



Automation for a Changing World

# Delta Temperature Controller DT Series



[www.deltaww.com](http://www.deltaww.com)

 **DELTA**  
Smarter. Greener. Together.

# Features

## Many Sizes Available:

- From 48 × 24 mm to 96 × 96 mm, all panel sizes comply with international standards

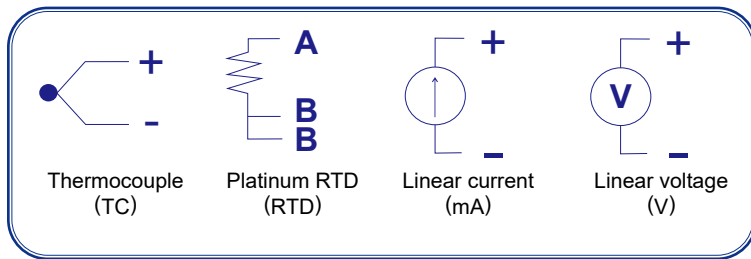
## Quality Assurance:

- All temperature controllers adopt an isolated switching power supply
- 100 ~ 240 V<sub>AC</sub> / 24 V<sub>DC</sub> input power supply applicable in all countries of the world
- CE, UL and C-Tick certified



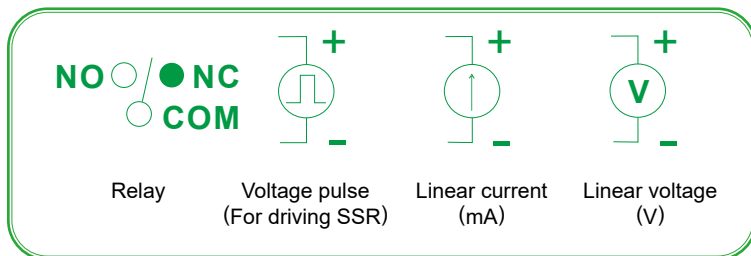
## Supports Various Sensors:

- Built-in various sensor input modes: Thermocouple, platinum RTD or linear voltage/current



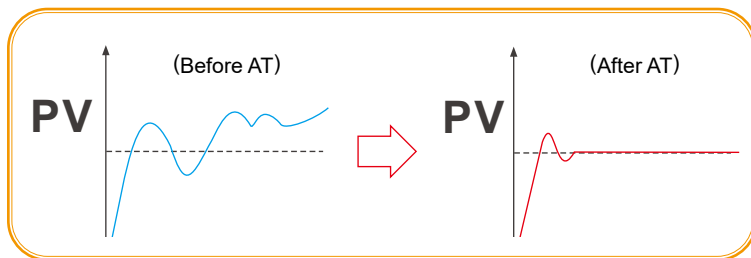
## Various Output Modes:

- Relay, voltage pulse, linear voltage, and linear current



## Stable Control:

- Built-in PID control function with accurate auto-tuning (AT)
- PID parameters are automatically calculated, enhancing the stability of the system and accuracy of control



## Current Transformer (CT):

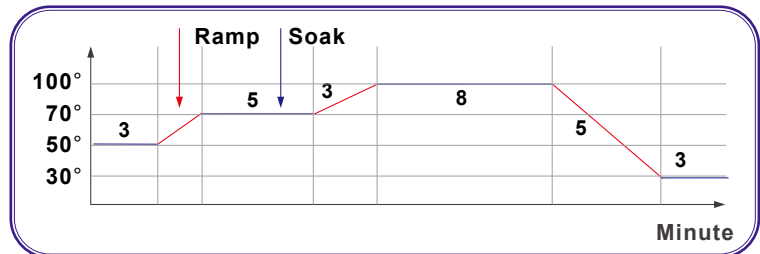
- CT can enable the off-line alarm and detect overloaded current





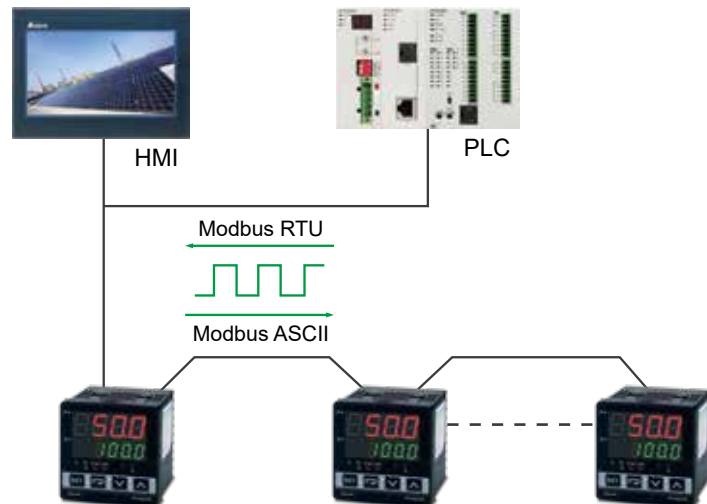
### Programmable Control:

- Max. 8 patterns available, with 8 steps in each pattern for planning various temperature control curves; no need for a master controller



### Communication:

- RS-485 communication interface, supporting Modbus ASCII/RTU communication



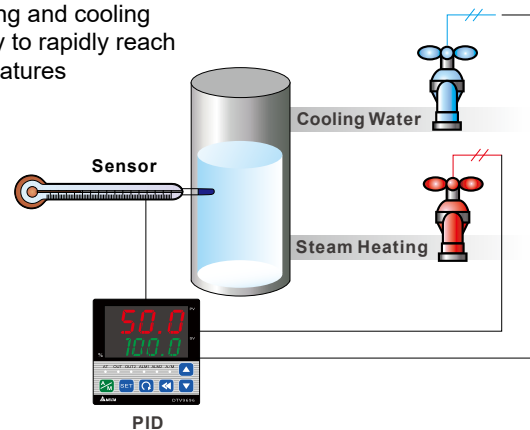
### Safety:

- The key-locking function and communication protection prevent incorrect operations



### Dual Output Control:

- Controls heating and cooling simultaneously to rapidly reach the set temperatures



# Delta Temperature Controller DT Series

## Multi-Loop Modular Temperature Controller DTM

Various input channel, multi-point temperature control, available in RS-485 Type and Ethernet Type



## Standard Temperature Controller DTA

Basic single channel input and output



## Advanced Temperature Controller DTB

Linear voltage control output and dual-loop control output



## Modular Temperature Controller DTC

Modular design for series connection to monitor multiple points, save installation space, and connect flexibly per output requirements



## Valve Controller DTV

Suitable for DTV control applications, easy setting and built-in Modbus for efficient data collection



## Multi-channel Modular Temperature Controller DTE

Supports up to 8 sets of thermocouple or 6 sets of platinum RTD, multiple output modules available



## Advanced Intelligent Temperature Controller DT3

Modular design with various control modes, heater disconnection detection, and remote input



## Intelligent Temperature Controller DTK

Simple design with high-speed data collection for basic application



# Products

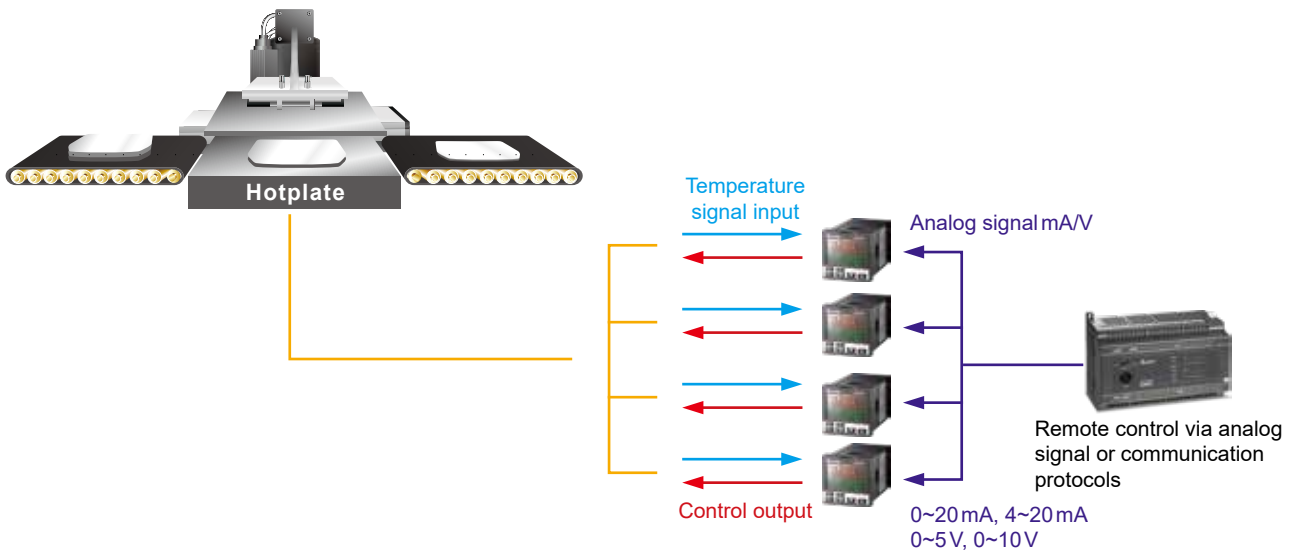
## DT3 High-speed Intelligent Temperature Controller

The Delta temperature controller DT3 series is designed with upgraded hardware and high specifications as well as smart operation, fast response, easy integration, and user-friendly and user-definable function keys. With Self-Tuning and Fuzzy temperature control functions, controllers can be installed in open space or confined space applications and are capable of presenting a smooth temperature control curve. In addition, the innovative design enables customers to replace the module with new functions to attain the ultimate in extension flexibility.



