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

Wiring: Do not use empty terminals for irrelevant purposes.

Operation: Do not use a sharp-pointed tool for operating keys.

⚠ Warning

※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

1) Verification of the model
Refer the model name printed in the packing box to the order sheet.

2) Verification of accessories:
Mounting devices (See the section, How to Mount the Panel.)
Operation manual (this document) ---- 1 copy

3) Model table:

TTM−04SP−□−AB (Model; Output1)

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 ※

Model	
Input	Thermocouple (K, J, R, T, N, S, B) / Resistance temperature Detector (Pt100, JPt100)
Dimension	48×48mm

※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 fixed as the heating 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 ℃, 20 to 90%RH (dew condensation not allowed)
Range of storage temperature and humidity	-25 to 70 ℃, 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

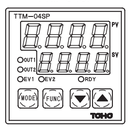
- This product employs nonvolatile memory; Setting is saved even after power-off.
- This product allows switchover of input types.
  For use, match the input type selection with the product input setting.
- This product allows PID control (time proportional control) and ON/OFF control.
  Characteristics 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

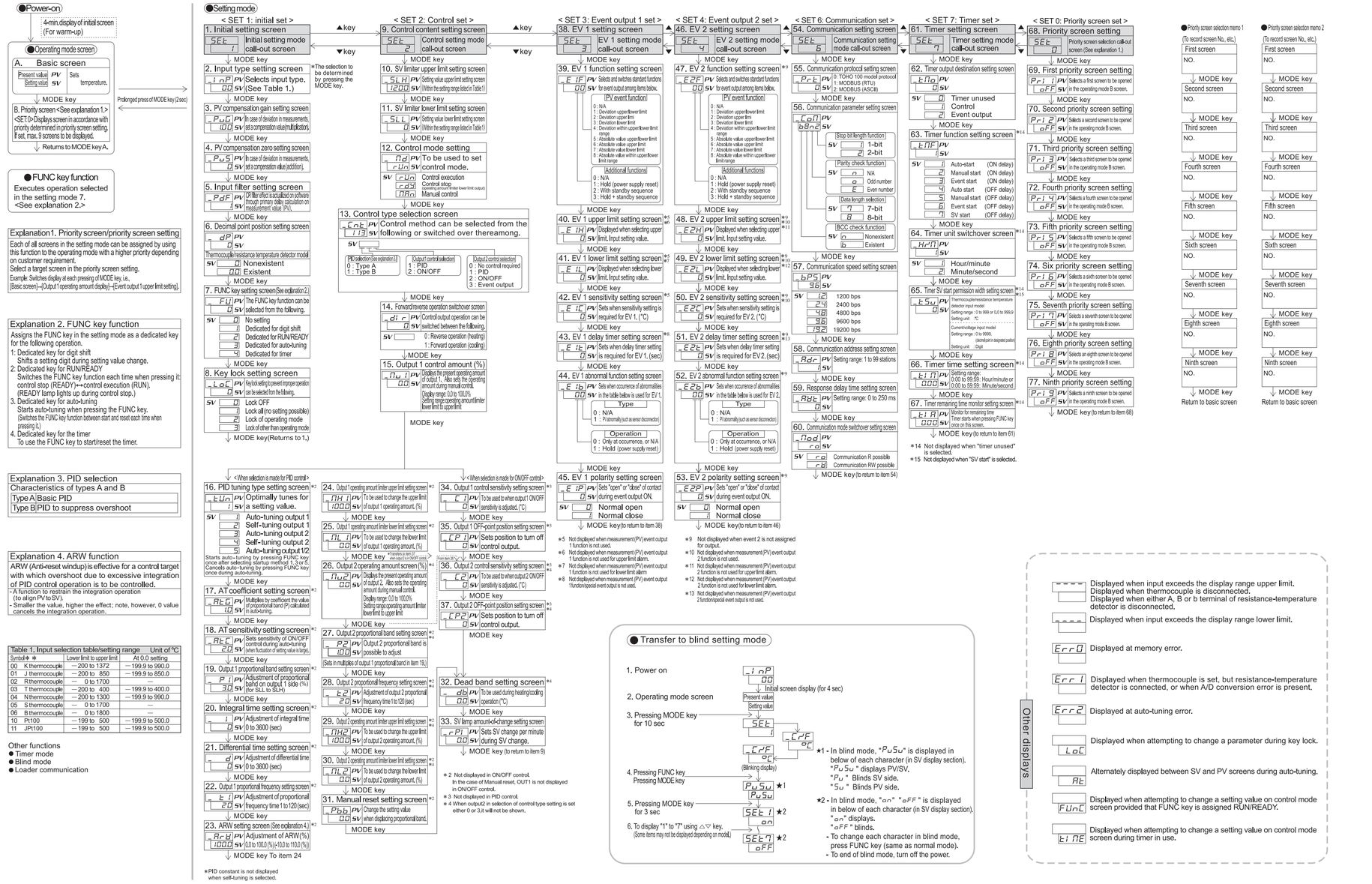
TTM-04SP



PV	Process value, charactor for setting mode display.
SV	Settiug 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/Set

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.)



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, i.e., (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
Shifts a setting digit during setting value change.
2: Dedicated key for RUN/READY
Switches the FUNC key function each time when pressing it: control stop (READY) ↔ control execution (RUN).
