

TTM-04SP Series Plug-in Digital Temperature Controller Operation Manual Second Edition, July 2008

* Thank you for purchasing our TTM-04SP Series. Please thoroughly read this manual.
 * For detailed specifications and usage, consult your dealer or our sales.

Cautions

- For safety purpose, following symbols are used in this manual.
- Warning** The case that a user may receive fatal damage, electric shock, or severe burn injury when the product is incorrectly used.
 - Caution** The case that a user may receive minor damage or the equipment may get damage.
 - Caution** (Lightning bolt symbol) W i r i n g : Do not use empty terminals for irrelevant purposes. Operation: Do not use a sharp-pointed tool for operating keys.
 - Warning** (Fire symbol) Verify correct wiring before turning on electricity since incorrect wiring may cause an equipment failure or a fire. Modification of this equipment may cause malfunctioning or a fire. Do not add modification on this equipment.
 - Hand over this operation manual to a person who actually operates the product.
 - Do not reprint or duplicate this manual without permission.
 - Content of this manual may be subject to modification without prior notice.

Verification of the product

- Verification of the model
Refer the model name printed in the packing box to the order sheet.
- Verification of accessories:
Mounting devices (See the section, How to Mount the Panel.)
Operation manual (this document) --- 1 copy
- Model table:

| | |
|--------|--|
| Model | TTM-04SP-□-AB |
| Symbol | Output 1 R Relay contact P Voltage to drive SSR |
| Symbol | Standard specifications A Event output 1 relay contact output B Event output 2 relay contact output |
| Input | Thermocouple (K, J, R, T, N, S, B) Resistance temperature detector (Pt100, Pt1000) Dimension 48 x 48mm |

※Event output2 can be used as control output2. When control output1 is the heating control, control output2 is fixed as the cooling control, and when control output1 is the cooling control, control output2 is fixed as the heating control.

Specifications

| | |
|---|---|
| Power supply voltage | 100 to 240VAC, 50/60Hz |
| Power consumption | 10 VA or less |
| Memory element | EEPROM |
| Input | Thermocouple/resistance-temperature detector (switchable in the parameter setting from front key) |
| Control output | Relay contact/voltage to drive SSR |
| Control method | Two types of PID, ON/OFF |
| Range of use temperature and humidity | 0 to 50 °C, 20 to 90%RH (dew condensation not allowed) |
| Range of storage temperature and humidity | -25 to 70 °C, 5 to 95%RH (freezing and dew condensation not allowed) |
| Weight | 200g or less |
| Installation environment | - Absence of corrosive gas, dust, oil, etc. - As far away as possible from electric noises and little effect from magnetic field - As little influence as possible from mechanical vibrations or impacts - No reception of direct sunlight |
| Installation | Installation category II |

Before Performing Control

- This product employs nonvolatile memory; Setting is saved even after power-off.
- This product allows switchover of input types. For use, match the input type selection with the product input setting.
- This product allows PID control (time proportional control) and ON/OFF control. Characteristics of each control are as follows.
- Make selection based on understanding of such characteristics.
- ※In self-tuning, PID constant is automatically determined and written in when control starts or SV changes.

| | PID control | ON/OFF control |
|-----------|---|---|
| Advantage | Better result is obtained than those from ON/OFF control. | Longer life of relay contact is typically expected due to turn-on at lower temperature than setting and turn-off at higher (case of heating control). |
| Drawback | Shorter life of relay contact is resulted due to frequent turn-on and -off of output. | Quality of control value is lower than that of PID control. |

PARTS INDICATION

| | | |
|----------|----------|--|
| TTM-04SP | PV | Process value, character for setting mode display. |
| | SV | Setting value, input value for setting mode display. |
| | OUT1 | Lights ON when output 1 turn ON |
| | OUT2 | Lights ON when output 2 turn ON |
| | EV1 | Lights ON when Event output 1 turn ON |
| | EV2 | Lights ON when Event output 2 turn ON |
| | RDY | Lights ON under Ready |
| | MODE KEY | For change of display |
| | FUNC KEY | For action of function setting |
| | ▲▼KEY | Up/down key for change of setting value. Holding the up/down keys are the value at a rapid rate. |

How to Operate/Setting

Unnecessary items are not displayed on each setting screen, depending on option, type selection, etc. (Some screens may not appear due to functions as described in the detailed manual.)

