Digital Controller

TTM-64

Space-saving Multi-function Type Smart Solution

Speedy Wiring
Push-in terminal

Bright and Easy-to-read Display
Uses industry-leading high-brightness LCD

Easy to Set and Change
New mechanism: Adoption of debossed operation keys

Enhanced Communication Port
RS485 2 points + loader communication

Max. 2CH Input Specifications with Low Cost and High Functionality

Space-saving: Miniaturization makes it easy to design and install equipment without taking up space.

Improved Work Efficiency: Shorten wiring time with push-in terminal wiring.

Cost Reduction: Achieves control functions for two units thus reduces costs.

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Interface with High Visibility and Operability

Simple Design

A simple interface that matches any device

Various Event Display

Highly visible yellow display

Excellent Operability

Easy-to-press debossed keys

High Brightness Large Display

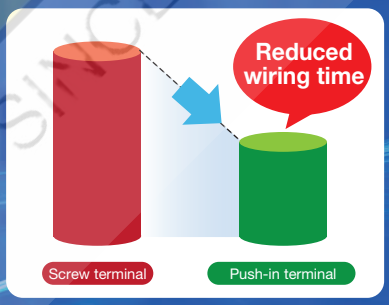
Industry-leading visibility.
The upper row is displayed in white, and the display content can freely be selected from PV (Process Value) / MV (Manipulated Variable) / SV (Setting Value), etc.

Actual size: 48mm × 48mm

New Color Scheme with High Visibility

A new color is used for the lower part of the display.
The bright blue color has a calm color scheme with high visibility.

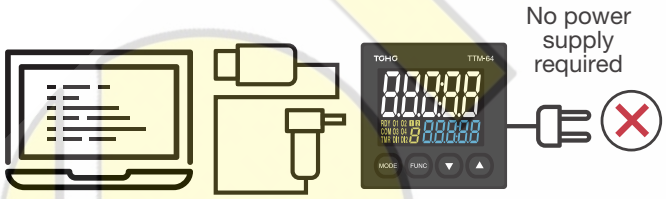
Screw terminal or Push-in terminal is selectable.



Dedicated Application

Easy setting of complicated parameters by dedicated application without power supply.
(Power is supplied by dedicated cable.)

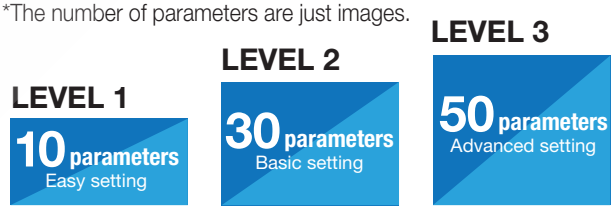
*Dedicated cable is available as option.



Parameter Layering

The parameter layering level can be selected according to the application. If complicated settings are not required, display only the simple or basic parameters to minimize trouble during the setting.

*The number of parameters are just images.



The Parameters You Want to Display Can Freely be Selected

Blind Function

Improved operability by hiding unnecessary parameters.
Hiding parameters is also effective in preventing erroneous operation.

Priority Display of Frequently Used Parameters

Priority Screen Setting Function

Up to 16 parameters can be displayed and set in operation mode. Effective for streamlining setting changes after product operation.

Programless Communication Function

Compatible with Mitsubishi PLC [QnA compatible 3C frame format 4] (Under development)
* Scheduled to support each manufacturer's PLC

Improved Operability after Operation

Aggregates the minimum necessary parameters + priority screens. [S-0]
Effective for efficient setting change after operation.

48×48mm Controller with Max. 2CH Input Specifications

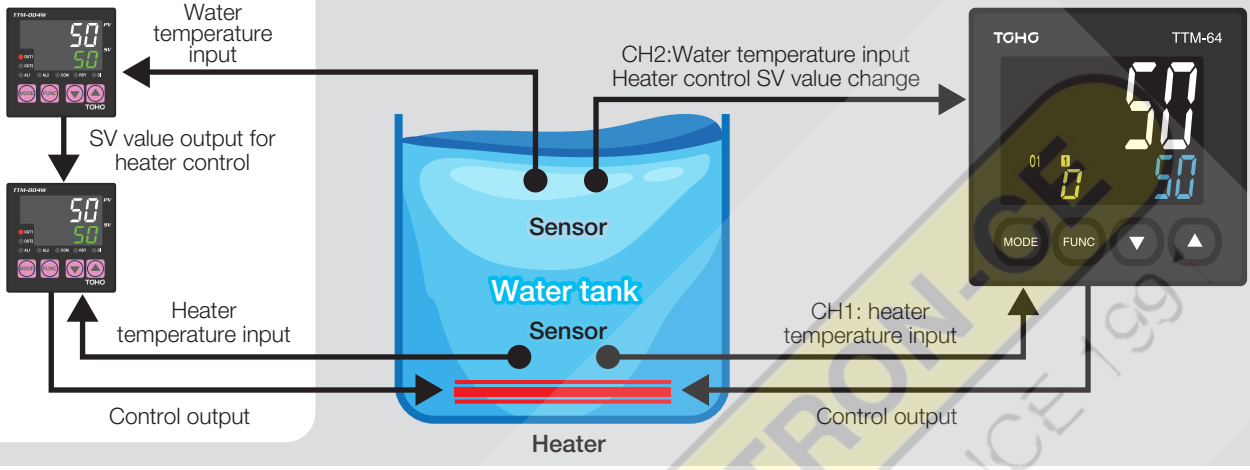
Controls that could not be handled with a single unit can now be handled with a single unit.

