Digitized Automation for a Changing World

Delta Temperature Controller
DT Series

www.deltaww.com

DELTA
Smarter. Greener. Together.

Features

Many Sizes Available:

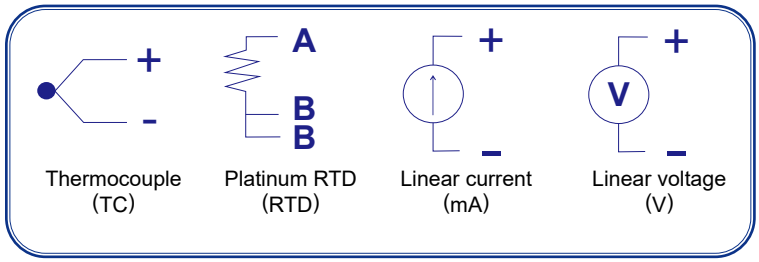
- From 48 × 24 mm to 96 × 96 mm, all panel sizes comply with international standards

Quality Assurance:

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

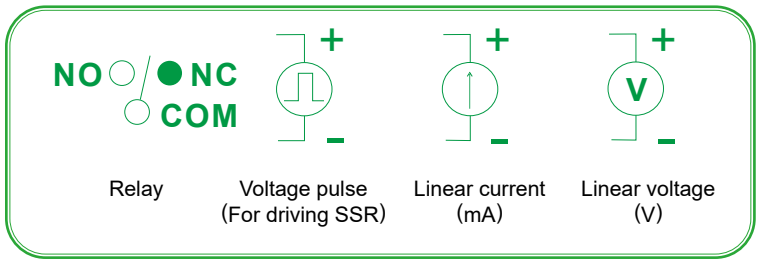
Supports Various Sensors:

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



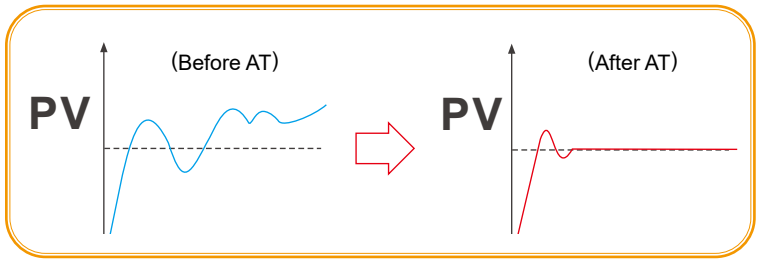
Various Output Modes:

- 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

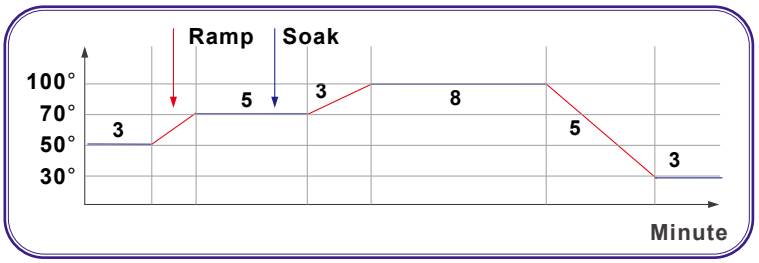


Current Transformer (CT):

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

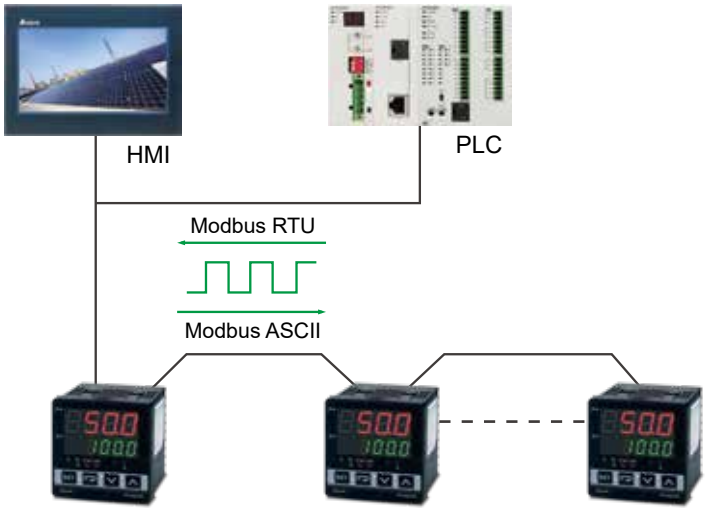
Programmable Control:

