Autonics

Multi-channel modular temperature controller **TM4 SERIES**

N U Α





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

Caution for your safety

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

*Please observe the cautions that follow;

⚠ Warning Serious injury may result if instructions are not followed.

⚠ Caution Product may be damaged, or injury may result if instructions are not followed

*The following is an explanation of the symbols used in the operation manual. \(\Delta \) caution: Injury or danger may occur under special conditions.

- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it is required to install fail—safe device, or contact us.

 It moves a first black in the safety black in the safety black.
- 3. Do not connect, inspect or repair when power is on.
- 4. Make sure power supply type and terminal polarity when connecting the wires.
- 5. Do not disassemble the case. Please contact us if it is required.

- 1. This unit shall not be used outdoors.
- It might shorten the life cycle of the product.

 2. For relay output terminal wire connections, use AWG No. 20(0.50mm²).
- 3. Please observe the rated specifications.
- It might shorten the life cycle of the product and cause a fire.

 4. Do not use beyond of the rated switching capacity of Relay contact.
- It may cause insulation failure, contact metr, contact failure, relay proven and life etc.

 5. In cleaning unit, do not use water or an oil-based detergent and use dry towels.
- It may cause an electric snock of a fire.

 6. Do not use this unit in place where there are flammable or explosive gas, humidity, direct ray of the light, radiant heat, vibration and impact etc.
- It may cause a fire or an explosion.

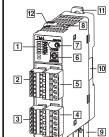
 7. Do not inflow dust or wire dregs into the unit.
- 8. Please wire properly after check the terminal polarity when connect temperature sensor.
- In order to install the units with reinforced insulation, use the power supply unit which reinforced insulation level is ensured.

Ordering information

M4-N2RB						
				Module type	В	Basic Module (*Power / communication terminal)
					Е	Expansion Module (*No power / communication terminal)
				Control output	R	Relay
ı			Power supply		S	SSR
					2	24VDC
			x I/C)	N	None(≋No Aux I/O)
Channel					4	4 Channel
Item				TM	Multi-Channel Modular Temperature Controller	
Maka	cure to r	nurch	1266	hoth evnancion mo	dula an	d basic module together since nower supply / communication

terminals are provided with basic modules only.

Parts description



1 Indicating LED			
Status Indicating LED	Initial power on(*1)	Control output	Auto tuning(*2)
PWR (*3)	Green	Green	Green
CH1	2,400bps- Flickering	ON - RED	Flickering
CH2	4,800bps- Flickering	ON - RED	Flickering
CH3	9,600bps- Flickering	ON - RED	Flickering
CH4	19,200bps- Flickering	ON - RED	Flickering
	38,400bps- Flickering		

- *1: In case of initial power on, default communication speed will be flickering for 5 sec (1 sec cycle).
- **※2**: Each CH□ LED will be flickering during auto tuning (1 sec cycle).
- *3: Power LED will be flickering while communicating with external units

2 CH1, CH2 Sensor input terminal OUT3, OUT4(Control output)

3 CH3, CH4 Sensor input termina 5 OUT1, OUT2(Control output)

ommunication address setting switch: Set a comm ication address

PC loader port(Port A): In case of PC parameter setting, use a dedicated loader(SCM-US, sold separately)

communication address group change switch: Set communication address group. Yower supply / communications connector(PortB): Only Basic module

10 END Cover: Remove it when connecting each module.
11 Rail Lock: Used for fixing units to DIN Rail or to the wall

- 12 Lock switch: Used for fixing each module when connecting module units. (up/down side)
- $\ensuremath{\mathrm{\#}}$ The above specifications are subject to change and some models may

