

和文の説明は裏面にあります。

TTM-000 SERIES USER'S MANUAL

1/8 DIN. DIGITAL TEMPERATURE CONTROLLER

Thank you for purchasing model TTM-000 SERIES Digital Temperature Controller.
Please go through this Instruction Manual carefully and use the unit in proper manner.

NOTICE/WARNING BEFORE OPERATION USE

When having the purchased controller at hand, please be sure that its unit is a correct model (See the following "Model Configuration").
The following symbol marks Δ provide to prevent incident or damage. Kindly refer to the details of the WARNING/CAUTION when using for the first time.
Another copy of the user's manual "Advanced Version" is provided at customer's request.

WARNING
Due to mishandling, serious dangers may occur to the operator such as death, electrocution and a skin burn.

CAUTION
Owing to mishandling, it may cause some damage to the unit or operator getting slight injury.

CAUTION
For prevention of its malfunction, do not push the front key with sharp points.
Spare terminal must not be used for other purposes.

WARNING
Make sure the correct wiring connection before turning on electricity. Mis-wiring may cause malfunction of the unit and fire.
Never modify the unit to prevent damage or incident such as malfunction and fire etc.

- Please put this user's manual aside for your reference, when operating the unit.
- Copy or reprint of this manual, wholly or partially, is not allowed.
- The contents of this manual may change without notice in future.

ACCESSORY & CONFIGURATION

- Please be sure that the unit enclosed in packing carton is a right model before using.
- Kindly check the following accessory being contained in that carton box. Installation Attachment (For installation, please see "INSTALLATION AND WIRING" on the back).
This user's manual : 1 copy
- Model Configuration

Model Configuration

Model	Input	Output	Option
TTM-000	NTC	Relay	None
002	24 x 48 mm	Output 2 Relay contact	None
004	48 x 48 mm	Output 2 SSR drive voltage	B or P selectable
X04	96 x 48 mm	EV 2 Relay contact	Not optional for TTM-002 / 004
006	96 x 48 mm	CT input	When DI is selected for TTM-002 / 004, this option is not available.
006	48 x 96 mm	DI input	When DI is selected for TTM-002 / 004, this option is not available.
007	72 x 72 mm	DI input	When DI is selected for TTM-002 / 004, this option is not available.
009	96 x 96 mm	DI input	When DI is selected for TTM-002 / 004, this option is not available.

Option

Option	Input	Output
A	Thermocouple (K, J, R, T, N, S, B)	Relay
B	R.T.D. (Pt100, JPt100)	SSR drive voltage
P	2-5V, 1-5V, 4-20mA	Relay

Input Type

Input Type	Input
N1L	Thermocouple (K, J, R, T, N, S, B)
R.T.D.	R.T.D. (Pt100, JPt100)
2	2-5V, 1-5V, 4-20mA

Output 1

Output 1	Output
SSR	SSR drive voltage
1	Current 4-20 mA DC

SPECIFICATIONS

Power Supply Voltage	100 to 240V AC, 50/60Hz
Power Consumption	Below 10 VA
Memory Element	EEPROM
Input of Sensor	Thermocouple, R.T.D. (0-5V, 1-5V, 4-20mA) (Changeable by front key)
Control Output	Relay contact, SSR drive voltage, Current
Control Method	Two kinds of PID, ON/OFF
Operation Environment	0 to 50 °C, 20 to 90%RH (Avoid making dew)
Storage Environment	-25 to 70 °C, 5 to 95%RH (Avoid making dew)
Weight	TTM-002 / 004 Less than 180g, TTM-006 / 008 Less than 240g, TTM-007 Less than 250g, TTM-009 Less than 300g
Location of the Unit Setting	Keep away from the following: - Gas of corrosion, dust and oily smoke. - The electric noise of generator. - The influence of electromagnetic field. - Mechanical vibration and shock. - The direct sunlight.
Installation condition	Installation category 1

OPERATION FLOW AND SETTING MENU

Setting display shows the existence of option.

Setting Mode

- Initial Setting Mode: SET1: Initial Setting
- Control Setting Mode: SET2: Control Setting
- Event Output Setting Mode: SET3: Event Output 1, SET4: Event Output 2
- Digital Input Setting Mode: SET5: Digital Input
- Communication Setting Mode: SET6: Communication
- Timer Setting Mode: SET7: Timer
- Priority Displays Setting Mode: SET8: Priority Displays

