select following shaped terminal.
- Please observe the rated specifications. It might shorten the life cycle of the product and cause a fire.
- 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.
- 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.
- 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.
- Do not inflow dust or wire dregs into the unit. It may cause a fire or a malfunction.
- Please wire properly after check the terminal polarity when connect temperature sensor. It may cause a fire or an explosion.
- In order to install the units with reinforced insulation, use the power supply unit which basic insulation level is ensured.

### Ordering information

TK4S-14RR	OUT2 Control output *3	Standard	N	None *Select in case of standard control(Heating or Cooling)
		Heating	R	Relay output
		Cooling	C	Current output+SSR drive output
	OUT1 Control output *2	R	Relay output	
		S	SSRP output	
		C	Current output+SSR drive output	
	Power supply	4	100-240VAC 50/60Hz	
	Option output *1	SP	1	ALARM1 output
		S	1	ALARM1 output
		M	2	ALARM1+ALARM2 output
		R	1	ALARM1+PV transmission output
		W	1	ALARM1+RS485 Communication output
		A	1	ALARM1+ALARM2+PV transmission output
		B	1	ALARM1+ALARM2+RS485 Communication output
	Size	SP	1	DIN W48 x H48mm(11 pin plug type)*4
		S	1	DIN W48*H48mm(Terminal block type)
		M	1	DIN W72 x H72mm
		W	1	DIN W96 x H48mm
		H	1	DIN W48 x H96mm
		L	1	DIN W96 x H96mm
	Digit	4	9999(4 Digit)	
	Item	TK		Temperature / Process Controller

\*1: In case of SP series, option control output selection and digital input will be limited due to number of terminals.  
\*2: "S" represents SSRP drive voltage output support model which SSR standard/cycle/phase control are available. "C" represents both current and SSR(standard) output support model.  
\*3: Select "R" or "C" type in case of using heating&cooling control. Select "N" type in case of using standard control.  
\*4: 11 Pin Socket(PG-11,PS-11) for TS4SP: Sold separately  
⊗ The above specifications are subject to change without notice.

### Specifications

Series	TK4S	TK4SP	TK4M	TK4W	TK4H	TK4L
Power supply	100-240VAC 50/60Hz					
Allowable voltage range	90 to 110% of rated voltage					
Power consumption	Max. 8VA					
Display method	7 Segment(Red), Other display part(Green, Yellow, Red) LED					
Character size	PV(W x H) 7.0 x 14.0mm	9.5 x 20.0mm	8.5 x 17.0mm	7.0 x 14.6mm	11.0 x 22.0mm	11.0 x 22.0mm
Size	SV(W*H) 5.0 x 10.0mm	7.5 x 15.0mm	6.0 x 12.0mm	6.0 x 12.0mm	7.0 x 14.0mm	7.0 x 14.0mm
Input type	RTD: JPT 100Ω, DPT 100Ω, DPT 50Ω, CU 100Ω, CU 50Ω, Nickel 120Ω (6types) Thermocouple: K, J, E, T, L, N, U, R, S, B, C, G, PLI(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°C± 5°C): (PV ± 0.3% or ± 1°C, select the bigger one) ± 1Digit *1 Out of range of room temperature: (PV ± 0.5% or ± 2°C, select the bigger one) ± 1Digit In case of TK4SP series, ± 1°C will be added. Thermocouple: At room temperature(23°C± 5°C): ± 0.3% FS. ± 1Digit, Out of range of room temperature: ± 0.5% FS. ± 1Digit CT input: ± 5% FS. ± 1Digit					
Control output	Relay: 250VAC 3A 1a SSR: 11VDC± 2V 20mA Max. Current: DC0-20mA or DC0-20mA (Load 500Ω Max.)					
Alarm output	Relay: AL1, AL2 Relay: 250VAC 3A 1a (TK4SP: AL1 only)					
Sub output	Transmission: DC4-20mA (Load 500Ω Max., Accuracy: ± 0.3% F.S.) Communication: RS485 communication output (Modbus RTU)					
Option input	Digital input: - Contact Input: ON-Max. 2kΩ, OFF-Min. 90kΩ - Non-contact Input: ON-Residual voltage max. 1.0V, OFF-leakage current max. 0.1mA ⊗ TK4S/M-1EA (due to limited terminals), TK4H/W/L-2EA (except TK4SP)					
Control type	heating/cooling: ON/OFF, P, PI, PD, PID control mode heating&cooling					
Hysteresis	Thermocouples / 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°C(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 to 100.0%					
Sampling period	50ms					
Dielectric strength	2000VAC 50/60Hz for 1min.(between power source terminal and input terminal)					
Vibration resistance	0.75mm amplitude at frequency of 5 to 55Hz (for 1min.) in each X, Y, Z direction for 2 hours					
Relay life cycle	Mechanical: OUT1/2: Over 5,000,000 times, AL1/2: Over 20,000,000 times(TK4H/W/L: Over 5,000,000 times) Electrical: OUT1/2: Over 200,000 times, AL1/2: Over 100,000 times(TK4H/W/L: Over 200,000 times)					
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)					
Ambient temperature	-10 to 50°C(at non-freezing status)					
Storage temperature	-20 to 60°C(at non-freezing status)					
Ambient humidity	35 to 85%RH(at non-dew status)					
Protection	IP65(Front panel) ⊗ TK4SP: IP50(Front panel)					
Insulation type(⊗2)	□					
Unit weight	Approx. 105g	Approx. 85g	Approx. 140g	Approx. 141g	Approx. 141g	Approx. 198g

