

TTM-i4N SERIES USER'S MANUAL

Thank you for purchasing model TTM-i4N 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
 - ◻ : Reinforced/dual insulation
- When having the purchased controller at hand, please be sure that its 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.

⚠ WARNING

Due to mishandling, the serious damages may occur to the operator, such as death, electrocution or skin burn.

⚠ CAUTION

Owing to mishandling, the operator may be inflicted with slight injury, or may cause some damage to the unit.

⚠ 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.

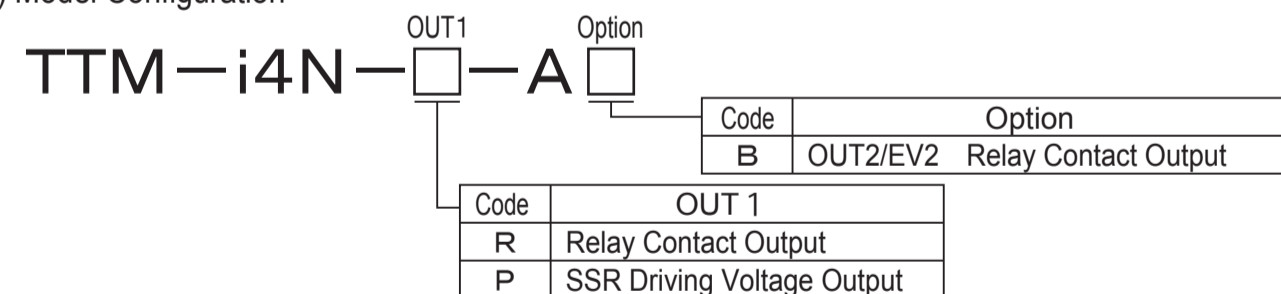
- Please put this user's manual aside for your reference, when operating the unit.
- Copy or reprint of this manual, wholly or partially, is not allowed.
- The contents of this manual may change without notice in future.

INSTALLATION CONDITIONS

- Indoor use
- Altitude up to 2000m
- Pollution Degree 2

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 "PANEL CUTOUT & INSTALLATION" on the right.)
 - This user's manual : 1 copy
- 3) Model Configuration