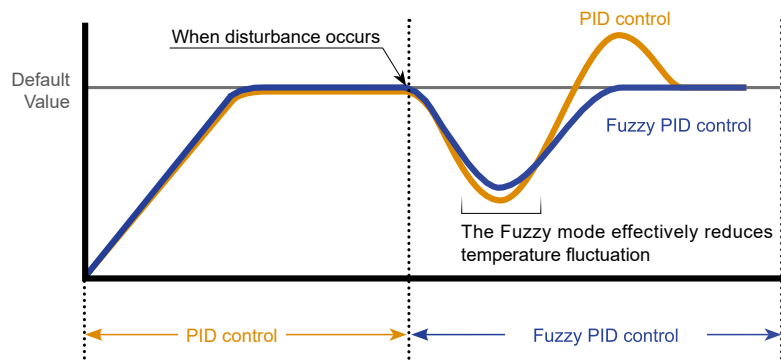
### Remote Control

Sets DT3 temperature via analog output of host controller



### Various Control Modes

- ▶ Auto-tuning
- ▶ Fuzzy
- ▶ Manual
- ▶ On/Off
- ▶ PID Process Control
- ▶ Self-tuning



## ■ Extension Ability

Modular design of functional devices for flexible replacement



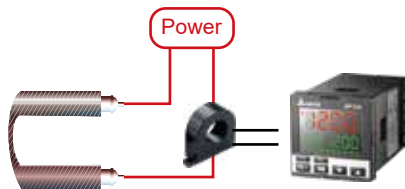
## ■ Large Tri-color LCD Display

Tri-color temperature controller



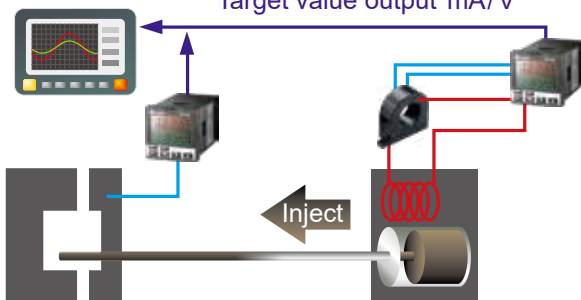
## ■ Heater Disconnection Detection

Measurable up to 100 A with a current transformer (CT)



## ■ Retransmission Output

0~20mA, 4~20mA, 0~5V, 0~10V  
Target value output mA/V



## ■ User-defined Function Keys

- ▶ Menu
- ▶ Auto-tuning
- ▶ Run/Stop Mode
- ▶ Program suspension
- ▶ Control modes selection



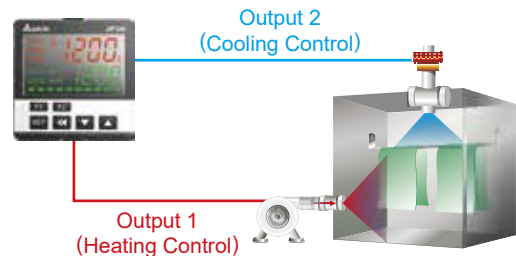
## ■ Point-to-point Control (Proportional Output mA)

Sets the target value by point-to-point control



## ■ Dual-output Control

- ▶ Two outputs for rapid heating/cooling to achieve a designated temperature
- ▶ AT function is used to automatically calculate two PID parameters, one for heating and the other for cooling



# Specifications

<b>Input power supply</b>	100 to 240V <sub>AC</sub> , 50/60Hz, 24V <sub>DC</sub> ±10%
<b>Display method</b>	LCD. Present Value: Orange, Set Value: green
<b>Input sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100; RTD: Cu50, Ni120
	Analog input: 0~5V, 0~10V, 0~20mA, 4~20mA, 0~50mV
<b>Control modes</b>	PID, PID programmable, Fuzzy, Self-tuning, Manual, On/Off
<b>Display accuracy</b>	0 or 1 digit to the right of the decimal point
<b>Sampling rate</b>	Analog input: 0.1 sec. Thermocouple or platinum RTD: 0.1 sec.
<b>Operating Ambient Temperature</b>	0~+50°C
<b>Operating Relative Humidity</b>	35~80% RH (non-condensing)

# Alarm Outputs

The DT3 offers 3 alarm outputs, and each alarm output has 18 alarm modes to choose from in the initial setting mode. When the target temperature exceeds or falls below the set point, the alarm output is enabled.

SV	Alarm Mode	Alarm Output Operation
0	Alarm function disabled	
1	Deviation upper- and lower-limit: This alarm output operates when PV value is higher than the set value SV + (AL - H) or lower than the set value SV - (AL - L).	
2	Deviation upper-limit: This alarm output operates when PV value is higher than the set value SV + (AL - H).	
3	Deviation lower-limit: This alarm output operates when PV value is lower than the set value SV - (AL - L).	
4	Absolute value upper- and lower-limit: This alarm output operates when PV value is higher than the set value AL-H or lower than the set value AL-L.	
5	Absolute value upper-limit: This alarm output operates when PV value is higher than the set value AL - H.	
6	Absolute value lower-limit: This alarm output operates when PV value is lower than the set value AL - L.	
7	Hysteresis upper-limit alarm output: This alarm output operates if PV value is higher than the set value SV + (AL - H). This alarm output is Off when PV value is lower than the set value SV + (AL - L).	
8	Hysteresis lower-limit alarm output: This alarm output operates if PV value is lower than the set value SV - (AL - H). This alarm output is Off when PV value is higher than the set value SV - (AL - L).	
9	Disconnection Alarm: This alarm output operates if the sensor connection is incorrect or has been disconnected.	
11	CT2 Alarm: CT2 is ON if the value of CT2 is lower than the value of AL - L or higher than AL - H.	
12	CT2 Alarm: CT2 is ON if the value of CT2 is lower than the value of AL - L or higher than AL - H.	
13	When SOAK status (temperature hold) happens to PID program control, alarm output is ON.	
14	When RAMP UP status happens to PID program control, alarm output is ON.	
15	When RAMP DOWN status happens to PID program control, alarm output is ON.	
16	When Run status happens to PID program control, alarm output is ON.	
17	When HOLD status happens to PID program control, alarm output is ON.	
18	When Stop status happens to PID program control, alarm output is ON.	
19	When END status happens to PID program control, alarm output is ON.	

## RS-485 Communication

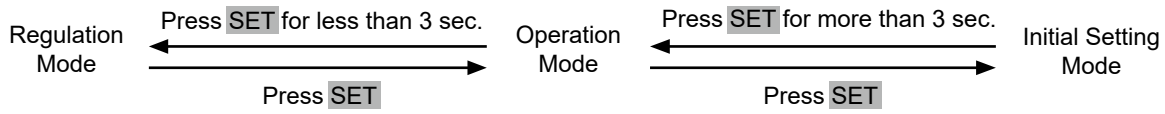
DT3 supports baud rate 2,400 to 38,400 bps, Modbus ASCII/RTU protocol, function code 03H and reads maximum 8 words from the register.