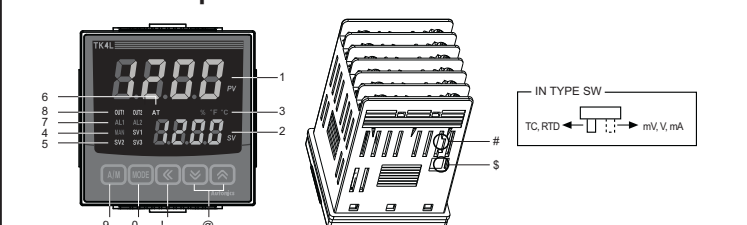
\*1: ⊗ At room temperature(23°C± 5°C)  
- TC K, J, T, N, E type, below -100°C / TC L, U, PLI, CU50, DPT type: (PV ± 0.3% or ± 2°C, select the bigger one) ± 1Digit  
- TC C, G type/TC R, S type, below 200°C: (PV ± 0.3% or ± 3°C, select the bigger one)± 1Digit  
- TC B type, below 400°C: There is no accuracy standards.  
⊗ Out of range of room temperature  
- RTD CU50, DPT50: PV ± 0.5% or ± 3°C, select the bigger one) ± 1Digit  
- TC R, S, B, C, G: (PV ± 0.5% or ± 5°C, select the bigger one) ± 1Digit  
- Others: Below -100°C: Within ± 5°C  
In case of TK4SP series, ± 1°C will be added.  
\*2: □ represents that this unit is double or reinforced insulated.  
⊗ Environment resistance is rated at no freezing or condensation.