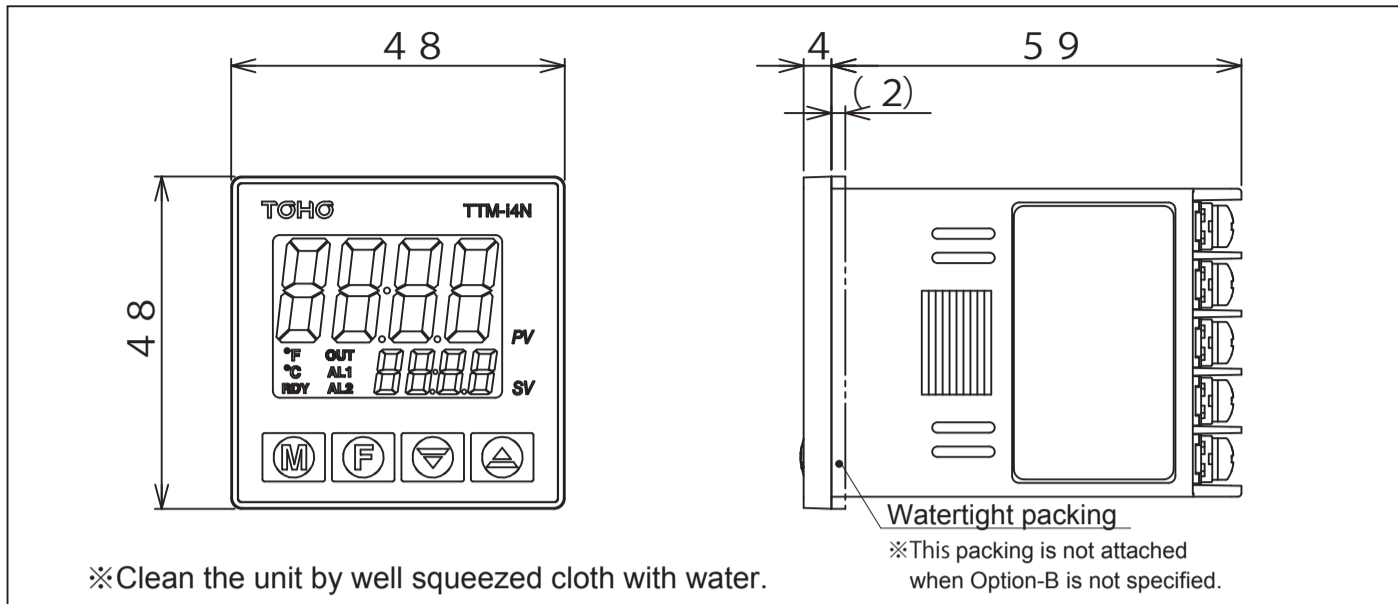


- This product is intended for use with industrial machineries, machine tools and measurement instruments. (It is not to be used with medical equipment which involves human lives).

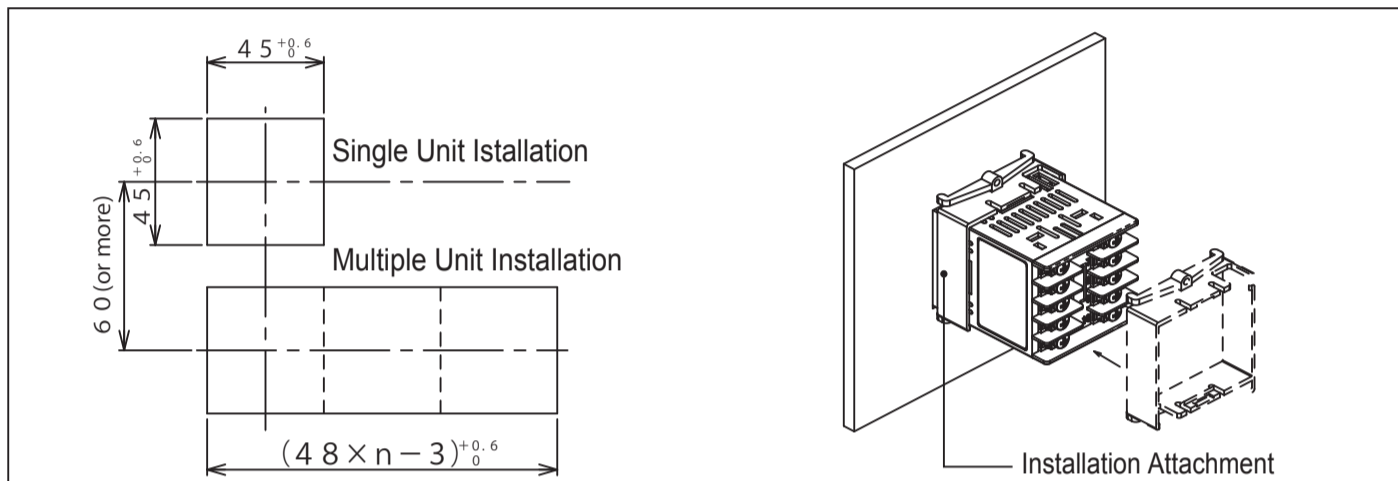
SPECIFICATIONS

Input Power Requirements	AC100 to 240V, 50/60Hz
Operating Voltage Range	85% to 110% of the rated voltage
Power Consumption	6VA MAX
Memory Element	EEPROM
Input of Sensor	a) Thermocouple Input (type : K, J, R, T, N, S, B) b) 3-wire Resistance Temperature Detector Input (type : Pt100, JPt100) (Changeable by input type selection)
Control Method	3 kinds of PID, ON/OFF
OUT1 (Control Output)	a) Relay Contact Output AC250V 3A MAX b) SSR Driving Voltage Output DC12V 600Ω (or more) (Output type depends on the model.)