Cascade Control

◆CH1 : Heater temperature
◆CH2 : Water temperature (controlled target)

By changing the heater control SV (Setting Value) from the water temperature input value, it is possible to optimally control the water temperature at a position away from the heater.

Conventional method

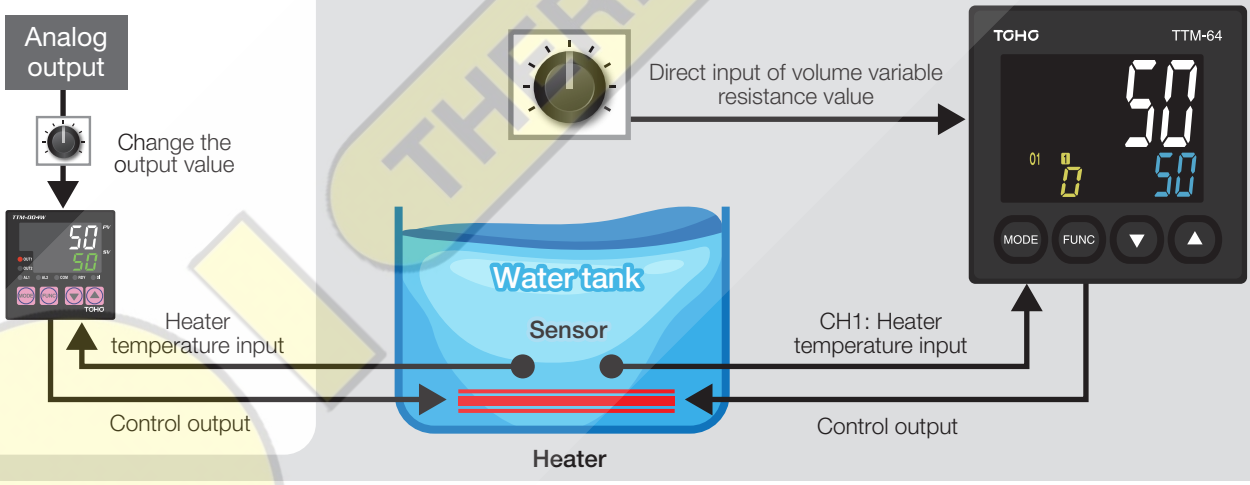


Remote Input Control with Volume

◆CH1: Heater temperature
◆CH2: Volume signal

Converts the signal from the volume into the SV (Setting Value) for heater temperature control.
Effective for replacing analog temperature controllers and/or electric kitchen equipment.