### Input Sensor Type and Temperature Range

Input type	Dot	Display	Input range(°C)	Input range(°F)
K(CA)	0.1	ℰ C R H	-200 to 1350	-328 to 2463
	0.1	ℰ C R L	-199.9 to 999.9	-199.9 to 999.9
	1	J I C H	-200 to 800	-328 to 1472
	0.1	ℰ C R - H	-200 to 800	-328 to 1472
	0.1	ℰ C R - L	-199.9 to 800.0	-199.9 to 999.9
	1	ℰ C C H	-200 to 400	-328 to 752
	0.1	ℰ C C L	-199.9 to 400.0	-199.9 to 752.0
	1	b P r	0 to 1800	32 to 3272
	1	r P r	0 to 1750	32 to 3182
	1	S P r	0 to 1750	32 to 3182
ThermoCouple	1	n n n	-200 to 1300	-328 to 2372
	1	ℰ ℰ ℰ	0 to 2300	32 to 4172
	1	ℰ ℰ ℰ	0 to 2300	32 to 4172
	1	L I C H	-200 to 900	-328 to 1652
	0.1	L I C L	-199.9 to 900.0	-199.9 to 999.9
	0.1	U C C H	-200 to 400	-328 to 752
	0.1	U C C L	-199.9 to 400.0	-199.9 to 752.0
	1	P L I I	0 to 1390	32 to 2534
	0.1	ℰ U 5	-199.9 to 200.0	-199.9 to 392.0
	0.1	ℰ U 10	-199.9 to 200.0	-199.9 to 392.0
RTD	1	J P ℰ H	-200 to 650	-328 to 1202
	0.1	J P ℰ L	-199.9 to 650.0	-199.9 to 999.9
	0.1	d P ℰ S	-199.9 to 600.0	-199.9 to 999.9
	1	d P ℰ H	-200 to 650	-328 to 1202
	0.1	d P ℰ L	-199.9 to 650.0	-199.9 to 999.9
	1	n i 12	-80 to 200	-112 to 392
	Analog	0 to 10V	R u 1	-1999 to 9999 (Display point will be changed according to decimal point position.)
		0 to 5V	R u 2	
		1 to 5V	R u 3	
		0 to 100mV	R n u 1	
0 to 20mA		R n r 1		
4 to 20mA		R n r 2		

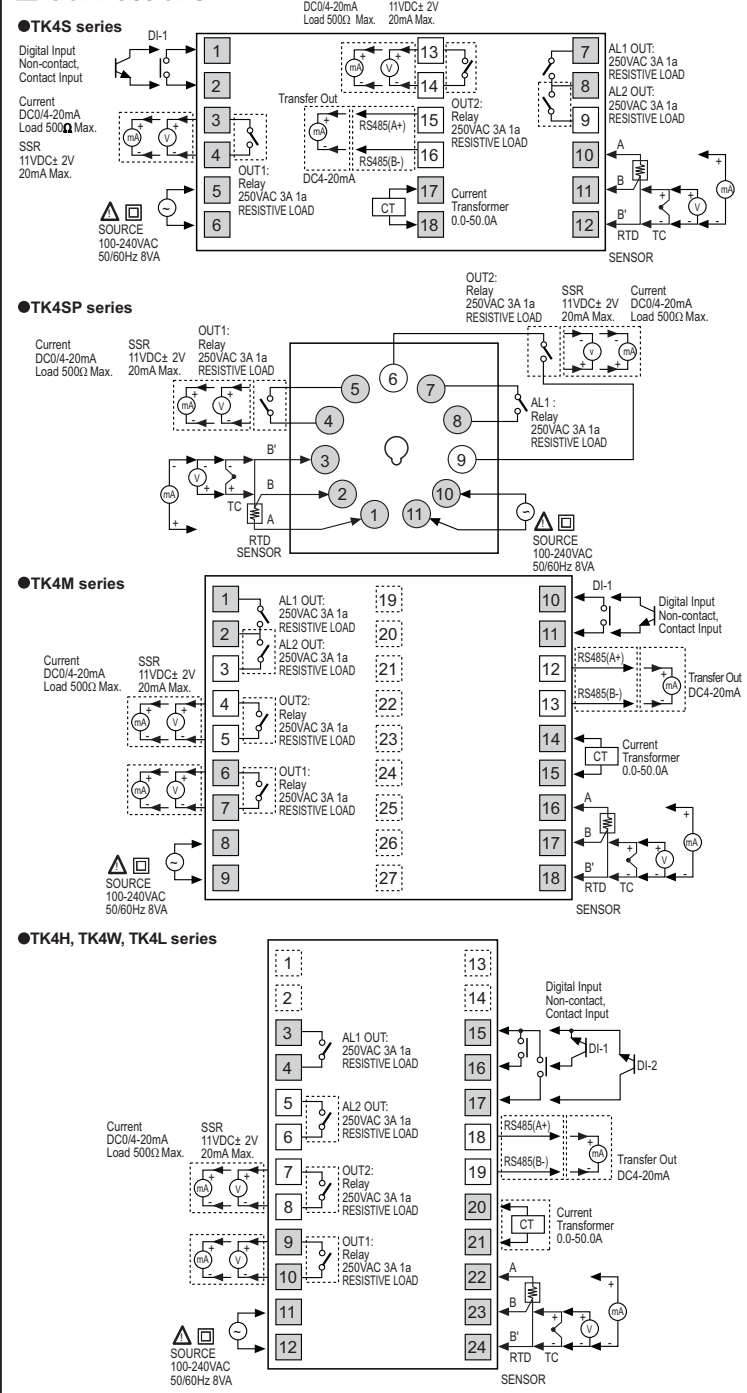
\*1: Same as existing W5 (TT) type sensor \*2: Same as existing W(TT) type sensor

