Modular 2/4-Channel PID Temperature Controllers with Screwless Connector

TM Series
CATALOG

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc are subject to change without notice for product improvement Some models may be discontinued without notice.

Features

- Multi-channel (4-channel : TM4/2-channel : TM2) input and output control
- High-speed sampling cycle (4-channel : 100ms/2-channel : 50ms)
- Module connection and expansion with expansion connectors
  - Communication between modules
  - No additional power supply wiring
  - Expandable up to 31 units (124-channels/62-channels)
- Simultaneous heating and cooling control function
- Isolated input channels (dielectric strength : 1000VAC)
- Switch between current output and SSR drive output (TM2- 2C)
- Parameter configuration via PC (USB and RS485 communication)
  - DAQMaster software included (comprehensive device management software)
  - Communication converter sold separately : SCM-US (USB to serial converter), SCM-38I (RS-232C to RS485 converter), SCM-US48I (USB to RS485 converter)
- Easy wiring and maintenance with various connectors : sensor input connector, control output connector, power/communication connector
- Heater disconnect alarm function (CT input)
  - Current transformer (CT) sold separately : CSTC-E80LN, CSTC-E200LN
- Various input types and temperature ranges

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	2	❸	❹

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

❹ 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
- Side connector: 1
- Instruction manual
- Power/Comm. connector: 1 (only for basic module)

Software

Download the installation file and the manuals from the Autonics website.

■ DAQMaster
DAQMaster is comprehensive device management program. It is available for parameter setting, monitoring.

Specifications

Series		TM2	TM4
No. of channels		2 channels	4 channels
Power supply		24 VDC⎓ ±10%	
Allowable 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 RTU	
Display type		None- parameter setting and monitoring is available at external devices	
Control type	Heating, Cooling Heating & Cooling	ON/OFF, P, PI, PD, PID Control	
Hysteresis		1 to 100 (0.1 to 100) °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)		0.1 to 120.0 sec	
Manual reset		0.0 to 100.0 %	
Relay life cycle	Mechanical	≥ 10,000,000 operations	
	Electrical	≥ 100,000 operations (250 VAC~ 3 A load resistance)	
Dielectric strength		Between input terminal and power terminal: 2,000 VAC~ 50/60 Hz for 1 min	
Vibration		0.75 mm amplitude at frequency of 5 to 55 Hz (for 1 min) 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 °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)	
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)	
Approval		CE cULus KC 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)

CE cULus KC EAC

Communication Interface

■ RS485

Protocol	Modbus RTU
Application standard	EIA RS485 compliance with
Maximum connection	31 units (address: 01to31)
Synchronization type	Asynchronous
Connection type	Two-wire half duplex
Comm. effective range	≤ 800 m
Comm. speed	2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 (parameter)
Start bit	1 bit (fixed)
Data bit	8 bit (fixed)
Parity bit	None (default) , Odd, Even
Stop bit	1 bit, 2 bit (default)

- When changing the setting value related to communication interface, reboot the device for normal operation.
- It is not allowed to set overlapping communication address at the same communication line.
- It is recommended to use Autonics communication converter. Please use twisted pair wire, which is suitable for RS485 communication.

■ Address

Set the communication address with the communication address setting switch (SW1, default: 1) and communication address group switch (SW2, default: +0).

- When setting as 0, it does not operate communication.

SW2 \ SW1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
+0	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
+16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

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 (°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	-200.0 to 1,350.0	-328.0 to 2462.0
	J (IC)	1	J (IC) .H	-200 to 800	-328 to 1,472
		0.1	J (IC) .L	-200.0 to 800.0	-328.0 to 1472.0
	E (CR)	1	E (CR) .H	-200 to 800	-328 to 1,472
		0.1	E (CR) .L	-200.0 to 800.0	-328.0 to 1,472.0
	T (CC)	1	T (CC) .H	-200 to 400	-328 to 752
		0.1	T (CC) .L	-200.0 to 400.0	-328.0 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	-200.0 to 900.0	-328.0 to 1,652.0
	U (CC)	1	U (CC) .H	-200 to 400	-328 to 752
		0.1	U (CC) .L	-200.0 to 400.0	-328.0 to 752.0
	Platinel II	1	PLII	0 to 1,400	32 to 2,552
RTD	JPt100 Ω	1	JPt100.H	-200 to 650	-328 to 1,202
	JPt100 Ω	0.1	JPt100.L	-200.0 to 650.0	-328.0 to 1,202.0
	DPt100 Ω	1	DPt100.H	-200 to 650	-328 to 1,202
	DPt100 Ω	0.1	DPt100.L	-200.0 to 650.0	-328.0 to 1,202.0