Power-on
4-min. display of initial screen (For warm-up)

Operating mode screen
A. Basic screen
B. Priority screen <See explanation 1.>
C. SET: Displays screen in accordance with priority determined in priority screen setting. (If set, max. 9 screens to be displayed.)

Setting mode
 < SET 1: Initial set >
 1. Initial setting screen
 2. Input type setting screen
 3. PV compensation gain setting screen
 4. PV compensation zero setting screen
 5. Input filter setting screen
 6. Decimal point position setting screen
 7. FUNC key setting screen
 8. Key lock setting screen
 9. Control control setting screen
 10. SV limiter upper limit setting screen
 11. SV limiter lower limit setting screen
 12. Control mode setting screen
 13. Control type selection screen
 14. Forward/reverse operation switchover screen
 15. Output 1 control amount (%)
 16. PID tuning type setting screen
 17. AT coefficient setting screen
 18. AT sensitivity setting screen
 19. Output 1 proportional band setting screen
 20. Integral time setting screen
 21. Differential time setting screen
 22. Output 1 proportional frequency setting screen
 23. ARW setting screen
 24. Output 1 operating amount/upper limit setting screen
 25. Output 1 operating amount/lower limit setting screen
 26. Output 2 operating amount screen (%)
 27. Output 2 proportional band setting screen
 28. Output 2 proportional frequency setting screen
 29. Output 2 operating amount/upper limit setting screen
 30. Output 2 operating amount/lower limit setting screen
 31. Manual reset setting screen
 32. Dead band setting screen
 33. SV ramp amount/d-change setting screen
 34. Output 1 control sensitivity setting screen
 35. Output 1 OFF-point position setting screen
 36. Output 2 control sensitivity setting screen
 37. Output 2 OFF-point position setting screen
 38. EV 1 setting screen
 39. EV 1 function setting screen
 40. EV 1 upper limit setting screen
 41. EV 1 lower limit setting screen
 42. EV 1 sensitivity setting screen
 43. EV 1 delay timer setting screen
 44. EV 1 abnormal function setting screen
 45. EV 1 polarity setting screen
 46. EV 2 setting screen
 47. EV 2 function setting screen
 48. EV 2 upper limit setting screen
 49. EV 2 lower limit setting screen
 50. EV 2 sensitivity setting screen
 51. EV 2 delay timer setting screen
 52. EV 2 abnormal function setting screen
 53. EV 2 polarity setting screen
 54. Communication setting screen
 55. Communication protocol setting screen
 56. Communication parameter setting screen
 57. Communication speed setting screen
 58. Communication address setting screen
 59. Response delay time setting screen
 60. Communication mode switchover setting screen
 61. Timer setting screen
 62. Timer output destination setting screen
 63. Timer function setting screen
 64. Timer unit switchover screen
 65. Timer SV start permission with setting screen
 66. Timer time setting screen
 67. Timer remaining time monitor setting screen
 68. Priority screen setting
 69. First priority screen setting
 70. Second priority screen setting
 71. Third priority screen setting
 72. Fourth priority screen setting
 73. Fifth priority screen setting
 74. Sixth priority screen setting
 75. Seventh priority screen setting
 76. Eighth priority screen setting
 77. Ninth priority screen setting

Explanation 1. Priority screen/priority screen setting
Each of all screens in the setting mode can be assigned by using this function to the operating mode with a higher priority depending on customer requirement.
Select a target screen in the priority screen setting.
Example: Switches display at each pressing of MODE key. (Basic screen) → (Output 1 operating amount display) → (Event output 1 upper limit setting).

Explanation 2. FUNC key function
Assigns the FUNC key in the setting mode as a dedicated key for the following operation.
1. Dedicated key for digit shift
2. Dedicated key for RUN/READY
3. Dedicated key for auto-tuning
4. Dedicated key for the timer.

Explanation 3. PID selection
Characteristics of types A and B
Type A: Basic PID
Type B: PID to suppress overshoot

Explanation 4. ARW function
ARW (Anti-reset windup) is effective for a control target with which overshoot due to excessive integration of PID control operation is to be controlled.