Conventional method

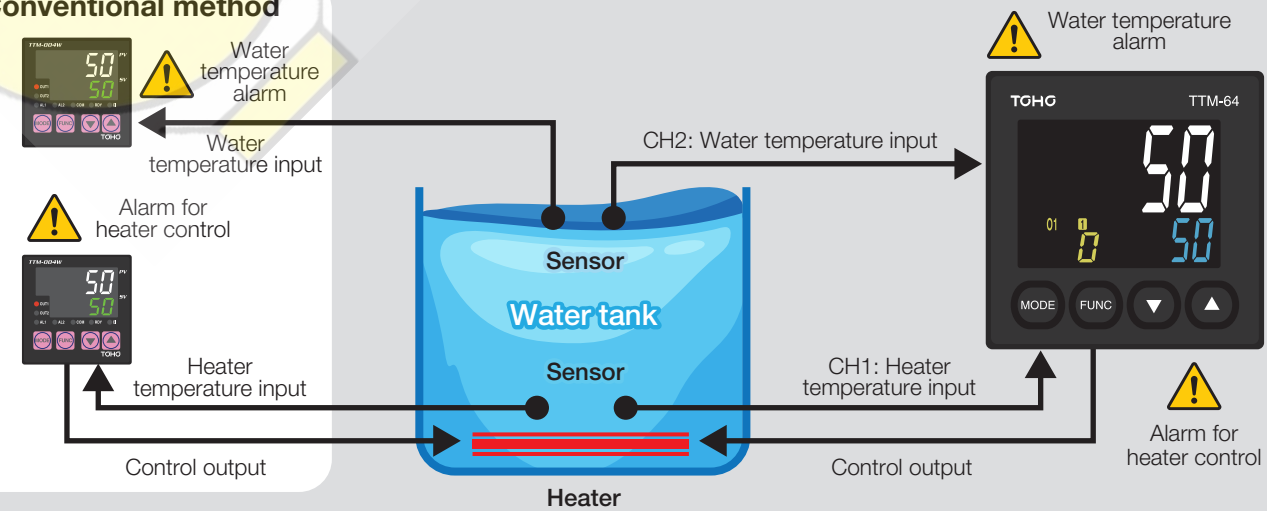


Temperature Control + 2CH Sensor Alarm

◆CH1: Heater temperature
◆CH2: Water temperature (controlled target)

Alarms for water temperature and heater abnormalities can be determined from the sensor input of each CH.

Conventional method



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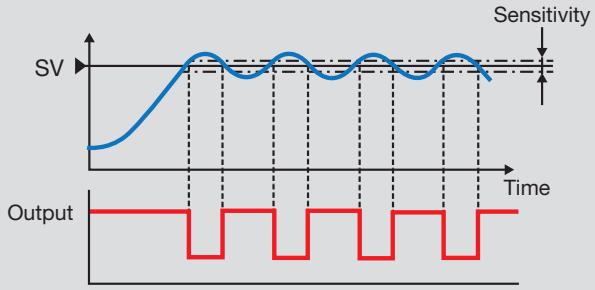
Supports Various Controls from Basic to Complex Control

Simple Basic Control

ON/OFF Control

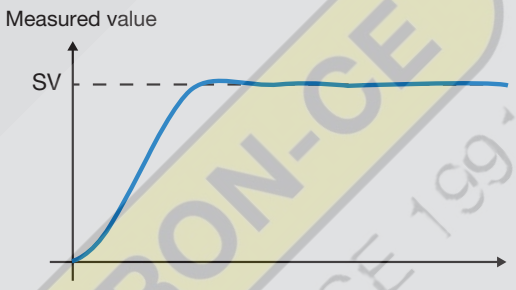
A control method in which the output is repeatedly turned ON/OFF at the set value. By setting the control sensitivity, it is possible to reduce the ON/OFF times of the relay contact.



Basic Control Based on PID Theory

PID Control(Supports 2-degrees-of-freedom PID)

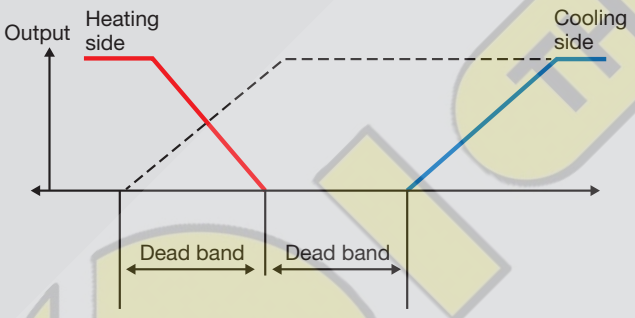
0% to 100% MV (output volume) is calculated using the PID constants set by auto-tuning, and adjustments are made continuously. It also supports 2-degree-of-freedom PID control, enabling more precise control.



Simultaneous Control of Heating and Cooling Mechanisms

Heating/Cooling Control

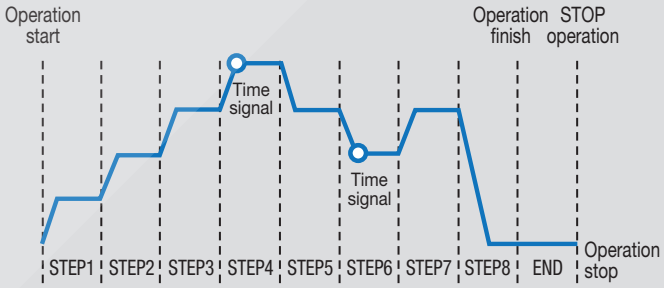
A control method that uses both heating and cooling to stabilize the controlled object at the set value.
By setting a dead band, it is possible to provide a range between heating output and cooling output.



