Temperature Controllers

Accurate and Precise Temperature Control

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Autonics Temperature Controllers

Temperature control is essential in many aspects of the industry, such as maintaining product quality, improving process efficiency, and saving energy, and it increases productivity and reliability across the industry.

There are temperature controllers, temperature sensors, and actuators which are organically connected to detect temperature changes and control them to maintain the desired temperature. The temperature sensors convert the temperature of the control target into an electrical signal and transmit it to the temperature controller, thereby monitoring real-time temperature changes. The temperature controllers compare the target temperature and the current temperature based on the signal received from the temperature sensors, analyze the difference, and send control signals to the actuators. The actuators actually control the temperature according to this signal, and maintain the temperature constant through various equipment such as heaters, coolers, electronic switches, and solenoid valves.

Autonics provides optimal temperature control solutions tailored to various industrial environments to achieve customer satisfaction. Based on our rich field experience and advanced technological prowess, we will continue to strengthen our differentiated competitiveness in the temperature control field by providing stable and reliable products.

Temperature Controllers

Temperature controllers are devices that convert temperature changes into electrical signals, connect to analog outputs of temperature sensors or various converters, and display and control the temperature or analog changes. Autonics provides various types of temperature controllers by types and purposes and users can select sizes and mounting methods flexibly to meet the diverse needs in different industrial environments. Autonics provides precise temperature control solutions allowing accurate temperature control with high-precision and high-speed temperature control with various functions.

Digital Type

- **2-DOF PID Temperature Controllers** | TN Series
- **LCD Display PID Temperature Controllers** | TX Series
- **High Performance PID Temperature Controllers** | TK Series
- **Economical Dual Display PID Temperature Controllers** | TCN Series
- **Economical Single Display PID Temperature Controllers** | TC Series
- **Bar Graph PID Temperature Controllers** | KPN Series
- **Slim Single Display PID Temperature Controllers** | TR1D Series
- **Thumbwheel Switch Digital Temperature Controllers** | T3/T4 Series
- **High Performance Refrigeration Temperature Controllers** | TF3 Series
- **Refrigeration Temperature Controllers** | TC3YF Series
- **Temperature/Humidity Temperature Controllers** | TH4M Series

Analog Type

- **Analog Non-Indicating Type PID Temperature Controllers** | TA Series

Modular Type

- **Modular Multi-Channel High Performance Temperature Controllers** | TMH Series
- **Modular Multi-Channel PID Temperature Controllers** | TM Series

Temperature Indicators

- **1-Channel Digital Indicators** | T3/T4 Series
- **1-Channel Digital Indicators** | KN-2000W Series
- **Bar Graph Indicators** | KN-1000B Series

Temperature Controllers Overview





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Temperature Controllers - Digital Type					
Series	**TN**	**TX**	**TK**	**TCN**	**TC**
Type	2-DOF PID	LCD Display PID	High Performance PID	Economical PID (Dual Display)	Economical PID (Single Display)
Power voltage	100 - 240 VAC, 50/60 Hz	100 - 240 VAC, 50/60 Hz	100 - 240 VAC, 50/60 Hz 24 VAC 50/60 Hz 24 - 48 VDC	24 VAC, 50/60 Hz 24 - 48 VDC 100 - 240 VAC, 50/60 Hz	24 VAC, 50/60 Hz 24 - 48 VDC 100 - 240 VAC, 50/60 Hz
Sampling cycle	50 / 100 / 250 ms	50 ms	50 ms	100 ms	100 ms
Control	heating, cooling control simultaneous heating and cooling control	heating, cooling control simultaneous heating and cooling control	heating, cooling control simultaneous heating and cooling control	heating, cooling control	heating, cooling control
Control method	ON/OFF, P, PI, PD, PID, 2 DOF PID	ON/OFF, P, PI, PD, PID	ON/OFF, P, PI, PD, PID	ON/OFF, P, PI, PD, PID	ON/OFF, P, PI, PD, PID
Size	W 48 × H 48 mm W 48 × H 96 mm W 96 × H 96 mm	W 48 × H 48 mm W 72 × H 72 mm W 96 × H 96 mm	W 48 × H 24 mm W 48 × H 48 mm (11-pin plug type) W 48 × H 48 mm W 72 × H 72 mm W 96 × H 48 mm W 48 × H 96 mm W 96 × H 96 mm	W 48 × H 48 mm W 72 × H 72 mm W 96 × H 96 mm	W 48 × H 48 mm W 48 × H 48 mm (11-pin plug type) W 72 × H 36 mm W 72 × H 72 mm W 48 × H 96 mm W 96 × H 48 mm W 96 × H 96 mm
Display part	11 segment, LCD	11 segment, LCD	7 segment, LED	7 segment, LED	7 segment, LED
Input channel	1-channel	1-channel	1-channel	1-channel	1-channel
Input	Thermocouple : K. J, E, T, B, R, S, N, C, G, L, U, Platinel II, L(RUS) RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω, Nickel120 Ω Analog : 0-10V, 0-5V, 1-5V, 0-100mV, 0-20mA, 4-20mA	Thermocouple : K, J, L, T, R, S RTD : Cu50 Ω, DPt100 Ω	Thermocouple : K. J, E, T, B, R, S, N, C, G, L(IC), U, Platinel II RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω, Nickel120 Ω Analog : 0-10V, 0-5V, 1-5V, 0-100mV, 0-20mA, 4-20mA	Thermocouple : K, J, L, T, R, S RTD : Cu50 Ω, DPt100 Ω	Thermocouple : K, J, L RTD : Cu50 Ω, DPt100 Ω
Control output	Relay SSR Current	Relay SSR Current	Relay SSR Current	Relay SSR	Relay SSR
Option input	CT, digital	-	CT, digital	-	-
Option output	Alarm (250 VAC, 3 A 1a), tranmission, communication	Alarm (250 VAC, 3 A 1a), tranmission, communication	Alarm(250 VAC, 3 A 1a, 250 VAC, 0.5 A 1a), tranmission, communication	Alarm (250 VAC, 1 A 1a)	Alarm (250 VAC, 1 A 1a)
Communication (Modbus RTU)	O	O	O	-	-
Installation Method	panel	panel	panel	panel	panel
Protection Structure (Front panel)	IP65	IP50	IP65, IP50 (TK4SP)	-	-
Certification	CE UKCA cULus KC EAC	CE UKCA cULus KC EAC	CE UKCA cULus EAC	CE UKCA cULus EAC	CE UKCA cULus EAC






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Temperature Controllers - Digital Type						
Series	**KPN**	**TR1D**	**T3/T4 (Setting Type)**	**TF3**	**TC3YF**	**TH4M**
Type	Bar Graph PID	Slim Single Display PID	Thumbwheel Switch	High Performance Refrigeration	Refrigeration	Temperature/ Humidity
Power voltage	100 - 240 VAC, 50/60 Hz	100 - 240 VAC, 50/60 Hz	100 - 240 VAC, 50/60 Hz	100 - 240 VAC, 50/60 Hz 24 VAC, 50/60 Hz 12 - 24 VDC	100 - 240 VAC, 50/60 Hz 12 - 24 VDC	100 - 240 VAC, 50/60 Hz
Sampling cycle	50 ms	50, 100, 250 ms	100 ms	500 ms	500 ms	1 sec
Control	heating, cooling control simultaneous heating and cooling control	heating, cooling control simultaneous heating and cooling control	heating, cooling control	cooling control	cooling control	heating, cooling control
Control method	ON/OFF, P, PI, PD, PID	ON/OFF, P, PI, PD, PID	ON/OFF, P	ON/OFF	ON/OFF	ON/OFF
Size	W 96 × H 48 mm W 48 × H 96 mm W 96 × H 96 mm	W 22.5 × H 100 mm	W 48 × H 48 mm (8-pin plug type) W 72 × H 72 mm W 48 × H 96 mm W 96 × H 96 mm	W 77 × H 36 mm	W 72 × H 36 mm	W 72 × H 72 mm
Display part	7 segment, LED control output bar graph	7 segment, LED	7 segment, LED	7 segment, LED	7 segment, LED	11 segment, LCD
Input channel	1-channel	1-channel	1-channel	1-channel, 3-channel	1-channel	1-channel
Input	Thermocouple : K. J, E, T, B, R, S, N, C, G, L(IC), U, Platinel II RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω, Nickel120 Ω Analog : 0-10V, 0-5V, 1-5V, 0-100mV, 0-20mA, 4-20mA	Thermocouple : K. J, L, T, R, S RTD : Cu50 Ω, DPt100 Ω, Nickel120 Ω	Thermocouple : K, J, R RTD : DPt100 Ω	RTD : DPt100 Ω Thermistor : NTC 5 kΩ, NTC 10 kΩ,	RTD : DPt100 Ω Thermistor : NTC 5 kΩ	Temperature/ Humidity Transducers (THD-RM)
Control output	Relay SSR Current	Relay SSR Current or SSR	Relay SSR Current	compressor (COMP) Defrost (DEF) Auxiliary (AUX)	compressor(COMP) Defrost (DEF) Evaporator fan (FAN)	Relay
Option input	CT, Remote SV, digital	CT	-	digital	-	-
Option output	Alarm (250 VAC, 1 A 1a), tranmission, communication	Alarm (250 VAC, 3 A 1a), tranmission, communication	Alarm (250 VAC, 2 A 1a)	Communication	Alarm (250 VAC, 1 A 1a)	Alarm (250 VAC, 3 A 1a)
Communication	O	O	-	O	-	-
Installation Method	panel	DIN Rail	panel	panel	panel	panel
Protection Structure (Front panel)	IP65	-	-	IP65	IP65	-
Certification	CE UKCA EAC	CE UKCA EAC	EAC	CE UKCA cULus KC EAC	AC : cULus KC(Except RTD option models) EAC DC : EAC	CE UKCA

* The following information may vary by model. For more information, please refer to the specification pages.

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Temperature Controllers - Analog Type	
Series	**TA**
Type	Analog Non-Indicating PID
Power voltage	100 - 240 VAC, 50/60 Hz
Sampling cycle	100 ms
Control	heating
Control method	ON/OFF, PID
Size	W 48 × H 48 mm (8-pin plug type) W 72 × H 72 mm W 96 × H 96 mm
Display part	PV deviation, Error display, LED type
Input channel	1-channel
Input	Thermocouple : K, J RTD : DPt100 Ω
Control output	Relay SSR
Option input	-
Option output	-
Communication	-
Installation Method	Panel
Protection Structure (Front panel)	-
Certification	

Temperature Controllers - Modular Type		
Series	**TMH (Control Module)**	**TM**
Type	Modular Multi-Channel High Performance PID	Modular Multi-Channel PID
Power voltage	24 VDC	24 VDC
Sampling cycle	50 ms (2-channel or 4-channel)	50 ms (2-channel), 100 ms (4-channel)
Control	heating, cooling control simultaneous heating and cooling control	heating, cooling control simultaneous heating and cooling control
Control method	ON/OFF control, P, PI, PD, PID	ON/OFF, P, PI, PD, PID
Size	W 30 × H 100 mm	W 30 × H100 mm
Display part	None- parameter setting	None- parameter setting
Input channel	2-channel, 4-channel	2-channel, 4-channel
Input	Thermocouple : K. J, E, T, B, R, S, N, C, G, L(IC), U, Platinel II RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω, Nickel120 Ω Analog : 0-10V, 0-5V, 1-5V, 0-100mV, 0-20mA, 4-20mA	Thermocouple : K. J, E, T, B, R, S, N, C, G, L(IC), U, Platinel II RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω, Nickel120 Ω
Control output	Relay SSR Current	Relay SSR Current
Option input	CT, Digital	CT, Digital
Option output	Alarm (250 VAC, 3A 1a), communication	Alarm (250 VAC, 3A 1a), communication
Communication	O	O
Installation Method	DIN Rail	DIN Rail
Protection Structure (Front panel)	-	-
Certification		

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Temperature Indicators - Digital Type			
Series	**T3/T4 (Indicator Type)**	**KN-2000W**	**KN-1000B**
Type	1-channel Indicator	1-channel Indicator	Bar Graph Indicator
Power voltage	100 - 240 VAC, 50/60 Hz 12 - 24 VDC	100 - 240 VAC 24 VDC	100 - 240 VAC 24 VDC
Sampling cycle	100 ms	250 ms, 100 ms	250 ms, 100 ms
Size	W 48 × H 24 mm W 72 × H 36 mm W 96 × H 48 mm W 48 × H 48 mm (8-pin plug type) W 72 × H 72 mm W 48 × H 96 mm W 96 × H 96 mm	W 96 × H 48 mm	W 36 × H 144 mm
Display part	7 segment, LED	7 segment, LED	7 segment, LED, bar graph
Input	Thermocouple : K, J, R RTD : DPt100 Ω	Thermocouple : K. J, E, T, B, R, S, N, C, L(IC), U, Platinel II RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω Analog : 0-20mA, 4-20mA, -50-50mV, -200-200mV, -1-1V, -1-10V	Thermocouple : K. J, E, T, B, R, S, N, C, L(IC), U, Platinel II RTD : Cu50 Ω, Cu100 Ω, JPt100 Ω, DPt50 Ω, DPt100 Ω Analog : 0-20mA, 4-20mA, -50-50mV, -199.9-200mV, -1-1V, -1-10V
Option input	-	Digital	Digital
Option output	-	Alarm (250 VAC, 3A 1c, 250 VAC, 1A 1a), tranmission, communication	Alarm (250 VAC, 3A 1c, 250 VAC, 1A 1a), tranmission, communication
Communication	-	O	O
Installation Method	panel	panel	panel
Certification			

* The following information may vary by model. For more information, please refer to the specification pages.

Autonics Temperature Controllers

Non-Indicating Type

Digital Type

Analog Type

[By Type]

1. Various Control Types and Purposes

Autonics temperature controllers support various products by type and purpose for the user environment.Autonics provides digital display, analog, and non-indicating models by type. The digital type allows users to check the setting value directly through the display with various functions. The analog type allows users to set the temperature and output with a dial for easy operation. The non-indicating type allows users to easily set and monitor parameters through software. By purpose, Autonics provides general-use models that allow heating, cooling, and heating and cooling control, refrigeration models that allow cooling control, and temperature/ humidity models that allow heating and cooling control. Users can select and use various temperature controllers according to their environment.

Refrigeration Control Type

Temperature / Humdity Control Type

General Control Type

Indicator

[By Purpose]

2. Various Sizes

Autonics provides various sizes of products including standard DIN sizes for different user environments. This allows users to select the size optimized for a specific industrial environment or equipment, thereby increasing installation convenience and space efficiency. Autonics provides customized temperature control solutions that meet various field needs in a wide range of sizes.

3. Various Mounting Methods

Autonics provides panel mounting and DIN Rail mounting by user environment and installation methods. The panel mounting type is mounted on the control panels for intuitive operation and easy confirmation. The DIN Rail mounting type is installed in a limited space efficiently allowing installation in tighter spaces. Through these two mounting methods, users can flexibly select and install the temperature controllers by various industrial environments.

Panel Mounting Type

DIN Rail Mounting Type

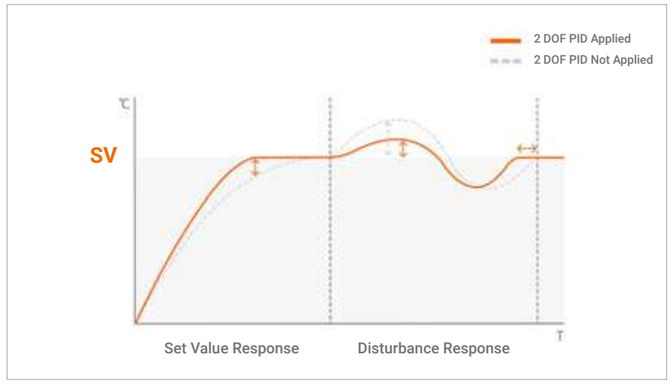
4. Various Temperature Control Methods

Autonics supports various control methods including 2 DOF PID, PID, P, PI, PD, ON/OFF control. With these various temperature control options, users can implement the optimal control solution for each environment. This allows for accurate temperature maintenance and management.

* Temperature control methods may vary by series, please refer to the specification pages for details.

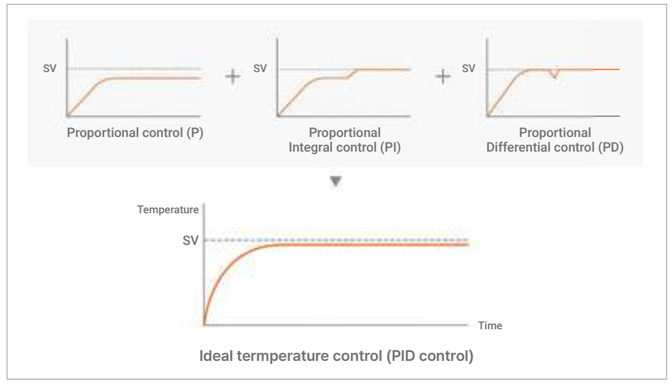
1) 2-DOF PID Control Algorithm

The two-degree-of-freedom (2-DOF) algorithm can accurately reach the set temperature (SV) and respond quickly to disturbances while reducing overshoot for accurate and precise temperature control. This method can effectively control environments with severe load fluctuations or where the set value changes frequently by reducing overshoot when reaching the target value and responding quickly to external disturbances.



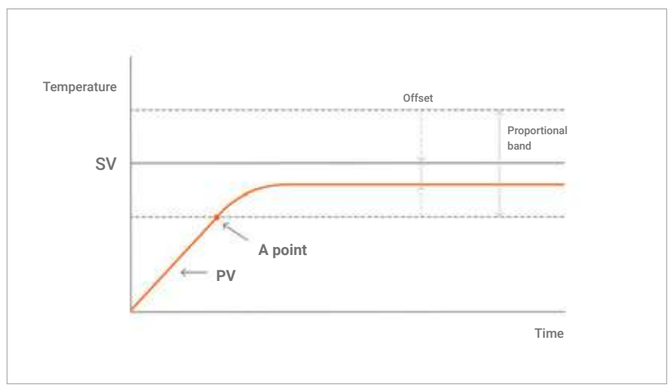
2) PID Control Algorithm

This is a combination of proportional control, integral control, and differential control, and provides excellent control results even for control targets with delay times, enabling ideal temperature control.