- 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

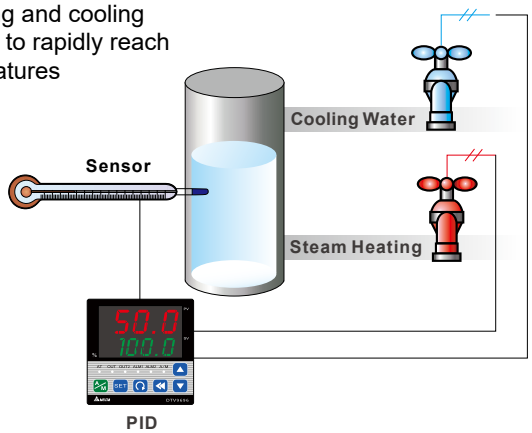


Safety:

- 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

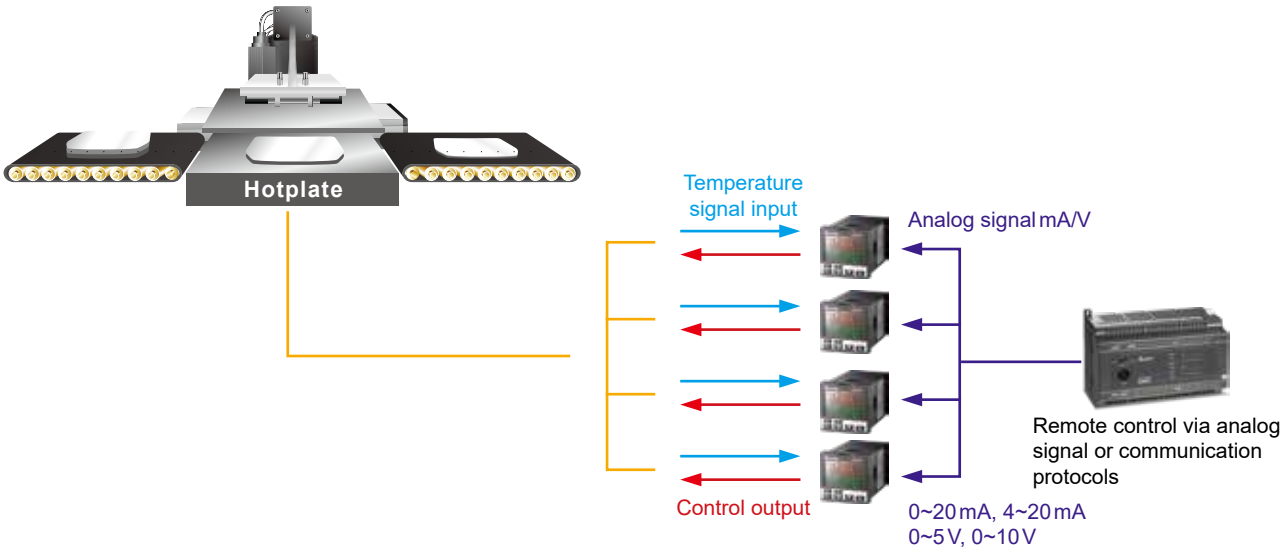
Products

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.

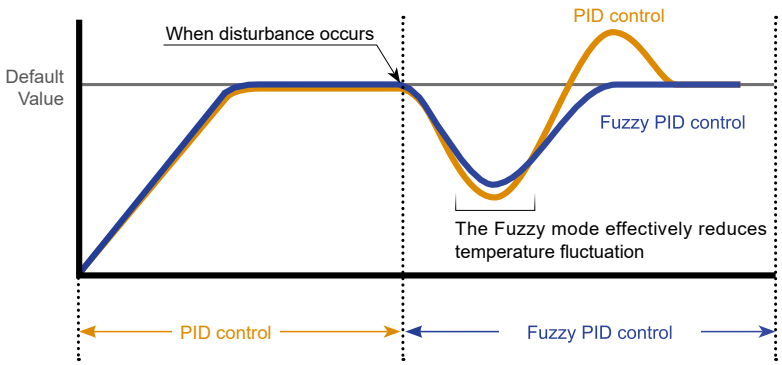
Remote Control

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

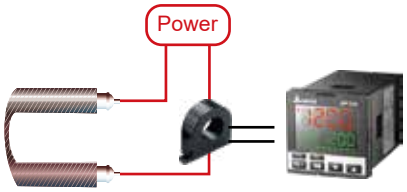
Modular design of functional devices for flexible replacement