Address	Content	Definition
1000H	Present value (PV)	Measuring unit: 0.1 scale. The following values mean error occurs. 8002H: Temperature not yet acquired 8003H: Not connected to sensor 8004H: Incorrect sensor
1001H	Set value (SV)	Measuring unit: 0.1 scale
1002H	Upper limit of temp. range	Cannot exceed the default value
1003H	Lower limit of temp. range	Cannot fall below the default value
1005H	Control mode	0: PID, 1: On/Off, 2: Manual, 3: Fuzzy
1006H	Heating/Cooling control	0: Heating/Heating, 1: Cooling/Heating, 2: Heating/Cooling, 3: Cooling/Cooling
1007H	1 <sup>st</sup> Heating/Cooling control cycle	0.1~99 sec.
1008H	2 <sup>nd</sup> Heating/Cooling control cycle	0.1~99 sec.
1009H	Proportional band (PB)	0.1~999.9
100AH	Ti value	0~9999
100BH	Td value	0~9999
1012H	Read/write Output 1 volume	Unit: 0.1 %, only valid in manual control mode
1013H	Read/write Output 2 volume	Unit: 0.1 %, only valid in manual control mode
1016H	Regulated temp. value	-99.9~+99.9, Unit: 0.1
102AH	Read/write LED status	b0: ALM3, b1: ALM2, b2: °F, b3: °C, b4: ALM1, b5: OUT2, b6: OUT1, b7: AT
102BH	Read/write key status	b0: Set, b1: Select, b2: Up, b3: Down, 0: Press it
102CH	Panel lockup status	0: Normal, 1: Fully locked, 11: SV adjustable
102DH	CT value	Unit: 0.1A
103BH	AT setting	0: Off (default), 1: On
103CH	Control Run/Stop setting	0: Stop, 1: Run (default), 2: End (program), 3: Hold (program)





# Parameters Operation



Regulation Mode	Operation Mode	Initial Setting Mode
<b>RE</b> Auto-tuning (when CTRL set in PID or Fuzzy and in Run mode) Press ◀ ▽	<b>T234</b> Use ▲ ▼ to set up target temperature Press ◀ ▽	<b>Ctrl</b> Set up input type Press ◀ ▽
<b>SE</b> Self-tuning switch (set when in PID control and the TUNE parameter = ST)	<b>R-S</b> Control loop Run or Stop	<b>TEMP</b> Set up temperature unit (not displayed when in analog input)
<b>d</b> Select the nth (n = 0~5) PID. When n = 6, PID is auto-selected.	<b>PRN</b> Set up start pattern (when in PID process control and <b>PSLP</b> )	<b>UP-H</b> Set up upper temperature limit
<b>Pdof</b> Set up PID control offset	<b>STEP</b> Set up start step (when in programmable control)	<b>UP-L</b> Set up lower temperature limit
<b>FZ-R</b> Set up Fuzzy gain value	<b>SP</b> Set up the position of decimal point	<b>Ctrl</b> Select control modes
<b>FZdb</b> Set up Fuzzy Deadband	<b>LoC</b> Lock the keys	<b>CtrlS</b> Select SV control modes
<b>o1-S</b> Adjust Output 1 hysteresis (when in On/Off control)	<b>AL1H</b> Set up upper limit of Alarm 1	<b>WESP</b> Set up waiting temperature (when in programmable control)
<b>o2-S</b> Adjust Output 2 hysteresis (when in On/Off control)	<b>AL1L</b> Set up lower limit of Alarm 1	<b>W-TN</b> Set up waiting time (when in programmable control)
<b>o1-H</b> <b>o1-C</b> Control cycle for Output 1 (except in On/Off control)	<b>AL2H</b> Set up upper limit of Alarm 2	<b>SLOP</b> Set up start slope (when in programmable control)
<b>o2-H</b> <b>o2-C</b> Control cycle for Output 2 (except in On/Off control)	<b>AL2L</b> Set up lower limit of Alarm 2	<b>PRN</b> Select pattern to be edited
<b>CoEF</b> Ratio of Output 1 against Output 2 when in dual output control (set when in PID and dual output control)	<b>AL3H</b> Set up upper limit of Alarm 3	<b>TUNE</b> Select AT or ST
<b>dERd</b> Set up deadband (when in dual output)	<b>AL3L</b> Set up lower limit of Alarm 3	<b>S-HC</b> Select heating, cooling or dual output heating and cooling
<b>PV-F</b> Set up input filter factor	<b>ALHP</b> Record highest temperature of Alarm 1	<b>AL1</b> <b>AL2</b> <b>AL3</b> Set up Alarm 1 mode
<b>R</b> Set up input filter range	<b>ALLP</b> Record lowest temperature of Alarm 1	<b>AL1o</b> <b>AL2o</b> <b>AL3o</b> Set up Alarm 1 options
<b>PVof</b> Adjust input compensation	<b>ALHP</b> Record highest temperature of Alarm 2	<b>AL1d</b> <b>AL2d</b> <b>AL3d</b> Set up Alarm 1 delay
<b>PVSR</b> Adjust input gain	<b>ALLP</b> Record lowest temperature of Alarm 2	<b>oELN</b> Set up reverse alarm output
<b>SVSL</b> Set up rising slope (when CRTS = SLOP)	<b>ALHP</b> Record highest temperature of Alarm 3	<b>RMEP</b> Set up Remote type
<b>ALMR</b> Adjust upper limit compensation for analog Output 1*	<b>ALLP</b> Record lowest temperature of Alarm 3	<b>EXEC</b> Select auxiliary function

# Parameters Operation

Regulation Mode	Operation Mode	Initial Setting Mode
<b>ALML</b> Adjust lower limit compensation for analog Output 1*	<b>oUe1</b> Display and adjust Output 1 volume	<b>CoSH</b> Enable/disable communication write-in
<b>ALMR</b> Adjust upper limit compensation for analog Output 2*	<b>oUe2</b> Display and adjust Output 2 volume	<b>C-SL</b> Select ASCII or RTU format
<b>ALML</b> Adjust lower limit compensation for analog Output 2*	<b>o1MR</b> Set up upper limit percentage for Output 1	<b>C-No</b> Set up communication address
<b>ALMR</b> Adjust upper limit compensation for Retransmission*	<b>o1ML</b> Set up lower limit percentage for Output 1	<b>bPS</b> Set up baudrate
<b>ALML</b> Adjust lower limit compensation for Retransmission*	<b>o2MR</b> Set up upper limit percentage for Output 2	<b>LEN</b> Set up data length
<b>RM-S</b> Adjust Remote gain	<b>o2ML</b> Set up lower limit percentage for Output 2	<b>StoP</b> Set up stop bit
<b>RM-F</b> Adjust Remote compensation	<b>CL1</b> Display current measured at CT1	<b>PRLY</b> Set up parity bit
<b>EVe1</b> Set up Event 1 function	<b>CL2</b> Display current measured at CT2	
<b>EVe2</b> Set up Event 2 function		
<b>EVe3</b> Set up Event 3 function Press		
<b>Note:</b> Press ◀ to return to auto-tuning * 1 scale = 2μA; 1 scale = 1mV 【TBC】	<b>Note:</b> Press ◀ to return to set up target temperature	<b>Note:</b> Press ◀ to return to set up input type *1 scale = 2μA; 1 scale = 1mV

**PID mode:** Any of the 6 PID groups can be selected. When n = 6, the program will automatically select the PID group that is the closest to the target temperature.

Regulation Mode	Operation Mode	Initial Setting Mode
<b>Pcd</b> Select the nth PID (n = 0~5) Press ◀▶ 0~5 <sup>th</sup> PID	<b>SVD</b> Set up the 0 <sup>th</sup> PID temperature value Press ◀▼	<b>SVS</b> Set up the 5 <sup>th</sup> PID temperature value Press ◀▼
	<b>PD</b> Set up the 0 <sup>th</sup> proportional band value	<b>PS</b> Set up the 5 <sup>th</sup> proportional band value
	<b>TD</b> Set up the 0 <sup>th</sup> Ti value	<b>TS</b> Set up the 5 <sup>th</sup> Ti value
	<b>TD</b> Set up the 0 <sup>th</sup> Td value	<b>DS</b> Set up the 5 <sup>th</sup> Td value
	<b>CoFD</b> Set up the 0 <sup>th</sup> PID integral deviation	<b>CoFS</b> Set up the 5 <sup>th</sup> PID integral deviation
	<b>Note:</b> Press ◀ to return to PID deviation	<b>Note:</b> Press ◀ to return to PID deviation

**Patterns and steps:** Edit **PROB** in **CLRL** parameter. Take editing pattern 0 for example:

Regulation Mode	Operation Mode	Initial Setting Mode
<b>PERN</b> Select the pattern number to be edited Select number Press ◀▼ to select Off	<b>SP00</b> Edit temperature for Step 0 Press ◀▼	<b>P540</b> Select actual number of steps when the program is executing Press ◀▼
Exit pattern and step editing and switch to <b>S-HC</b> to continue the setup process	<b>EM00</b> Edit time for Step 0 (time unit: hr, min) Set up Step 0~15 in order	<b>CYCO</b> Set up additional cycles (0~99) for the pattern execution
	<b>SP15</b> Edit temperature for Step 15 <b>EM15</b> Edit time for Step 15 <b>Note:</b> Press ◀ to set up actual step numbers	<b>LINK</b> Set up link pattern. Off refers to the program end. <b>Note:</b> Press ◀ to return to select the pattern number to be edited

## Products

# DTK

## New generation of intelligent temperature controller

The DTK series is a temperature controller with high performance. It is user-friendly to save development costs and time for users and features advanced temperature control functions. With the compact dimensions (60 mm in length) and a high-resolution LCD display, the DTK series is a good choice for all kinds of environments or occasions.