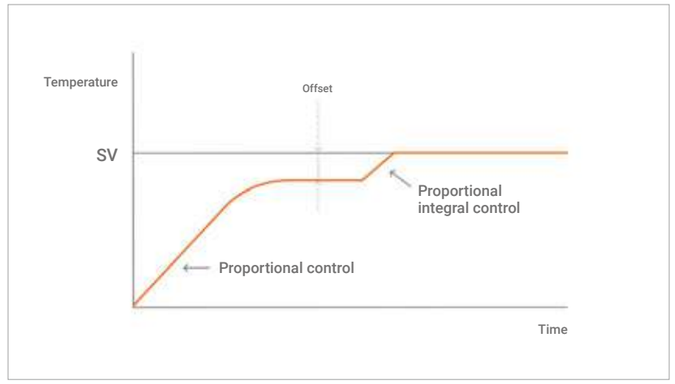
3) P Control Algorithm (Proportional control)

This is a control operation that outputs a manipulation amount proportional to the deviation between the set value and the current value. It has less overshoot and hunting.



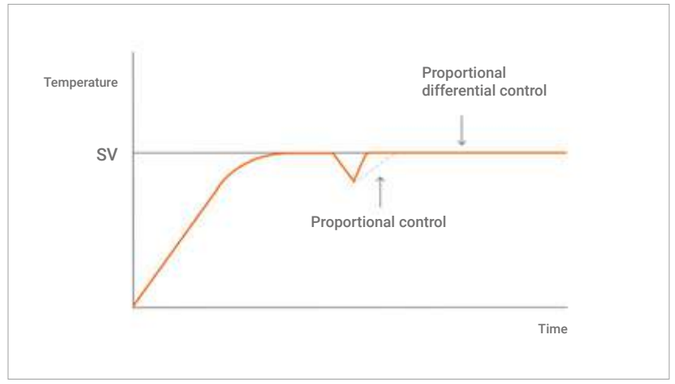
4) PI Control Algorithm (Proportional integral control)

This is a control operation that automatically corrects the offset that occurs in proportional control through integral operation. It removes the offset, and it must be used with proportional control.



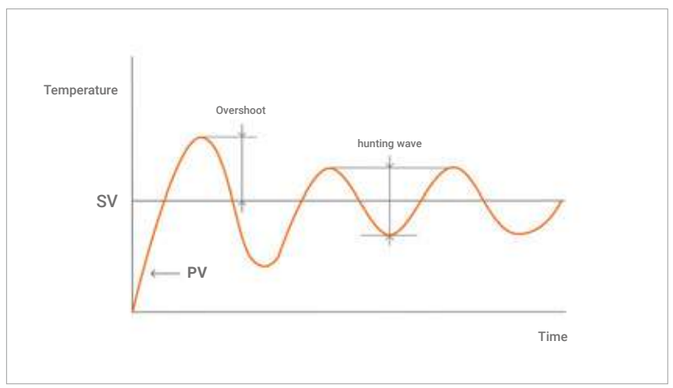
5) PD Control Algorithm (Proportional differential control)

This is a control operation that stabilizes the control temperature in a short time by giving a large amount of manipulation against sudden disturbances. It responds quickly to disturbances, and it must be used with proportional control.



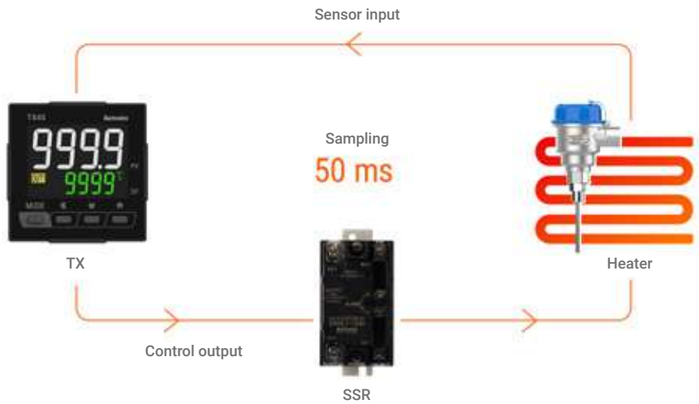
6) ON/OFF Control Algorithm

This is a method of repeating ON/OFF operations based on the set value. Compared to PID control, the response is faster, but the precision is lower.



5. High-Speed, High-Precision Response

As temperature controllers are devices that convert analog values such as temperature sensors into digital values, the faster the sampling speed, the faster the response speed. Autonics temperature controllers realize high-speed sampling of up to 50 ms, and can be applied to processes that require fast response supporting high-speed and high-precision temperature control.



6. Multi-Channel Control

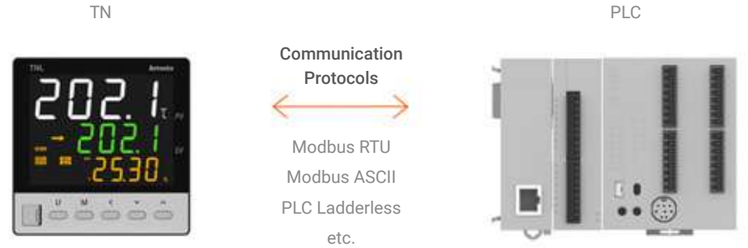
Multi-channel temperature controllers are capable of controlling 2-channels or 4-channels of input and outputs. One 4-channels model can perform the role of 4 temperature controllers. It saves space, increases cost efficiency, and enables various temperature control easily. In addition, modular temperature controllers provide communication modules and option modules. Users can expand or combine control, communication, and option input/output modules in various environments.

7. Simultaneous Heating & Cooling Control

The controllers can simultaneously control heating and cooling elements, providing efficient temperature control. For models that control heating and cooling simultaneously, the heating side performs a control operation in which the output of the controller decreases as the temperature measurement value increases. The cooling side performs a control operation in which the output of the controller increases as the temperature measurement value increases. The temperature controller can be applied to heating control systems or cooling control systems.

8. Various Communication Protocols

Temperature controllers support various communication protocols including RS485, RS422, and Ethernet. This allows smooth data transmission and system integration and enables efficient monitoring and control connecting with various automation systems.



9. PLC Ladderless Communication

Working efficiency increases due to initial settings without writing a separate ladder when communicating with the upper PLC via RS485.

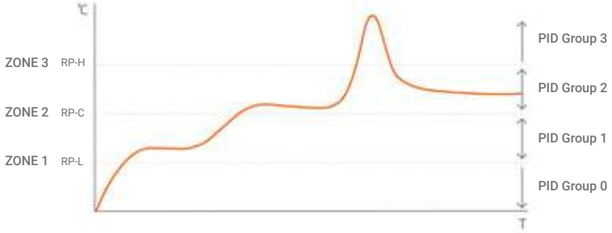
10. Main Functions

Autonics provides various funtions for more efficient temperature control. Autonics introduces main functions to increase customer convenience and achieve accurate temperature control. These functions can help users easily implement the temperature management solutions, including precise temperature control, flexible control options, and alarms.

* Main functions may vary by series, please refer to the specification pages for details.

1) Group PID and Zone PID function

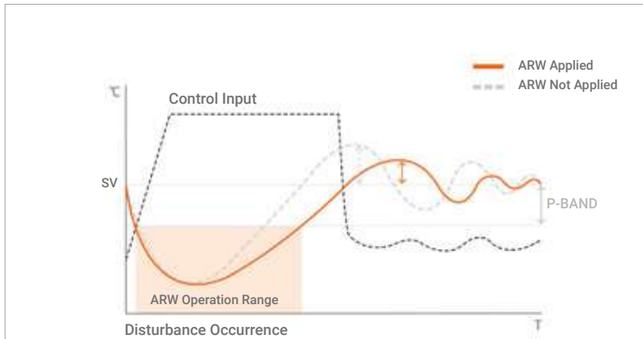
When the temperature control range is wide, zones can be separated according to the temperature range and apply different PID values to each zone for detailed control.
In the case of a control process with a wide temperature range, since the optimal PID coefficients are different by the temperature range, this function allows users to apply PID data differently to each zone. This function is widely used in industrial ovens, heating systems, plastic heaters, and environmental control (greenhouses, farms, animal farms).



※ The above graph is a sample graph of autotuning. Autotuning allows optimal PID control as PV changes within the set temperature range.

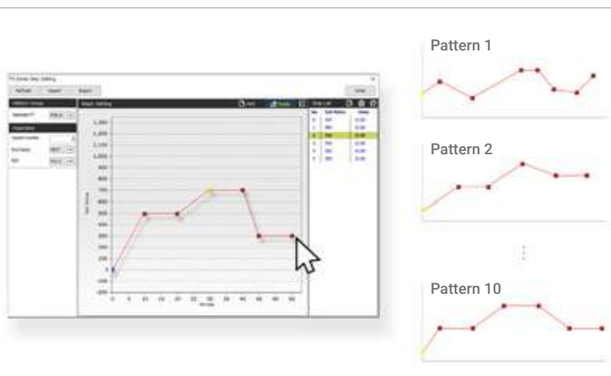
2) Anti-over Integration (ARW) Function

When the control output reaches the maximum point, the range can be set to perform the integral operation to prevent overshoot with ARW function.



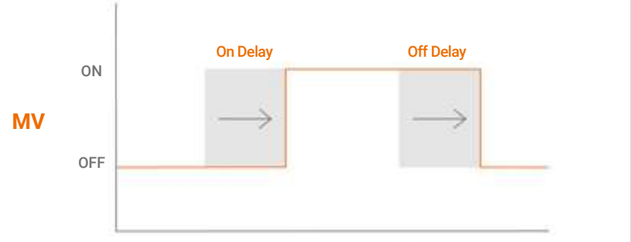
3) Pattern Control (Program Control Models)

Program control models can be used to easily set the control pattern by sequentially setting the target temperature and time of each step. Up to 10 patterns can be registered, and up to 20 steps can be configured for each pattern. Users can easily draw the pattern with DAQMaster software by clicking the coordinates of the time-temperature graphs.



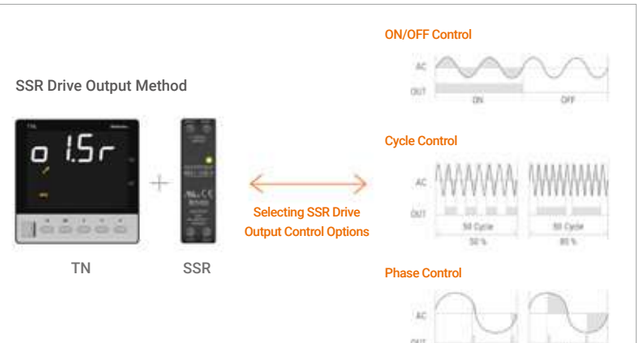
4) Timer Function (Fixed Control Models)

Fixed control models can be used to preset the operation time by delaying the On/Off control outputs or by maintaining the PV for a set amount of time.



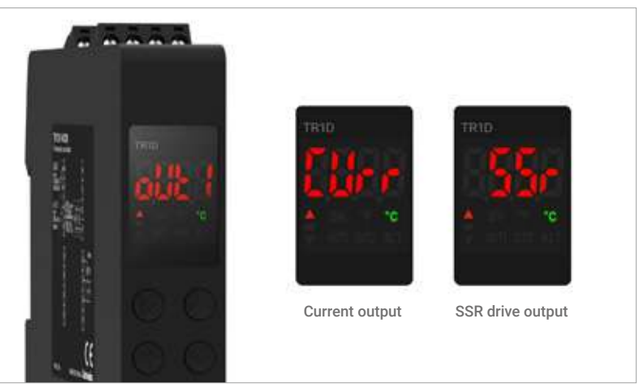
5) SSR Drive Output Control Options (SSRP function)

Users can select from ON/OFF control, cycle control, and phase control using standard SSR drive output option. This enables linear control even with SSR output, allowing for precision control at low cost without a separate power regulator.



6) Switch Between Current Output and SSR Drive Output

Users can select between current output and SSR drive output by parameter configuration.

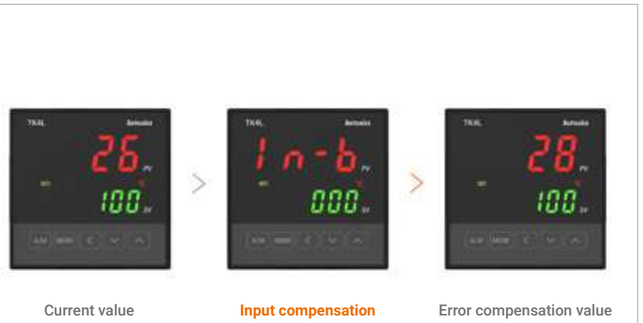


7) Synchronous Control with Sync-Master Communication

The SV and Run/Stop status of the master device can be synchronized with up to 31 devices to simultaneously control multiple zones.

8) Input Compensation and Input Digital Filter

Input compensation function compensates for errors caused by external input devices. Through the input digital filter, the current temperature value can be stabilized when the current temperature value repeatedly fluctuates due to rapid changes in the input signal and is reflected in the manipulated amount.

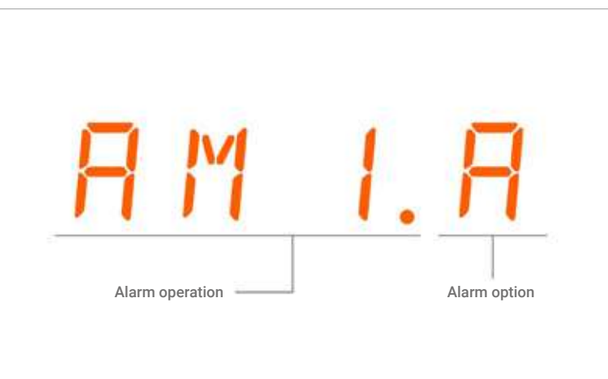


9) Alarm Function

The alarm output in the thermostat can be set by combining the alarm operation and alarm option.

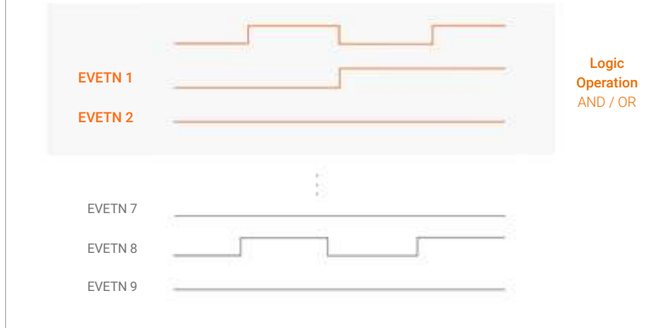
Alarm operation	Deviation high limit alarm, Deviation low limit alarm, Deviation high, low limit alarm, Deviation high, low reverse alarm, Absolute value high limit alarm, Absolute value low limit alarm, Sensor break alarm, Loop break alarm (LBA)
Alarm option	Standard alarm, Standby sequence 1, Standby sequence 2, Alarm latch, Alarm latch and standby sequence 1, Alarm latch and standby sequence 2

* The alarm function varies by series, models, and control output.



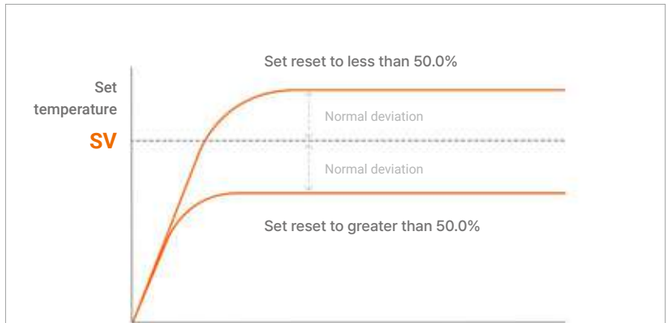
10) Control Status Monitoring of Up to 10 Events

Users can set up to 10 events such as PV high/low limit, disconnection and control operation notification. Logic operation result can be transmitted with relay alarm output and real-time monitoring is possible via RS485 communication.



11) Manual Reset Function

When using proportional control (P/PD), since the rise and fall times of the heater differ depending on the heat capacity of the control target and heater capacity, normal deviation generally occurs even when the control becomes stable. In this case, users can obtain a more accurate value by setting/compensating with manual reset.

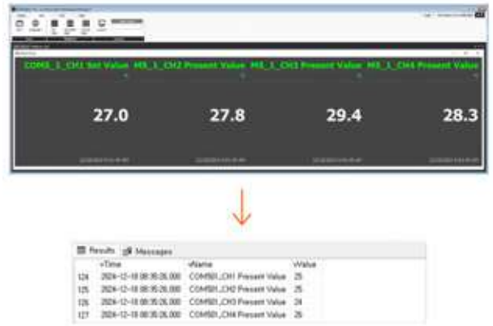


11. Comprehensive Device Management Software DAQMaster

DAQMaster (free provided) is a comprehensive device management software used to configure parameters and monitor real-time data with communication supported devices from Autonics.

1) Real-time Logging

Log files are automatically created and saved as CSV files at user specified times.

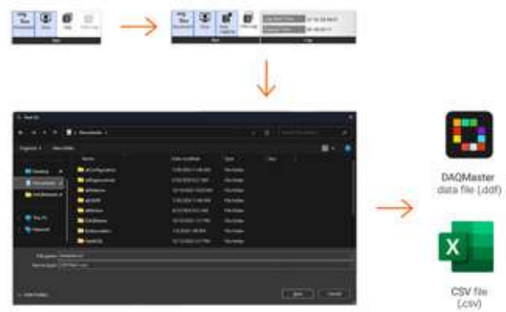


2) Database Management

Information can be changed to database using database management systems (Access, MySQL, SQL Server, SQLite) in real-time, allowing easy creation and management of various databases.