Up to 8 Steps Program Operation

Simple Program Control

A maximum of 8 steps of program operation is possible. By using the bank function, it is possible to set up to 16 parameters such as PID for each step.

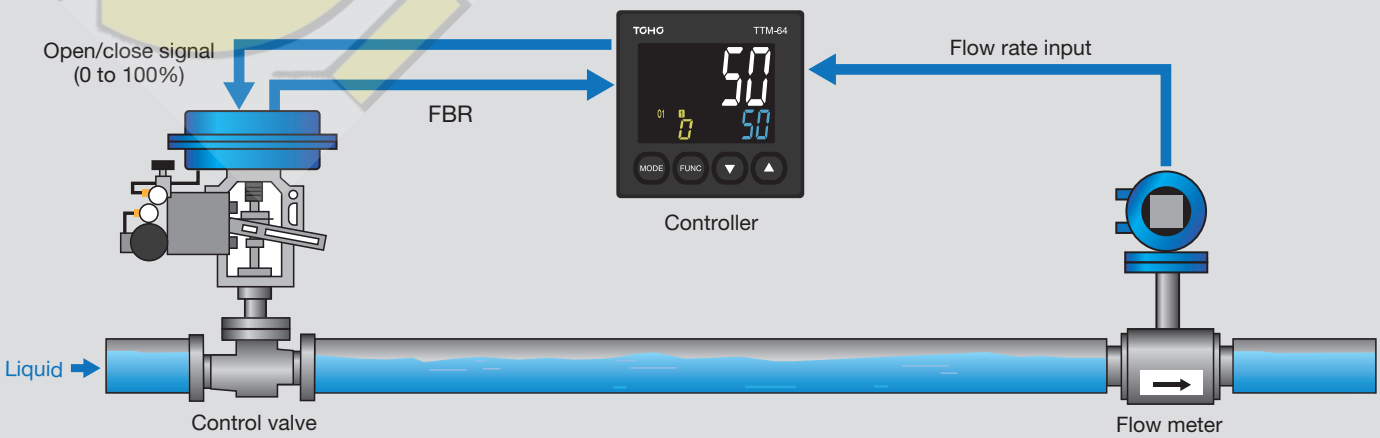


*S-grade

Process Variable Control of Flow Rate, Pressure, Liquid Level, and Temperature

Position Proportional Control [Supports Feedback Resistor (FBR)]

A method that uses solenoid valves to control process quantities required in plants and factories, such as flow rate, pressure, temperature and liquid level. It supports feedback resistance (FBR), enabling more reliable control.
*Also supports valve position proportional control without FBR.



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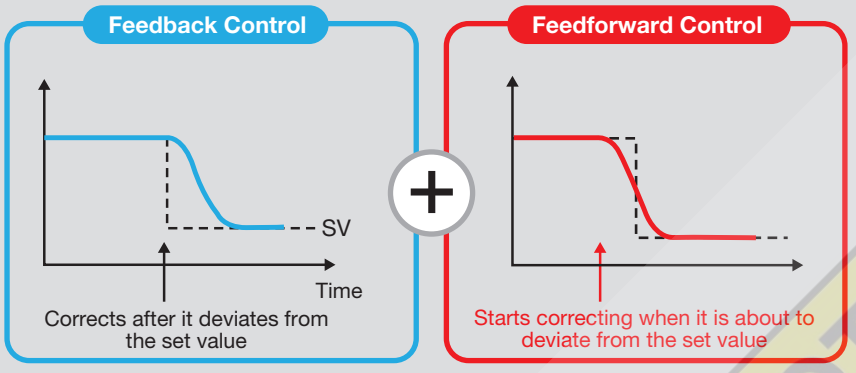
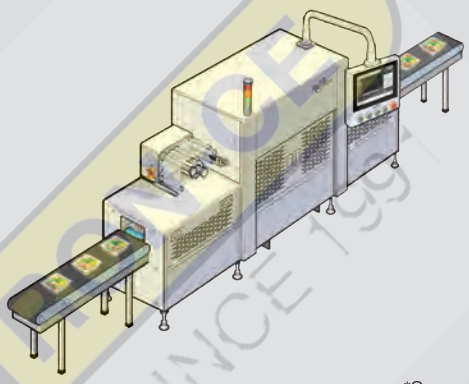
Suppress Disturbance Factors in Advance

Feedback Control (FB control) + Feedforward Control (FF control)

A control method used to compensate for the shortcomings of feedback control. Feed-forward control is a control method that, when an external factor that disturbs control occurs, performs the necessary corrective action to eliminate the effect as much as possible before it appears as an effect such as "temperature disturbance". Mainly required for control of packaging machines.