### Parts description

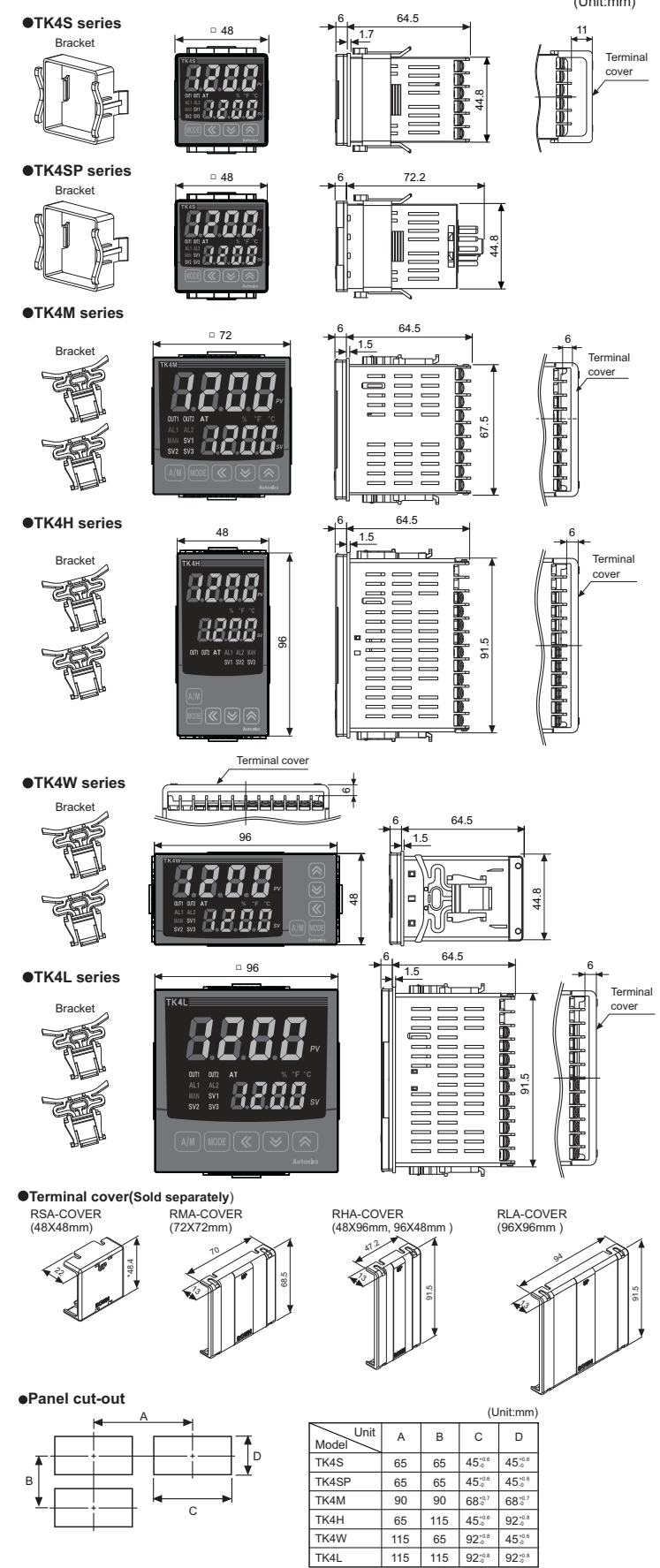


- PV display part: It shows current temperature (PV) in RUN mode and parameters in Setting mode.
- SV display part: It shows setting temperature value (SV) to control in RUN mode and each parameter setting value in Setting mode.
- Unit(°C/°F/%) Indicator: It shows current temperature unit.
- Manual Control Indicator: It will be ON in case of selecting manual control mode.
- Multi SV Indicator: One of SV1 to 3 lamp will be ON in case of selecting multi SV function.
- Auto-Tuning Indicator: It will be flashing every 1 sec during Auto-tuning.
- Alarm output indicator: It will be ON when each alarm output is ON.
- Control output(Heating, Cooling) Indicator: It will be ON when control output is ON.  
⊗ In case of SSRP output type is control/phase mode, it will be ON when MV is over 3.0%.  
⊗ In case of selecting current output (4-20mA DC, 0-20mA DC).  
- Manual control mode: It will be always ON except MV is 0.0%.  
- Auto control mode: It will be ON when MV is over 3.0%, and OFF when MV is below 2.0%.
- [A/M] key: Used when switching auto control mode → manual control mode  
⊗ In case of TK4S/SP model(48X48), [MODE] key will be used for the same function (auto control mode → manual control mode switching).
- [MOD] key: Used when entering into parameter setting mode and moving parameters.  
[K] key: Used when entering into set value change mode and Digit moving.
- [D] key: Used when entering into set value change mode and changing set value(Digit).
- Input selection switch: Used when switching sensor input (TC, RTD) → analog input (mV, V, mA).
- PC loader port for serial communication enables to set parameter and monitor by PC. Use this port for connecting SCM-US (USB to Serial converter).