3) Log Monitoring Data

While monitoring data can be logged and saved into DAQMaster data files (*.ddf) or CSV files (*.csv). The saved CSV file can be opened directly onto Excel spreadsheets. Define log data file naming rules destination folders for easier file management.



Temperature Control System Configuration

Temperature Control System

1. Temperature sensor

2.Temperature controller

3. Controller

Temperature value input

Control output

Control

Controlled Subject

1. Temperature Sensors

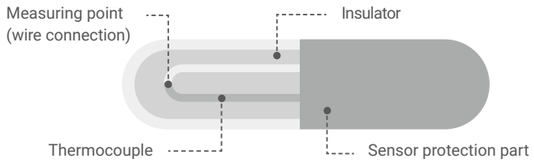
Temperature sensors convert the temperature of the controlled subject into an electrical signal and transmit the signal to the temperature controller.

1) Temperature sensors type and description

• Thermocouple

Principle that a small electromotive force is generated by joining the ends of different metal wires by temperature change of the joint area.

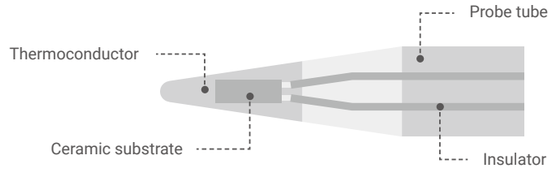
- Advantages : Wide temperature measurement range, Self-signal generation, No self-heating, Robustness
- Disadvantages : Temperature compensation required, Low accuracy, Low stability, Compensating lead wire required



• RTD

Principle that the eigenresistance value of platinum changes constantly by temperature change. (Pt has excellent deformation characteristic.)

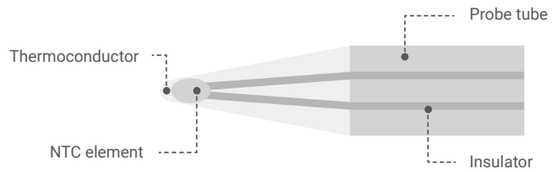
- Advantages : High accuracy, High stability, Excellent linearity
- Disadvantages : Wiring resistance error, Slow response time, Size



• Thermistor

Principle of negative coefficient of resistance that the eigenresistance value decreases as the temperature increases.

- Advantages : High sensitivity, High accuracy, Robustness, Reasonable price
- Disadvantages : Narrow temperature measurement range, Nonlinearity, Self-heat generation, Vulnerable to moisture



2. Temperature Controllers

Temperature controllers receive electrical signals from temperature sensors, compare the values with the set temperature value and send control signals to controllers.

1) Temperature control type and description

No.	Type	Advantages	Disadvantages
1	**ON/OFF Control**	It is easy to control. Offset does not occur.	Overshoot and hunting occur.
2	**Proportional control (P)**	It has overshoot and hunting compared to ON/OFF control.	It takes time to achieve stable control and offsets occur.
3	**Proportional integral control (PI)**	It removes the offset.	It takes more time for the stable control than proportional control. (PI control shall be used with P control.)
4	**Proportional differential control (PD)**	It is fast response to external disturbances.	It cannot be controlled by itself. (D control shall be used with P control.)
5	**PID Control**	It is able to get an excellent control characteristics.	It needs to set PID parameter.
6	**2-DOF PID Control**	It can reach the set temperature quickly and accurately by controlling the constant and respond to external disturbances quickly.	The more precise the control, the higher the control cost.

2) Main Terms of Temperature Controllers

Auto-tunning	PID Auto-tunning function is automatically to measure thermal charcteristics and response of the control object and then execture its value under high response & stability after calculating the time constant of PID required to control optimum temperature.
Hysteresis	In ON/OFF control, since it turns ON and OFF with the set value, the output changes frequently depending on small temperature changes. This shortens the life of the output relay or has a negative effect on the connected equipment. This operation interval is called the hysteresis.
Offset	In proportional control, there is certain error despite stable operation status by the heat capcity of controlled subject, or the heating capability. This error is offset which occurs only in proportional control and is adjustable by reset volume.
Hunting/overshoot	Overshoot means excessive temperature increase after reaching the set value when the ON/OFF operation and hunting refer to oscillation around the set value.
Compensating lead wire	These are compensating lead wires used when the temperature measurement point and the temperature controller are far apart.
Deviation	It means the deviation of the controlled value from the setting value.
Burn out function	Output turns OFF when sensor is disconnected.

3. Controllers

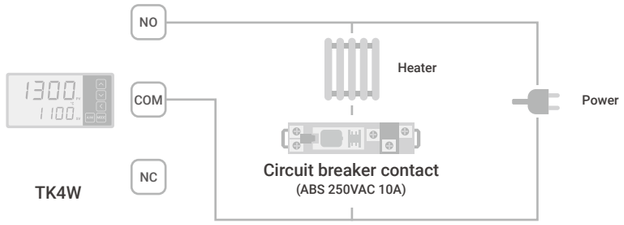
Controllers are electronic switches that open/close the current supplied to heating devices or solenoid valves that supply fuel to heating devices. Controllers are used to heat or cool electronic furnace or other heating devices.

* Type: SSR, power controller, magnet, electronic valve

1) Controller output type and description

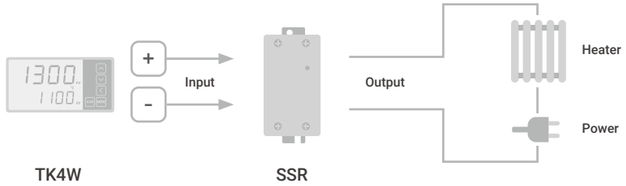
• Relay output

Output	Contact ouput
Controller	Built-in temperature controller
Switching speed	Slow
Lifetime	Contact lifetime (e.g. 5 million times)



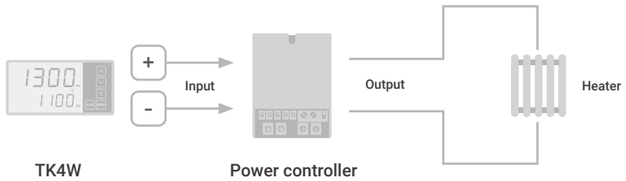
• SSR drive voltage output

Output	Non-contact ouput
Controller	SSR
Switching speed	Fast
Lifetime	Semipermanent



• Current ouput

Output	Non-contact ouput
Controller	Power controller
Switching speed	-
Lifetime	Semipermanent



2-DOF PID

Temperature Controllers (Program / Fixed Control)

TN Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

TN ❶ - ❷ ❸ ❹ ❺ ❻ - ❼ ❽ - ❾

❶ Size
S: DIN W 48 × H 48 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

❷ Control method
No mark: Fixed control
P: Program control

❸ Power supply
4: 100 - 240 VAC

❹ Alarm outputs
2: Alarm 1 / 2
4: Alarm 1 / 2 / 3 / 4
6: Alarm 1 / 2 / 3 / 4 / 5 / 6

❺ Control output 1
R: Relay
S: SSR drive
C: Current or SSR drive

❻ Control output 2
R: Relay
S: SSR drive
C: Current or SSR drive

❼ Communication
N: None
R: RS485

❽ Terminal type
S: Screw

❾ Option input/output

No.	Digital input	CT input	Transmission output
006	0	1	0
008	2	1	0
009	3	1	0
014	3	2	0
026	0	1	1
031	0	2	1
035	6	2	1

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

- Front cover: FSA / FHA / FLA-COVER
- Terminal protection cover: RSA / RMA / RHA / RLA-COVER
- Communication Converter: SCM-USP / SCM-38I / SCM-US48I / SCM-WF48
- Current transformer (CT)

View product details

Specifications

Series		TN Series
Power supply		100 - 240 VAC⎓, 50/60 Hz
Permissible voltage range		90 to 110 % of rated voltage
Power consumption		≤ 8 VA
Display type		11 segment, LCD type (operating value display part: 7 segment)
Sampling period		50 / 100 / 250 ms (parameter)
Input specification		Refer to 'Input Type and Using Range'.
Option input	CT	• 0.0-50.0 A (primary current measurement range) • CT ratio: 1/1,000 • Measurement accuracy: ±5% F.S. ±1digit
	Digital	• Contact - ON: ≤ 2 kΩ, OFF: ≥ 90 kΩ • Non contact - residual voltage ≤ 1.0 V, leakage current ≤ 0.1 mA • Outflow current: ≈ 0.5 mA per input
Control output	Relay	250 VAC⎓ 3A 1a
	SSR	12 VDC⎓ ±2 V, ≤ 20 mA
	Current	DC 0 - 20 mA or DC 4 - 20 mA (parameter), Load resistance: ≤ 500 Ω
Option output	Alarm	250 VAC⎓ 3 A 1a
	Trans-mission	DC 4 - 20 mA (load resistance: ≤ 500 Ω, output accuracy: ±0.3% F.S.)
	Commu-nication	RS485
Control type	Type	ON/OFF, P, PI, PD, PID
	Multi SV	≤ 4 SV
	Group PID	≤ 8 group
	Zone PID	4 zones
	ARW (Anti Reset Windup)	50 to 200 %
Program control	Program	≤ 10 patterns
	Step	≤ 200 steps (1 pattern: ≤ 20 steps)
	Setting type	Time setting
Hysteresis		• Thermocouple, RTD: 1 to 100 (0.1 to 100.0) °C/°F • Analog: 1 to 100 digit
Proportional band (P)		0.1 to 999.9 °C (0.1 to 999.9%)
Integral time (I)		0 to 9,999 sec
Derivative time (D)		0 to 9,999 sec
Control cycle (T)		• Relay / SSRP output: 0.1 to 120.0 sec • Selectable current or SSR drive output: 1.0 to 120.0 sec
Manual reset		0.0 to 100.0%
Dielectric strength		Between the charging part and the case: 3,000 VAC⎓ 50/60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours
Relay life cycle	Mecha-nical	• OUT1/2: ≥ 5,000,000 operations • AL1/2/3/4/5/6: ≥ 20,000,000 operations
	Electrical	• OUT1/2: ≥ 200,000 operations • AL1/2/3/4/5/6: ≥ 100,000 operations
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Insulation type		Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 3 kV)
Noise immunity		±2 kV square shaped noise by noise simulator (pulse width: 1 μs) R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH
Protection structure		IP65 (Front panel, IEC standards)
Loader port		• TNS: top side • TNH, TNL: front side
Unit weight (packaged)		• TNS: ≈ 128 g (≈ 156 g) • TNH: ≈ 184 g (≈ 286 g) • TNL: ≈ 301 g (≈ 443 g)
Certification		CE UK CA cULus KC EAC

Communication Interface

■ RS485

Comm. protocol	Modbus RTU/ASCII, Sync-Master, PLC ladderless
Connection type	RS-485, RS-422A
Application standard	EIA RS485 compliance with
Maximum connection	32 units (address: 01 to 99)
Synchronous method	Asynchronous
Comm. Method	Two-wire half duplex
Comm. effective range	≤ 800 m
Comm. speed	≤ 115,200 bps
Response time	5 to 99 ms (default: 20 ms)
Start bit	1 bit (fixed)
Data bit	8 bit (fixed)
Parity bit	None (default), Odd, Even
Stop bit	1 bit, 2 bit (default)
EEPROM life cycle	≈ 1,000,000 operations (Erase / Write)

• 1 character of ModBus RTU is fixed at 11 bit.

Input Type and Using Range

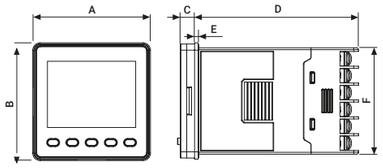
The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display	Using range (°C)			Using range (°F)		
Thermo-couple	K (CA)	1	K.CA.H	-200	to	1,350	-328	to	2,462
		0.1	K.CA.L	-199.9	to	999.9	-199.9	to	999.9
	J (IC)	1	J.IC.H	-200	to	800	-328	to	1,472
		0.1	J.IC.L	-199.9	to	800.0	-199.9	to	999.9
	E (CR)	1	E.CR.H	-200	to	800	-328	to	1,472
		0.1	E.CR.L	-199.9	to	800.0	-199.9	to	999.9
	T (CC)	1	T.CC.H	-200	to	400	-328	to	752
		0.1	T.CC.L	-199.9	to	400.0	-199.9	to	752.0
	B (PR)	1	b.Pr	0	to	1,800	32	to	3,272
	R (PR)	1	r.Pr	0	to	1,750	32	to	3,182
	S (PR)	1	S.Pr	0	to	1,750	32	to	3,182
	N (NN)	1	n.nn	-200	to	1,300	-328	to	2,372
	C (TT) [01]	1	C.tt	0	to	2,300	32	to	4,172
	G (TT) [02]	1	G.tt	0	to	2,300	32	to	4,172
	L (IC)	1	L.IC.H	-200	to	900	-328	to	1,652
		0.1	L.IC.L	-199.9	to	900.0	-199.9	to	999.9
	U (CC)	1	U.CC.H	-200	to	400	-328	to	752
		0.1	U.CC.L	-199.9	to	400.0	-199.9	to	752.0
	Platinel II	1	Pt.II	0	to	1,390	32	to	2,534
	L (RUS)	1	L.r.H	-200	to	800	-328	to	1,472
		0.1	L.r.L	-199.9	to	800.0	-199.9	to	999.9
RTD	Cu50 Ω	0.1	CU.50	-199.9	to	200.0	-199.9	to	392.0
	Cu100 Ω	0.1	CU.100	-199.9	to	200.0	-199.9	to	392.0
	JPt100 Ω	1	JPt.H	-200	to	650	-328	to	1,202
		0.1	JPt.L	-199.9	to	650.0	-199.9	to	999.9
	DPt50 Ω	0.1	dPt.50	-199.9	to	600.0	-199.9	to	999.9
	DPt100 Ω	1	dPt.H	-200	to	650	-328	to	1,202
		0.1	dPt.L	-199.9	to	650.0	-199.9	to	999.9
	Nickel120 Ω	1	ni.12	-80	to	260	-112	to	500
	Analog	0 to 10 V	-	Au.1	0 to	10 V			
		0 to 5 V	-	Au.2	0 to	5 V			
		1 to 5 V	-	Au.3	1 to	5 V			
		0 to 100 mV	-	An.u1	0 to	100 mV			
		0 to 20 mA	-	An.A1	0 to	20 mA			
		4 to 20 mA	-	An.A2	4 to	20 mA			

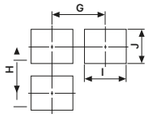
• Permissible line resistance per line: ≤ 5 Ω
01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on TNS Series.



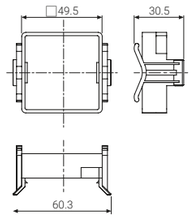
■ Panel cut-out



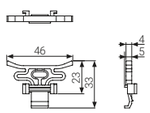
	Body						Panel cut-out			
	A	B	C	D	E	F	G	H	I	J
TNS	49	49	6	69	1.5	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TNH	49	97	6	69	1.5	91.5	≥ 65	≥115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
TNL	97	97	6	69	1.5	91.5	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ Bracket

[TNS]



[Other series]



LCD Display PID

Temperature Controllers

TX Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	X	❶	❷	-	❸	❹	❺

❶ Display digits
4: 4 digit

❷ Size
S: DIN W 48 × H 48 mm
M: DIN W 72 × H 72 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

❸ Option in/output
1: Alarm 1
2: Alarm 1 + Alarm 2
A: Alarm 1 + Alarm 2 + PV transmission
B: Alarm output 1 + Alarm output 2 + RS485

❹ Power supply
4: 100 - 240 VAC

❺ Control output
R: Relay
S: SSR drive
C: Selectable current or SSR drive output

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

- Terminal protection cover: RSA / RMA / RHA / RLA-COVER
- Communication Converter: SCM-USP / SCM-38I / SCM-US48I / SCM-WF48

View product details

Specifications

Series		TX Series	
Power supply		100 - 240 VAC⎓ 50/60 Hz	
Permissible voltage range		90 to 110 % of rated voltage	
Power consumption		≤ 8 VA	
Sampling period		50 ms	
Input specification		Refer to 'Input Type and Using Range'.	
Control output	Relay	250 VAC⎓ 3 A, 30 VDC⎓ 3 A, 1a	
	SSR	TX4S: 12 VDC⎓ ±2 V, ≤ 20 mA TX4M/H/L: 13 VDC⎓ ±3 V, ≤ 20 mA	
	Current	DC 4-20 mA or DC 0-20 mA (parameter), Load resistance: ≤ 500 Ω	
Alarm output	Relay	AL1/2: 250 VAC⎓ 3 A 1a	
Option output	PV transmission	DC 4 - 20 mA (Load resistance: ≤ 500 Ω, Output Accuracy: ±0.3% F.S.)	
	RS485 Comm.	Modbus RTU	
Display type		11 Segment (White, Green, Yellow), LCD type	
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control	
Hysteresis		1 to 100 (0.1 to 50.0) °C/°F	
Proportional band (P)		0.1 to 999.9 °C/°F	
Integral time (I)		0 to 9,999 sec	
Derivative time (D)		0 to 9,999 sec	
Control cycle (T)		0.5 to 120.0 sec	
Manual reset		0.0 to 100.0%	
Relay life cycle	Mechanical	≥ 5,000,000 operations	
	Electrical	≥ 200,000 operations (resistance load: 250 VAC⎓ 3 A)	
Dielectric strength		Between the charging part and the case: 3,000 VAC⎓ 50/60 Hz for 1 min	
Vibration		0.75 mm amplitude at frequency 5 to 55Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity		±2 kV square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase	
Memory retention		≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Protection structure		IP50 (Front panel, IEC standards)	
Insulation type		Double or reinforced insulation (mark: ⧈, dielectric strength between primary circuit and secondary circuit: 3 kV)	
Certification		CE UK CA cULus KC EAC	
Unit weight (packaged)		• TX4S: ≈ 87 g (≈ 146 g)	• TX4M: ≈ 143 g (≈ 233 g)
		• TX4H: ≈ 133 g (≈ 214 g)	• TX4L: ≈ 206 g (≈ 290 g)

01) When using the unit at low temperature (below 0°C), display cycle is slow.