## Features

- ▶ High-resolution LCD display
- ▶ Length shortened to 60 mm
- ▶ High-speed sampling time 100 ms
- ▶ CE & UL certified

## LCD Panel & Keypad



- A** PV: Present Value
- B** SV: Set Value
- C** °C, °F: Celsius, Fahrenheit temperature indicator
- D** 1, 2: ALM1, ALM2 alarm output indicator
- E** A/M: Auto-tuning and manual modes indicator
- F** OUT1, OUT2: Output indicators
- G** Select/Set key
- H** Value adjustment key

## Electrical Specifications

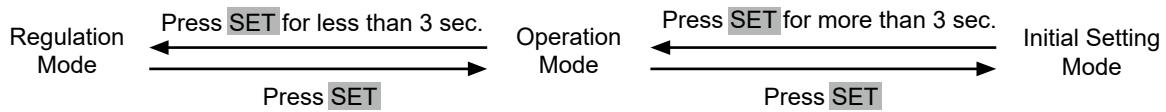
<b>Power supply</b>	100~240V <sub>AC</sub> , 50/60 Hz
<b>Display</b>	LCD display. PV: red, SV: green
<b>Input temperature sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100
	RTD: Cu50, Ni120
<b>Control methods</b>	On/Off, PID, Manual
<b>Display scale</b>	1 digit after decimal point, or no decimal point
<b>Sampling rate</b>	Thermocouple or platinum RTD: 0.1 second
<b>Ambient temperature</b>	0~+50 °C
<b>Ambient humidity</b>	35~80 % RH (non-condensing)

## Alarm Outputs

The DTK Series offers 2 alarm outputs, and each alarm output has 9 alarm modes to choose from in the initial setting mode. When the target temperature exceeds or falls below the set point, the alarm output is enabled.

SV	Alarm Mode	Alarm Output Operation
0	Alarm function disabled	
1	Deviation upper- and lower-limit : This alarm output operates when PV value is higher than the set value SV+(AL-H) or lower than the set value SV-(AL-L).	
2	Deviation upper-limit : This alarm output operates when PV value is higher than the set value SV+(AL-H).	
3	Deviation lower-limit : This alarm output operates when PV value is lower than the set value SV-(AL-L).	
4	Absolute value upper- and lower-limit : This alarm output operates when PV value is higher than the set value AL-H or lower than the set value AL-L.	
5	Absolute value upper-limit : This alarm output operates when PV value is higher than the set value AL-H.	
6	Absolute value lower-limit : This alarm output operates when PV value is lower than the set value AL-L.	
7	Hysteresis upper-limit alarm output : This alarm output operates if PV value is higher than the set value SV+(AL-H). This alarm output is Off when PV value is lower than the set value SV+(AL-L).	
8	Hysteresis lower-limit alarm output : This alarm output operates if PV value is lower than the set value SV-(AL-H). This alarm output is Off when PV value is higher than the set value SV-(AL-L).	
9	Disconnection alarm: This alarm output operates if the sensor connection is incorrect or has been disconnected.	

# Parameters Operation



Regulation Mode	Operation Mode	Initial Setting Mode
<b>RL</b> Auto-tuning ( when in PID control and Run mode ) Press  ▾	<b>rT34</b> Use   to set up target temperature Press  ▾	<b>EnPE</b> Set up input type Press  ▾
<b>P</b> Set proportion band	<b>r-S</b> Control loop Run or Stop	<b>EPUn</b> Set up temperature unit
<b>i</b> Set integration time	<b>SP</b> Set up the position of decimal point	<b>EP-H</b> Set up upper temperature limit
<b>d</b> Set derivative time	<b>LoC</b> Lock the keys	<b>EP-L</b> Set up lower temperature limit
<b>PdoF</b> Set up PID control offset	<b>AL1H</b> Set up upper limit of Alarm 1	<b>Ctrl-L</b> Select control modes
<b>o1-S</b> Adjust Output 1 hysteresis (when in On/Off control)	<b>AL1L</b> Set up lower limit of Alarm 1	<b>S-HC</b> Select heating, cooling or dual output heating and cooling
<b>o2-S</b> Adjust Output 2 hysteresis (when in On/Off control)	<b>AL2H</b> Set up upper limit of Alarm 2	<b>ALR1</b> Set up Alarm 1 mode
<b>o1-H</b> OUT1 HEAT: Heating control cycle for Output 1 (when Ctrl = PID/Fuzzy/Manual)	<b>AL2L</b> Set up lower limit of Alarm 2	<b>AL1o</b> Set up Alarm 1 options *3
<b>o1-C</b> OUT1 COOL: Cooling control cycle for Output 1 (when Ctrl = PID/Fuzzy/Manual)	<b>oUt1</b> Display and adjust Output 1 volume	<b>AL1d</b> Set up Alarm 1 delay *4
<b>o2-H</b> OUT2 HEAT: Heating control cycle for Output 2 (when Ctrl = PID/Fuzzy/Manual)	<b>oUt2</b> Display and adjust Output 2 volume	<b>ALR2</b> Set up Alarm 2 mode
<b>o2-C</b> OUT2 COOL: Cooling control cycle for Output 2 (when Ctrl = PID/Fuzzy/Manual)	<b>o1nR</b> Set up upper limit percentage for Output 1	<b>AL2o</b> Set up Alarm 2 options *3
<b>CoEF</b> Ratio of Output 1 against Output 2 when in dual output control (set when in PID control)	<b>o1nL</b> Set up lower limit percentage for Output 1	<b>AL2d</b> Set up Alarm 2 delay *4
<b>dERd</b> Set up deadband	<b>o2nR</b> Set up upper limit percentage for Output 2	
<b>Pu-F</b> Set up input filter factor	<b>o2nL</b> Set up lower limit percentage for Output 2	
<b>Pu-r</b> Set up input filter range		
<b>Puof</b> Adjust input compensation *1		
<b>PuBR</b> Adjust input gain *1		
<b>RIrR</b> Adjust upper limit compensation for analog Output 1 *2		
<b>RIrL</b> Adjust lower limit compensation for analog Output 1 *2		
<b>Note:</b> Press  to return to auto-tuning	<b>Note:</b> Press  to return to set up target temperature	<b>Note:</b> Press  to return to set up input type

# Parameters Operation

- \* Alarm 1 is automatically switched to Output Control 2 when the dual output mode is selected
- \* Set up upper/lower limit percentage for Output 1/2 volume: set output permission ranges. E.g. upper and lower limit percentages are respectively set as 90 and 20, output volume will be limited to 20%~90%.
- \*1. Offset Present value: Use  $P_{\text{offset}}$  and  $P_{\text{offsetR}}$ .  
Present value = measured value  $\times (1 + P_{\text{offsetR}} / 1,000) + P_{\text{offset}}$ .
- \*2. 1 scale = 1 $\mu$ A
- \*3. Set up alarm standby: set corresponding Y value as xxxY (Y = 0: normal, Y = 1: standby)  
Set up reverse alarm output: set corresponding Y value as xxYx (Y = 0: forward, Y = 1: backward)  
Set up Hold output: set corresponding Y value as xYxx (Y = 0: normal, Y = 1: Hold)
- \*4. Set up alarm delay: The alarm operates after reaching alarm delay time (recalculating time if discontinuity occurs in the process)

# Temperature Sensors and Temperature Range

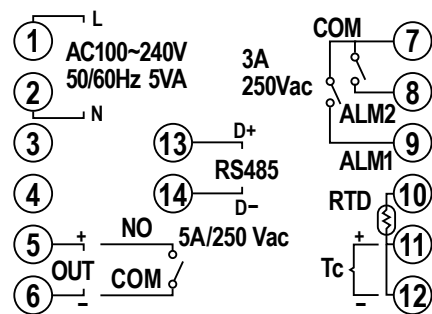
Input sensors	Display	Temperature Range
Platinum RTD: Pt100	Pt	-200~850°C
Platinum RTD: JPt100	JPt	-100~400°C
Copper resistance: Cu50	Cu	-50~150°C
RTD Ni120	ni	-80~300°C
Thermocouple B	b	100~1,800°C
Thermocouple S	s	0~1,700°C
Thermocouple R	r	0~1,700°C
Thermocouple N	n	-200~1,300°C

Input sensors	Display	Temperature Range
Thermocouple E	E	0~600°C
Thermocouple T	t	-200~400°C
Thermocouple J	J	-100~1,200°C
Thermocouple K	K	-200~1,300°C
Thermocouple L	L	-200~850°C
Thermocouple U	U	-200~500°C
Thermocouple Txk	txk	-200~800°C

# Panel Sizes

Models	Sizes (W×H)
4848	45 mm × 45 mm
4896	44.5 mm × 91.5 mm
7272	68 mm × 68 mm
9696	91.5 mm × 91.5 mm

# Terminal Wiring Diagram



## Products

# DTA

## Standard Type

The DTA Series is designed for simple applications, offering 3 most frequently adopted outputs with various user-friendly functions and simple stable data transmission.