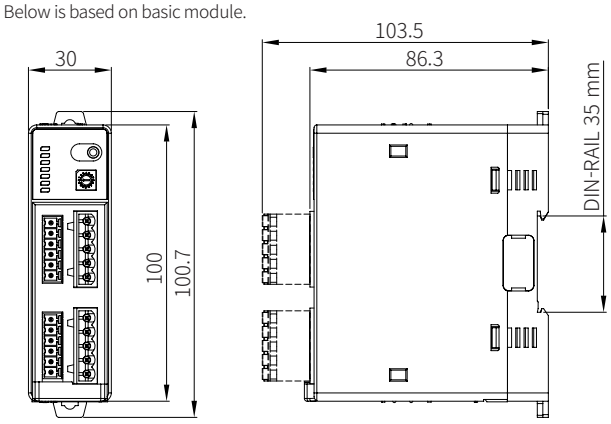
01) C (TT): Same as existing W5 (TT) type sensor
02) G (TT): Same as existing W (TT) type sensor

■ Measurement accuracy

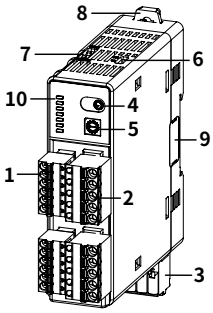
Input type	Using temperature	Measurement accuracy
Thermo -couple	At room temperature (23 ±5 °C)	(PV ±0.5% or ±1 °C higher one) ±1-digit • Thermocouple K, J, T, N, E below -100 °C and L, U, PLII: ±2 °C ±1-digit • Thermocouple C, G and R, S below 200 °C: ±3 °C ±1-digit • Thermocouple B below 400°C: there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

Dimensions

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



Unit Descriptions



1. Sensor input connector
2. Control output connector
3. Power/Comm. Terminal (Basic module)
Refer to 'Connections' for the detail description about connector and terminal.
4. PC loader port
For serial communication between one module and PC to set parameter and monitoring by using communication converter.
5. Communication address setting switch (SW1)
6. Communication address group switch (SW2)
When setting the communication address over 16, select +16.
7. Lock switch
Used for fixing modules at top and bottom.
8. Rail lock
Used for installing at DIN rail or using bolts.
9. END cover
Remove it when connecting each module to connect an side connector for expansion.
10. Indicator

TM2

Status / Indicator	Initial power ON 01)	Control output	Auto tuning 02)	Alarm output N.O. OFF	N.O. ON	N.C OFF	N.C ON
PWR (Green) 03)	ON	ON	ON				
CH1 (Red)	Flash (4,800 bps)	ON	Flash	-			
CH2 (Red)	Flash (9,600 bps)	ON	Flash				
AL1 (Yellow)	Flash (19,200 bps)	ON 04)	OFF	OFF	ON	OFF	ON
AL2 (Yellow)	Flash (38,400 bps)	ON 05)	OFF	OFF	ON	OFF	ON
AL3	-	-	OFF	OFF	ON	OFF	ON
AL4	-	-	OFF	OFF	ON	OFF	ON

TM4

Status / Indicator	Initial power ON 01)	Control output	Auto tuning 02)
PWR (Green) 03)	ON	ON	ON
CH1 (Red)	Flash (4,800 bps)	ON	Flash
CH2 (Red)	Flash (9,600 bps)	ON	Flash
CH3 (Red)	Flash (19,200 bps)	ON 04)	Flash
CH4 (Red)	Flash (38,400 bps)	ON	OFF
(Yellow)	-	-	OFF
(Yellow)	-	-	OFF

01) When power is supplied initially, the set communication speed LED flashes for 5 sec.
02) Yellow auto tuning CH LED flashes for 1 sec in-turn.
03) The PWR LED flashes during communication for 1 sec in turn.
04) Turns ON when CH1 control method is heating & cooling control and cooling output occurs. (disable AL1 setting)
05) Turns ON when CH2 control method is heating & cooling control and cooling output occurs. (disable AL2 setting)

Sold Separately

- Communication converter: SCM-Series
- Current transformer (CT)

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