Communication Interface

■ RS485

Comm. protocol	Modbus RTU
Application standard	EIA RS485 compliance with
Maximum connection	31 units (address: 01 to 127)
Synchronous method	Asynchronous
Comm. method	Two-wire half duplex
Comm. effective range	≤ 800 m
Comm. speed	2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 bps (parameter)
Response time	5 to 99 ms (default: 20 ms)
Start bit	1 bit (fixed)
Data bit	8 bit (fixed)
Parity bit	None (default), Odd, Even
Stop bit	1 bit, 2 bit (default)

Input Type and Using Range

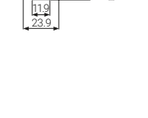
The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display	Using range (°C)			Using range (°F)		
Thermo -couple	K (CA)	1	PCRH	-50	to	1,200	-58	to	2,192
		0.1	PCRL	-50.0	to	999.9	-58.0	to	999.9
	J (IC)	1	JICH	-30	to	800	-22	to	1,472
		0.1	JICL	-30.0	to	800.0	-22.0	to	999.9
	L (IC)	1	LICH	-40	to	800	-40	to	1,472
		0.1	LICL	-40.0	to	800.0	-40.0	to	999.9
	T (CC)	1	TCCH	-50	to	400	-58	to	752
		0.1	TCCL	-50.0	to	400.0	-58.0	to	752.0
	R (PR)	1	rPr	0	to	1,700	32	to	3,092
	S (PR)	1	SPr	0	to	1,700	32	to	3,092
RTD	Cu50 Ω	1	CUSH	-50	to	200	-58	to	392
		0.1	CUSL	-50.0	to	200.0	-58.0	to	392.0
	DPt100 Ω	1	dPtH	-100	to	400	-148	to	752
		0.1	dPtL	-100.0	to	400.0	-148.0	to	752.0

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on TX4S Series.

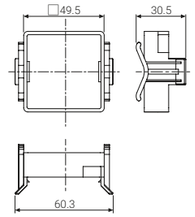
■ Panel cut-out



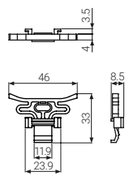
	Body					Panel cut-out			
	A	B	C	D	E	F	G	H	I
TX4S	48	48	6	45	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TX4M	72	72	6	45	67.5	≥ 90	≥ 90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$
TX4H	48	96	6	45	91.5	≥ 65	≥ 115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
TX4L	96	96	6	45	91.5	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ Bracket

[TX4S]



[Other series]



High Performance PID
Temperature Controllers

TK Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	K	❶	❷	-	❸	❹	❺	❻

❶ Digit
4: 4 digit

❷ Size
N: DIN W 48 × H 24 mm
SP: DIN W 48 × H 48 mm (11 pin plug type)
S: DIN W 48 × H 48 mm
M: DIN W 72 × H 72 mm
W: DIN W 96 × H 48 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

❸ Option in/output

Size: N		
PN	**OUT2**	**Function**
1	Normal type [01]	Alarm 1 + CT input
	Heating & Cooling	Alarm 2
2	Normal type	Alarm 1 + Alarm 2
D	Normal type	Alarm 1 + Digital input 1/2
	Heating & Cooling	Digital input 1/2
R	Normal type	Alarm 1+Transmission output
	Heating & Cooling	Transmission output
T	Normal type	Alarm output 1 + RS485 communication
	Heating & Cooling	RS485 communication

Size: SP	
PN	**Function**
1	Alarm 1

Size: S, M, W, H, L	
PN	**Function**
1	Alarm 1
2	Alarm 1 + Alarm output 2
R	Alarm 1 + Transmission output
T	Alarm 1 + RS485 communication
A	Alarm 1 + Alarm 2 + Transmission output
B	Alarm 1 + Alarm 2 + RS485 communication
D	Alarm 1 + Alarm 2 + Digital input 1/2 [02]

❹ Power supply
2: 24 VAC~ 50/60 Hz, 24-48 VDC⎓
4: 100-240 VAC~ 50/60 Hz

❺ OUT1 Control output
R: Relay
S: SSR drive
C: Selectable current or SSR drive output

❻ OUT2 Control output
N: Normal type
[No OUT2 (Heating or Cooling)]
R: Heating & Cooling type
[Relay output] [03]
C: Heating & Cooling type
[Selectable current or SSR drive output] [04]

01) The CT input model of TK4N can be selected only in the normal type model with alarm output 1. (except TK4SP)
02) Only for TK4S-D, OUT2 output terminal is used as DI-2 input terminal.
03) When operating mode is heating or cooling control, OUT2 can be used as alarm output 3 (except TK4N).
04) When operating mode is heating or cooling control, OUT2 can be used as transmission output 2.

View product details

Product Components

- Product (+ bracket)
- [TK4N] Terminal protection cover × 1
- Instruction manual

Sold Separately

- Current transformer (CT)
- Terminal protection cover: RSA / RMA / RHA / RLA-Cover
- Communication Converter: SCM-US / SCM-38I / SCM-US48I / SCM-WF48
- 11-pin controller socket: PG-11, PS-11 (N)

Specifications

Series		TK4N	TK4SP	TK4S	TK4M
Power supply	AC type	100 - 240 VAC~ 50/60 Hz			
	AC/DC type	-	24 VAC~ 50/60 Hz, 24-48 VDC⎓		
Permissible voltage range		90 to 110 % of rated voltage			
Power consum-mption	AC type	≤ 6 VA	≤ 8 VA		
	AC/DC type	-	AC: ≤ 8 VA, DC ≤ 5W		
Unit weight (packaged)		≈ 70 g (≈ 140 g)	≈ 85 g (≈ 130 g)	≈ 105 g (≈ 150 g)	≈ 140 g (≈ 210 g)

Series		TK4W	TK4H	TK4L
Power supply	AC type	100 - 240 VAC~ 50/60 Hz		
	AC/DC type	24 VAC~ 50/60 Hz, 24-48 VDC⎓		
Permissible voltage range		90 to 110 % of rated voltage		
Power consum-mption	AC type	≤ 8 VA		
	AC/DC type	AC: ≤ 8 VA, DC ≤ 5W		
Unit weight (packaged)		≈ 141 g (≈ 211 g)	≈ 141 g (≈ 211 g)	≈ 198 g (≈ 294 g)

Sampling period		50 ms
Input specification		Refer to 'Input Type and Using Range'.
Option input	CT input	• 0.0-50.0 A (primary current measurement range) • CT ratio: 1/1,000 • Measurement accuracy: ±5% F.S. ±1digit
	Digital input	• Contact - ON: ≤ 2 kΩ, OFF: ≥ 90 kΩ • Non contact - residual voltage ≤ 1.0 V, leakage current ≤ 0.1 mA • Outflow current: ≈ 0.5 mA per input
Control output	Relay	250 VAC~ 3 A, 30 VDC⎓ 3 A 1a
	SSR	11 VDC⎓±2 V, ≤ 20 mA
	Current	DC 4-20 mA or DC 0-20 mA (parameter), Load resistance: ≤ 500 Ω
Alarm output	Relay	AL1, AL2: 250 VAC~ 3 A 1a • TK4N AL2: 250 VAC~ 0.5 A 1a (≤ 125 VA)
Option output	trans-mission	DC 4 - 20 mA (Load resistance: ≤ 500 Ω, Output accuracy: ±0.3% F.S.)
	RS485 comm.	Modbus RTU
Display type		7 segment (red, green, yellow), LED type
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control
	Heating & Cooling	
Hysteresis		• Thermocouple, RTD: 1 to 100 (0.1 to 100.0) °C/°F • Analog: 1 to 100 digit
Proportional band (P)		0.1 to 999.9 °C/°F (0.1 to 999.9%)
Integral time (I)		0 to 9,999 sec
Derivative time (D)		0 to 9,999 sec
Control cycle (T)		• Relay output, SSR drive output: 0.1 to 120.0 sec • Selectable current or SSR drive output: 1.0 to 120.0 sec
Manual reset		0.0 to 100.0%
Relay life cycle	Mechanical	OUT1/2: ≥ 5,000,000 operations AL1/2: ≥ 20,000,000 operations (TK4H/W/L: ≥ 5,000,000 operations)
	Electrical	≥ 100,000 operations
Dielectric strength		Dependent on the power supply
AC voltage type		Between the charging part and the case: 3,000 VAC ~ 50/60 Hz for 1 minute
AC / DC voltage type		Between the charging part and the case: 2,000 VAC ~ 50/60 Hz for 1 minute
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Noise immunity		±2 kV square shaped noise by noise simulator (pulse width: 1 μs) R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Protection structure		IP65 (Front panel, IEC standards) • TK4SP: IP50 (Front panel, IEC standards)
Insulation type		Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 2 kV)
Certification		CE UK cULus EAC

Communication Interface

■ RS485

Comm. protocol	Modbus RTU
Connection type	RS485
Application standard	EIA RS485 compliance with
Maximum connection	31 units (address: 01 to 99)
Synchronous method	Asynchronous
Comm. Method	Two-wire half duplex
Comm. effective range	≤ 800 m
Comm. speed	2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 bps (parameter)
Response time	5 to 99 ms (default: 20 ms)
Start bit	1 bit (fixed)
Data bit	8 bit (fixed)
Parity bit	None (default), Odd, Even
Stop bit	1 bit, 2 bit (default)
EEPROM life cycle	≈ 1,000,000 operations (Erase / Write)

Input Type and Using Range

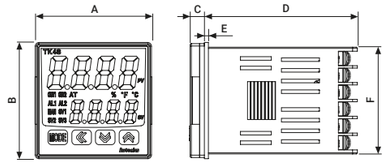
The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display	Using range (°C)	Using range (°F)
Thermo-couple	K (CA)	1	K CRH	-200 to 1,350	-328 to 2,462
		0.1	K CRL	-199.9 to 999.9	-199.9 to 999.9
	J (IC)	1	J I CH	-200 to 800	-328 to 1,472
		0.1	J I CL	-199.9 to 800.0	-199.9 to 999.9
	E (CR)	1	E CrH	-200 to 800	-328 to 1,472
		0.1	E CrL	-199.9 to 800.0	-199.9 to 999.9
	T (CC)	1	t CCH	-200 to 400	-328 to 752
		0.1	t CCL	-199.9 to 400.0	-199.9 to 752.0
	B (PR)	1	b Pr	0 to 1,800	32 to 3,272
	R (PR)	1	r Pr	0 to 1,750	32 to 3,182
	S (PR)	1	S Pr	0 to 1,750	32 to 3,182
	N (NN)	1	n nn	-200 to 1,300	-328 to 2,372
	C (TT) [01]	1	C tt	0 to 2,300	32 to 4,172
	G (TT) [02]	1	G tt	0 to 2,300	32 to 4,172
	L (IC)	1	L I CH	-200 to 900	-328 to 1,652
		0.1	L I CL	-199.9 to 900.0	-199.9 to 999.9
	U (CC)	1	U CCH	-200 to 400	-328 to 752
		0.1	U CCL	-199.9 to 400.0	-199.9 to 752.0
	Platinel II	1	PL I I	0 to 1,390	32 to 2,534
RTD	Cu50 Ω	0.1	CU S	-199.9 to 200.0	-199.9 to 392.0
	Cu100 Ω	0.1	CU 10	-199.9 to 200.0	-199.9 to 392.0
	JPt100 Ω	1	JPtH	-200 to 650	-328 to 1,202
		0.1	JPtL	-199.9 to 650.0	-199.9 to 999.9
	DPt50 Ω	0.1	dPt5	-199.9 to 600.0	-199.9 to 999.9
	DPt100 Ω	1	dPtH	-200 to 650	-328 to 1,202
		0.1	dPtL	-199.9 to 650.0	-199.9 to 999.9
	Nickel120 Ω	1	n I 12	-80 to 200	-112 to 392
Analog	0 to 10 V	-	A u 1	0 to	10 V
	0 to 5 V	-	A u2	0 to	5 V
	1 to 5 V	-	A u3	1 to	5 V
	0 to 100 mV	-	A n u 1	0 to	100 mV
	0 to 20 mA	-	A n A 1	0 to	20 mA
	4 to 20 mA	-	A n A2	4 to	20 mA

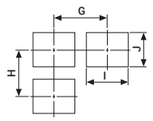
01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor
• Permissible line resistance per line: ≤ 5 Ω

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on TK4S Series.



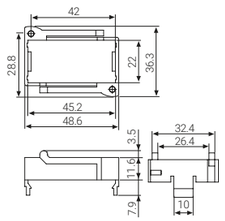
■ Panel cut-out



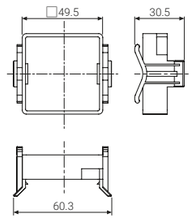
	Body						Panel cut-out			
	A	B	C	D	E	F	G	H	I	J
TK4N	48	24	3	91.8	-	21.8	≥ 55	≥ 37	$45^{+0.6}_{0}$	$22.2^{+0.3}_{0}$
TK4S	48	48	6	64.5	1.7	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TK4SP	48	48	6	72.2	1.7	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TK4M	72	72	6	64.5	1.5	67.5	≥ 90	≥ 90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$
TK4W	96	48	6	64.5	1.5	44.7	≥ 115	≥ 65	$92^{+0.8}_{0}$	$45^{+0.6}_{0}$
TK4H	48	96	6	64.5	1.5	91.5	≥ 65	≥ 115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
TK4L	96	96	6	64.5	1.5	91.5	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ Bracket

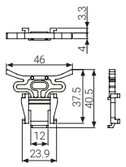
[TK4N]



[TK4S/SP]

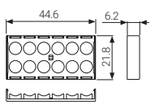


[Other series]



■ Terminal protection cover

[TK4N]



Dual Display PID
Temperature Controllers

TCN Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	C	N	❶	❷	-	❸	❹	❺	❻

❶ Digit
4: 4 digit

❷ Size
S: DIN W 48 × H 48 mm
M: DIN W 72 × H 72 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

❸ Option in/output
2: Alarm 1/2

❹ Power supply
2: 24 VAC 50/60 Hz, 24-48 VDC
4: 100-240 VAC 50/60 Hz

❺ Control output
R: Relay + SSR drive

❻ Wiring type
No mark: Bolt
P: Connector plug connection

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

- Terminal protection cover: RSA / RMA / RHA / RLA-COVER

View product details

Specifications

Series		TCN4□-22R-□	TCN4□-24R-□
Power supply		24 VAC~ 50/60 Hz 24 - 48 VDC⎓	100 - 240 VAC~ 50/60 Hz
Permissible voltage range		90 to 110 % of rated voltage	
Power consumption		AC: ≤ 5 VA, DC: ≤ 3 W	≤ 5 VA
Sampling period		100 ms	
Input specification		Refer to 'Input Type and Using Range.	
Control output	Relay	250 VAC~ 3A, 30 VDC⎓ 3A, 1a	
	SSR	12 VDC⎓±2 V, ≤ 20 mA	
Alarm output		250 VAC~ 1 A 1a	
Display type		7 Segment (red, green), LED type	
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control	
Hysteresis		1 to 100 (0.1 to 50.0) °C/°F	
Proportional band (P)		0.1 to 999.9 °C/°F	
Integral time (I)		0 to 9,999 sec	
Derivative time (D)		0 to 9,999 sec	
Control cycle (T)		0.5 to 120.0 sec	
Manual reset		0.0 to 100.0%	
Relay life cycle	Mechanical	≥ 5,000,000 operations	
	Electrical	OUT1/2: ≥ 200,000 operations (load resistance: 250 VAC~ 3 A) AL1/2: ≥ 300,000 operations (load resistance: 250 VAC~ 1 A)	
Dielectric strength		Between the charging part and the case: 1,000 VAC~ 50/60 Hz for 1 min	Between the charging part and the case: 2,000 VAC~ 50/60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity		±2 kV square shaped noise (pulse width: 1 μs) by noise simulator R-phase, S-phase	
Memory retention		≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Insulation type		Mark: ⊡, double or reinforced insulation (dielectric strength between the measuring input part and the power part: 1 kV)	Mark: ⊡, double or reinforced insulation (dielectric strength between the measuring input part and the power part: 2 kV)
Certification		CE UKCA cULus EAC	
Unit weight (packaged)		• TCN4S: ≈ 100 g (≈ 147 g)	• TCN4M: ≈ 133 g (≈ 203 g)
		• TCN4H: ≈ 124 g (≈ 194 g)	• TCN4L: ≈ 179 g (≈ 275 g)

Input Type and Using Range

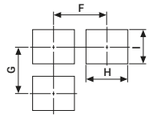
The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display	Using range (°C)	Using range (°F)
Thermo -couple	K (CA)	1	K CA.H	-50 to 1,200	-58 to 2,192
		0.1	K CA.L	-50.0 to 999.9	-58.0 to 999.9
	J (IC)	1	J IC.H	-30 to 800	-22 to 1,472
		0.1	J IC.L	-30.0 to 800.0	-22.0 to 999.9
	L (IC)	1	L IC.H	-40 to 800	-40 to 1,472
		0.1	L IC.L	-40.0 to 800.0	-40.0 to 999.9
	T (CC)	1	T CC.H	-50 to 400	-58 to 752
		0.1	T CC.L	-50.0 to 400.0	-58.0 to 752.0
	R (PR)	1	rPr	0 to 1,700	32 to 3,092
	S (PR)	1	SPr	0 to 1,700	32 to 3,092
RTD	Cu50 Ω	1	CU5.H	-50 to 200	-58 to 392
		0.1	CU5.L	-50.0 to 200.0	-58.0 to 392.0
	DPt100 Ω	1	dPt.H	-100 to 400	-148 to 752
		0.1	dPt.L	-100.0 to 400.0	-148.0 to 752.0

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on TCN4S Series .