Optional functions:

- RS-485 communication interface (Modbus ASCII/RTU 2,400~38,400 bps)
- Current transformer (CT)



## Electrical Specifications

<b>Power supply</b>	100~240 V <sub>AC</sub> , 50/60 Hz
<b>Voltage range</b>	85~110% rated voltage
<b>Power consumption</b>	Max. 5 VA
<b>Display</b>	2-line 7-segment LED display, PV: red; SV: green
<b>Input temperature sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, U, L, TXK
	Platinum RTD: Pt100, JPt100
<b>Display scale</b>	1 digit after decimal point, or no decimal point
<b>Control methods</b>	PID, On/Off, Manual
<b>Output types</b>	Relay: 250 V <sub>AC</sub> , 5 A, SPDT (DTA4848: SPST)
	Voltage pulse: 14 V <sub>DC</sub> , Max. output current: 40 mA
	Current: DC 4~20 mA (Load resistance < 600 Ω)
<b>Sampling rate</b>	0.5 second
<b>Communication</b>	RS-485 digital communication, 2,400~38,400 bps (optional)
<b>Communication protocol</b>	Modbus protocol, ASCII/RTU format (optional)
<b>Vibration resistance</b>	10~55 Hz, 10 m/s <sup>2</sup> for 10 mins in X, Y, Z directions
<b>Shock resistance</b>	Max. 300 m/s <sup>2</sup> , 3 times in each of 3 axes, 6 directions
<b>Ambient temperature</b>	0°C~50°C
<b>Storage temperature</b>	-20°C~+65°C
<b>Altitude</b>	< 2,000 m
<b>Ambient humidity</b>	35~85% RH (non-condensing)
<b>IP Rating (Panel)</b>	IP65

## Products

# DTB **Advanced Type**

Compared to the DTA Series, the DTB Series is designed with a linear voltage output and adopts dual-loop output control for simultaneous heating and cooling and to rapidly reach a target temperature.

The DTB Series features built-in RS-485 communication interface (Modbus ASCII/RTU 2,400~38,400 bps). The programmable PID control function allows users to set up to 64 groups of different temperature and control time.

Optional functions:

- Current transformer (CT)-output by alarm
- EVENT function-switching between 2 SVs by using PLC or switches



## Electrical Specifications

<b>Power supply</b>	100~240 V <sub>AC</sub> , 50/60 Hz; 24 V <sub>DC</sub> ±10 %
<b>Voltage range</b>	85~110 % rated voltage
<b>Power consumption</b>	< 5 VA
<b>Display</b>	2-line 7-segment LED display, 4 digits available, PV: red, SV: green
<b>Input temperature sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100
	Analog input: 0~5V, 0~10V, 0~20 mA, 4~20 mA, 0~50 mV
<b>Display scale</b>	1 digit after decimal point, or no decimal point
<b>Control methods</b>	PID, programmable PID, On/Off., Manual
<b>Output types</b>	Relay: SPDT (DTB4848/DTB4824: SPST), Max. load: 250 V <sub>AC</sub> , Resistive load: 5 A
	Voltage pulse: 14 V <sub>DC</sub> , Max. output current: 40 mA
	Current: DC 4~20 mA (Load resistance < 600 Ω)
	Analog voltage: 0~10 V
<b>Sampling rate</b>	Analog input: 0.15 second, Thermocouple or platinum RTD: 0.4 second
<b>Communication</b>	RS-485 digital communication, 2,400~38,400bps
<b>Communication protocol</b>	Modbus protocol, ASCII/RTU format
<b>Vibration resistance</b>	10~55 Hz, 10 m/s <sup>2</sup> for 10 mins in X, Y, Z direction
<b>Shock resistance</b>	Max. 300 m/s <sup>2</sup> , 3 times in each of 3 axes, 6 directions
<b>Ambient temperature</b>	0°C~+50°C
<b>Storage temperature</b>	-20°C~+65°C
<b>Altitude</b>	< 2,000 m
<b>Ambient humidity</b>	35~85 % RH (non-condensing)
<b>IP Rating (Panel)</b>	IP65



# DTC

## Modular Type

The DTC series features a modular and wire-saving structure to monitor multiple temperature points in parallel. Output flexibility allows users to configure output per applications. The built-in password protection prevents unauthorized operation or malicious damage.

The programmable PID control function allows users to set up to 64 groups of different temperature and control time. The DTC series also supports 3 levels of password protection, synchronous communication, and auto ID setup.



## Electrical Specifications

<b>Power supply</b>	24 V <sub>DC</sub> , isolated switching power supply
<b>Voltage range</b>	90 ~ 110 % rated voltage
<b>Power consumption</b>	3 W + 3 W × number of DTC2000 controllers connected in parallel (Max. 7)
<b>Input temperature sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100
	Analog input: 0 ~ 5 V, 0 ~ 10 V, 0 ~ 20 mA, 4 ~ 20 mA, 0 ~ 50 mV
<b>Control methods</b>	PID, programmable PID, On/Off, Manual
<b>Output types</b>	Relay: SPST, Max. load: 250 V <sub>AC</sub> , Resistive load: 3 A
	Voltage pulse: 12 V <sub>DC</sub> , Max. output current: 40 mA
	Current: DC 4 ~ 20 mA (Load resistance < 500 Ω)
	Analog voltage: 0 ~ 10 V (Load resistance > 1,000 Ω)
<b>Sampling rate</b>	Analog input: 0.15 second, Thermocouple or platinum RTD: 0.4 second
<b>Communication</b>	RS-485 digital communication, 2,400 ~ 38,400 bps
<b>Communication protocol</b>	MODBUS protocol, ASCII/RTU format
<b>Vibration resistance</b>	10 ~ 55 Hz, 10 m/s <sup>2</sup> for 10 mins in X, Y, Z direction
<b>Shock resistance</b>	Max. 300 m/s <sup>2</sup> , 3 times in each of 3 axes, 6 directions
<b>Ambient temperature</b>	0 °C ~ 50 °C
<b>Storage temperature</b>	-20 °C ~ +65 °C
<b>Altitude</b>	< 2,000 m
<b>Ambient humidity</b>	35 ~ 85 % RH (non-condensing)

## Products

# DTE **Multi-Channel Modular Type**

The DTE series is a multi-channel temperature controller with modular design. The DTE10T supports up to 8 thermocouple inputs, and the DTE10P supports up to 6 platinum RTD inputs. Installation on DIN Rail enables each channel to operate independently.

The built-in RS-485 2-wire communication allows transmission of up to 115,200 bps. The programmable PID control function allows users to set up to 64 groups of different temperature and control time. The DTE series also supports synchronous communication and auto ID setup, and provides diverse optional output modules (relay, voltage pulse, current and linear current) to fulfill various applications.



## Electrical Specifications

<b>Power supply</b>	24 V <sub>DC</sub> , isolated switching power supply
<b>Voltage range</b>	90 ~ 110 % rated voltage
<b>Power consumption</b>	Max. 10W + 3W × number of DTC2000 controllers connected in parallel (Max. 7)
<b>Input temperature sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100 RTD: Cu50; Ni120
<b>Control methods</b>	PID, programmable PID, On/Off, Manual
<b>Output types</b>	Relay: SPST, Max. load: 250 V <sub>AC</sub> , Resistive load: 3A
	Voltage pulse: 12 V <sub>DC</sub> , Max. output current: 40 mA
	Current: DC 4 ~ 20 mA (Load resistance < 500 Ω)
	Analog voltage: 0 ~ 10 V (Load resistance > 1,000 Ω)
<b>Sampling rate</b>	Thermocouple or platinum RTD: 1.0 second / all inputs
<b>Communication</b>	RS-485 digital communication, 2,400 ~ 115,200 bps
<b>Communication protocol</b>	Modbus protocol, ASCII/RTU format
<b>Vibration resistance</b>	10 ~ 55 Hz, 10 m/s <sup>2</sup> for 10 mins in X, Y, Z direction
<b>Shock resistance</b>	Max. 300 m/s <sup>2</sup> , 3 times in each of 3 axes, 6 directions
<b>Ambient temperature</b>	0 °C ~ +50 °C
<b>Storage temperature</b>	-20 °C ~ +65 °C
<b>Altitude</b>	< 2,000 m
<b>Ambient humidity</b>	35 ~ 85 % RH (non-condensing)

# DTV **Valve Type**

The DTV series is dedicated for electronic valve applications. It is user-friendly and easy to operate. With the built-in Modbus communication, data collection can be implemented quickly. The DTV series also features the following functions:

- Auto/manual mode switching by a single key
- "Left" key enables fast and convenient parameter setting
- Real-time output percentage display of the valve action level
- 2 alarm outputs with 17 alarm modes available
- Monitors and collects data of multiple temperature controllers via RS-485 communication interface