Large Tri-color LCD Display

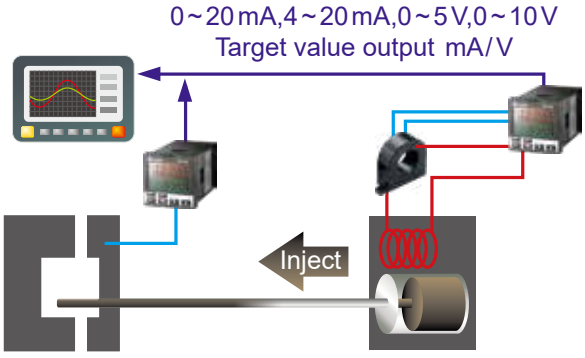
Tri-color temperature controller

Heater Disconnection Detection

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



Retransmission Output



User-defined Function Keys

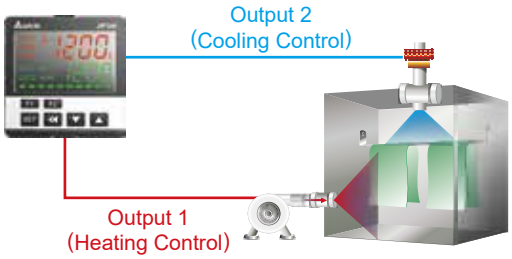
- Menu
- Auto-tuning
- Run/Stop Mode
- Program suspension
- Control modes selection

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

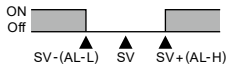
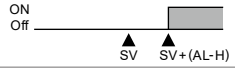
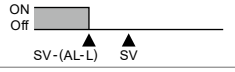
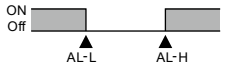
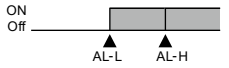
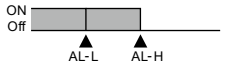
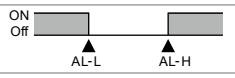


Specifications

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

Alarm Outputs

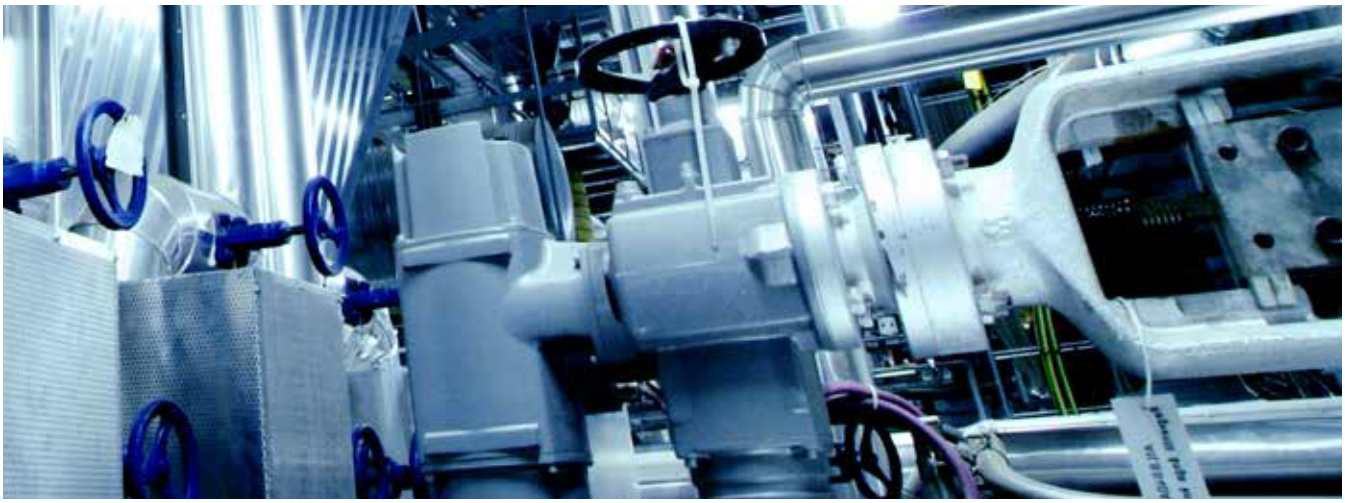
The DT3 offers 3 alarm outputs, and each alarm output has 18 alarm modes to choose from in the initial setting mode. When the target temperature exceeds or falls below the set point, the alarm output is enabled.