Setting Menu

- 1. Initial setting display
- 2. Initial setting mode
- 3. Initial setting mode
- 4. Zero point setting for PV connection
- 5. PV connection
- 6. Position of decimal point
- 7. FUNC key setting
- 8. Key lock setting
- 9. PID control type setting
- 10. Control setting mode
- 11. Low limit setting for SV limiter
- 12. Control mode setting
- 13. Setting of control type
- 14. Change of normal or reverse
- 15. Manual reset setting
- 16. Setting for PID tuning type
- 17. AT coefficient setting
- 18. AT sensitivity setting
- 19. Proportional band setting for output 1
- 20. Integral time setting
- 21. Manual reset setting
- 22. Derivative time setting
- 23. ARW setting
- 24. High limit setting for output 1
- 25. Low limit setting for output 1
- 26. Manipulated value for output 2
- 27. Proportional band setting for output 2
- 28. Proportional band setting for output 2
- 29. High limit setting for output 2
- 30. Low limit setting for output 2
- 31. Manual reset setting
- 32. Dead band setting
- 33. Control sensitivity setting for output 1
- 34. OFF position setting for output 1
- 35. Control sensitivity setting for output 2
- 36. OFF position setting for output 2
- 37. Event output 1 setting
- 38. Event output 1 setting
- 39. High limit setting for EV 1
- 40. Low limit setting for EV 1
- 41. Control sensitivity setting for EV 1
- 42. Delay timer setting for EV 1
- 43. Abnormal for EV 1
- 44. Polarity setting for EV 1
- 45. CT Input Monitor for EV 1
- 46. Abnormal current value of heater for EV 1
- 47. Polarity setting for EV 2
- 48. CT Input Monitor for EV 2
- 49. High limit setting for EV 2
- 50. Low limit setting for EV 2
- 51. Control sensitivity setting for EV 2
- 52. Delay timer setting for EV 2
- 53. Abnormal for EV 2
- 54. Polarity setting for EV 2
- 55. CT Input Monitor for EV 2
- 56. Abnormal current value of heater for EV 2
- 57. DI setting
- 58. Function setting for DI
- 59. Polarity setting for DI
- 60. Setting for S1/2
- 61. Communication setting
- 62. Parameter setting for communication
- 63. Speed setting
- 64. Address setting
- 65. Response delay time setting
- 66. Mode selection setting
- 67. Timer setting
- 68. Time unit selection
- 69. Timer start permissible range
- 70. Timer start selection
- 71. Timer SV start permissible range
- 72. Timer time setting
- 73. Timer residual time monitor setting
- 74. Priority displays setting
- 75. Setting for 1st priority display
- 76. Setting for 2nd priority display
- 77. Setting for 3rd priority display
- 78. Setting for 4th priority display
- 79. Setting for 5th priority display
- 80. Setting for 6th priority display
- 81. Setting for 7th priority display
- 82. Setting for 8th priority display
- 83. Setting for 9th priority display
- 84. Setting for 10th priority display
- 85. Release of Time Setting Mode from BLIND Function

CAUTION
ERROR MESSAGES AND TROUBLE SHOOTING

(Display)	(Description)	(Trouble Shooting)
[Error Message]	Shown whenever input value exceeds the high limit of display range. Also displays when the wire thermocouple, A/B terminal of R.T.D. is snapped off.	Check the snapping of thermocouple and R.T.D. input. Check short circuit of input leads. In case this indication shows after the re-input of power, replace unit if it is necessary.
[Error Message]	Shown whenever input value exceeds the low limit of display range.	Check sensor connection or change to other tuning. Discontinue to change parameter.
[Error Message]	Display of memory error.	Normality
[Error Message]	Display of A/D converter error or incorrect sensor connection with selectable input.	Discontinue to change setting value (during control of SV2).
[Error Message]	Display of auto-tuning error.	Discontinue to change setting value of the self on digital input.
[Error Message]	Displayed when parameter is changed in key-locked condition.	Discontinue to change setting value of the self on digital input.
[Error Message]	Alternately this and SV/VPV display are shown.	Discontinue to change setting value of the self on digital input.
[Error Message]	Displayed when setting value is changed on SV2 control.	Discontinue to change setting value of the self on digital input.
[Error Message]	Displayed when changing setting value of shift on DI.	Discontinue to change setting value of the self on digital input.
[Error Message]	Displayed when making setting value change in control display while function key is in RUN/READY.	Discontinue to change setting value of the self on digital input.
[Error Message]	Displayed when altering setting value in control display while being on timer.	Discontinue to change setting value of the self on digital input.

CAUTION BEFORE CONTROL

Setting program is stored after power OFF. As non-volatile memory is equipped with TTM-000 SERIES controllers for setting storage. Either thermocouple or R.T.D. (Pt 100 / JPt 100) is selectable input type, but Current/Voltage input needs to be selected individually. For suitable application, please select most appropriate input type and adjust input setup.
PID or ON/OFF control is selective for the optimal performance and each detail of features is specified in the table on the right side.

	PID Control	ON/OFF Control
Merit	Better control result is achieved as opposed to that of ON/OFF control.	Life span of relay is generally longer, just if it is ON when temperature is below SV and it is OFF when temperature is over SV (For heating control).
Demerit	Life span of relay is shorter, as output fluctuates frequently with relay contact.	Control value is worse in comparison with that of PID control.

PID constants are automatically reckoned up to write in, when control begins or SV is altered on self-tuning.

See also "PARTS INDICATION" & "INSTALLATION AND WIRING" on the reverse.

TOHO TOHO ELECTRONICS INC.

Head office: 1-13-21, Tanashioda, Sagahara Kanagawa 229-1125 Japan.
Phone: +81-42-777-3311 Fax: +81-42-777-3751
E-Mail: info@toho-inc.co.jp
Web site: http://www.toho-inc.co.jp