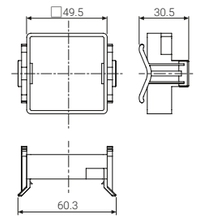
■ **Panel cut-out**



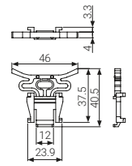
	Body					Panel cut-out			
	A	B	C	D	E	F	G	H	I
TCN4S	48	48	6	64.5	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TCN4S-□-P	48	48	7.7	65.8	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TCN4M	72	72	6	64.5	67.5	≥ 90	≥ 90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$
TCN4H	48	96	6	64.5	91.5	≥ 65	≥ 115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
TCN4L	96	96	6	64.5	91.5	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ **Bracket**

[TCN4S]



[Other series]



Single Display PID
Temperature Controllers

TC Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	C	❶	❷	-	❸	❹	❺

❶ Digit
4: 4 digit

❷ Size
- S: DIN W 48 × H 48 mm
- SP: DIN W 48 × H 48 mm (11 pin plug type)
- Y: DIN W 72 × H 36 mm
- M: DIN W 72 × H 72 mm
- H: DIN W 48 × H 96 mm
- W: DIN W 96 × H 48 mm
- L: DIN W 96 × H 96 mm

❸ Alarm output
N: No alarm
1: 1 alarm
2: 2 alarm

❹ Power supply
2: 24 VAC~ 50/60 Hz, 24-48 VDC⎓
4: 100-240 VAC~ 50/60 Hz

❺ Control output
N: Indicator - without control output
R: Relay + SSR drive

Product Components

- Product (+ bracket) [TC4Y] Product, Bracket × 2
- Instruction manual

Sold Separately

- 11-pin controller socket: PG-11, PS-11 (N)
- Terminal protection cover: RSA / RMA / RHA / RLA-COVER

View product details

Specifications

Series		TC4□-□2□	TC4□-□4□
Power supply		24 VAC~ 50/60 Hz 24-48 VDC⎓	100 - 240 VAC~ 50/60 Hz
Permissible voltage range		90 to 110 % of rated voltage	
Power consumption		AC: ≤ 5 VA, DC: ≤ 3 W	≤ 5 VA
Sampling period		100 ms	
Input specification		Refer to 'Input Type and Using Range'.	
Control output	Relay	250 VAC~ 3 A, 30 VDC⎓ 3 A, 1a	
	SSR	12 VDC⎓±2 V, ≤ 20 mA	
Alarm output		250 VAC~ 1 A 1a	
Display type		7 Segment (red, green, yellow), LED type	
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control	
Hysteresis		1 to 100 (0.1 to 50.0) °C/°F	
Proportional band (P)		0.1 to 999.9 °C/°F	
Integral time (I)		0 to 9,999 sec	
Derivative time (D)		0 to 9,999 sec	
Control cycle (T)		0.5 to 120.0 sec	
Manual reset		0.0 to 100.0%	
Relay life cycle	Mechanical	OUT1/2, AL1/2: ≥ 5,000,000 operations	
	Electrical	OUT1/2: ≥ 200,000 operations (load resistance: 250 VAC~ 3A) AL1/2: ≥ 300,000 operations (load resistance: 250 VAC~ 1 A)	
Dielectric strength		Between the charging part and the case: 1,000 VAC~ 50/60 Hz for 1 min	Between the charging part and the case: 2,000 VAC~ 50/60 Hz 1 min
Vibration		0.75 mm amplitude at frequency 5 to 55Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity		Square shaped noise (pulse width: 1 μs) by noise simulator ±2 kV R-phase, S-phase	
Memory retention		≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Insulation type		Mark: ⊟, double or reinforced insulation (dielectric strength between the measuring input part and the power part: 1 kV)	Mark: ⊟, double or reinforced insulation (dielectric strength between the measuring input part and the power part: 2 kV)
Certification		CE cULus EAC	
Unit weight (packaged)		• TC4S: ≈ 94 g (≈ 141 g)	• TC4SP: ≈ 76 g (≈ 123 g)
		• TC4Y: ≈ 85 g (≈ 174 g)	• TC4M: ≈ 133 g (≈ 204 g)
		• TC4W: ≈ 122 g (≈ 194 g)	• TC4H: ≈ 122 g (≈ 194 g)
		• TC4L: ≈ 155 g (≈ 254 g)	

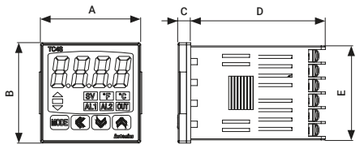
Input Type and Using Range

The setting range of some parameters is limited when using the decimal point display.

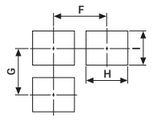
Input type		Decimal point	Display	Using range (°C)	Using range (°F)
Thermo -couple	K (CA)	1	K C A	-50 to 1,200	-58 to 2,192
	J (IC)	1	J I C	-30 to 500	-22 to 932
	L (IC)	1	L I C	-40 to 800	-40 to 1,472
RTD	Cu50 Ω	1	C U 5.H	-50 to 200	-58 to 392
		0.1	C U 5.L	-50.0 to 200.0	-58.0 to 392.0
	DPt100 Ω	1	d P t.H	-100 to 400	-148 to 752
		0.1	d P t.L	-100.0 to 400.0	-148.0 to 752.0

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on TC4S Series.



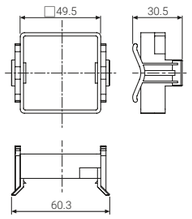
■ **Panel cut-out**



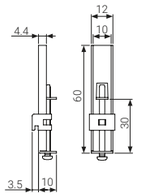
Series	Body					Panel cut-out			
	A	B	C	D	E	F	G	H	I
TC4S	48	48	6	64.5	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TC4SP	48	48	6	72.2	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TC4Y	72	36	7	77	30	≥ 91	≥ 40	$68^{+0.7}_{0}$	$31.5^{+0.5}_{0}$
TC4W	96	48	6	64.5	44.7	≥ 115	≥ 65	$92^{+0.8}_{0}$	$45^{+0.6}_{0}$
TC4M	72	72	6	64.5	67.5	≥ 90	≥ 90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$
TC4H	48	96	6	64.5	91.5	≥ 65	≥ 115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
TC4L	96	96	6	64.5	91.5	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ **Bracket**

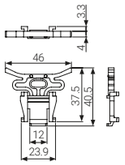
[TC4S/TC4SP]



[TC4Y]



[Other series]



Bar Graph PID
Temperature Controllers

KPN Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

K	P	N	5	❶	❷	-	❸	❹	❺

❶ Size
2: DIN W 96 × H 48 mm
3: DIN W 48 × H 96 mm
5: DIN W 96 × H 96 mm

❷ Control output

PN	Output number	Type	
		Heating: OUT1	Cooling: OUT2
00	1 (Heating or Cooling)	Relay, selectable current or SSR drive output	
11	2 (Heating & Cooling)	Selectable current or SSR drive output	
13		Selectable current or SSR drive output	Relay
17		Relay	Selectable current or SSR drive output
19		Relay	

❸ Option Communication output
0: No
2: RS485

❹ Option in/output
0: No
3: Transmission output + Remote SV

❺ Power supply
0: 100 - 240 VAC

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

- Terminal protection cover: RHA / RLA-COVER
- Communication Converter: SCM-US / SCM-38I / SCM-US48I / SCM-WF48
- Current transformer (CT)

View product details

Specifications

Series		KPN Series
Power supply		100 - 240 VAC⎓ 50/60 Hz
Permissible voltage range		90 to 110 % of rated voltage
Power consumption		≤ 15 VA
Sampling period		50 ms
Input specification		Refer to 'Input Type and Using Range'.
Option input	CT input	• 0.0-50.0 A (primary current measurement range) • CT ratio: 1/1,000
	Remote SV	1 - 5 VDC⎓ or 4 - 20 mA (Current Input: External resistance 250 Ω)
	Digital input	• Contact - ON: ≤ 2 kΩ, OFF: ≥ 90 kΩ • Non contact - residual voltage ≤ 1.0 V, leakage current ≤ 0.1 mA
Control output	Relay	250 VAC⎓ 5 A 1a
	SSR	11 VDC⎓±2 V, ≤ 20 mA
	Current	DC 4-20 mA or DC 0-20 mA (parameter), load resistance: ≤ 500 Ω
Alarm output	Relay	250 VAC⎓ 3 A 1a
Option output	Trans-mission	DC 4 - 20 mA (load resistance: ≤ 500 Ω, output accuracy: ±0.3% F.S. ±1-digit)
	RS485 Comm.	Modbus RTU
Display type		7 segment (red, green), control output bar graph (red, green), LED type
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control
	Heating & Cooling	
Hysteresis		• Thermocouple, RTD: 1 to 100 (0.1 to 100.0) °C/°F • Analog: 1 to 100 digit
Proportional band (P)		0.1 to 999.9 °C/°F (0.1 to 999.9%)
Integral time (I)		0 to 9,999 sec
Derivative time (D)		0 to 9,999 sec
Control cycle (T)		• 0.1 to 120.0 sec [relay output model] • 1.0 to 120.0 sec [SSR drive output model]
Manual reset		0.0 to 100.0%
Relay life cycle	Mechanical	≥ 10,000,000 operations
	Electrical	≥ 100,000 operations (load resistance: 250 VAC⎓ 3 A)
Dielectric strength		Between the charging part and the case: 3,000 VAC ⎓ 50/60 Hz for 1 minute
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Noise immunity		±2 kV square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Protection structure		IP65 (front panel, IEC standards)
Insulation type		Double or reinforced insulation (mark: ⊟, dielectric strength between the measuring input part and the power part: 2 kV)
Certification [1]		CE UK EAC
Unit weight (packaged)		• KPN52□-□: ≈ 160 g (≈ 230 g) • KPN53□-□: ≈ 160 g (≈ 230 g) • KPN55□-□: ≈ 220 g (≈ 316 g)

01) Certification attainment may vary depending on the model. Check the certification on the Autonics website.

Communication Interface

■ RS485

Comm. protocol	Modbus RTU
Connection type	RS485
Application standard	EIA RS485 compliance with
Maximum connection	31 units (address: 01 to 127)
Synchronous method	Asynchronous
Comm. Method	Two-wire half duplex
Comm. effective range	≤ 800 m
Comm. speed	2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 bps (parameter)
Response time	5 to 99 ms (default: 20 ms)
Start bit	1 bit (fixed)
Data bit	8 bit (fixed)
Parity bit	None (default), Odd, Even
Stop bit	1 bit, 2 bit (default)
EEPROM life cycle	≈ 1,000,000 operations (Erase / Write)

Input Type and Using Range

The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display	Using range (°C)	Using range (°F)
Thermo -couple	K (CA)	1	tC.K2	-200 to 1,350	-328 to 2,462
		0.1	tC.K2	-199.9 to 999.9	-199.9 to 999.9
	J (IC)	1	tC.J1	-200 to 800	-328 to 1,472
		0.1	tC.J2	-199.9 to 800.0	-199.9 to 999.9
	E (CR)	1	tC.E1	-200 to 800	-328 to 1,472
		0.1	tC.E2	-199.9 to 800.0	-199.9 to 999.9
	T (CC)	1	tC.t1	-200 to 400	-328 to 752
		0.1	tC.t2	-199.9 to 400.0	-199.9 to 752.0
	B (PR)	1	tC-b	0 to 1,800	32 to 3,272
	R (PR)	1	tC-r	0 to 1,750	32 to 3,182
	S (PR)	1	tC-S	0 to 1,750	32 to 3,182
	N (NN)	1	tC-n	-200 to 1,300	-328 to 2,372
	C (TT) [01]	1	tC-C	0 to 2,300	32 to 4,172
	G (TT) [02]	1	tC-G	0 to 2,300	32 to 4,172
	L (IC)	1	tC.L1	-200 to 900	-328 to 1,652
		0.1	tC.L2	-199.9 to 900.0	-199.9 to 999.9
	U (CC)	1	tC.U1	-200 to 400	-328 to 752
		0.1	tC.U2	-199.9 to 400.0	-199.9 to 752.0
	Platinel II	1	tC-P	0 to 1,390	32 to 2,534
RTD	Cu50 Ω	0.1	CU.50	-199.9 to 200.0	-199.9 to 392.0
	Cu100 Ω	0.1	CU.10	-199.9 to 200.0	-199.9 to 392.0
	JPt100 Ω	1	JPt.1	-200 to 650	-328 to 1,202
		0.1	JPt.2	-199.9 to 650.0	-199.9 to 999.9
	DPt50 Ω	0.1	dPt.5	-199.9 to 600.0	-199.9 to 999.9
	DPt100 Ω	1	dPt.1	-200 to 650	-328 to 1,202
		0.1	dPt.2	-199.9 to 650.0	-199.9 to 999.9
	Nickel120 Ω	1	ni.12	-80 to 200	-112 to 392
Analog	0 to 10 V	-	A-u1	0~	10 V
	0 to 5 V	-	A-u2	0~	5 V
	1 to 5 V	-	A-u3	1~	5 V
	0 to 100 mV	-	A.Au1	0~	100 mV
	0 to 20 mA	-	A.tA1	0~	20 mA
	4 to 20 mA	-	A.tA2	4~	20 mA

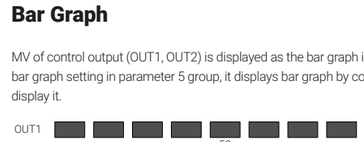
01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor
• Permissible line resistance per line: ≤ 5 Ω

Input type		Decimal point	Display	Using range (°C)	Using range (°F)
Analog	0 to 20 mA	-	A.tA1	0~	20 mA
	4 to 20 mA	-	A.tA2	4~	20 mA

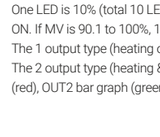
01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor
• Permissible line resistance per line: ≤ 5 Ω

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on KPN52□-□ Series.

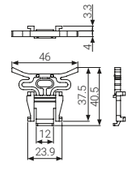


■ Panel cut-out



	Body						Panel cut-out			
	A	B	C	D	E	F	G	H	I	J
KPN52□-□	96	48	6	64.5	1.5	44.7	≥ 115	≥ 65	$92^{+0.8}_{0}$	$45^{+0.6}_{0}$
KPN53□-□	48	96	6	64.5	1.5	91.5	≥ 65	≥ 115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
KPN55□-□	96	96	6	64.5	1.5	91.5	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ Bracket



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.

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.

Slim Single Display PID
Temperature Controllers

TR1D Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	R	1	D	-	❶	❷	❸	❹

❶ Option output
1: Alarm output 1
R: Alarm output 1, Transmission output 1
T: Alarm output 1, RS485 communication

❷ Control output1
R: Relay
C: Current/SSR

❸ Power supply
R: Relay 2-stage

❹ Control output2

PN	Control output2	Additional function
N	None	-
R	Relay ↔ Alarm output 2	CT input
C	Current/SSR ↔ Transmission output 2	CT input

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

- Terminal protection cover: RHA / RLA-COVER
- Communication Converter: SCM-US / SCM-38I / SCM-US48I / SCM-WF48
- Current transformer (CT)

Specifications

Series		TR1D Series
Power supply		100 - 240 VAC⎓ 50/60 Hz
Permissible voltage range		90 to 110% of rated voltage
Power consumption		≤ 8 VA
Sampling period		50, 100, 250 ms
Input specification		Refer to 'Input Type and Using Range'.
Option input	CT input	• 0.0-50.0 A (primary current measurement range) • CT ratio: 1/1,000, • Measurement accuracy: ±5% F.S. ±1digit
Control output	Relay	250 VAC⎓ 3 A 1a
	SSR	12 VDC⎓ ±3 V, ≤ 20 mA
	Current	DC 4-20 mA or DC 0-20 mA (parameter), Load: ≤ 500 Ω
Option output	Alarm	AL1, AL2: 250 VAC⎓ 3 A 1a
	Trans-mission	DC4-20 mA (Load resistance: ≤ 500 Ω, Output accuracy: ±0.3% F.S.)
	RS485 comm.	Modbus RTU / ASCII
Display type		7 segment (red), 4-digit
Control type		ON/OFF, P, PI, PD, PID Control
Hysteresis		Control output: 1 to 100 °C/°F (0.1 to 100.0 °C/°F) Alarm output: 1 to 100 °C/°F (0.1 to 50.0 °C/°F)
Proportional band (P)		0.1 to 999.9 °C
Integral time (I)		0 to 9,999 sec
Derivative time (D)		0 to 9,999 sec
Control cycle (T)		Relay output: 0.5 to 120.0 sec, SSR drive output: 0.5 to 120.0 sec
Manual reset		0.0 to 100.0%
Dielectric strength		Between the charging part and the case : 3,000 VAC⎓ 50/60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency of 5 to 55Hz in each X, Y, Z direction for 2 hours
Relay life cycle	Mechanical	OUT1/2, AL1/2: ≥ 5,000,000 operations
	Electrical	OUT1/2, AL1/2: ≥ 100,000 operations (resistance load: 250 VAC⎓ 5 A)
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Insulation type		Double insulation or reinforced insulation (dielectric strength between the charging part and the case: 3 kV)
Noise immunity		Square shaped noise (pulse width: 1 μs) by noise simulator ±2 kV R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Certification		CE UK EAC
Unit weight (packaged)		≈ 123.5 g (≈ 194.5 g)

View product details

LCD
Temperature / Humidity Controllers

TH4M Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

TH	4	❶	-	-	❷	❸	❹

❶ Size
M: DIN W 72 × H 72 mm

❷ Option I/O
2: Alarm 1/2 output

❸ Power supply
4: 100 - 240 VAC

❹ Control output
R: Relay 2-stage

Product Components

- Product (+ bracket)
- Temperature / Humidity sensor THD-RM
- Instruction manual

Sold Separately

- Terminal protection cover: RMA-COVER

Specifications

Model		TH4M-24R
Power supply		100 - 240 VAC⎓ 50/60 Hz
Permissible voltage range		90 to 110 % of rated voltage
Power consumption		≤ 8 VA
Sampling period		1 sec
Display accu-racy	Temper-ature	• At room temperature (25 °C ±5 °C): ≤ ±1.0 °C • Out of room temperature range: ≤ ±2.0 °C
	Humidity	• At room temperature (25 °C ±5 °C): ≤ ±3.0%RH (20 to 90%RH), ≤ ±5.0%RH (below 20%RH, over 90%RH) • Out of room temperature: ≤ ±5.0%RH (all range)
Display range	Temper-ature	-20.0 ~ 60.0 °C
	Humidity	10.0 ~ 100.0%RH
Using range	Temper-ature	-20.0 ~ 60.0 °C
	Humidity	10.0 ~ 100.0%RH
Control output 01)	Temper-ature (OUT1)	Relay: 250 VAC⎓ 3 A, 30 VDC⎓ 3 A, 1a
	Humidity (OUT2)	Relay: 250 VAC⎓ 3 A, 30 VDC⎓ 3 A, 1a
Alarm output	Relay	AL1/2: 250 VAC⎓ 3 A, 1a
Display type 02)		11-Segment (temperature: white, humidity: blue), other display (yellow) LCD type
Dielectric strength		Between the charging part and the case : 3,000 VAC⎓ 50/60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency 5 to 55Hz in each X, Y, Z direction for 2 hours
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Noise immunity		±2 kV square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Insulation type		Double or reinforced insulation (mark: ⊟, dielectric strength between primary circuit and secondary circuit: 3 kV)
Certification		CE UK CA
Unit weight		≈ 144 g

01) Connect to a load using the same power supply. Connecting to a load from a different power supply may cause safety issues.
02) 02) When using the unit at low temperature (below 0°C), display cycle is slow.