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.	

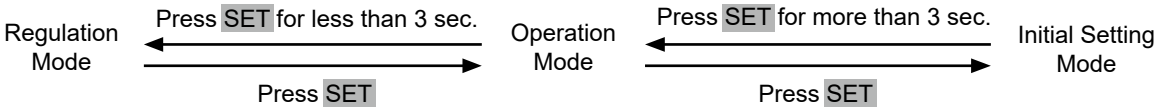
RS-485 Communication

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 an error has occurred. 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	1st Heating/Cooling control cycle	0.1~99 sec.
1008H	2nd 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
AT Auto-tuning (when CTRL set in PID or Fuzzy and in Run mode) Press ◀◀ ▽	1234 Use ▲ ▼ to set up target temperature Press ◀◀ ▽	InPt Set up input type Press ◀◀ ▽
ST Self-tuning switch (set when in PID control and the TUNE parameter = ST)	R-S Control loop Run or Stop	tPUN Set up temperature unit (not displayed when in analog input)
n d Select the nth (n = 0 ~ 5) PID. When n = 6, PID is auto-selected.	PtRN Set up start pattern (when in PID process control and PSTP)	tP-H Set up upper temperature limit
PdoF Set up PID control offset	STEP Set up start step (when in programmable control)	tP-L Set up lower temperature limit
FZ-R Set up Fuzzy gain value	SP Set up the position of decimal point	CtrL Select control modes
FZdb Set up Fuzzy Deadband	LoC Lock the keys	CtRS Select SV control modes
o1-S Adjust Output 1 hysteresis (when in On/Off control)	AL1H Set up upper limit of Alarm 1	WtSV Set up waiting temperature (when in programmable control)
o2-S Adjust Output 2 hysteresis (when in On/Off control)	AL1L Set up lower limit of Alarm 1	W-tM Set up waiting time (when in programmable control)
o1-H o1-C Control cycle for Output 1 (except in On/Off control)	AL2H Set up upper limit of Alarm 2	SLoP Set up start slope (when in programmable control)
o2-H o2-C Control cycle for Output 2 (except in On/Offcontrol)	AL2L Set up lower limit of Alarm 2	PRtN Select pattern to be edited
CoEF Ratio of Output 1 against Output 2 when in dual output control (set when in PID and dual output control)	AL3H Set up upper limit of Alarm 3	tUNE Select AT or ST
dEAd Set up deadband (when in dual output)	AL3L Set up lower limit of Alarm 3	S-HC Select heating, cooling or dual output heating and cooling
PV-F Set up input filter factor	A1HP Record highest temperature of Alarm 1	ALA1 ALA2 ALA3 Set up Alarm 1 mode
R Set up input filter range	A1LP Record lowest temperature of Alarm 1	AL1o AL2o AL3o Set up Alarm 1 options
PVoF Adjust input compensation	A2HP Record highest temperature of Alarm 2	AL1d AL2d AL3d Set up Alarm 1 delay
PVGR Adjust input gain	A2LP Record lowest temperature of Alarm 2	oLCN Set up reverse alarm output
SVSL Set up rising slope (when CRTS = SLOP)	A3HP Record highest temperature of Alarm 3	RMEP Set up Remote type
A1MR Adjust upper limit compensation for analog Output 1*	A3LP Record lowest temperature of Alarm 3	EXEC Select auxiliary function