## Electrical Specifications

<b>Power supply</b>	100~240V <sub>AC</sub> · 50/60Hz
<b>Voltage range</b>	85~110% rated voltage
<b>Power consumption</b>	< 5VA
<b>Display</b>	2-line 7-segment LED display, 4-bit or 2-bit valve action level display available PV: red, SV & action level of valve: green
<b>Input temperature sensors</b>	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK Platinum RTD: Pt100, JPt100 Analog input: 0~5V, 0~10V, 0~20mA, 4~20mA, 0~50mA
<b>Display scale</b>	1 digit after decimal point, or no decimal point
<b>Control methods</b>	PID, programmable PID, On/Off, Manual
<b>Output types</b>	Relay: SPST, Max. load: 250V <sub>AC</sub> ; resistive load: 5A Current: DC 4~20mA
<b>Sampling rate</b>	Analog input: 0.15 second; thermocouple or platinum RTD: 0.4 second
<b>Communication</b>	RS-485 digital communication, 2,400~38,400 bps
<b>Communication protocol</b>	Modbus protocol, ASCII/RTU format
<b>Vibration resistance</b>	10~55Hz, 10 m/s <sup>2</sup> for 10 mins in X, Y, Z directions
<b>Shock resistance</b>	Max. 300 m/s <sup>2</sup> , 3 times in each of 3 axes, 6 directions
<b>Ambient temperature</b>	0°C~+50°C
<b>Storage temperature</b>	-20°C~+65°C
<b>Altitude</b>	< 2,000m
<b>Ambient humidity</b>	35~85% RH (non-condensing)
<b>IP Rating (Panel)</b>	IP65

# Ordering Information

## DT3

1 2 3 4 5 6 7 8

Series Name	Delta DT3 Series Temperature Controller	
1 2 Panel dimensions (W × H)	20: 4848, 1/16 DIN 48 × 48 mm 30: 7272, 72 × 72 mm	40: 4896, 1/8 DIN 48 × 96 mm 60: 9696, 1/4 DIN 96 × 96 mm
3 Output 1 options	R: Relay, 250 V <sub>AC</sub> , 5 A V: Voltage pulse, 12 V, -10 % ~ +20 %	C: DC current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10 V <sub>DC</sub>
4 Power supply	A: AC 100 ~ 240 V D: DC 24 V	
5 Output 2 options	R: Relay, 250 V <sub>AC</sub> , 5 A V: Voltage pulse, 12 V, -10 % ~ +20 %	C: DC current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10 V <sub>DC</sub>
6 Optional function 1 <sup>st</sup>	0: None, 1: Event input 3, 2: RS-485 communication	
7 Optional function 2 <sup>nd</sup>	0: None, 1: Event input 2, 2: CT input 2, 3: Retransmission output	
8 Optional function 3 <sup>rd</sup>	0: None, 1: Event input 1, 2: CT input 1, 3: Remote setup input	

## DT3 Accessories

D T 3 - 1

Accessories	Delta DT3 Series Temperature Controller	
1 Option 1	20ESTD : DT320 Extension without RS-485 & EV3	R: Relay Output
	20ECOM : DT320 Extension includes RS-485	V: DC Voltage Pulse Output
	20EEV3 : DT320 Extension includes Event3	C: DC Current Output
	40ESTD : DT340/DT360 Extension without RS-485 & EV3	L: DC Linear Voltage Output
	40ECOM : DT340/360 Extension includes RS-485	Event: Event Input
	40EEV3 : DT340/360 Extension includes Event3	CTI: CT Input
	DT330 is a substitute for DTA7272 (with basic function). It has less extension function. <ul style="list-style-type: none"> <li>DT330□A-0 has 1 output, 1 alarm output, and has no extension functions</li> <li>DT330□A has 1 output, 2 alarm outputs, but no extension functions (similar to DTA7272□0)</li> <li>DT330□A-0200 has 1 output, 2 alarm outputs, and has no extension functions. It supports RS-485 communication function (similar to DTA7272□1)</li> </ul>	RETRANS: Retransmission REMOTE: Remote set point CT30A: 30A CT CT100A: 100A CT



# DTK

1 2 3 4 5 6 7

Series Name	Delta DTK Series Temperature Controller	
1 2 3 4 Panel size (W × H)	4848: 48 × 48 mm 4896: 48 × 96 mm	7272: 72 × 72 mm 9696: 96 × 96 mm
5 Output options	R: Relay, 250 V <sub>AC</sub> , 5A V: Voltage pulse, 12V, -10% ~ +20%	C: DC Current 4~20 mA
6 Optional function	0: N/A	1: RS-485 communication
7 Optional function	1: 1 Alarm output	2: 2 Alarm outputs

# DTA

1 2 3 4 5 6 - 7

Series Name	Delta DTA Series Temperature Controller	
1 2 3 4 Panel size (W × H)	4848: 1/16 DIN 48 × 48 mm 4896: 1/8 DIN 48 × 96 mm 9696: 1/4 DIN 96 × 96 mm	7272: 72 × 72 mm 9648: 96 × 48 mm
5 Output	R: Relay, SPDT, 250 V <sub>AC</sub> , 5A (SPST: 1/16 DIN) V: Voltage pulse, 14V, -20% ~ +10% (Max. 40 mA)	C: DC Current, 4~20 mA
6 Communication (optional)	0: N/A	1: RS-485 communication
7 CT (optional)	□: N/A	T: With CT (only DTA7272R0)

# DTB

1 2 3 4 5 6 7 - 8

Note 1: DTB4824 series: no optional function provided and no extra alarm output supported, but user can set 2<sup>nd</sup> output as alarm mode.  
Note 2: DTB4848 series: only one alarm output when optional function supported, but user can set 2<sup>nd</sup> output as 2<sup>nd</sup> alarm output.

Series Name	Delta DTB Series Temperature Controller	
1 2 3 4 Panel size (W × H)	4824: 1/32 DIN 48 × 24 mm 4848: 1/16 DIN 48 × 48 mm	4896: 1/8 DIN 48 × 96 mm 9696: 1/4 DIN 96 × 96 mm
5 Output 1 options	R: Relay, SPDT, 250 V <sub>AC</sub> , 5A (SPST: 1/16 DIN and 1/32 DIN size) V: Voltage pulse, 14V, -20% ~ +10% (Max. 40 mA)	C: DC current, 4~20 mA L: Linear voltage, 0~10 V <sub>DC</sub>
6 Output 2 options	R: Relay, SPDT, 250 V <sub>AC</sub> , 5A (SPST: 1/16 DIN and 1/32 DIN size)	V: Voltage pulse, 14V, -20% ~ +10% (Max. 40 mA)
7 Event inputs/Current Transformer function (optional)	None: No Event input; no CT T: CT is provided; no Event input	E: Event input is provided; no CT
8 Power supply	None: AC 100~240V	D: DC 24V



## DTC

1 2 3 4 5

Series Name	Delta DTC Series Temperature Controller
1 Controller type	1: Main unit 2: Extension unit
2 Number of auxiliary outputs	0: Standard 2 outputs, no auxiliary output
3 4 Optional function	00: Standard function 01: With CT input
5 Output	R: Relay, SPST, 250 V <sub>AC</sub> , 3 A V: Voltage pulse output, 12V, -10% ~ +20% C: DC Current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10V

## DTE

1 2 3

Series Name	Delta DTE Series Temperature Controller
1 Controller type	1: Main unit 2: Accessory
2 3 Optional function	0T: 4-channel TC (main unit, accessory) 0P: 3-channel PT (main unit, accessory) 0V: 4 channels of voltage pulse output 0C: 4 channels of linear current output 0R: 4 channels of relay output 0L: 4 channels of linear voltage output 0D: 8 Digital inputs, no output. CT: 4 channels of current transformers DS: Display & setup module

## DTV

1 2 3 4 5

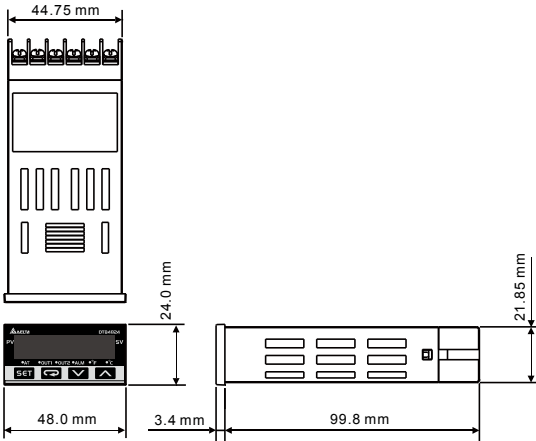
Series Name	Delta DTV Series Temperature Controller
1 2 3 4 Panel dimensions (W x H)	4896: 1/8 DIN 48 × 96 mm 9696: 1/4 DIN 96 × 96 mm
5 Output	R: Relay, SPDT, 250 V <sub>AC</sub> , 5 A C: DC Current, 4 ~ 20 mA