OUTER DIMENSION



PANEL CUTOUT & INSTALLATION



- Install the unit in either horizontal or vertical (upward) direction.
- When fitting the product, give more than 12 mm space between the upper / lower / left & right & backface portion to the product and the peripheral device or plates.

⚠ CAUTION

- When you use compressed lead wire to install multiple units, please be careful sufficiently not to touch the other lead wires.

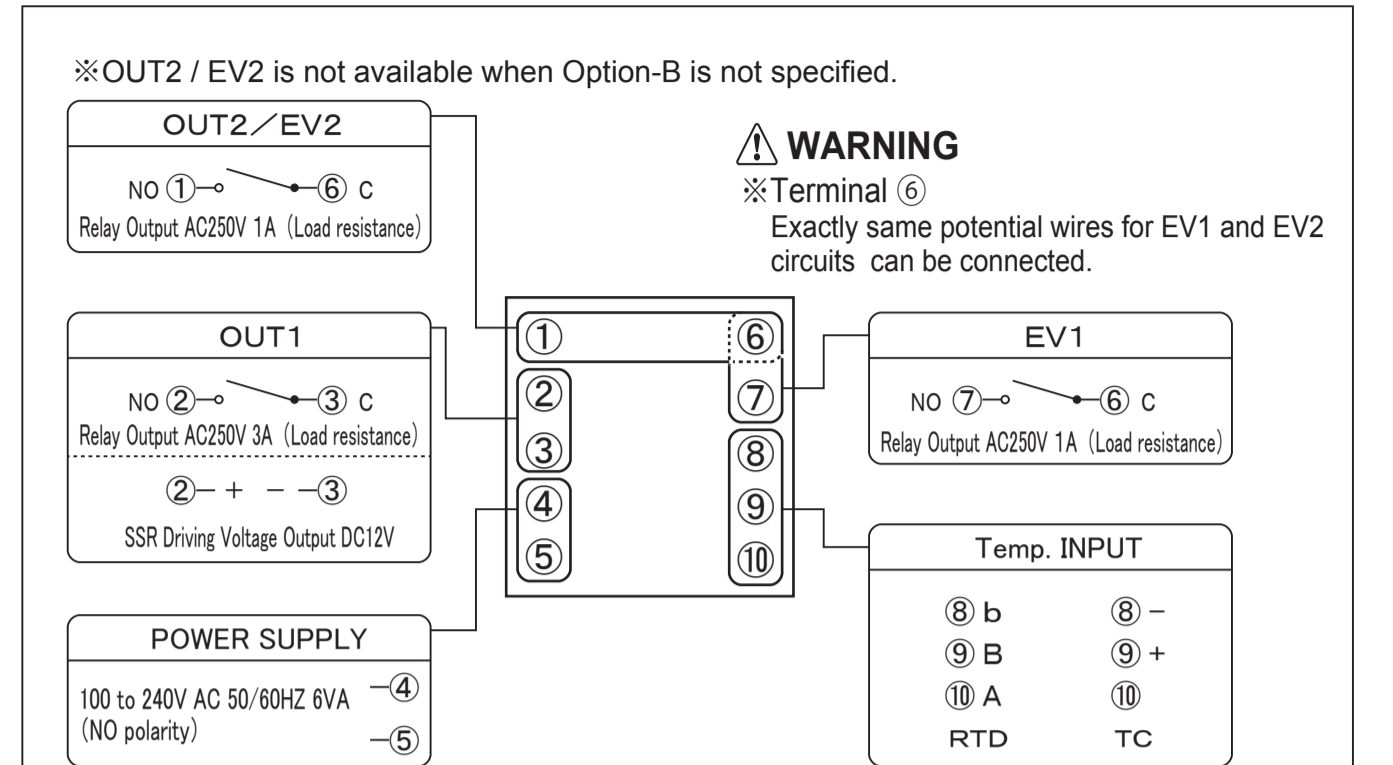
PARTS INDICATION

M KEY	For change of display
F KEY	For action of function setting
▲ ▼ KEY	Up down key for change of setting value. Holding the U/D keys changes value at a rapid rate.
PV	Measured value indication, Character indication
SV	Set value indication, Operation quantity indication
OUT	Output monitor (appears when OUT1 is ON)
AL1	Alarm1 monitor (appears when EV1 is ON)
AL2	Alarm2 monitor (appears when EV2 is ON) It also lights when OUT2 is ON in Heating/Cooling Control mode.
RDY	RDY lamp (It appears in Ready condition)
°C	It lights-up when the set value in the Temp. data is Celsius.
°F	It lights-up when the set value in the Temp. data is Fahrenheit.