Parameters Operation

Regulation Mode	Operation Mode	Initial Setting Mode
AIMC Adjust lower limit compensation for analog Output 1*	oUt1 Display and adjust Output 1 volume	CoSH Enable/disable communication write-in
A2MA Adjust upper limit compensation for analog Output 2*	oUt2 Display and adjust Output 2 volume	C-SL Select ASCII or RTU format
A2MC Adjust lower limit compensation for analog Output 2*	o1MA Set up upper limit percentage for Output 1	C-No Set up communication address
RtMA Adjust upper limit compensation for Retransmission*	o1MC Set up lower limit percentage for Output 1	bPS Set up baudrate
RtMC Adjust lower limit compensation for Retransmission*	o2MA Set up upper limit percentage for Output 2	LEN Set up data length
RM-G Adjust Remote gain	o2MC Set up lower limit percentage for Output 2	StoP Set up stop bit
RM-F Adjust Remote compensation	Ct 1 Display current measured at CT1	PRtY Set up parity bit
Evt1 Set up Event 1 function	Ct2 Display current measured at CT2	
Evt2 Set up Event 2 function		
Evt3 Set up Event 3 function Press		
Note: Press ◀◀ to return to auto-tuning * 1 scale = 2μA; 1 scale = 1mV【TBC】	**Note:** Press ◀◀ to return to set up target temperature	**Note:** 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
Pid Select the nth PID (n = 0~5) Press ◀◀ ▷ 0~5th PID	SV0 Set up the 0th PID temperature value Press ◀◀ ▽	SV5 Set up the 5th PID temperature value Press ◀◀ ▽
	P0 Set up the 0th proportional band value	P5 Set up the 5th proportional band value
	I0 Set up the 0th Ti value	I5 Set up the 5th Ti value
	d0 Set up the 0th Td value	d5 Set up the 5th Td value
	CoF0 Set up the 0th PID integral deviation	CoF5 Set up the 5th PID integral deviation
	Note: Press ◀◀ to return to PID deviation	**Note:** Press ◀◀ to return to PID deviation

Patterns and steps: Edit PRo6 in CtRL parameter. Take editing pattern 0 for example:

Regulation Mode	Operation Mode	Initial Setting Mode
PtRN Select the pattern number to be edited Select number Press ◀◀ ▽ to select Off	SP00 Edit temperature for Step 0 Press ◀◀ ▽	PSt0 Select actual number of steps when the program is executing Press ◀◀ ▽
Exit pattern and step editing and switch to S-HC to continue the setup process	tM00 Edit time for Step 0 (time unit: hr, min)	CyC0 Set up additional cycles (0~99) for the pattern execution
	Set up Step 0~15 in order	LCN0 Set up link pattern. Off refers to the program end.
	SP15 Edit temperature for Step 15 tM15 Edit time for Step 15	
	Note: Press ◀◀ to set up actual step numbers	**Note:** 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

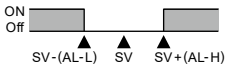
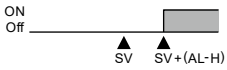
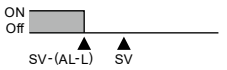
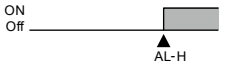
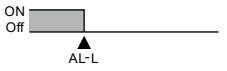
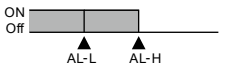
- **A** PV: Present Value
- **B** SV: Set Value
- **C** ºC, ºF: Celsius, Fahrenheit temperature indicator
- **D** 1, 2: ALM1, ALM2 alarm output indicator
- **E** A/M: Auto-tuning and manual modes indicator
- **F** OUT1, OUT2: Output indicators
- **G** Select/Set key
- **H** Value adjustment key