(READY lamp lights up during control stop.)
3. Dedicated key for auto-tuning
Starts auto-tuning when pressing the FUNC key.
(Switches the FUNC key function between start and reset each time when pressing it.)
4. Dedicated key for the timer
To use the FUNC key to start/reset 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.
- A function to restrain the integration operation (to align PV to SV).
- Smaller the value, higher the effect; note, however, 0 value cancels the integration operation.

Table 1. Input selection table/setting range — Unit of °C

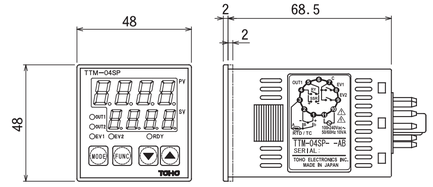
Symbol ✻		Lower limit to upper limit	At 0.0 setting
00	K thermocouple	−200 to 1372	−199.9 to 990.0
01	J thermocouple	−200 to 850	−199.9 to 850.0
02	R thermocouple	− 0 to 1700	—
03	T thermocouple	−200 to 400	−199.9 to 400.0
04	N thermocouple	−200 to 1300	−199.9 to 990.0
05	S thermocouple	− 0 to 1700	—
06	B thermocouple	− 0 to 1800	—
10	Pt100	−199 to 500	−199.9 to 500.0
11	JPt100	−199 to 500	−199.9 to 500.0

Other functions
- Timer mode
- Blind mode
- Loader communication

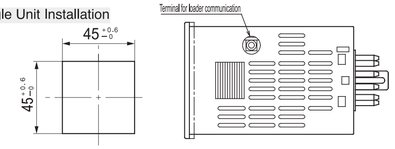
INSTALLATION AND WIRING

Unit : mm

Outer Dimensions and Panel Cutout

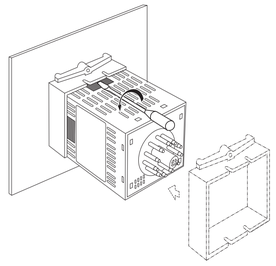


Single Unit Installation



Please clean by the well squeezed cloth within eutral detergent.

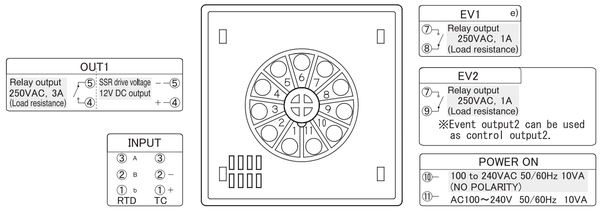
■Mounting



∗Attachment removal technique
For removal, insert a flathead screwdriver in between body and attachment pawl, and rotate the screwdriver to float the pawl.

Wiring

⚠ Caution
To prevent an electric shock, do not touch terminals while energized.



⚠ CAUTION For prevention of electric shock, please do wiring connection only after turning power off and don't touch the terminal part under power on.

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