# Dimensions

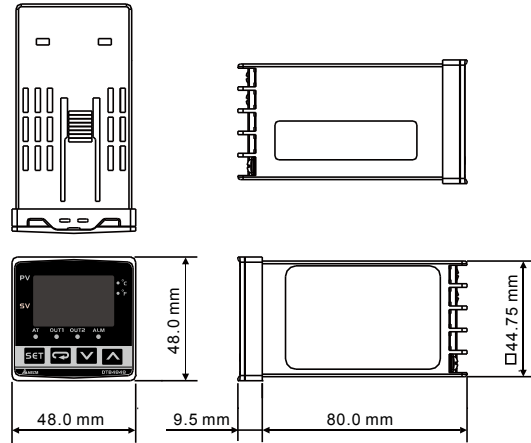
## DTB

4824

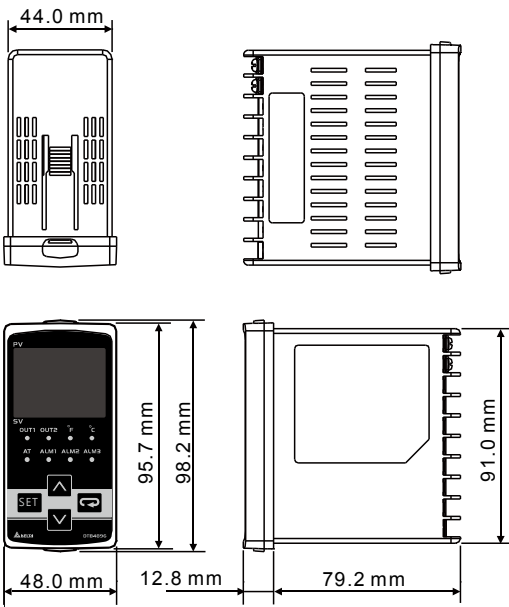


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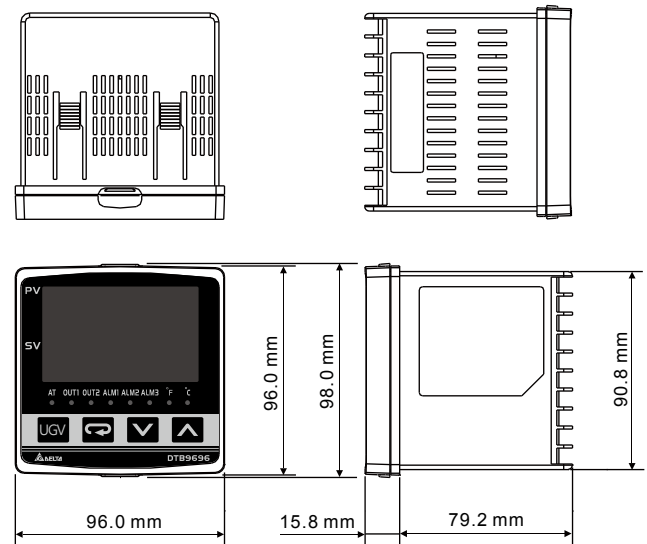
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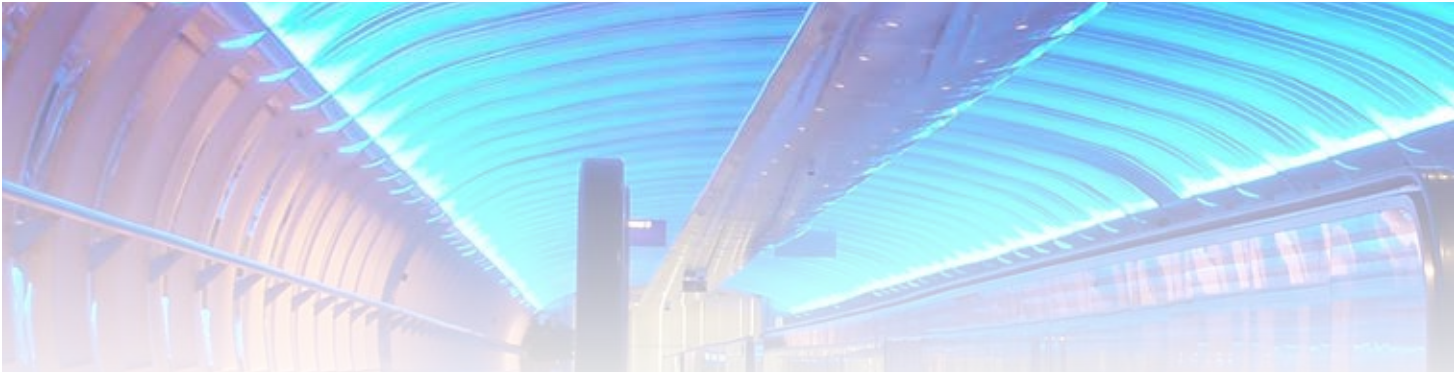


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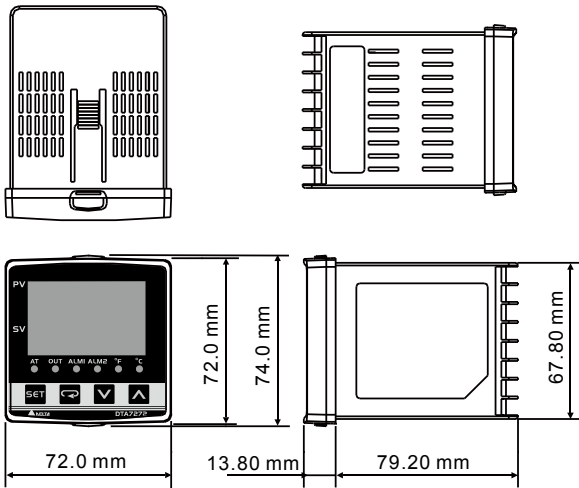


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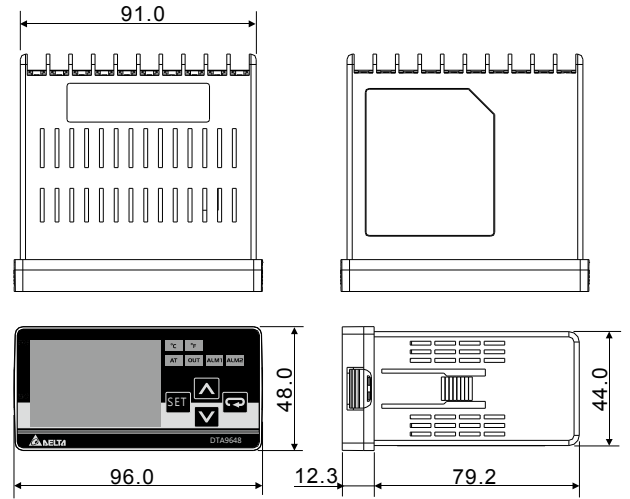


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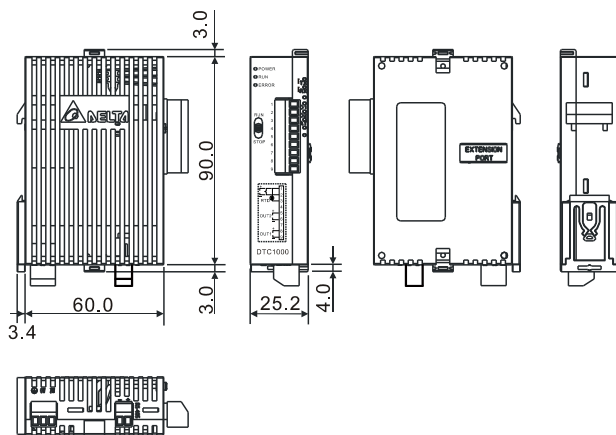