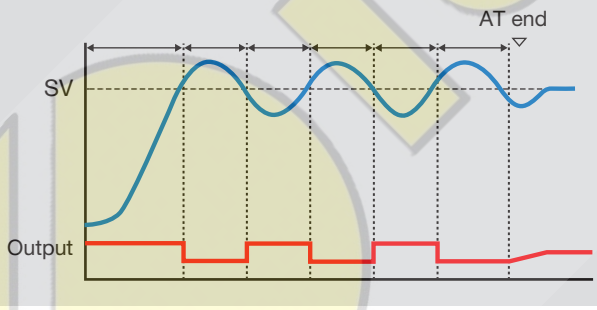
*S-grade

Supplements High-performance Control + α Function

Calculating the Optimum PID Constants for the Control Target

Auto Tuning Function (AT)

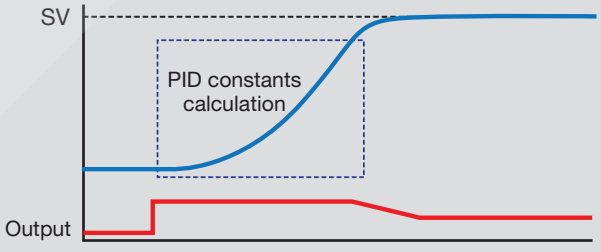
PID constants are calculated from the PV (Process Value) waveform of the controlled object by repeating fluctuations in MV (Manipulated Variable). AT type can be selected from 3 types such as overshoot suppression.



Automatically Calculate and Set PID Constants

Self-Tuning (ST)

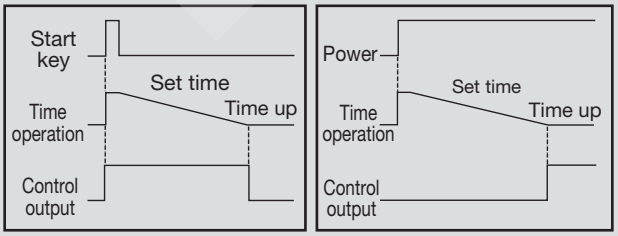
Calculate the PID constant from the PV (Process Value) waveform when the SV (Setting Value) is changed. Optimal PID constants can be calculated without affecting control waveforms.



Timer Control of Control Output ON/OFF

Timer Function

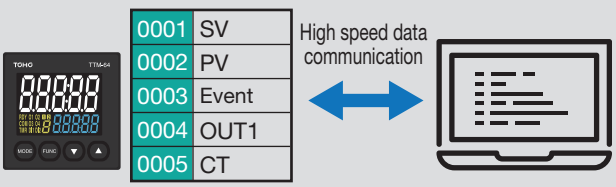
It is possible to set the time from pressing the start key to the end of control, and the time from power ON to the start of control.



Data Transfer Packets, Time Reduction

MODBUS Address Assignment Function

By allocating up to 16 items of frequently sent/received data to consecutive addresses, it is possible to obtain data with a small number of packets.



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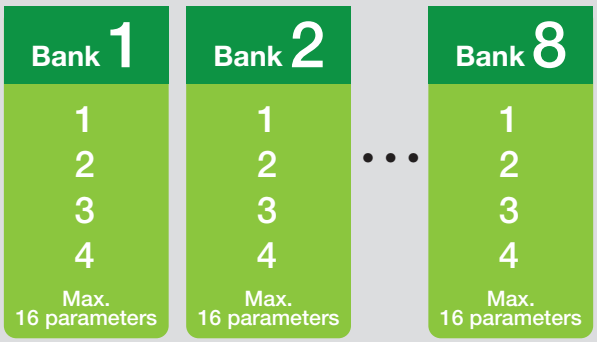
Supplements High-performance Control +αFunction

Multiple Temperature Control with One Device

Bank Function

Memorizes parameter settings for up to 8 patterns (banks). Up to 16 setting parameters can be selected for each bank. Banks can be switched manually or with an external input signal.

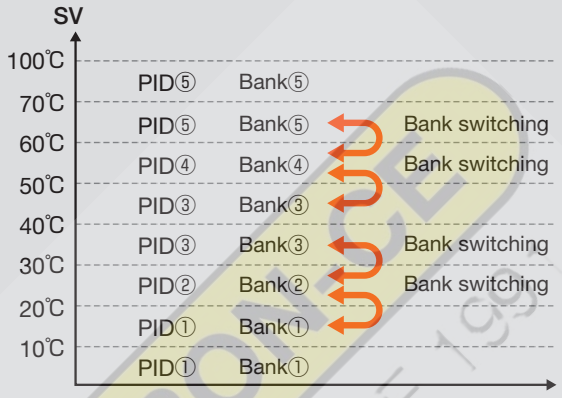


*S-grade

Automatically Change PID in Different Temperature Ranges

Automatically Bank Switching Function

It is possible to automatically switch the PID set in the bank in advance according to the temperature range of PV (Process Value) or SV (Setting Value).