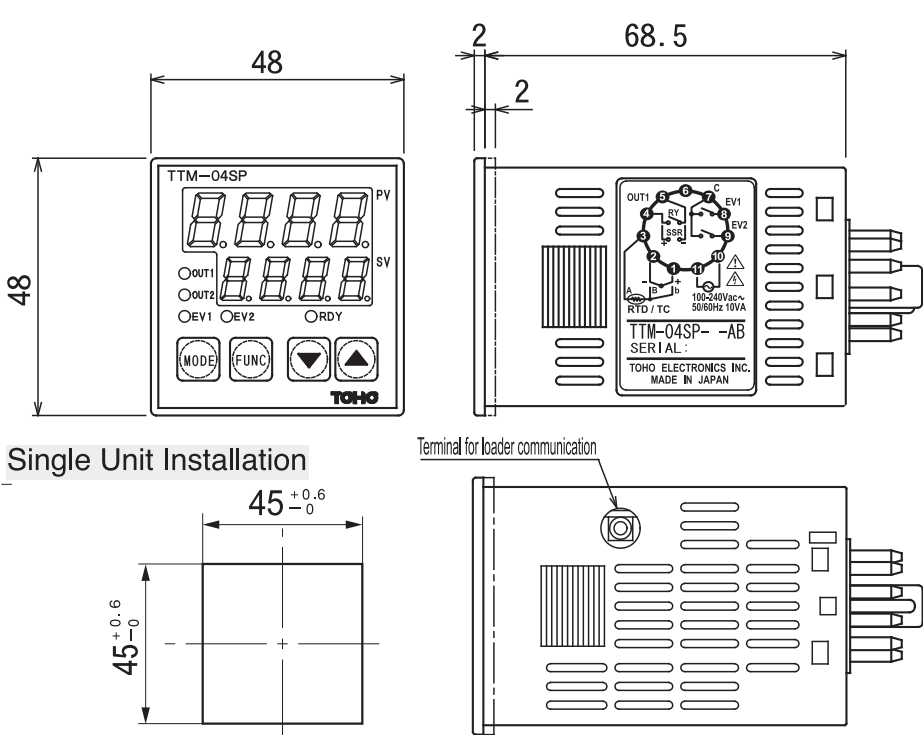
Other functions
 ● Timer mode
 ● Blind mode
 ● Loader communication

Transfer to blind setting mode
 1. Power on
 2. Operating mode screen
 3. Pressing MODE key for 10 sec
 4. Pressing FUNC key
 5. Pressing MODE key for 3 sec
 6. To display "1" to "7" using ▲▼ key.

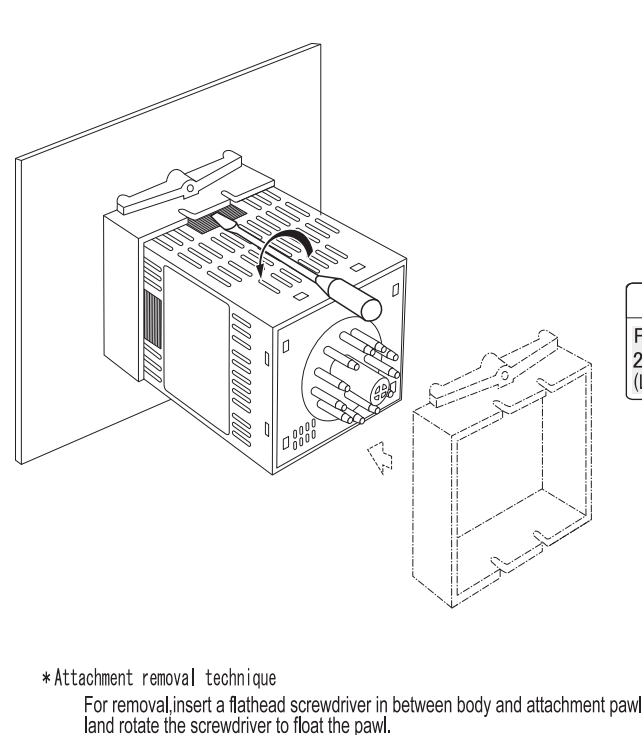
Other displays
 Err0: Displayed when input exceeds the display range upper limit.
 Err1: Displayed when thermocouple is set, but resistance-temperature detector is disconnected.
 Err2: Displayed when input exceeds the display range lower limit.
 Err3: Displayed at memory error.
 Err4: Displayed when thermocouple is set, but resistance-temperature detector is disconnected, or when A/D conversion error is present.
 Err5: Displayed at auto-tuning error.
 Loc: Displayed when attempting to change a parameter during key lock.
 RE: Alternately displayed between SV and PV screens during auto-tuning.
 Func: Displayed when attempting to change a setting value on control mode screen provided that FUNC key is assigned RUN/READY.
 Err6: Displayed when attempting to change a setting value on control mode screen during timer in use.