■ Temperature/Humidity sensor

Model		THD-RM
Power supply		3.3 VDC⎓ ±2%
Power consumption		≤ 1.3mA
Response time		15 sec
Sensing accur-acy	Temper-ature	• At room temperature (25 °C ±5 °C): ≤ ±1.0 °C • Out of room temperature: ≤ ±2.0 °C
	Humidity	• At room temperature (25 °C ±5 °C): ≤ ±3.0%RH (20 to 90%RH), ≤ ±5.0%RH (below 20%RH, over 90%RH) • Out of room temperature: ≤ ±5.0%RH (all range)
Sensing range	Temper-ature	-20.0 to 60.0 °C
	Humidity	10.0 to 100.0%RH
Communication type		I2C communication output
Dielectric strength		Between the charging part and the case : 500 VAC⎓ 50/60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency 5 to 55Hz in each X, Y, Z direction for 2 hours
Ambient temperature		-20 to 60 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		0 to 100%RH, storage: 35 to 85%RH (no freezing or condensation)
Cable		Ø4 mm, 4-core , 2 m (tensile strength: 1kgf/s)
Certification		CE UK CA
Unit weight		≈ 56 g

View product details

Thumbwheel Switch Digital
Temperature Controllers

T3/T4 Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	❶	❷	❸	-	❹	❺	❻	❼	❽	-	❾

❶ Digit
3: 3 digit
4: 4 digit

❷ Size
S: DIN W 48 × H 48 mm (8 pin plug type)
M: DIN W 72 × H 72 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

❸ Option output

PN	Option output	T3S	T3H	T4M	T4L
No mark	No output	○	○	○	○
A	Alarm	-	○	○	○
S	Option	-	○	-	-
P	Dual setting	-	-	-	○

❹ Control method
B: ON/ OFF / Proportional

❺ Power supply
4: 100-240 VAC 50/60Hz

❻ Control output
R: Relay
S: SSR drive
C: Current

❼ Input type and using range

PN	Input type		Using range	T3S	T3H	T3HA	T3HS	T4M T4MA	T4L T4LA	T4LP
K4	Thermocouple	K(CA)	0 ~ 400 °C	○	○	○	○	○	○	○
K8			0 ~ 800 °C	○	○	○	-	○	○	○
KA			0 ~ 999 °C	-	○	○	-	-	-	-
KC			0 ~ 1200 °C	-	-	-	-	○	○	○
J2		J(IC)	0 ~ 200 °C	○	-	-	-	-	-	-
J4			0 ~ 400 °C	○	○	○	○	○	○	○
J8			0 ~ 800 °F	-	○	-	-	-	-	-
RF		R(PR)	600 ~ 1600 °C	-	-	-	-	○	○	○
P0	RTD	DPt 100Ω	-99.9 ~ 199.9 °C	-	-	-	-	○	○	-
P0			-99 ~ 199 °C	-	○	○	-	-	-	-
P1			0 ~ 99.9 °C	○	○	-	-	-	-	-
P2			0 ~ 200.0 °C	-	-	-	-	-	-	○
P2			0 ~ 200 °C	○	-	-	-	-	-	-
P4			0 ~ 400 °C	○	○	○	○	○	○	○

❽ Temperature unit
C: Celsius (°C)
F: Fahrenheit (°F)
• Contact us for temperature unit °F model.

❾ Version
N: New

View product details

Product Components

• Product (+ bracket)
• Instruction manual

Sold Separately

• 8-pin controller socket: PG-8, PS-8 (N)
• Terminal protection cover: RMA / RHA / RLA-COVER

Specifications

Series		T3, T4 Series
Power supply		100 - 240 VAC~ 50/60 Hz
Permissible voltage range		90 to 110 % of rated voltage
Power consumption		≤ 5 VA
Sampling period		100 ms
Input specification		Refer to 'Ordering Information: Input type and using range'.
Display accuracy 01)		• At room temperature (23 °C ±5 °C): (PV ±0.5% or ±1°C higher one) ±1 digit • Out of room temperature range: (PV ±0.5% or ±2 °C higher one) ±1 digit
Control output	Relay 02)	OUT1: 250 VAC~ 5 A / 30 VDC⎓ 5A 1c, OUT2: 250 VAC~ 2 A / 30 VDC⎓ 2A 1c
	SSR	12 VDC⎓±2 V, ≤ 20 mA
	Current	DC 4-20 mA, Load resistance: ≤ 500 Ω
Option output		250 VAC~ 2 A 1c
Alarm output setting range		F.S. 0 to 10% (volume switch)
Option output setting range		0 to 50 °C (volume switch)
Reset range		F.S. -3 to 3% (volume switch)
Display type		7 segment (red), LED type
Control type		ON/OFF, Proportional control
Hysteresis		F.S. 0.2 to 3% (T3S: F.S. 0.5%) (volume switch)
Proportional band		F.S. 1 to 10% (T3S: F.S. 3%) (volume switch)
Proportional cycle		20 sec
Relay life cycle	Mechanical	≥ 5,000,000 operations
	Electrical	OUT1: ≥ 100,000 operations, OUT2: ≥ 200,000 operations
Dielectric strength		Between the charging part and the case: 2,000 VAC~ 50/60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Noise immunity		±2 kV square shaped noise by noise simulator (pulse width 1 μs) R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Certification 03)		EAC
Unit weight (packaged)		• T3S: ≈ 95 g (≈ 135 g) / • T3H, T3HA, T3HS: ≈ 176 g (≈ 239 g)
		• T4M, T4MA: ≈ 180 g (≈ 246 g) / • T4L, T4LA, T4LP: ≈ 222 g (≈ 310 g)

01) In case of the T3S Series and the decimal point display models
At room temperature (23 °C ±5 °C): (PV ±0.5% or ±2 °C higher one) ±1 digit
Out of room temperature range: (PV ±0.5% or ±3 °C higher one) ±1 digit
02) Dual setting output of the T4LP is fixed as relay output and, it is also available as alarm output.

1-Channel
Digital Temperature Indicators

T3/T4 Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	❶	❷	❸	-	❹	❺	❻	❼	❽	-	❾

❶ Digit
3: 3 digit
4: 4 digit

❷ Size
N: DIN W 48 × H 24 mm
Y: DIN W 72 × H 36 mm
W: DIN W 96 × H 48 mm
S: DIN W 48 × H 48 mm (8 pin plug type)
M: DIN W 72 × H 72 mm
H: DIN W 48 × H 96 mm
L: DIN W 96 × H 96 mm

❸ Option output
I: Indicator

❹ Control method
N: Indicator

❺ Power supply
X: 12-24 VDC⎓
4: 100-240 VAC~ 50/60Hz

❻ Control output
N: Indicator

❼ Input type and using range

PN	Input		Using range	T3NI	T4YI T4WI	T3SI	T3HI	T4MI T4LI
K2	Thermo -couple	K(CA)	0 ~ 200 °C	○	-	-	-	-
K4			0 ~ 400 °C	○	-	-	-	-
K8			0 ~ 800 °C	○	-	○	-	○
KA			0 ~ 999 °C	○	-	-	○	-
KC			0 ~ 1200 °C	-	○	-	-	○
J2		J(IC)	0 ~ 200 °C	○	-	-	-	-
J4			0 ~ 400 °C	○	-	○	○	○
J5			0 ~ 500 °C	○	○	-	-	-
RF		R(PR)	600 ~ 1600 °C	-	-	-	-	○
P0	RTD	DPt100Ω	-99.9 ~ 99.9 °C	○	-	-	-	-
P0			-99.9 ~ 199.9 °C	-	○	-	-	○
P0			-99 ~ 199 °C	-	-	-	○	-
P1			0 ~ 99.9 °C	○	-	○	-	-
P2			0 ~ 200 °C	○	-	-	-	-
P4			0 ~ 400 °C	○	○	○	○	○

❽ Temperature unit
C: Celsius (°C)
F: Fahrenheit (°F)
• Contact us for temperature unit °F model.

❾ Version
N: New

Product Components

• Product (+ bracket) [T4YI] Product, bracket × 2
• Instruction manual

View product details

Sold Separately

• 8-pin controller socket: PG-8, PS-8 (N)
• Terminal protection cover: RMA / RHA / RLA-COVER

Specifications

Series	T3, T4 Series	
Power supply	100 - 240 VAC~ 50/60 Hz (T3NI: 12 -24 VDC⎓)	
Permissible voltage range	90 to 110 % of rated voltage	
Power consumption	≤ 5 VA (T3NI: ≤ 1 W)	
Input specification	Refer to 'Ordering Information: Input type and using range'.	
Display accuracy 01)	• At room temperature (23 °C ±5 °C): (PV ±0.5% or ±1°C higher one) ±1 digit • Out of room temperature range: (PV ±0.5% or ±2 °C higher one) ±1 digit	
Display type	7 Segment (red), LED type	
Dielectric strength	Between the charging part and the case: 2,000 VAC~ 50/60 Hz for 1 min	
Vibration	0.75 mm amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance	≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity	±2 kV square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase	
Ambient temperature	-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Certification	EAC	
Unit weight (packaged)	• T3NI: ≈ 25 g (≈ 48 g)	• T4YI: ≈ 123 g (≈ 181 g)
	• T4WI: ≈ 140 g (≈ 231 g)	• T3SI: ≈ 80 g (≈ 120 g)
	• T3HI: ≈ 137 g (≈ 203 g)	• T4MI: ≈ 137 g (≈ 202 g)
	• T4LI: ≈ 185 g (≈ 274 g)	

01) In case of T3NI, T3SI Series and the decimal point display models
At room temperature (23 °C ±5 °C): (PV ±0.5% or ±2 °C higher one) ±1 digit
Out of room temperature range: (PV ±0.5% or ±3 °C higher one) ±1 digit

High Performance Refrigeration

Temperature Controllers

TF3 Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	F	3	❶	-	❷	❸	❹	-	❺

❶ Input No. of channels
1: 1-channel (NTC or RTD)
[Temperature + digital input (DI)]
3: 3-channel (NTC)
[Inlet + Defrost + Outlet temperature
or digital input (DI)]

❷ Output
1: Compressor
2: Compressor + Defrost or Auxiliary (alarm, evaporator-fan)
3: Compressor + Defrost + Auxiliary (alarm, evaporator-fan) + buzzer support

❸ Power supply
1: 24 VAC⁓ 50/60 Hz, 12-24 VDC⎓
4: 100-240 VAC⁓ 50/60 Hz

❹ Compressor load capacity
G: 20 A 1a (TF31 model)
A: 5 A 1a
H: 16 A 1a

❺ Option per compressor load capacity (3-channel)

Product number	Option	Compressor load capacity	
		5 A 1a	16 A 1c
No mark	No	-	○
S	Synchronize defrost	○	-
T	RS485 Comm.	○	-
R	RTC Function (Real Time Clock)	-	○
A	RS485 Comm. + RTC	○	

Specifications

Series		TF3 Series
Power supply	AC	100 - 240 VAC⁓ 50/60 Hz
	AC/DC	24 VAC⁓ 50/60 Hz ±10%, 12-24 VDC⎓
Permissible voltage range		90 to 110 % of rated voltage
Power consumption	AC	≤ 8 VA
	AC/DC	AC: ≤ 5 VA, DC: ≤ 3 W
Sampling period		500 ms
Input specification		Refer to 'Input Type and Using Range'.
Option input	Digital input	• Contact - ON: ≤ 1 kΩ, OFF: ≥ 100 kΩ • Non contact - residual voltage ≤ 1 V, leakage current ≤ 1 mA Outflow current: ≈ 4 uA
Control output	Compressor (COMP)	250 VAC⁓ 5 A / 30 VDC⎓ 5 A / 1a 250 VAC⁓ 16 A / 24 VDC⎓ 16 A / 1c 250 VAC⁓ 20 A 1a
	Defrost (DEF)	250 VAC⁓ 10 A / 24 VDC⎓ 10 A / 1a
	Auxiliary (AUX)	250 VAC⁓ 5 A / 30 VDC⎓ 5 A / 1a
RS485 communication		Modbus RTU
Display type		7 segment (red), LED type
Control type		ON/OFF Control
Hysteresis		0.5 ~ 5.0 °C, 2 ~ 10 °F
Relay life cycle	Mechanical	• COMP (5 A 1a), AUX: ≥ 5,000,000 operations • COMP (16 A 1c), DEF: ≥ 20,000,000 operations • COMP (20 A 1a): ≥ 10,000,000 operations
	Electrical	• COMP (5 A 1a), AUX: ≥ 50,000 operations (load resistance: 250 VAC⁓ 5 A) • COMP (16 A 1c): ≥ 30,000 operations (load resistance: 250 VAC⁓ 16 A) • COMP (20 A 1a): ≥ 100,000 operations (load resistance: 250 VAC⁓ 20 A) • DEF: ≥ 100,000 operations (load resistance: 250 VAC⁓ 10 A)
Dielectric strength	AC	Between the charging part and the case: 3,000 VAC⁓ 50 / 60 Hz for 1 min
	AC/DC	Between the charging part and the case: 1,000 VAC⁓ 50 / 60 Hz for 1 min
Vibration		1.5 mm amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Noise immunity		Square shaped noise by noise simulator (pulse width 1 μs) ±2kV R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Protection structure		IP65 (front panel, IEC standards)
Certification		CE UK cULus EAC
Unit weight (packaged)		≈ 105 g (≈ 207 g)

Product Components

- Product (+ bracket)
- Instruction manual
- NTC sensor (5 kΩ) × 1

Sold Separately

- Dedicated remote display unit for TF3: TFD Series
- Communication Converter: SCM-US / SCM-38I / SCM-US48I / SCM-WF48

View product details

Refrigeration

Temperature Controllers

TC3YF Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	C	3	Y	F	-	❶	❷	❸

❶ Control output for refrigeration
1: Compressor
2: Compressor + Defrost
3: Compressor + Defrost +Evaporation-fan

❷ Power supply
1: 12-24 VDC⎓
4: 100-240 VAC⁓ 50/60 Hz

❸ Control output
R: Relay

Product Components

- Product
- Bracket ×2
- Instruction manual
- NTC sensor (5 kΩ) × 1 (Except RTD option models)

Specifications

Series		TC3YF Series
Power supply	AC	100 - 240 VAC⁓ 50/60 Hz
	DC	12-24 VDC⎓
Permissible voltage range		90 to 110% of rated voltage
Power consumption	AC	≤ 4 VA
	DC	≤ 8 W
Sampling period		500 ms
Input specification		Refer to 'Input Type and Using Range'.
Display accuracy		At room temperature (23 ±5 °C): (PV ±0.5% or 1 °C higher one) rdg ±1 digit Out of room temperature range: (PV ±0.5% or 1 °C higher one) rdg ±1 °C
Control output	Compressor (COMP)	250 VAC⁓ 5 A 1a, 30 VDC⎓ 5 A 1a
	Defrost (DEF)	250 VAC⁓ 10 A 1a
	Evaporation-fan (FAN)	250 VAC⁓ 5 A 1a, 30 VDC⎓ 5 A 1a
Display type		7 segment (red), LED type
Control type		ON/OFF Control
Hysteresis		0.5 to 5.0 °C, 2 to 50 °F
Relay life cycle	Mechanical	≥ 20,000,000 operations
	Electrical	• COMP, DEF: ≥ 50,000 operations (load resistance: 250 VAC⁓ 5 A) • FAN ≥ 100,000 operations (load resistance: 250 VAC⁓ 10 A)
Dielectric strength		Between the charging part and the case: 2,000 VAC⁓ 60 Hz for 1 min
Vibration		0.75 mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours
Malfunction vibration		0.5mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 10 min
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)
Noise immunity	AC	±2 kV square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase
	DC	±500 V square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase
Memory retention		≈ 10 years (non-volatile semiconductor memory type)
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Protection structure		IP65 (Front panel, IEC standards)
Certification	AC	cULus (Except RTD option models) EAC
	DC	EAC
Unit weight (packaged)		≈ 143 g (≈ 229 g)

View product details

Analog Non-Indication Type PID
Temperature Controllers

TA Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	A	❶	❷	-	❸	❹	❺	❻	❼

❶ Size
S: DIN W 48 × H 48 mm
(8 pin plug type)
M: DIN W 72 × H 72 mm
L: DIN W 96 × H 96 mm

❷ Control method
B: ON / OFF / Proportional

❸ Power supply
4: 100-240 VAC∼

❹ Control output
R: Relay
S: SSR drive

❺ Input sensor
K: K(CA)
J: J(IC)
P: DPt100 Ω

❻ Temperature range for each sensor
Refer to 'Input Type and Using Range'.