Specifications

Series		TM4 series						
Series		TM4-N2RB	TM4-N2RE	TM4-N2SB	TM4-N2SE			
Channel		4 channels(Each channel insulated - Dielectric strength : 1,000VAC)						
Power Sup	ply	24VDC						
Allowable v	oltage range	90 ~ 110% of rated voltage						
Power cons	sumption		Max. 5W(At r	maximum load)				
Indicating type		Non-indicating type ☞ Parameter setting & monitoring with external devices (PC or P						
Input type	RTD	DPt100Ω, JPt100Ω 3 wire (Allowable line resistance: Max. 5Ω)						
	Thermocouples	K, J, E, T, L, N, U, R, S, B, C, G, PLII(13types)						
Indicating accuracy	RTD							
	Thermocouples (*1)	(Bigge	r one either PV ± 0	.5% or ±1℃) ±1 Dig	git Max.			
Influence of	RTD	(Bigger one either PV ±0.59	(Bigger one either PV ±0.5% or ±2°C) ±1 Digit Max. (In case of thermocouple input, it is ±5°C at −100°C below					
Temperature (* 2)	Thermocouples	Thermocouples L,U,C,G,R,S,B: (Bigger one either PV ±0.5% or ±5°C) ±1 Digit Max						
Control	Relay	250VAC	C 3A 1a	_				
output	SSR	_	_	22VDC ±	3V 30mA Max.			
Communicat	ion output	R	S485 Communicatio	n output (Modbus RT	U)			
Control type	heating, cooling heating&cooling	ON/OFF control mode, P, PI, PD, PID control mode						
Hysteresis		Thermocouples/RTD: 1 ~ 100°C/°F(0.1 ~ 100°C/°F) variable						
Proportion	al band (P)	0.1 ~ 999.9℃						
Integral tir	me (I)	0 ~ 9,999 sec.						
Derivative	time (D)	0 ~ 9,999 sec.						
Control pe	riod (T)	0.1 ~ 120.0 sec.(Only Relay and SSR output type)						
Manual re	set value	0.0 ~ 100.0%						
Sampling	period	100ms(4 channel synchronous sampling)						
Dielectric	strength	1,000VAC 50/60Hz for 1 min. (between power source terminal and input termina						
Vibration r	esistance	0.75mm amplitude at frequency of 5~55Hz(for 1 min.) in each X, Y, Z direction for 2 hour						
Relav	Mechanical	Over 10,000,000 times						
life cycle	Electrical	Over 100,000 times (250 VAC 3A resistance load)						
Insulation	resistance	100MΩ (500VDC megger)						
Noise resis	stance	Square shaped noise by noise simulator (pulse width 1 µs) ±0.5kV						
Ambient to	emperature	-10 ~ 50°C (at non-freezing status)						
Storage te	mperature	-20 ~ 60°C (at non-freezing status)						
Ambient humidity		35 ~ 85%RH						
		Parallel expansion connector						
Accessorie	es	Power / communication connector		Power / communication connector				
Insulation type(%3)								
Approval		CE cAlus						
Unit weigh	t	Approx. 174g	Approx. 166g	Approx. 160g	Approx. 152g			

- In case of thermocouple B, indicating accuracy cannot be ensured under 400 °C. In case of thermocouple R,S at 200°C below and thermocouple C, G, it is 3°C±1Digit Max
- **※2**: Applied when used out of range 23±5℃.
- *3: " | " Mark indicates that equipment protected throughout by double insulation or reinforced insulation

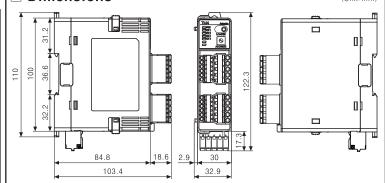
■ Input Sensor Type and Temperature Range