⚠ CAUTION

- Location of the Unit Setting
- Keep away from the following :
- Gas of corrosion, dust and oily smoke.
 - The electrical noise of the generator.
 - The influence of electromagnetic field.
 - Mechanical vibration and shock.
 - The direct sunlight.

WIRING



⚠ WARNING

- Use specified size (M3.5 width 7.3 mm or less) crimped terminals for wiring and machines & tools.
- A conformity wire : copper / AWG18-24 / Temp. rating 80°C
- Tightening torque : 0.5 Nm (5 kgfm, 4.43 lb.in)
- Make sure the wiring is done correctly for any wires with polarity (+ and -).
- For relay contact output, "C : common" and "NO : normal open" .
- Temp. INPUT and OUT1 in case of SSR Output, only the secondary circuits with reinforced/dual insulation from the primary side can be connected.

⚠ CAUTION

- Do not touch the terminal part while the power is on.

- This Controller is not equipped with overcurrent protection device (Fuse). Please prepare semi-time lag fuse (rated voltage : 250V, rated current : 1A) when making power source wiring. A Fuse is connected to the live side.

- The use of Noise Filter close to the Power Supply terminal is recommended. Recommended Noise Filter : RSEL-2002W/A (available from TDK Lambda)
Noise filter's terminal 3 and 4 should be connected to the unit.
Noise filter's body may or may not be connected to frame ground. Both are acceptable.

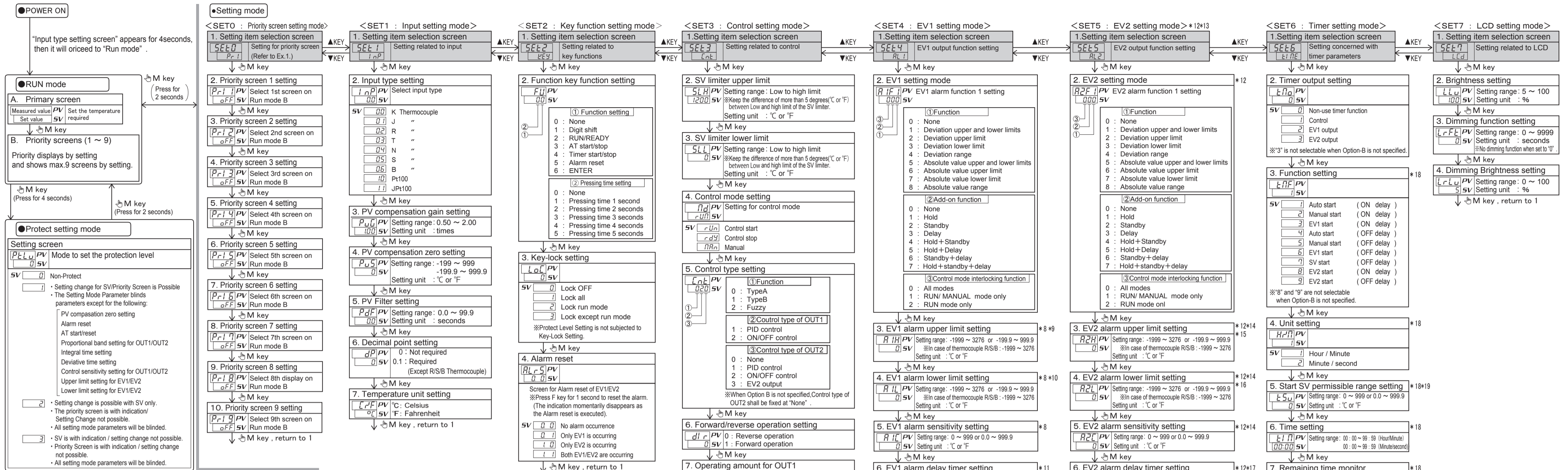
CAUTION BEFORE CONTROL

- Setting program is stored after power OFF, as non-volatile memory is equipped with TTM-i4N SERIES controllers for setting storage.
- Either thermocouple or R.T.D (Pt100 / JPt100) is selectable input type. 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 as below.