## 9648

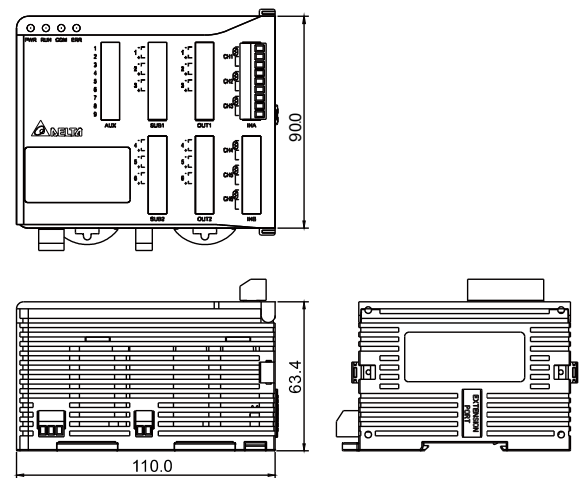
Unit: mm



## DTC



## DTE

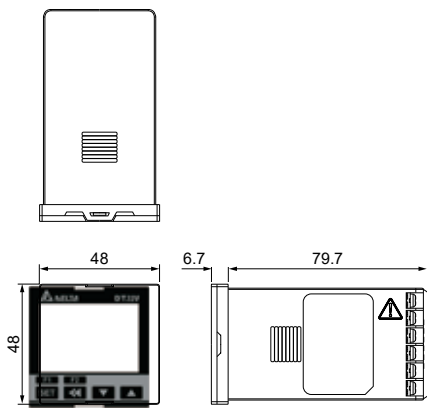




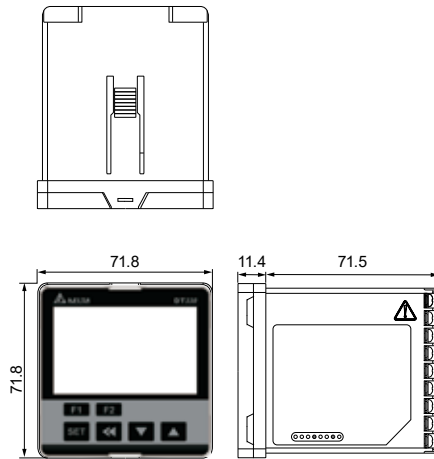


## DT3

320

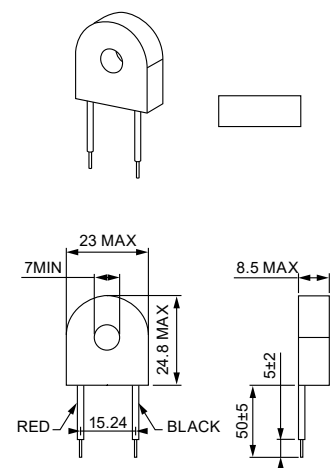


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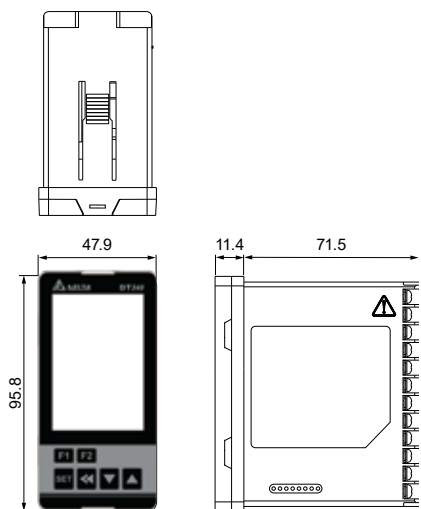


CT30A

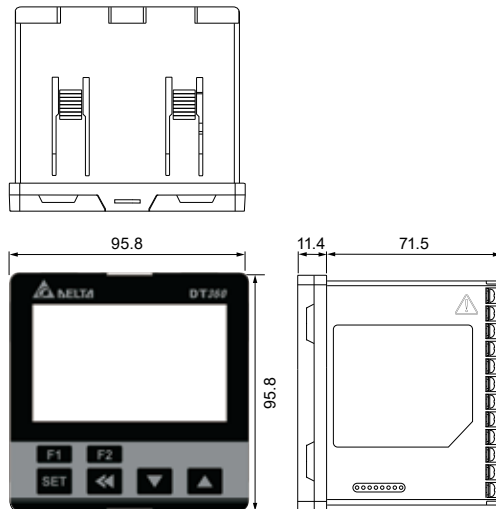
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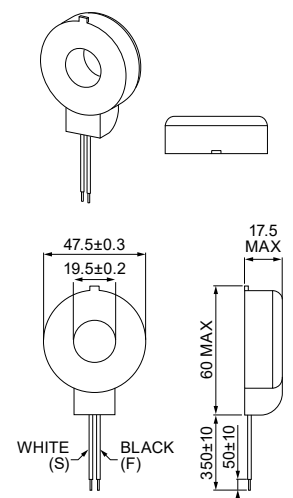
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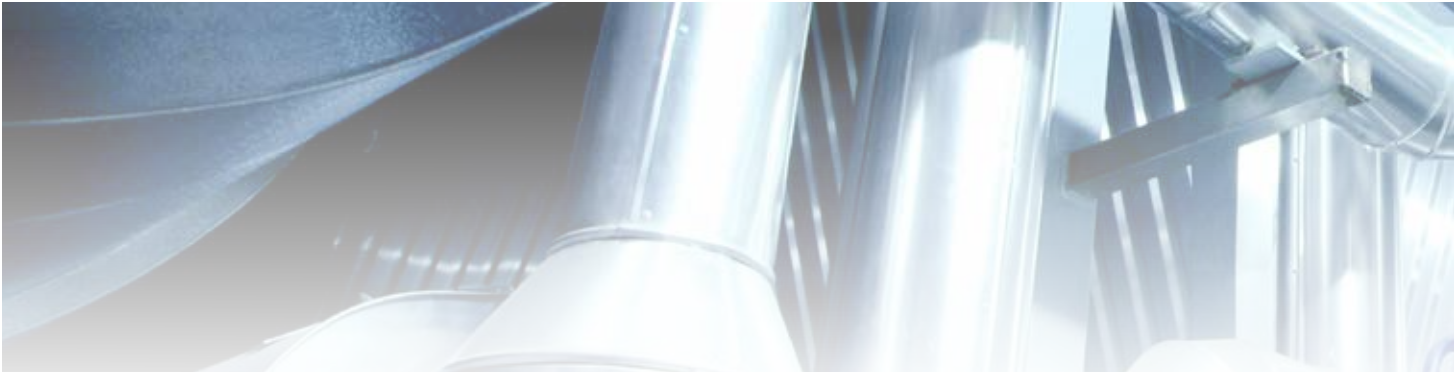


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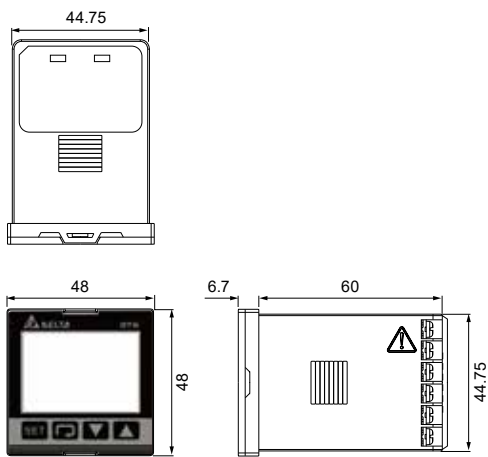
CT100A



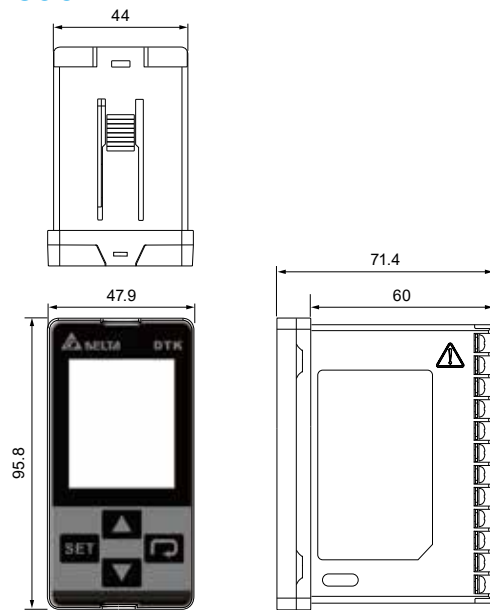


## DTK

4848

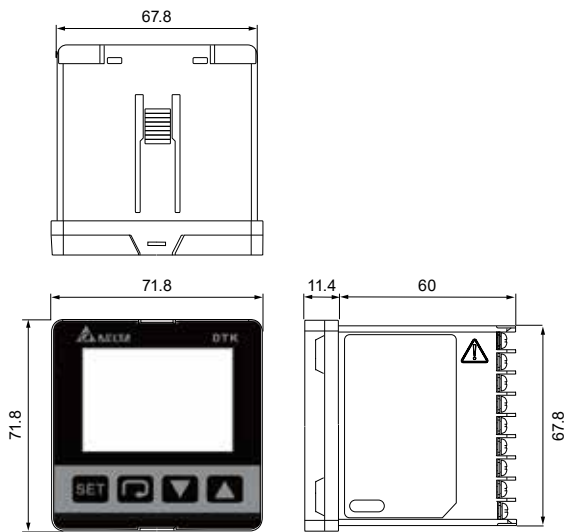


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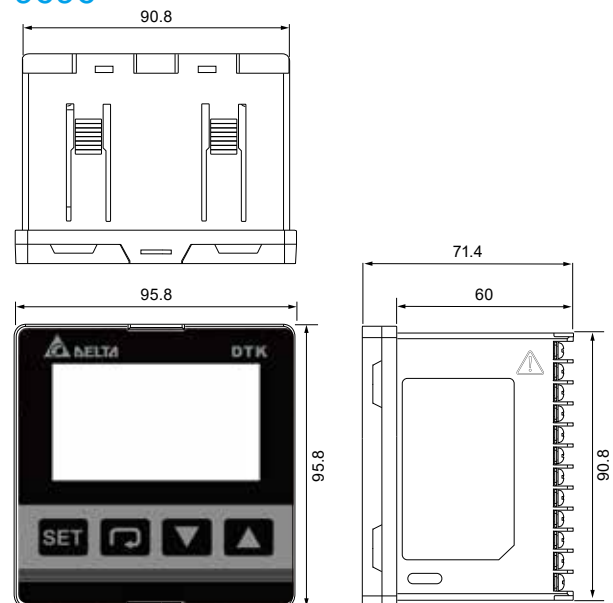


Unit: mm

7272



9696







Smarter. Greener. Together.

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