和文の説明は裏面にあります。

TTM-000W SERIES USER'S MANUAL
DIN.DIGITAL TEMPERATURE CONTROLLER

Thank you for purchasing model **TTM-000W SERIES** Digital Temperature Controller.
Please go through this Instruction Manual carefully and use the unit in proper manner.
If the unit is used in a manner not specified by the manufacturer, the protection provided the unit may be impaired

NOTICE/WARNING BEFORE OPERATION USE

- The meaning of the symbols indicated on the label found at the side of the unit is as follows.
  ⚠ : Cautions,Danger,Refer to a manual ∿ :Alternating current
  ⚠ : Cautions, Danger of Electric Shock
- 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 ⚠ 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 the 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.

INSTALLATION CONDITIONS

・Indoor use ・Altitude up to 2000m ・Pollution Degree 2
・Mains supply voltage fluctuations can't exceed −15/+10 percent of nominal voltage. However, 24V does not exceed + −10 percent.
・TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY Ⅱ.
・TEMPORARY OVERVOLTAGES occurring on the MAINS supply Short-term:1440V (may last up to 5S) Long-term:490V (may last longer than 5S)

ACCESSORY & CONFIGURATION

1) Please be sure that the unit enclosed in packing carton is a right model before using.
2) 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
3) Model Configuration

TTM-□□□ W −□ −□ −A□□□ _
(Model / Input / Output 1 / Option)

MODEL	Front Dimensions
004	48×48 mm
005	96×48 mm
006	48×96 mm
007	72×72 mm
009	96×96 mm

CODE	Option		
B	Output 2 Relay contact		B or P selectable
P	Output 2 SSR drive voltage		
R	EV 2 Relay contact	Not optional for TTM-004W. When DI is selected for TTM-005W, 006W, 007W or 009W,this option is not available.	
D	CT input	When DI is selected for TTM-004W, this option is not usable, When I output (4–20mA) is selected, this option is not provided. *1	
E	DI (Digital input)	When CT is selected for TTM-004W, this option cannot be obtained. When EV 2 is selected for TTM-005W, 006W, 007W or 009W, this option cannot be chosen.	
X	Communication	RS-485(TOHO TTM-100 type protocol-MODBUS)	
H	Transfer Output	0-10mVDC	Not available in TTM-004W.
K		0-1VDC	
J		0-5VDC	
F		1-5VDC	
G		0-10VDC	
I		4-20mADC	
-24	Power supply Voltage 24VDC/AC		

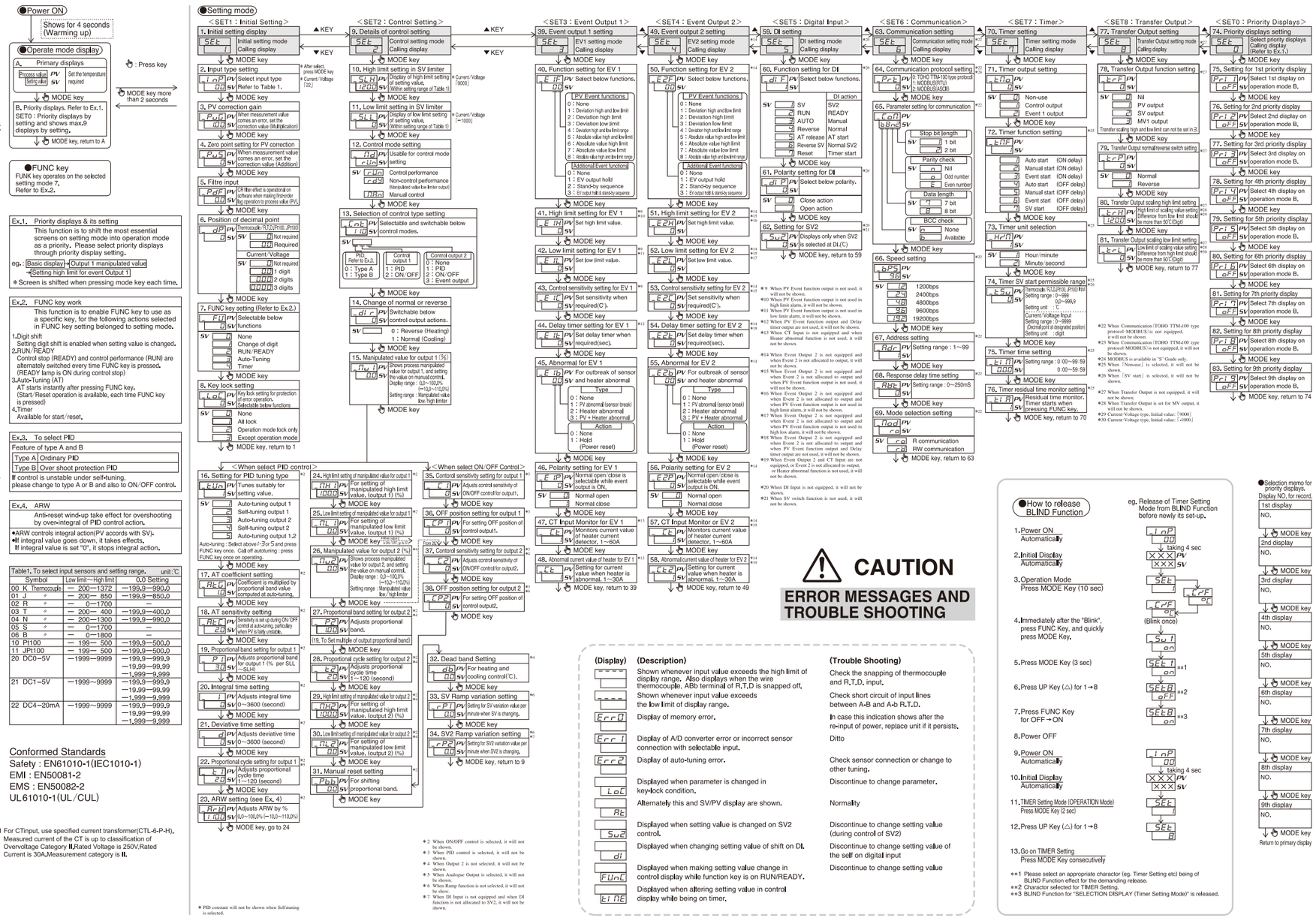
CODE	Input Type
	Thermocouple (K, J, R, T, N, S, B) R.T.D.(Pt100, JPt100)
2	0–5V, 1–5V, 4–20mA