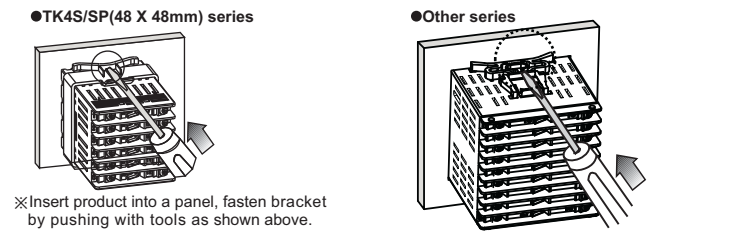
### Connections



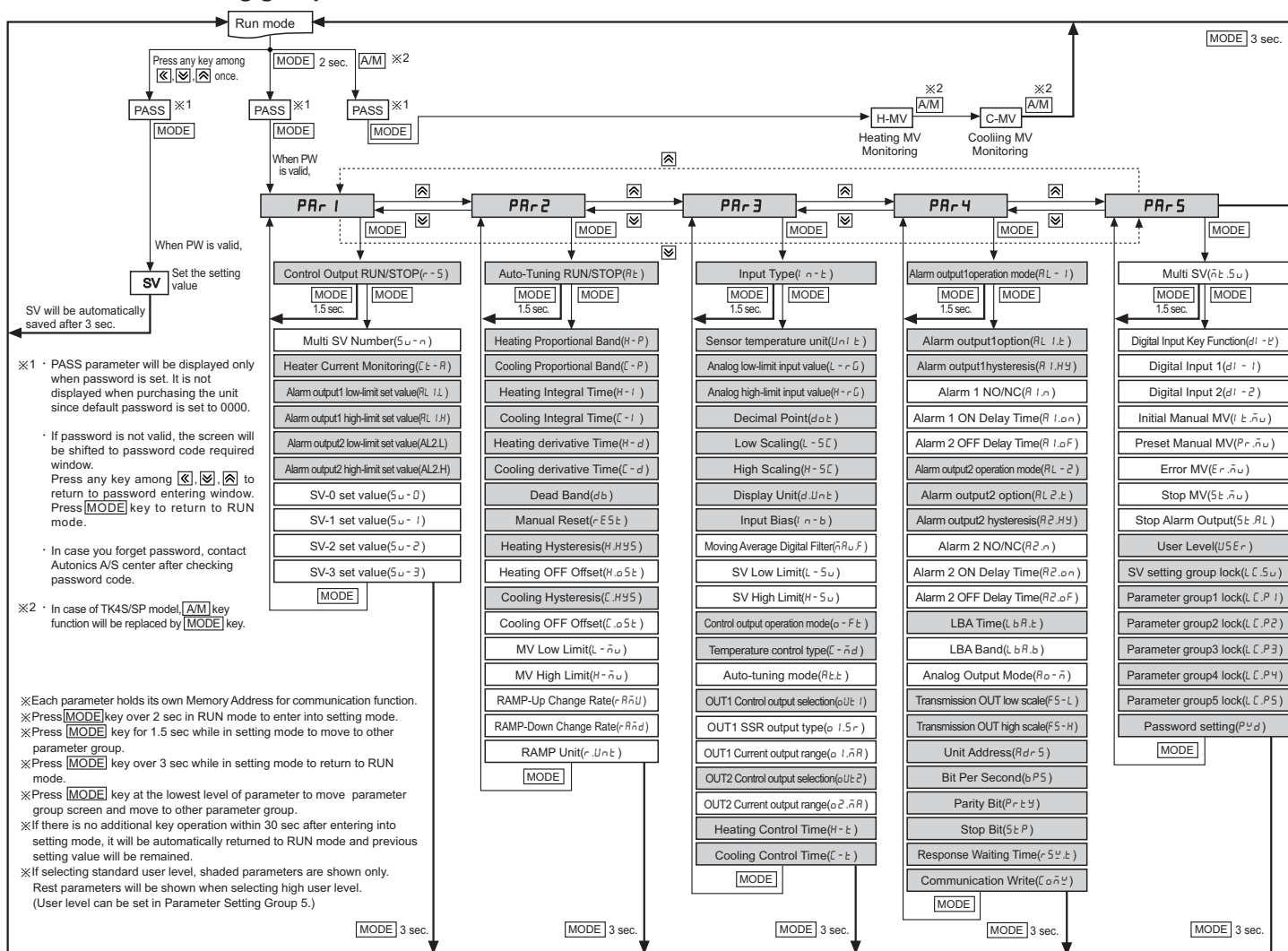
### Dimensions



### Product mounting



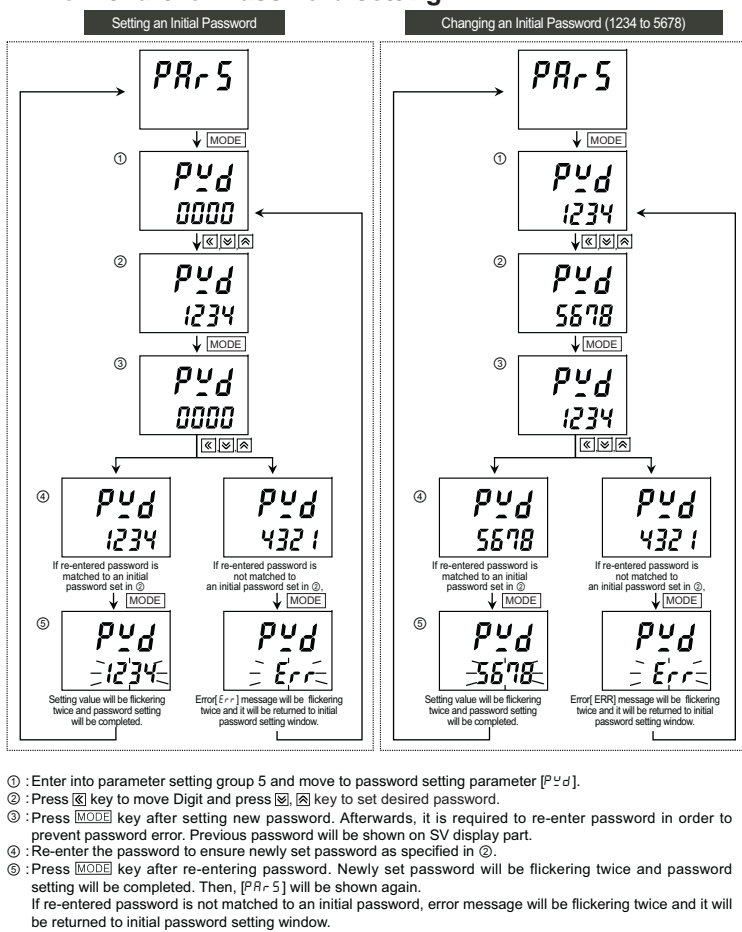
### Flow chart for setting group



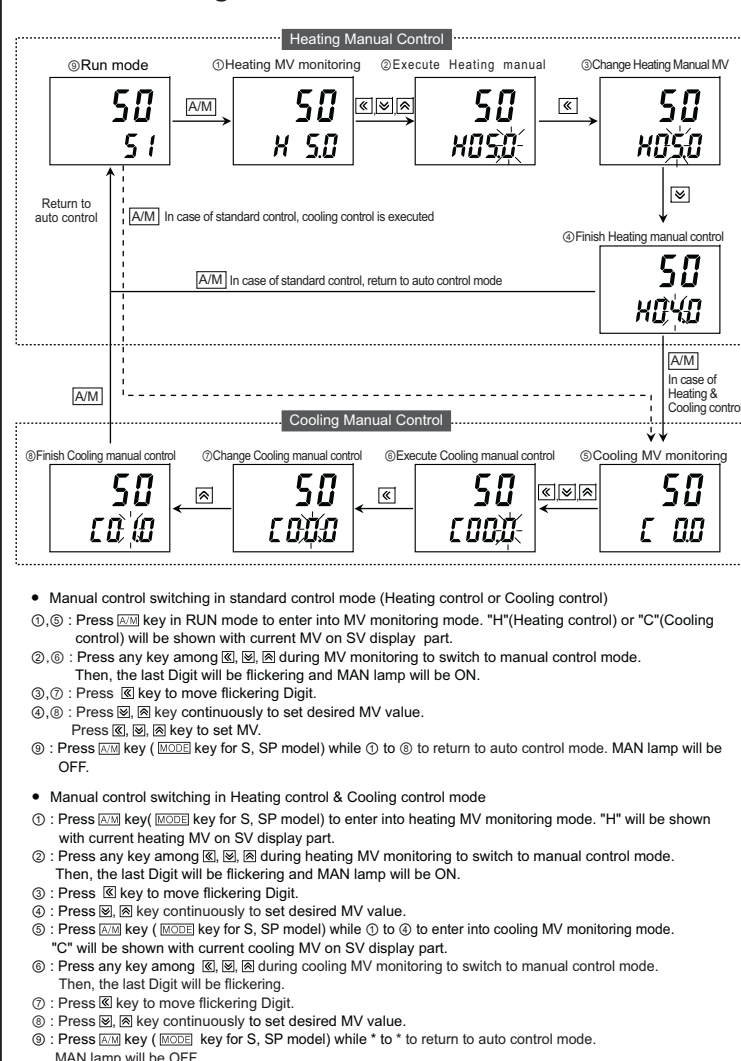
### Alarm output operation mode

Mode	Alarm output operation	Description(Default Deviation)
oFF	—	No alarm output
dUCL	OFF   ON (High deviation)	Deviation high-limit alarm (Temperature, analog: +F.S.) If PV/SV deviation is occurring higher than set value of deviation temperature, alarm output will be ON. Deviation temperature is set in RL 1.H / RL 2.H.
JJdU	ON   OFF (Lower deviation)	Deviation low-limit alarm (Temperature, analog: +F.S.) If PV/SV deviation is occurring lower than set value of deviation temperature, alarm output will be ON. Deviation temperature is set in RL 1.L / RL 2.L.
JdUc	ON   OFF (High/Low deviation)	Deviation high / low-limit alarm (Temperature, analog: +F.S.) If PV/SV deviation is occurring higher or lower than set value of deviation temperature, alarm output will be ON. High-limit deviation temperature is set in RL 1.H / RL 2.H. Low-limit deviation temperature is set in RL 1.L / RL 2.L.