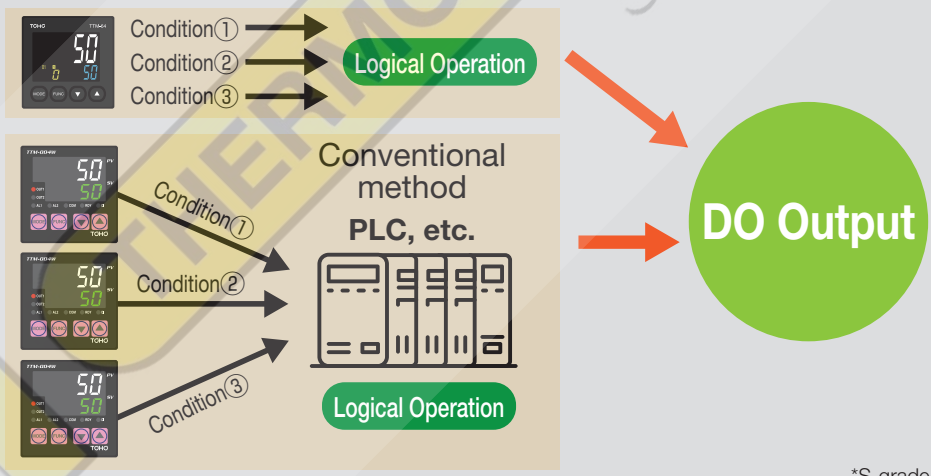


*S-grade

DO Output Generation Conditions Can be Defined by Logical Operations of Multiple Conditions (Events, etc.)

Logical Operation Function

Using logical operations (AND, OR), DO output generation conditions can be set by combining up to 4 conditions such as event, DI, timer, etc.
It is now possible to generate DO output from multiple conditions without going through an upper-end device (PLC, etc.), which is also effective in reducing design man-hours for the upper-end device.



*S-grade

Achieves Functions Similar to Multi-channel Products by Linking Digital Controllers

Cooperative Operation of Multiple Units

1 Multiple slave cascade (multiple control loops)

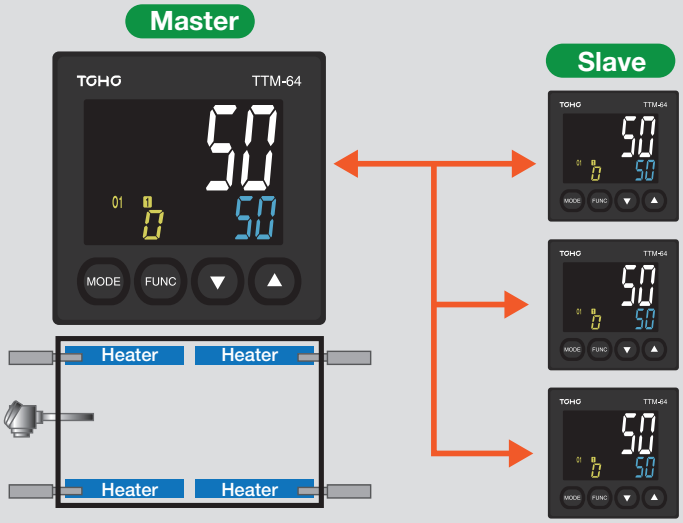
Changes the Slave SV (Setting Value) in proportion to the Master MV (Manipulated Variable).
Since the heater temperature is controlled by the Slave SV (Setting Value), it is possible to appropriately control the master control target while suppressing overheating of the heater when the temperature rises. Effective for extending the life of the heater.

2 PV calculation function

Input duplication (risk hedging) is possible by removing the input of the disconnected sensor from the calculation.

3 SV/MV cooperative operation (1-input multiple-output)

Multiple slaves can be controlled by master input.