❼ Temperature unit
C: Celsius (°C)
F: Fahrenheit (°F)

Product Components

- Product (+ bracket)
- Instruction manual

Sold Separately

- 8-pin controller socket: PG-08, PS-08(N)
- Terminal protection cover: RMA / RLA-COVER

View product details

Input Type and Using Range

The setting range of some parameters is limited when using the decimal point display.

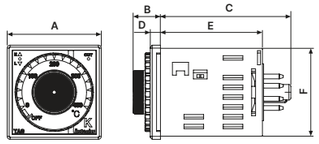
PN	Input type		Using range (°C)	Using range (°F)
1	Thermocouple	K(CA)	0 ~ 100	32 ~ 212
2			0 ~ 200	32 ~ 392
4			0 ~ 400	32 ~ 752
6			0 ~ 600	32 ~ 1,112
8			0 ~ 800	32 ~ 1,472
C			0 ~ 1,200	32 ~ 2,192
2		J(IC)	0 ~ 200	32 ~ 392
3			0 ~ 300	32 ~ 572
4			0 ~ 400	32 ~ 752
0	RTD	DPt100Ω	-50 ~ 100	-58 ~ 212
1			0 ~ 100	32 ~ 212
2			0 ~ 200	32 ~ 392
4			0 ~ 400	32 ~ 752

Specifications

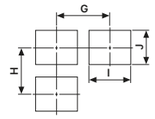
Series		TA Series	
Power supply		100 - 240 VAC∼ 50/60 Hz	
Permissible voltage range		90 to 110 % of rated voltage	
Power consumption		≤ 4 VA	
Sampling period		100 ms	
Input specification		• RTD: DPt100Ω (allowable line resistance per a wire: ≤5 Ω) • Thermocouple: K (CA), J (IC)	
Control output	Relay	250 VAC∼ 3 A, 30 VDC⎓ 1 A 1c	
	SSR	12 VDC⎓±2 V, ≤ 20 mA	
Display type		PV deviation, Error display (red, green), LED type	
Setting method		Front dial	
Setting accuracy		• At room temperature (23 °C ±5 °C) Over 100 °C model: F.S.±2%, below 100 °C model: F.S.±3% • Out of room temperature range Over 100 °C model: F.S.±3%, below 100 °C model: F.S.±4%	
Control type	ON/OFF	Hysteresis: 2°C (fixed)	
	PID Control	Control cycle: relay output 20 sec / SSR drive output 2 sec	
Relay life cycle	Mechanical	≥ 10,000,000 operations (18,000 operations/time)	
	Electrical	≥ 100,000 operations (900 operations/time)	
Dielectric strength		Between the charging part and the case: 2,000 VAC∼ 50/60 Hz for 1 min	
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity		Square shaped noise (pulse width: 1 μs) by noise simulator ±2 kV R-phase, S-phase	
Memory retention		≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Insulation type		Double or reinforced insulation (mark: ⊟, dielectric strength between the measuring input part and the power part: 2 kV)	
Certification		CE UK cA US EAC	
Unit weight (packaged)		• TAS: ≈ 69 g (≈ 107 g) • TAM: ≈ 109 g (≈ 171 g)	• TAL: ≈ 147 g (≈ 232 g)

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.



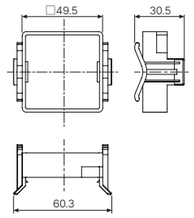
■ Panel cut-out



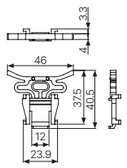
Series	Body						Panel cut-out			
	A	B	C	D	E	F	G	H	I	J
TAS	□48	14	66.7	5.2	52	44.8	≥ 65	≥ 65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TAM	□72	14.7	64.5	6.5	-	-	≥ 90	≥ 90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$
TAL	□96	14.7	64.5	6.5	-	-	≥ 115	≥ 115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

■ Bracket

[TAS Series]



[TAM, TAL Series]



Modular Multi-Channel High Performance

Temperature Controllers

TMH Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T M H ❶ - ❷ ❸ ❹ - ❺

❶ Module
2: Control 2-channels
4: Control 4-channels

❷ Option Input/Output
2: Alarm output 1/2 (Module: 2)
4: Alarm output 1/2/3/4 (Module: 2)
N: None (Module: 4)

❸ Power supply
2: 24 VDC

❹ Control output
R: Relay output
S: SSR drive output
C: Selectable current or SSR drive output

❺ Terminal type
None: Screw
L: Screwless

■ **Option module**

T M H ❶ - ❷ ❸ ❹ - ❺

❶ Module
A: Analog input/output
E: Digital input/Alarm output
CT: CT input

❷ Option Input/Output
4: Analog 1 to 4 (Module: A)
8: Digital input 1 to 8,
Alarm output 1 to 8 (Module: E)
8: CT input 1 to 8 (Module: CT)

❸ Power supply
2: 24 VDC

❹ Output
A: Transmission output
R: Relay output
N: None

❺ Terminal type
None: Screw
L: Screwless

View product details

■ **Communication module**

T M H ❶ - ❷ ❸ ❹ - ❺

❶ Module
C: Communication

❷ Option Input/Output
2: Communication output COM1+ COM2

❸ Power supply
2: 24 VDC

❹ Communication
E: Ethernet
L: PLC Ladderless

❺ Terminal type
None: Screw
L: Screwless

Product Components

- Product (+ bracket)
- Expansion connector × 1
- [Screwless type] 5-pin connector× 4
- Instruction manual
- Module lock connector × 2

Sold Separately

- Current transformer (CT)
- Communication Converters: SCM-USP / SCM-38I / SCM-US48I / SCM-WF48
- CT connector cable: CICT4-□
- Terminal Protection Cover: TMH-COVER

Specifications

■ Control module

Model	TMH2-□□□	TMH2-□□□-L	TMH4-□□□	TMH4-□□□-L
No. of channels	2-channels		4-channels	
Sampling period	50 ms (2-channels or 4-channels synchronous sampling)			
Input specification	Thermocouple, RTD, Analog (refer to 'Input Specification')			
CT input	• 0.0 - 50.0A (primary current measurement range) • CT ratio: 1/1,000, • Measurement accuracy: ±5% F.S. ±1 digit			
Digital input	• Connect input ON: ≤ 1 kΩ, OFF: ≥ 100 kΩ • Solid state input Residual voltage: ≤ 0.9 V, Leakage current: ≤ 0.5 mA • Outflow current: ≈ 0.3 mA per input	-		
Control type	Heating, cooling, heating & cooling: ON/OFF, P, PI, PD, PID control			
Control output	• Relay: 250 VAC⁓ 3 A 1a mechanical life cycle: ≥ 10,000,000 operations, electrical life cycle: ≥ 100,000 operations • SSR: 12 VDC⎓ ±3 V, ≤ 20 mA • Current [01]: DC 4 - 20 mA or DC 0 - 20 mA (Load: ≤ 500 Ω)			
Alarm output	250 VAC⁓ 3 A 1a Mechanical life cycle: ≥ 10,000,000 operations Electrical life cycle: ≥ 100,000 operations	-		
Communication	Modbus RTU			
Hysteresis	• Thermocouple / RTD: 1 to 100 (0.1 to 100.0) °C/°F • Analog: 1 to 100 digit			
Proportional band (P)	• Thermocouple / RTD: 0.1 to 999.9 °C/°F • Analog: 0.1 to 999.9 %			
Integral time (I)	0 to 9,999 sec			
Derivative time (D)	0 to 9,999 sec			
Control period (T)	• Relay output, SSR drive output: 0.1 to 120.0 sec • Selectable current or SSR drive output: 1.0 to 120.0 sec			
Manual reset	0 ~ 100 (0.0 ~ 100.0) %			
Insulation type	Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 1 kV)			
Unit weight (packaged)	≈ 174 g (≈ 249 g)	≈ 162 g (≈ 261 g)	≈ 154 g (≈ 229 g)	≈ 151 g (≈ 250 g)

01) When the control output is set to the current output, the heater current value monitoring function through the CT input terminals is not available.

■ Option module

Model	TMHA-42A	TMHA-42A-L
No. of channels	4-channels	
Sampling period	50 ms (4-channels synchronous sampling)	
Input specification	Thermocouple, RTD, analog (refer to 'Input Specification')	
Transmission output	DC 4 - 20 mA or DC 0 - 20 mA (Load: ≤ 500 Ω)	
Communication	Modbus RTU	
Insulation type	Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 1 kV)	
Unit weight (packaged)	≈ 160 g (≈ 235 g)	≈ 148 g (≈ 247 g)

Model	TMHE-82R	TMHE-82R-L	TMHCT-82N	TMHCT-82N-L
No. of I/O points	8 points		8 points	
Input specification	- Digital input • Connect input ON: ≤ 1 kΩ, OFF: ≥ 100 kΩ • Solid state input Residual voltage: ≤ 0.9 V, Leakage current: ≤ 0.5 mA • Outflow current: ≈ 0.3 mA per input		- CT input • 0.0-50.0 A (primary current measurement range) • CT ratio: 1/1,000 • Measurement accuracy: ±5% F.S. ±1 digit	
Alarm output	250 VAC⁓ 3 A 1a, • Mechanical life cycle: ≤ 10,000,000 operations • Electrical life cycle: ≤ 100,000 operations		-	
Communication	Modbus RTU			
Insulation type	Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 1 kV)		-	
Unit weight (packaged)	≈ 163 g (≈ 239 g)	≈ 151 g (≈ 250 g)	≈ 144 g (≈ 219 g)	≈ 133 g (≈ 232 g)

■ Communication module

Model		TMHC-22L	TMHC-22L-L	TMHC-22E
Communi-cation	COM1	• Connection type: RS422 / RS485 • Protocol: Modbus RTU, PLC Ladderless communication		• Connection type: Ethernet (10/100BaseT) • Protocol: Modbus TCP
	COM2			
Insulation type		Double insulation or reinforced insulation (mark: ⧈, dielectric strength between the measuring input part and the power part: 1 kV)		
Unit weight (packaged)		≈ 147 g (≈ 222 g)	≈ 137 g (≈ 236 g)	≈ 129 g (≈ 204 g)

■ Common

Power supply	24 VDC⎓
Permissible voltage range	90 to 110% of rated voltage
Power Consumption	≤ 5 W (for max. load)
Display type	None- parameter setting and monitoring is available at external devices
Memory retention	≈ 10years (non-volatile semiconductor memory type)
Insulation resistance	100 MΩ (500 VDC⎓ megger)
Dielectric strength	Between the charging part and the case: 1,000 VAC⁓ 50/60 Hz for 1 min
Vibration	0.75mm amplitude at frequency of 5 to 55Hz in each X, Y, Z direction for 2 hours
Noise immunity	Square shaped noise by noise simulator (pulse width 1 μs) ±0.5 kV
Ambient temperature	-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH (no freezing or condensation)
Protection structure	IP20 (IEC standard)
Certification	CE UKCA cULus KC

Input Specifications

■ Input type and range

The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display Method	Input range (°C)	Input range (°F)
Thermo -couple	K (CA)	1	K (CA) .H	-200 ~ 1,350	-328 ~ 2,462
		0.1	K (CA) .L	-200.0 ~ 1,350.0	-328.0 ~ 2462.0
	J (IC)	1	J (IC) .H	-200 ~ 800	-328 ~ 1,472
		0.1	J (IC) .L	-200.0 ~ 800.0	-328.0 ~ 1472.0
	E (CR)	1	E (CR) .H	-200 ~ 800	-328 ~ 1,472
		0.1	E (CR) .L	-200.0 ~ 800.0	-328.0 ~ 1,472.0
	T (CC)	1	T (CC) .H	-200 ~ 400	-328 ~ 752
		0.1	T (CC) .L	-200.0 ~ 400.0	-328.0 ~ 752.0
	B (PR)	1	B (PR)	0 ~ 1,800	32 ~ 3,272
	R (PR)	1	R (PR)	0 ~ 1,750	32 ~ 3,182
	S (PR)	1	S (PR)	0 ~ 1,750	32 ~ 3,182
	N (NN)	1	N (NN)	-200 ~ 1,300	-328 ~ 2,372
	C (TT)	1	C (TT)	0 ~ 2,300	32 ~ 4,172
	G (TT)	1	G (TT)	0 ~ 2,300	32 ~ 4,172
	L (IC)	1	L (IC) .H	-200 ~ 900	-328 ~ 1,652
		0.1	L (IC) .L	-200.0 ~ 900.0	-328.0 ~ 1,652.0
	U (CC)	1	U (CC) .H	-200 ~ 400	-328 ~ 752
		0.1	U (CC) .L	-200.0 ~ 400.0	-328.0 ~ 752.0
	Platinel II	1	PLII	0 ~ 1,390	32 ~ 2,534
RTD	Cu50 Ω	0.1	CU 50	-200.0 ~ 200.0	-328.0 ~ 392.0
	Cu100 Ω	0.1	CU 100	-200.0 ~ 200.0	-328.0 ~ 392.0
	JPt100 Ω	1	JPt100.H	-200 ~ 650	-328 ~ 1,202
		0.1	JPt100.L	-200.0 ~ 650.0	-328.0 ~ 1,202.0
	DPt50 Ω	0.1	DPt50.L	-200.0 ~ 600.0	-328.0 ~ 1,112.0
	DPt100 Ω	1	DPt100.H	-200 ~ 650	-328 ~ 1,202
		0.1	DPt100.L	-200.0 ~ 650.0	-328.0 ~ 1,202.0
	Nickel 120 Ω	1	NI12	-80 ~ 260	-112 ~ 500
Analog	0 ~ 10 V	-	AV1	0 ~ 10 V	
	0 ~ 5 V	-	AV2	0 ~ 5 V	
	1 ~ 5 V	-	AV3	1 ~ 5 V	
	0 ~ 100 mV	-	AMV1	0 ~ 100 mV	
	0 ~ 20 mA	-	AMA1	0 ~ 20 mA	
	4 ~ 20 mA	-	AMA2	4 ~ 20 mA	

- Permissible line resistance per line: ≤ 5 Ω

■ Measurement accuracy

Input type	Using temperature	Teriminal type	
Thermo -couple RTD	At room temperature (23 ±5 °C)	Screw	(PV ±0.3% or ±1 °C higher one) ±1-digit • Thermocouple K, J, T, N, E below -100 °C and L, U, PLII, RTD Cu50 Ω, DPt50 Ω: (PV ±0.3% or ±2 °C higher one) ±1-digit • Thermocouple C, G and R, S below 200 °C: (PV ±0.3% or ±3 °C higher one) ±1-digit • Thermocouple B below 400°C: there is no accuracy standards
		Screwless	(PV ±0.5% or ±1 °C higher one) ±1-digit • Thermocouple K, J, T, N, E below -100 °C and L, U, PLII, RTD Cu50 Ω, DPt50 Ω: (PV ±0.5% or ±2 °C higher one) ±1-digit • Thermocouple C, G and R, S below 200 °C: (PV ±0.5% or ±3 °C higher one) ±1-digit • Thermocouple B below 400°C: there is no accuracy standards
	Out of room temperature range		(PV ±0.5% or ±2 °C higher one) ±1-digit • RTD Cu50 Ω, DPt50 Ω: (PV ±0.5% or ±3 °C higher one) ±1-digit • Thermocouple R, S, B, C, G: (PV ±0.5% or ±5 °C higher one) ±1-digit • Other sensors: ≤ ±5 °C (≤-100 °C)
Analog	At room temperature (23 ±5 °C)		±0.3% F.S. ±1-digit
	Out of room temperature range		±0.5% F.S. ±1-digit

- Connecting 1 or more module can vary measurement accuracy about ±1°C, regardless of the number of connected module.

Communication Setting

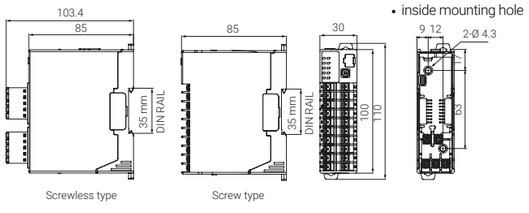
■ Interface

Module	Control	Option	Communication	
Series	**TMH2/4**	**TMHA, TMHE, TMHCT**	**TMHC-22L**	**TMHC-22E**
Protocol	Modbus RTU		Modbus RTU, PLC Ladderless communication	Modbus TCP
Comm. method	RS485		RS422, RS485	Ethernet (10/100BaseT)
PC loader	TTL (Protocol: Modbus RTU)			
Maximum connection	32 units (address: 01 to 32) • 16 units in case of connecting TMHC module (address: 01 to 16)	16 units per each module	Control module 16 units, option module 16 units per each module (32 units in total)	
Synchronization	Asynchronous			-
Connection method	Two-wire half duplex			-
Comm. effective range	≤ 800 m			-
Comm. speed	4,800 / 9,600 (default) / 19,200 / 38,400 / 115,200 bps (parameter)			10/100 Mbps
Response time	5 to 99 ms (default: 20 ms)			-
Start bit	1 bit (fixed)			-
Data bit	8 bit (fixed)			-
Parity bit	None (default) , Odd, Even			-
Stop bit	1 bit, 2 bit (default)			-
EEPROM life cycle	≈ 1,000,000 operations (Erase / Write)			

- When changing the setting value related to communication interface, reboot the device for normal operation.
- It is recommended to use Autonics communication converter. Please use twisted pair wire, which is suitable for RS485 communication.

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.



- inside mounting hole

Modular Multi-Channel PID

Temperature Controllers

TM Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

T	M	❶	-	❷	❸	❹	❺

❶ Channel
2: 2-channels
4: 4-channels

❷ Alarm output
2: Alarm output 1/2 (2-channels)
4: Alarm output 1/2/3/4 (2-channels)
N: None (4-channels)

❸ Power supply
2: 24 VDC

❹ Control output
R: Relay
S: SSR drive
C: Selectable current or SSR drive output

❺ Structure
B: Basic module
E: Expansion module
• Since the expansion module is not supplied with power/comm. terminal. Use it with the basic module.