Input type			No.	Dot	Display	Input range(°C)	Input range(°F)
	K(C	۸)	0	1	K(CA).H	-200 ~ 1350	-328 ~ 2462
	K(C	Α)	1	0.1	K(CA).L	-200.0 ~ 1350.0	-328.0 ~ 2462.0
	J(IC	1	2	1	J(IC).H	-200 ~ 800	-328 ~ 1472
	0(10	,,	3	0.1	J(IC).L	-200.0 ~ 800.0	-328.0 ~ 1472.0
	E(C	D)	4	1	E(CR).H	-200 ~ 800	-328.0 ~ 1472
		1)	5	0.1	E(CR).L	-200.0 ~ 800.0	-328.0 ~1472.0
	T(CC)		6	1	T(CC).H	-200 ~ 400	-328 ~ 752
			7	0.1	T(CC).L	-200.0 ~ 400.0	-328.0 ~ 752.0
ThermoCouple	B(PR)		8	1	B(PR)	0 ~ 1800	32 ~ 3272
Thermocouple	R(PR)		9	1	R(PR)	0 ~ 1750	32 ~ 3182
	S(PR)		10	1	S(PR)	0 ~ 1750	32 ~ 3182
	N(NN)		11	1	N(NN)	-200 ~ 1300	-328 ~ 2372
	C(TT)(*1)		12	1	C(TT)	0 ~ 2300	32 ~ 4172
	G(TT)(*2)		13	1	G(TT)	0 ~ 2300	32 ~ 4172
	L(IC)		14	1	L(IC).H	-200 ~ 900	-328 ~ 1652
			15	0.1	L(IC).L	-200.0 ~ 900.0	-328.0 ~ 1652.0
			16	1	U(CC).H	-200 ~ 400	-328 ~ 752
			17	0.1	U(CC).L	-200.0 ~ 400.0	-328.0 ~ 752.0
	Platin	el II	18	1	PLII	0 ~ 1400	32 ~ 2552
	JIS Standards	JPt 100Ω	19	1	JPt100.H	-200 ~ 600	-328 ~ 1112
RTD		JPt 100Ω	20	0.1	JPt100.L	-200.0 ~ 600.0	-328.0 ~ 1112.0
l nin	DIN	DPt 100Ω	21	1	DPt100.H	-200 ~ 600	-328 ~ 1112
	Standards	DPt 100Ω	22	0.1	DPt100.L	-200.0 ~ 600.0	-328.0 ~ 1112.0

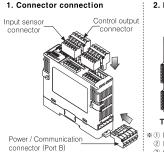
Error Indication

	Input Sensor Open Error	Over Temperature Range
PWR LED		RED ON
CH1 LED		RED Flickering (for 0.5 sec)
CH2 LED		RED Flickering (for 0.5 sec)
CH3 LED		RED Flickering (for 0.5 sec)
CH4 LED		RED Flickering (for 0.5 sec)
Communication Output (decimal)	'31000' output	'30000 (upper limit)' output, '-30000 (lower limit)' output
Dedicated program	'OPEN' indication	'HHHH (upper limit)' indication , 'LLLL (lower limit)' indication

Dimensions



Installation



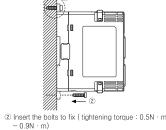
2. Multi Module connection TM4-N2□E TM4-N2□E

- (1) Remove END cover for both basic modules and expansion m nsert expansion module connection connectors.
- Fix the LOCK switch by pushing it in the LOCK direction.
- Mount the END cover at each side.
 Up to 30 expansion modules can be connected to a basic module Use an adequate power supply system for the power input specification. and overall capacity. (Maximum power required when connecting 31 units

3. Bolt Inserting

∦TM4-N2□B





4.2 Removal Method

①Pull each Rail Lock switch up and down

4. DIN Rail Installation 4.1 Installation Method



① Put the top edge of the rail Lock on the top edge or the DIN rail. Push the module body in while pressing down

Using END PLATE(sold separately, NOT

2 1 Press down the module body. 2 Pull the module body forward

to the ground. 0.000 Horizontal Installation (0) (X)

Connections FRONT VIEW ●TM4-N2□□ $\rightarrow \frac{B'}{RTD}$ 3 RELAY OUT3 SSR OUT3
250VAC 3A 1a 19 19 30mA Max $\xrightarrow{B'}$ 9 SOURCE

** Shaded terminals are available only for TM4-N2□B models.

Communication Setting

Interface

Application Standard	Compliance with EIA R5 465		
Max. connection	31 units(communication address setting: 01 ~ 31)		
Communication type	Two wire, Half Duplex		
Synchronization method	Asynchronous		
Communication distance	Max. 800m		
Communication speed(bps)	2400, 4800, 9600(default),19200, 3840		
Communication response time	5 ~ 99ms		
Start Bit	1bit(fixed)		
Stop Bit	1bit, 2bit(default)		
Parity Bit	None(default), Odd, Even		
Data Bit	8bit(fixed)		
Protocol	Modbus RTU		

*Overlapped address setting is not allowed on the same

●Communication speed indication

· Current communication speed will be flickering in case of initial power ON

2400

4800 9600 19200

38400

#One module communication is allowed for Port A. Communication speed is fixed to 9600bps.