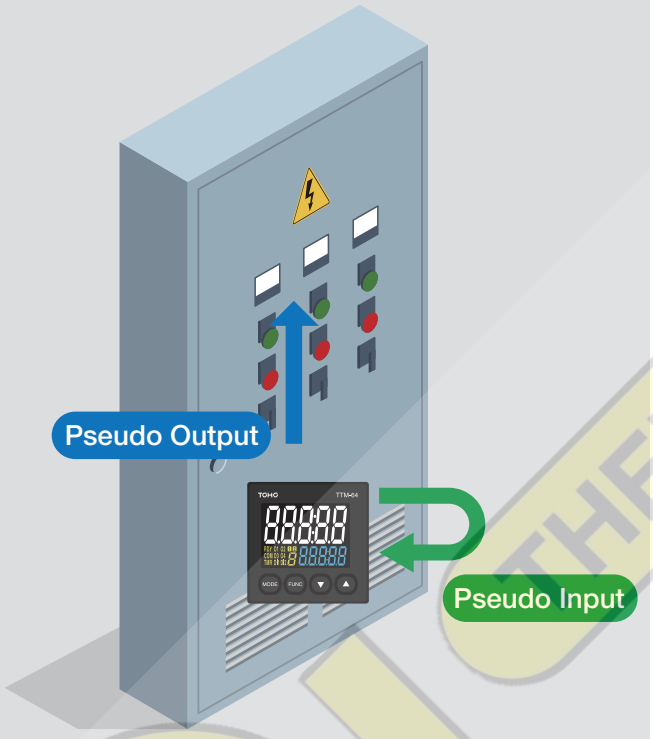


Maintenance

Possible to Check Wiring and Operation before the Actual Operation of Embedded Equipment

Operation Check Mode

Output signals to external devices and input signals from external devices can be simulated. The wiring and operation with the temperature controller can be checked before starting the actual operation of the device. Effective in reducing man-hours such as malfunctions due to wiring mistakes and reassembly.



Check Accumulated Control Time

The accumulated control time can be checked on the operation time monitor. Effective as a guideline for the timing to replace the temperature controller. An event can be generated by setting an arbitrary time.

Confirmation of Relay Life

ON/OFF Count

Effective as a guideline for the timing to replace the temperature controller, which is related to the life of the relay. An event can be generated by setting an arbitrary number of times.

Supports Various Customizations

Customization of TTM-64 for Customer's Ideal Digital Controller

TTM-64

1 Change to panel sheet with desired design

It is possible to change the color of the panel sheet and write your company name and logo.

2 Hardware customization

3 Software customization

*There are conditions such as minimum quantity for supporting the customization.

Specification

INPUT	No. of Inputs	Max. 2 points
	Input Type	•1CH input specifications: Temperature input (Thermocouple/RTD) Universal input (Thermocouple/RTD/Voltage/Current) •2CH input specifications: Universal input (Thermocouple/RTD/Voltage/Current) + Universal input Universal input (Thermocouple/RTD/Voltage/Current) + Potentiometer input Thermocouple: K/J/R/T/N/S/B RTD: Temperature input (Pt100Ω/JPt100Ω), Universal input (Pt100Ω/Pt500Ω/Pt1000Ω/JPt100Ω) Current/Voltage: 4 to 20mA/0 to 5V/1 to 5V
	Sampling Rate	100ms (fixed)
OUTPUT	No. of Outputs	Max. 4 points
	Output Type	•Relay contact output (OUT1 to OUT2) 1a contact 250VAC 3A (resistive load) •Relay contact output (OUT3 to OUT4) 1a contact 250VAC 1A (resistive load) •Voltage output for SSR drive Output voltage: 12VDC Load resistance: 600Ω or more •Open collector output Output rating: 24VDC 100mA (MAX) •Voltage 0 to 1VDC output Load resistance: 500kΩ or more •Voltage 0 to 5VDC output Load resistance: 1 kΩ or more •Voltage 1 to 5VDC output Load resistance: 1 kΩ or more •Voltage 0 to 10VDC output Load resistance: 1 kΩ or more •Voltage 0 to 10mVDC output Load resistance: 500kΩ or more •Current 4 to 20mADC output Load resistance: 600Ω or more
INDICATION ACCURACY AMBIENT TEMPERATURE 23℃ AMBIENT HUMIDITY 65%	Themocouple	±(0.3% of input value or ±1℃, whichever is larger) ±1 digit or less *Operating temp. conditions apply.
	RTD	± (0.2% of input value or ±0.8°C, whichever is larger) ±1 digit or less
	Current/Voltage	±0.2% FS ±1 digit or less
	Potentiometer	±0.2% FS ±1 digit or less
CT INPUT	No. of Inputs	Max. 2 points
	Measuring Current Range	0 to 50.0A
	Setting Current Range	0.0 to 30.0A
	Setting Resolution	0.1 A
	Measurement Accuracy	±5% of full span (1.0A or less is out of accuracy)
DI INPUT	No. of Inputs	Max. 2 points
	ON Current	Max. 10mADC
	OFF Voltage	Max. 6VDC
	Minimum Input Time	200mS
RS-485 COMM.	Points	Max. 2 points
	Communication Standard	RS-485(1：31)
	Protocol	Toho dedicated protocol/MODBUS (RTU)/MODBUS (ASCII)
LOADER COMM.	Communication Method	UART *USB connection to PC with loader communication cable
	Protocol	Dedicated protocol
GENERAL SPECS.	Power-Supply Voltage	100 to 240VAC 50/60Hz (allowable voltage range 85 to 110%) 24VDC (allowable voltage range 90 to 110%)
	Memory Element	EEPROM
	Momentary Blackout	100 to 240 VAC: No effect on operation due to power failure within 1 cycle 24VDC: No regulation of operation holding time
	Withstand Voltage	1500VAC 1 min. Break Current 5mA
	Insulation Resistance	500VDC 50MΩ or more
STANDARD	External standard	CE marking comliant/UL/c-UL mark/UKCA certified