CdUJ	OFF   ON (Reverse alarm)	Deviation high / low-limit reverse alarm (Temperature: 0, analog: 0) If PV/SV deviation is occurring higher or lower than set value of deviation temperature, alarm output will be ON. High-limit deviation temperature is set in RL 1.H / RL 2.H. Low-limit deviation temperature is set in RL 1.L / RL 2.L.
PuCL	OFF   ON (Absolute value high-limit)	Absolute value high-limit alarm (Temperature: High-limit value, analog: H-5C or L-5C, Select the higher one.) If PV is higher than absolute value of alarm temperature, alarm output will be ON. Absolute value alarm value is set in RL 1.H / RL 2.H.
JJPu	ON   OFF (Absolute value low-limit)	Absolute value low-limit alarm (Temperature: Low-limit value, Analog: H-5C or L-5C, Select the lower one.) If PV is lower than absolute value of alarm temperature, alarm output will be ON. Absolute value alarm value is set in RL 1.L / RL 2.L.
LbR	It will be ON when it detects loop break.	Loop Break Alarm
SbR	It will be ON when it detects sensor disconnection.	Sensor Break Alarm
HbR	It will be ON when it detects heater break using CT.	Heater Break Alarm

### Flow chart for Password setting



### MV Monitoring and Manual Control



### Factory Default

Mode	Factory Default	Mode	Factory Default	Mode	Factory Default	Mode	Factory Default
SV	0	PR55	0001	RL	oFF	H-d	0000
PR1	0000	RL2H	1550	H-o5t	000	rARU	000
RL-5	rUn	RL2L	1550	C-HY5	002	rARd	000
Su-n	Su-0	SV-0	0000	C-o5t	000	rUnL	ri n
Ct-A	RL2L	SV-1	0000	H-i	0000	L-nu	+00.
		SV-2		C-i	0000	H-HY5	002
		SV-3				H-nu	0

### User Manual

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

### DAQMaster

DAQMaster is integrated device management program. It is available for parameter setting and monitoring. Visit our homepage (www.autonics.com) to download DAQMaster.

Item	Recommended Requirement
System	IBM PC compatible PC, Intel Pentium III above
Memory	256MB
Hard Disk	100M of Hard Disk Space or more
Resolution	1024X768
Operating system	Windows 98/NT/XP/Vista/Windows 7 (In case of Windows 98, only English supported)
Communication Port	RS-232 Serial Port (9Pin), USB Port

### User Level Setting

- A function to set user levels(Standard Level/High Level) to place limitations on parameter display.
- User level can be set in Parameter Setting Group 5. When selecting Standard Level, shaded parameters - specified in "Flow Chart for Setting Group" will be displayed only.
- Setting Range : 5tnd, HtGH - Default : 5tnd (Unit : -)

### Parameter Initialization

- Press [MODE] + [MODE] to initialize all parameters in memory to default value.
- Set [INIT] parameter to "YES" to initialize all parameters.
- In case password function is on, it is required to enter valid password to initialize parameters.(Password is also initialized.)
- Setting range : YE5, no -Default : no (Unit : -)

### Caution for using

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

※It may cause malfunction if above instructions are not followed.

### Major products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Counters
- Rotary encoders
- Power controllers
- Panel meters
- Temperature controllers
- Switching power supplies
- Temperature/Humidity transducers
- Temperature/Pulse(Rate) meters
- Stepping motors/drivers/motion controllers
- Laser marking system(CO<sub>2</sub>, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Timers
- Display units
- Sensor controllers
- Graphic/Logic panels
- Field network devices

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