#Multiple communication is allowed for Port B. It is required to reset controller's Power (Power OFF — Power ON) after changing communication speed.

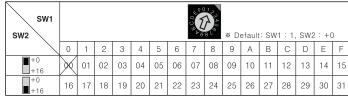
*Simultaneous monitoring can not be done for port A and B since Port A is for parameter setting only.

communication line.

Twist Pair wires(for RS485 communication) must be used for communication cable.

Communication Address Setting

• Set the communication address using SW1 and SW2. Setting range is 01 ~ 31. (* In case setting 00, communication is not available.)



Simple Failure Diagnosis

. When indicating LED is flickering every 0.5 sec or when error message is indicated or

- external units

 It represents input sensor open error. Cut off the power of controller and check input sensor connection. If sensor is properly connected, disconnect sensor line from the controller and short the input terminal (+) / (-). Then, make sure that current indoor temperature is indicated. If current indoor temperature is properly indicated, it represents no errors detected. If external unit displays 'HHHH' or 'LLLL', please contact our A/S center.

 (Current indoor temperature checking is available only if selecting thermocouple type.)

 Make sure proper input sensors are selected.

 2. When no output is operated

 Check output indicating LED at the front. In case output indicating LED does not work properly, please check each parameter setting again. In case output indicating LED works properly, disconnect the output terminal and check controller's output type (relay contact, SSR, Current) again.

 3. When external units receives no response or error data

- 3. When external units receive no response or error data
- When external units receive no response or error data

 Check communication converter first. [RS-485 to serial converter (SCM-381, sold separately), serial to USB converter (SCM-US, sold separately)]
 Do not install the unit with overlapping communication converter lines and AC power supply lines.
 Use separate power supply (24VDC) for communication converter if possible.
 Strong external noise could be a possible cause for this symptom. Please contact our A/S center. In addition, analyze the main cause that triggers strong noise and take measures to prevent it. Even though this unit complies with proper noise resistance standards, consistent noise induction could affect internal circuit break.

 When communication does not work properly.
- 4. When communication does not work properly
- Check converter's power supply and connection.
 Check communication setting.
 Check main body's connections to external units

User Manual

●Visit our website (www.autonics.com) to download user manual and PC loader program. ●Function setting, Control method, parameter group and PC loader program explanations available

Caution for using

- Use DC power only. Keep the ambient temperature −10°C ~ 50°C

- 2. Keep the ambient temperature -10°C 50°C
 3. For more accurate controlling, start temperature controlling approx. 20 minutes later after connecting input sensors and supplying power.

 1. In case indicating accuracy does not meet the specification, check Input Bias parameter first.

 5. Power switch or a circuit breaker must be installed for proper application.

 6. Make sure that the power switch or a circuit breaker installed near operators.

 7. This unit is solely allowed for temperature controlling application. Do not apply this unit as a voltage meter or current meter.

 8. When line extension is required, please use specified compensation line. If not, there occurs temperature difference at the ioint part between thermocouples and extension lines.

temperature difference at the joint part between thermocouples and extension lines.

In case of using RTD, line connection must be done with 3 wires. When line extension is required
use the same wire with material, thickness and length. Different line resistance may cause temperature 10. Make sure controller's line connection must be separated from high voltage line or power supply

Make sure controller's line connection must be separated from high voltage line or power supply line in order to prevent induced noise.
 If it is required that power supply line should be connected near input signal line, use line filter on controller's power supply line and input signal line must be shielded.
 Avoid installing controllers adjacent to high frequency noise generating units including high frequency soldering machine, high frequency sewing machine, and high capacity SCR controllers and motors.
 Avoid using the unit near radio, TV or wireless machines that may cause high frequency interference.
 When changing input sensors, power off the controller first. Connect input sensors as specified and supply the power again. Then, change & download related parameters using PC loader program.
 Use (-) driver screws (2mm) or use plastic driver screws. If not, it might cause product damage.
 Twist Pair wires must be used for communication cable. Connect Ferrite Bead at each end of line in order to reduce the effect of external noise.
 Avoid installing the unit with overlapping communication line and AC power line together.

17. Avoid installing the unit with overlapping communication line and AC power line together

18. Draw a draft while using the controllers. In case of installing at a closed area, please take measures

Major products



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■ HEAD QUARTERS:

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