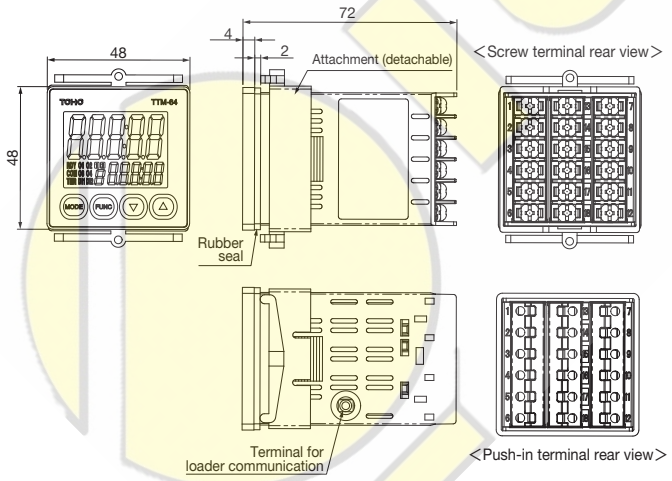
Ordering Information (Model Configurations)

TTM - 6 4 ① - ② - ③④⑤ - ⑥⑦ - ⑧ - ⑨

①	GRADE *	N	Normal Grade		
		S	S-Grade		
②	INPUT	1	CH1=Temperature Input/CH2=None		
		2	CH1=Universal Input/CH2=None		
		3	CH1=Universal Input/CH2=Universal Input		
		4	CH1=Universal Input/CH2=Potentiometer Input		
③	OUT 1	N	None	J	0 to 5VDC
		R	Relay Contact	F	1 to 5VDC
		P	SSR Drive Voltage	G	0 to 10VDC
		A	Open Collector	I	4 to 20mADC
		K	0 to 1VDC	H	0 to 10mVDC
④	OUT 2	N	None	J	0 to 5VDC
		R	Relay Contact	F	1 to 5VDC
		P	SSR Drive Voltage	G	0 to 10VDC
		A	Open Collector	I	4 to 20mADC
		K	0 to 1VDC	H	0 to 10mVDC
⑤	OUT 3/4 (Shared Common)	N	None		
		R	Relay Contact		
		A	Open Collector		
⑥	OPTION 1		None		
		B	CT Input 1		
		S	DI Input 1		
		M	RS-485 Communication 1		
⑦	OPTION 2		None		
		C	CT Input 2 *Cannot be selected if there is CH 2		
		T	DI Input 2 *Cannot be selected if there is CH 2		
		X	RS-485 Communication 2 *Cannot be selected if there is CH 2		
		CX	CT Input 2, RS-485 Communication 2 *Cannot be selected if there is CH 2		
		TX	DI Input 2, RS-485 Communication 2 *Cannot be selected if there is CH 2		
⑧	POWER SUPPLY		100 to 240VAC		
		L	24VDC		
⑨	TERMINAL BLOCK		Screw Terminal		
		Q	Push-in Terminal		

*Difference between the Normal Grade and the S-Grade: Restrictions on some of the functions. Functions with "*S-Grade Specification" written in the catalog cannot be used with Normal Grade.

Dimensions



Warning This product is designed to control the temperature and other physical quantities of general industrial equipment. (Please do not use it for controlled objects that have a serious impact on human life.)

Caution Please read the "Instruction Manual" carefully to use this product correctly and safely. If there is a risk of damage or damage to the system or property due to a failure of this product, please use it after taking safety measures to prevent failure.

Representative

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●Specifications are subject to change without notice. Note: The color printed in this catalog may be different from actual color

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