Product Components

- Product (+ bracket)
- Side connector ×1
- Instruction manual
- Power/Comm. connector ×1 (only for basic module)

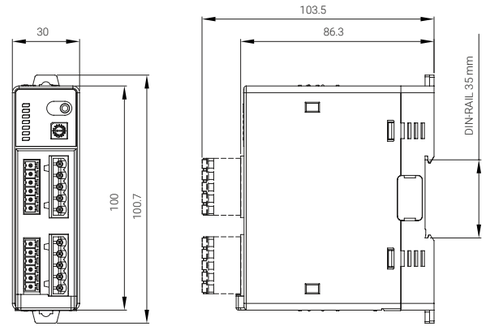
Sold Separately

- Current transformer (CT)
- Communication Converter: SCM-US / SCM-38I / SCM-US48I / SCM-WF48

View product details

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.
Below is based on basic module.



Specifications

Series		TM2	TM4
No. of channels		2-channels	4-channels
Power supply		24 VDC⎓	
Permissible voltage range		90 to 110% of rated voltage	
Power consumption		≤ 5 W (for Max. load)	
Sampling period		50 ms (2-channels synchronous sampling)	100 ms (4-channels synchronous sampling)
Input specification		Refer to 'Input Type and Using Range'.	
Option input	CT input	• 0.0-50.0 A (primary current measurement range) • CT ratio: 1/1,000 • Measurement accuracy: ±5% F.S. ±1 digit	-
	Digital input	• Contact ON: ≤ 1 kΩ, OFF: ≥ 100 kΩ • Non contact residual voltage: ≤ 1.5 VDC⎓ leakage current: ≤ 0.1 mA • Outflow current: ≈ 0.5 mA per input	-
Control output	Relay	250 VAC⁓ 3 A 1a, 30 VDC⎓ 3 A 1a	
	SSR	12 VDC⎓ ±3 V, ≤ 30 mA	22 VDC⎓ ±3 V, ≤ 30 mA
	Current	DC 4 - 20 mA or DC 0 - 20 mA (Load resistance: ≤ 500 Ω)	
Alarm output		250 VAC⁓ 3 A 1a	-
RS485 Comm.		Modbus ASCII / RTU	
Display type		None- parameter setting and monitoring is available at external devices	
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control	
	Heating & Cooling		
Hysteresis		1 ~ 100 (0.1 ~ 100) ℃/℉	
Proportional band (P)		0.1 ~ 999.9 ℃/℉	
Integral time (I)		0 to 9,999 sec	
Derivative time (D)		0 to 9,999 sec	
Control cycle (T)		0.1 to 120.0 sec	
Manual reset		0.0 ~ 100.0 %	
Relay life cycle	Mechanical	≥ 10,000,000 operations	
	Electrical	≥ 100,000 operations (250 VAC⁓ 3 A load resistance)	
Dielectric strength		Between the charging part and the case: 3,000 VAC⁓ 50/60 Hz for 1 min	
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		100 MΩ (500 VDC⎓ megger)	
Noise immunity		±0.5 kV square shaped noise (pulse width 1 μs) by noise simulator	
Ambient temperature		-10 to 50 ℃, storage: -20 to 60 ℃ (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Channel insulation		Dielectric strength 1,000 VAC⁓	
Insulation type		Double insulation or reinforced insulation (mark: ⊡, dielectric strength between the measuring input part and the power part: 1 kV)	
Certification		CE UK cULus EAC	
Unit weight (packaged)		• Basic module: ≈ 152 g (≈ 217 g) • Expansion module: ≈ 143 g (≈ 208 g)	• Basic module: ≈ 174 g (≈ 239 g) • Expansion module: ≈ 166 g (≈ 231 g)

Input Type and Using Range

The setting range of some parameters is limited when using the decimal point display.

Input type		Decimal point	Display method	Using range (℃)		Using range (℉)		
Thermo -couple	K (CA)	1	K (CA) .H	-200 ~ 1,350		-328	~	2,462
		0.1	K (CA) .L	-200.0 ~ 1,350.0		-328.0	~	2462.0
	J (IC)	1	J (IC) .H	-200 ~ 800		-328	~	1,472
		0.1	J (IC) .L	-200.0 ~ 800.0		-328.0	~	1472.0
	E (CR)	1	E (CR) .H	-200 ~ 800		-328	~	1,472
		0.1	E (CR) .L	-200.0 ~ 800.0		-328.0	~	1,472.0
	T (CC)	1	T (CC) .H	-200 ~ 400		-328	~	752
		0.1	T (CC) .L	-200.0 ~ 400.0		-328.0	~	752.0
	B (PR)	1	B (PR)	0 ~ 1,800		32	~	3,272
	R (PR)	1	R (PR)	0 ~ 1,750		32	~	3,182
	S (PR)	1	S (PR)	0 ~ 1,750		32	~	3,182
	N (NN)	1	N (NN)	-200 ~ 1,300		-328	~	2,372
	C (TT) 01)	1	C (TT)	0 ~ 2,300		32	~	4,172
	G (TT) 02)	1	G (TT)	0 ~ 2,300		32	~	4,172
	L (IC)	1	L (IC) .H	-200 ~ 900		-328	~	1,652
		0.1	L (IC) .L	-200.0 ~ 900.0		-328.0	~	1,652.0
	U (CC)	1	U (CC) .H	-200 ~ 400		-328	~	752
		0.1	U (CC) .L	-200.0 ~ 400.0		-328.0	~	752.0
	Platinel II	1	PLII	0 ~ 1,400		32	~	2,552
RTD	JPt100 Ω	1	JPt100.H	-200 ~ 600		-328	~	1,112
		0.1	JPt100.L	-200.0 ~ 600.0		-328.0	~	1,112.0
	DPt100 Ω	1	DPt100.H	-200 ~ 600		-328	~	1,112
		0.1	DPt100.L	-200.0 ~ 600.0		-328.0	~	1,112.0
	DPt50 Ω	0.1	DPt50.L	-200.0 ~ 600.0		-328.0	~	1,112.0
	Cu50 Ω	0.1	CU 50	-200.0 ~ 200.0		-328.0	~	392.0
	Cu100 Ω	0.1	CU 100	-200.0 ~ 200.0		-328.0	~	392.0
	Nickel120 Ω	1	NI12	-80 ~ 260		-112	~	500

01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor

■ Measurement accuracy

Input type	Using temperature	Measurement accuracy
Thermo -couple RTD	At room temperature (23 ±5 ℃)	(PV ±0.5% or ±1 ℃ higher one) ±1-digit • Thermocouple K, J, T, N, E below -100 ℃ and L, U, PLII, RTD DPt50 Ω, Cu50 Ω: PV ±2 ℃ ±1-digit • Thermocouple C, G and R, S below 200 ℃: PV ±3 ℃ ±1-digit • Thermocouple B below 400℃: there is no accuracy standards
	Out of room temperature range	(PV ±0.5% or ±2 ℃ higher one) ±1-digit • RTD: (PV ±0.5% or ±3 ℃ higher one) ±1-digit • Thermocouple R, S, B, C, G, L, U: (PV ±0.5% or ±5 ℃ higher one) ±1-digit • Thermocouple below -100 ℃: ±5 ℃

1-Channel

Digital Indicators

KN-2000W Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

K	N	-	2	❶	❷	❸	W

❶ Alarm output
0: No (Option output: Transmission is not available)
2: 2 alarm
4: 2 alarm

❷ Option Output
0: No
1: PV transmission
4: Communication
5: PV transmission + Communication

❸ Power supply
0: 100-240 VAC 50/60 Hz
1: 24 VDC

Product Components

- Product
- Bracket ×2
- Instruction manual

Specifications

Series		KN-2000W Series	
		AC voltage	DC voltage
Power supply		100 - 240 VAC⁓ 50/60 Hz	24 VDC⎓
Permissible voltage range		90 to 110 % of rated voltage	
Power consumption		≤ 8 VA	≤ 3 W
Sampling period		• Thermocouple, RTD: 250 ms • Analog: 100 ms	
Input specification		Refer to 'Input Type and Using Range'.	
Digital input	Contact	• ON: ≤ 2 kΩ • OFF: ≥ 90 kΩ	
	Non contact	• Residual voltage: ≤ 1.0 V • Leakage current: ≤ 0.03 mA	
	Outflow current	≈ 0.2 mA	
Option output	Alarm	• 2 point relay: 250 VAC⁓ 3 A 1c • 4 point relay: 250 VAC⁓ 1 A 1a	
	PV Trans-mission	ISOLATED DC 4-20 mA (Load resistance: ≤ 600 Ω)	
	RS485 comm.	Modbus RTU	
Display type		7 Segment (Red, Green, Yellow), LED type	
Alarm output Hysteresis		1 to 999 digit	
Relay life cycle	Mechani-cal	• 2 point: ≥ 10,000,000 operations • 4 point: ≥ 20,000,000 operations	
	Electrical	• 2 point: ≥ 100,000 operations(Load resistance: 250 VAC⁓ 3 A) • 4 point: ≥ 500,000 operations (Load resistance: 250 VAC⁓ 1 A)	
Dielectric strength		Between the charging part and the case: 2,000 VAC⁓ 50/60 Hz for 1 min	
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity		±2 kV square shaped noise (pulse width 1 μs) by noise simulator	
Memory retention		≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Certification		CE UK EAC	
Unit weight (packaged)		≈ 200 g (≈ 332 g)	

View product details

Bar Graphic

Temperature Indicators

KN-1000B Series

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

K	N	-	1	❶	❷	❸	B

❶ Alarm output
0: No mark
2: 2 alarm
4: 4 alarm

❷ Option output
0: No mark
1: PV Transmission
4: Communication

❸ Power supply
0: 100-240 VAC 50/60 Hz
1: 24 VDC

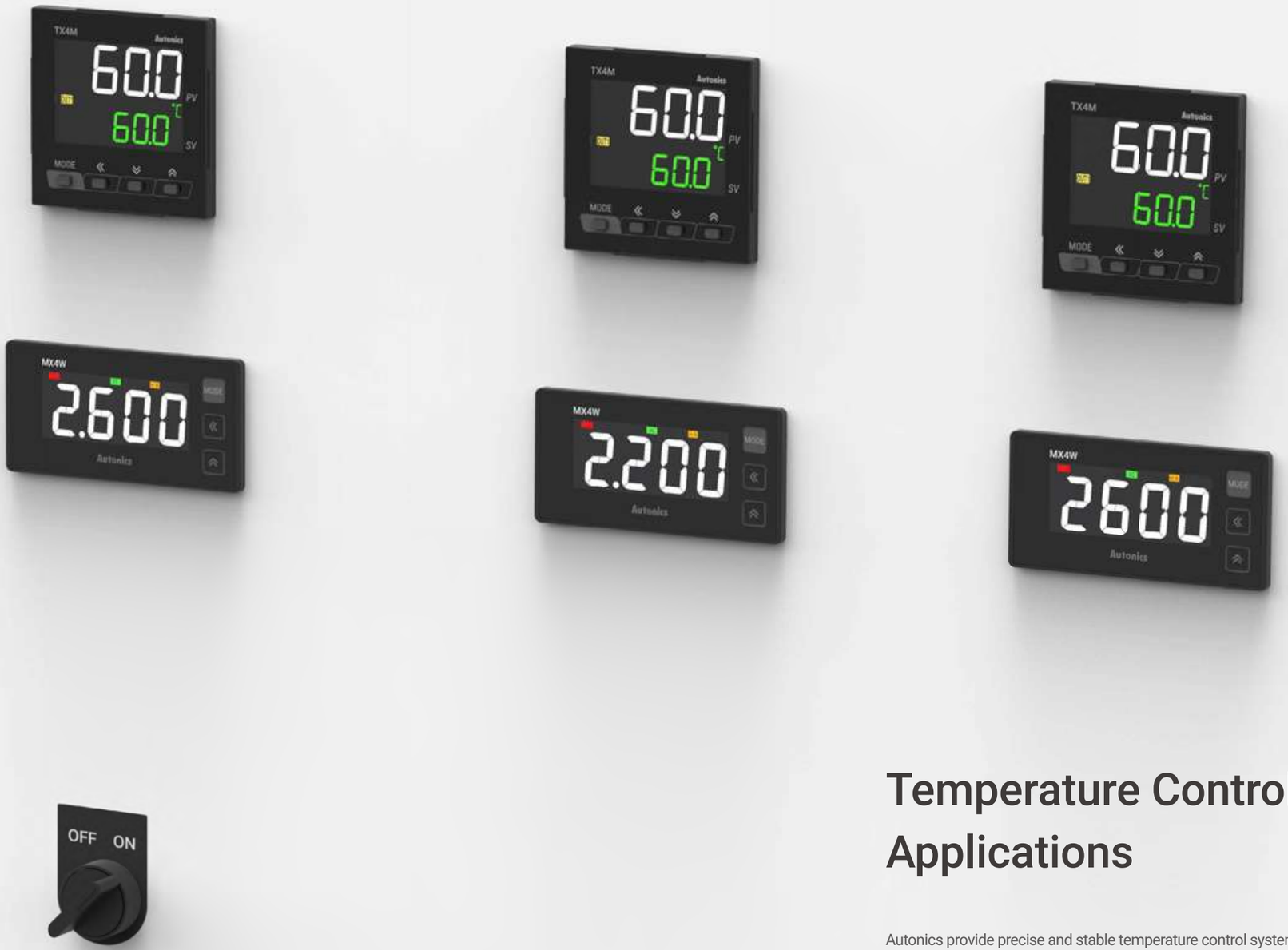
Product Components

- Product
- Bracket ×2
- Connector (KN-10□□B: ×3, KN-12□□B: ×4, KN-140□B: ×4, KN-141□B: ×5, KN-144□B: ×5)
- Instruction manual
- Unit sticker ×1

Specifications

Series		KN-1000B Series	
		AC voltage	DC voltage
Power supply		100 - 240 VAC⁓ 50/60 Hz	24 VDC⎓
Permissible voltage range		90 to 110 % of rated voltage	
Power consumption		≤ 6 VA	≤ 4 W
Sampling period		• Thermocouple, RTD: 250 ms • Analog: 100 ms	
Input specification		Refer to 'Input Type and Using Range'.	
Digital input	Contact	• ON: ≤ 2 kΩ • OFF: ≥ 90 kΩ	
	Non contact	• Residual voltage: ≤ 1.0 V • leakage current: ≤ 0.03 mA	
	Outflow current	≈ 0.2 mA	
Option output	Alarm	• 2 point relay: 250 VAC⁓ 3 A 1c • 4 point relay: 250 VAC⁓ 1 A 1a	
	PV trans-mission	ISOLATED DC 4-20 mA (Load resistance: ≤ 600 Ω)	
	RS485 comm.	Modbus RTU	
Display type		7 Segment (red), Graph bar (green)	
Alarm output Hysteresis		1 to 999 digit	
Relay life cycle	Mechani-cal	• 2 point: ≥ 10,000,000 operations • 4 point: ≥ 20,000,000 operations	
	Electrical	• 2 point: ≥ 100,000 operations (load resistance: 250 VAC⁓ 3 A) • 4 point: ≥ 500,000 operations (load resistance: 250 VAC⁓ 1 A)	
Dielectric strength		Between the charging part and the case: 2,000 VAC⁓ 50/60 Hz for 1 min	
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz in each X, Y, Z direction for 2 hours	
Insulation resistance		≥ 100 MΩ (500 VDC⎓ megger)	
Noise immunity		±2 kV square shaped noise (pulse width 1 μs) by noise simulator	
Memory retention		≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity		35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)	
Certification		CE UK EAC	
Unit weight (packaged)		≈ 182 g (≈ 304 g)	

View product details



Temperature Control Applications

Autonics provide precise and stable temperature control system to meet customer needs in various environments. Temperature control is essential in modern industrial processes, and Autonics temperature control products play an important role in ensuring product quality and maximizing process efficiency. In particular, products are applied in temperature-sensitive industries such as semiconductors, automobiles, food, and packaging, improving optimal quality and user productivity.

1. Packaging Industry

Chip Bag Filling, Sealing, and Cutting

High performance PID temperature controllers are used to control heater temperature fast for chip bag filling and sealing.

2. Plastics/Rubber Industry

Plastic Bag Cutting Machines

Temperature controllers are used to control the temperature of packaging material cutting machines.

3. Semiconductor/Display Industry

Semiconductor and Display Heat Regulators

Power controllers are used in semiconductor and display heat regulators which require precise temperature control.

4. Machine Tools Industry

Edge Banding Machine

Temperature controllers are used to control heat levels for heating and melting solid adhesive when bonding bands to finish wood board edges.

Wire Extrusion Molding

Temperature controllers are used to control heat levels for raw material heating during wire extrusion molding process.

5. Food/beverage Manufacturing Industry

Raw Material Mixing Tank

Temperature controllers are used to control appropriate temperature and time for each raw material to equalize the production quality.

Food Display Refrigerators

Temperature controllers are used to control temperature of food display refrigerators.

Food Storage Refrigerators

Temperature controllers are used to control temperature of food storage refrigerators.

Commercial Coffee Roasters

Temperature controllers are used to control temperature of commercial coffee roasters.

Baking Fermentation Machine

Temperature/humidity controllers are used to control and maintain appropriate temperature and humidity for dough fermentation in baking machines.

Sterilization Machine

Temperature controllers are used to control and maintain appropriate temperature for sterilization in machines.

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• Pressure Sensors • Pressure Transmitters • Smart Camera • Vision Sensors • Safety Light Curtains • Safety Door Switches • Safety Switches
• Safety Controllers • Safety I/O Terminal Blocks • Temperature Controllers • Solid State Relays • Power Controllers • Counters • Timers
• Digital Panel Meters • Digital Display Units • Sensor Controllers • SMPS • Industrial PC • HMIs • Recorders • Indicators • Network Converters
• Closed Loop Stepper Motor System • 5-Phase Stepper Motor & Drivers • 2-Phase Stepper Motor Drivers • Motion Controllers
• Industrial Networking • I/O Terminal Blocks • Distribution Boxes • Cables • Control Switches / Pilot Lights / Buzzers • Software

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