	PID Control
Merit	Better control result is achieved as opposed to that of ON/OFF control.
Demerit	Life span of relay is shorter, as output exists frequently with relay contact.

	ON/OFF Control
Merit	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	Control value is worse in comparison with that of PID control.

OPERATION FLOW AND SETTING MENU



EX1. Priority screens & its setting
 This function enables the selection of the most necessary screen indication from all the screen indication found in the setting mode, and assign it to the RUN mode on priority basis.
 Please select priority screen indication through the priority screen setting mode.
 eg. [Basic screen] → [OUT1 manipulated value] → [Setting high limit for EV1]
 *Screen is shifted when pressing M key each time.

EX2. Function key works
 This function is to enable F key to use as a specific key, for the following actions selected in F key setting belonging to setting mode.

Function	Effective
1. Digit shift Setting digit shift is enabled when setting value is changed. Digit under selection will blink.	Effective in all modes
2. RUN/READY Control stop(READY) and control performance(RUN) are alternately switched by F key.	
3. AT Start / Reset AT(Auto-Tuning) starts instantly after pressing F key. Start and Reset are alternately switched by F key.	Effective only in Operating mode
4. Timer Start / Reset Start and Reset are alternately switched by F key.	
5. Alarm Reset Press once for function.	
6. Enter Press once for function.	Effective in all modes

EX3. To select PID
 Features of type A,B,FUZZY

TypeA	Basic PID
TypeB	Over shoot protection PID
FUZZY	Effectively control the over shoot in the beginning of PID control.

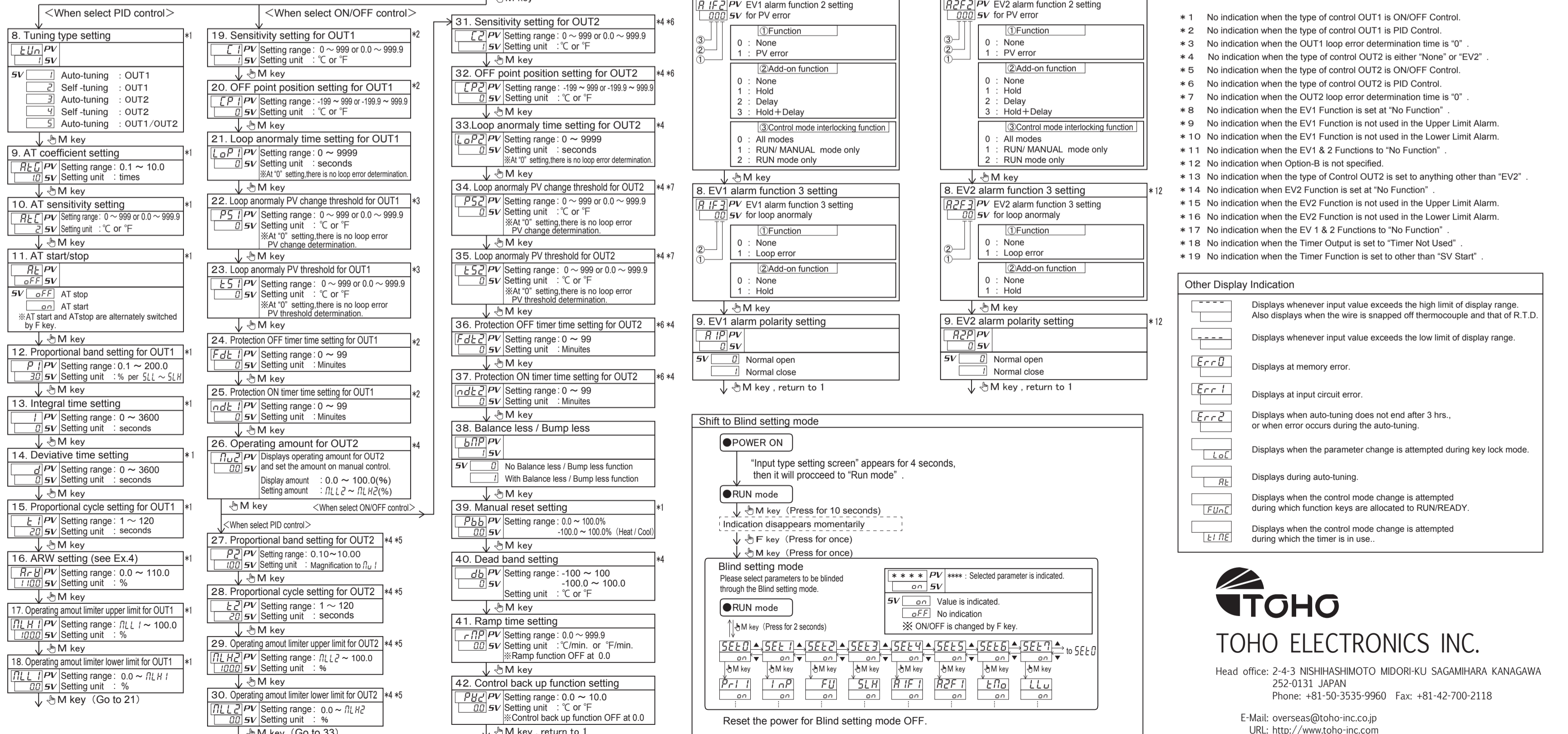
If control is unstable under self-tuning, please change to type A, B or FUZZY and also ON/OFF control.