CODE	Output 1
R	Relay contact
P	SSR drive voltage
I	Current 4–20 mA DC

1) A (EV1) provided in the standard specifications.
2) Without output 2, EV2 is not available. Output 2 is equally used as EV2, but both not activated simultaneously.
3) Transfer Output (H, K, J, F, G, I) , not available in TTM-004W.
4) This product is intended for use with industrial machineries, machine tools and measurement instruments. (It is not to be used with medical equipment which involves human lives).

OPERATION FLOW AND SETTING MENU

There are menus not displayed by the selected options and models.



⚠ CAUTION
ERROR MESSAGES AND TROUBLE SHOOTING

(Display)	(Description)	(Trouble Shooting)
-----	Shown whenever input value exceeds the high limit of display range. Also displays when the wire thermocouple, ABb terminal of R.T.D is snapped off.	Check the snapping of thermocouple and R.T.D. input.
-----	Shown whenever input value exceeds the low limit of display range.	Check short circuit of input lines between A-B and A-b R.T.D.
Err0	Display of memory error.	In case this indication shows after the re-input of power, replace unit if it persists.
Err1	Display of A/D converter error or incorrect sensor connection with selectable input.	Ditto
Err2	Display of auto-tuning error.	Check sensor connection or change to other tuning.
LoC	Displayed when parameter is changed in key-lock condition.	Discontinue to change parameter.
At	Alternately this and SV/PV display are shown.	Normality
Su2	Displayed when setting value is changed on SV2 control.	Discontinue to change setting value (during control of SV2)
dI	Displayed when changing setting value of shift on DI.	Discontinue to change setting value of the self on digital input
FunC	Displayed when making setting value change in control display while function key is on RUN/READY.	Discontinue to change setting value
tIME	Displayed when altering setting value in control display while being on timer.	

SPECIFICATIONS

Power Supply Voltage	100 to 240V AC , 50/60Hz or 24VDC/AC 50/60Hz
Power Consumption	Below 10 VA or 6VA/4W(24V)
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℃, 20 to 90%RH (Avoid making dew)
Storage Environment	−25 to 70℃, 5 to 95%RH (Avoid making dew)

Weight	TTM-004W Less than 180g,TTM-005W/006W Less than 300g, TTM-007W Less than 250g, TTM-009W Less than 380g.
Location of the Unit Setting ⚠ CAUTION	Keep away from the followings. ・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 Ⅱ

CAUTION BEFORE CONTROL

- Setting program is stored after power OFF, as non-volatile memory is equipped with TTM-000W 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, as 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 exists 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.

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