INSTALLATION AND WIRING

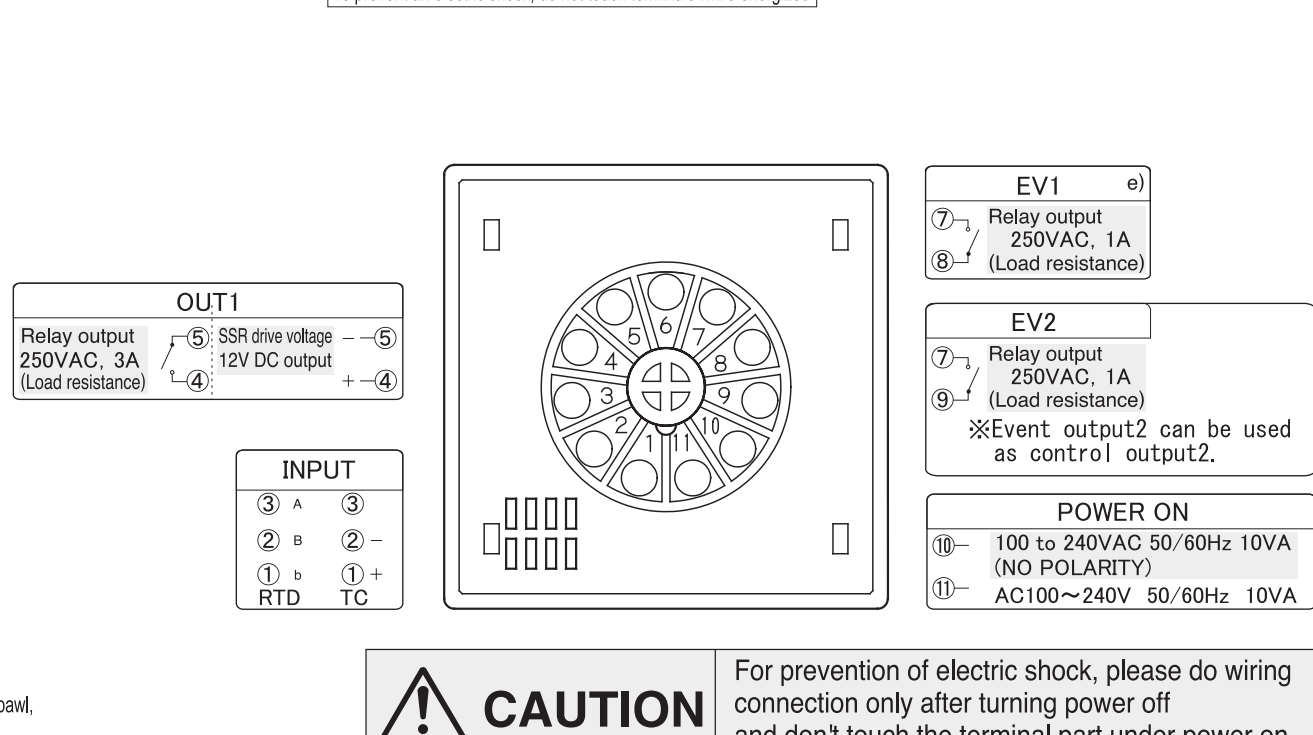
Outer Dimensions and Panel Cutout



Mounting



Wiring



Unit : mm

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