EX4. ARW (Anti-Reset-Windup)
 ARW take effect for overshooting by over-integral of PID action.

- ARW controls integral action (PV accords with SV).
- If integral value goes down, it takes effects.
- If integral value is set "0", it stops integral action.

Table 1. To select input sensors and setting range. unit : °C

Symbol	Low limit ~ High limit	0.0 Setting
K Thermocouple	-200 ~ 1372	-199.9 ~ 999.9
J	-200 ~ 850	-199.9 ~ 850.0
R	0 ~ 1700	-
T	-200 ~ 400	-199.9 ~ 400.0
N	-200 ~ 1300	-199.9 ~ 999.9
S	0 ~ 1700	-
B	0 ~ 1800	-
Pt100	-200 ~ 500	-199.9 ~ 500.0
JPt100	-200 ~ 500	-199.9 ~ 500.0



- * 1 No indication when the type of control OUT1 is ON/OFF Control.
- * 2 No indication when the type of control OUT1 is PID Control.
- * 3 No indication when the OUT1 loop error determination time is "0".
- * 4 No indication when the type of control OUT2 is either "None" or "EV2".
- * 5 No indication when the type of control OUT2 is ON/OFF Control.
- * 6 No indication when the type of control OUT2 is PID Control.
- * 7 No indication when the OUT2 loop error determination time is "0".
- * 8 No indication when the EV1 Function is set at "No Function".
- * 9 No indication when the EV1 Function is not used in the Upper Limit Alarm.
- * 10 No indication when the EV1 Function is not used in the Lower Limit Alarm.
- * 11 No indication when the EV1 & 2 Functions to "No Function".
- * 12 No indication when Option-B is not specified.
- * 13 No indication when the type of Control OUT2 is set to anything other than "EV2".
- * 14 No indication when EV2 Function is set at "No Function".
- * 15 No indication when the EV2 Function is not used in the Upper Limit Alarm.
- * 16 No indication when the EV2 Function is not used in the Lower Limit Alarm.
- * 17 No indication when the EV1 & 2 Functions to "No Function".
- * 18 No indication when the Timer Output is set to "Timer Not Used".
- * 19 No indication when the Timer Function is set to other than "SV Start".