Electrical Specifications

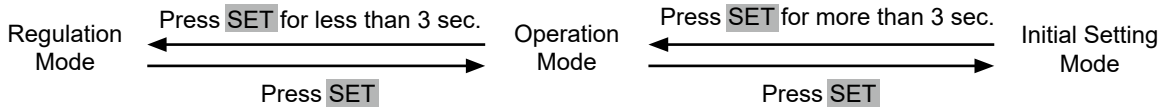
Power supply	100 ~ 240 V_{AC} , 50 / 60 Hz
Display	LCD display. PV: red, SV: green
Input temperature sensors	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100
	RTD: Cu50, Ni120
Control methods	On / Off, PID, Manual
Display scale	1 digit after decimal point, or no decimal point
Sampling rate	Thermocouple or platinum RTD: 0.1 second
Ambient temperature	0 ~ +50 °C
Ambient humidity	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
AT Auto-tuning (when in PID control and Run mode) Press ▽	1234 Use ▲ ▼ to set up target temperature Press ▽	InPt Set up input type Press ▽
P Set proportion band	r-S Control loop Run or Stop	tPUn Set up temperature unit
I Set integration time	SP Set up the position of decimal point	tP-H Set up upper temperature limit
d Set derivative time	LoC Lock the keys	tP-L Set up lower temperature limit
PdoF Set up PID control offset	AL1H Set up upper limit of Alarm 1	Ctrl Select control modes
o1-S Adjust Output 1 hysteresis (when in On/Off control)	AL1L Set up lower limit of Alarm 1	S-HC Select heating, cooling or dual output heating and cooling
o2-S Adjust Output 2 hysteresis (when in On/Off control)	AL2H Set up upper limit of Alarm 2	AL1 Set up Alarm 1 mode
o1-H OUT1 HEAT: Heating control cycle for Output 1 (when Ctrl = PID/Fuzzy/Manual)	AL2L Set up lower limit of Alarm 2	AL1o Set up Alarm 1 options *3
o1-C OUT1 COOL: Cooling control cycle for Output 1 (when Ctrl = PID/Fuzzy/Manual)	oUt1 Display and adjust Output 1 volume	AL1d Set up Alarm 1 delay *4
o2-H OUT2 HEAT: Heating control cycle for Output 2 (when Ctrl = PID/Fuzzy/Manual)	oUt2 Display and adjust Output 2 volume	AL2 Set up Alarm 2 mode
o2-C OUT2 COOL: Cooling control cycle for Output 2 (when Ctrl = PID/Fuzzy/Manual)	o1nA Set up upper limit percentage for Output 1	AL2o Set up Alarm 2 options *3
CoEF Ratio of Output 1 against Output 2 when in dual output control (set when in PID control)	o1nL Set up lower limit percentage for Output 1	AL2d Set up Alarm 2 delay *4
dEAd Set up deadband	o2nA Set up upper limit percentage for Output 2	
Pu-F Set up input filter factor	o2nL Set up lower limit percentage for Output 2	
Pu-r Set up input filter range		
PuoF Adjust input compensation *1		
PuGA Adjust input gain *1		
AInA Adjust upper limit compensation for analog Output 1 *2		
AInL Adjust lower limit compensation for analog Output 1 *2		
Note: Press to return to auto-tuning	**Note:** Press to return to set up target temperature	**Note:** 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 PuoF and PuSR .
Present value = measured value × (1 + PuSR /1,000) + PuoF .

*2. 1 scale = 1μA

*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

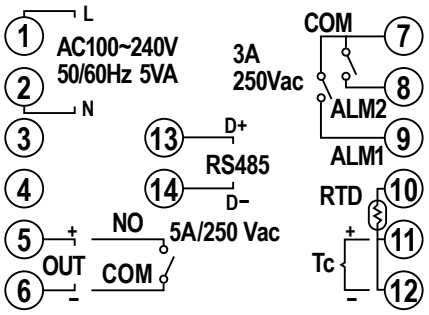
Input Sensors	Display	Temperature Range
Platinum RTD: Pt100	Pt	-200~850°C
Platinum RTD: JPt100	JPt	-100~400°C
Copper resistance: Cu50	Cu	-50~150°C
RTD Ni120	nI	-80~300°C
Thermocouple B	b	100~1,800°C
Thermocouple S	S	0~1,700°C
Thermocouple R	r	0~1,700°C
Thermocouple N	n	-200~1,300°C

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 the 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

Power supply	100~240 V_{AC}, 50/60 Hz
Voltage range	85~110% rated voltage
Power consumption	Max. 5 VA
Display	2-line 7-segment LED display, PV: red; SV: green
Input temperature sensors	Thermocouple: K, J, T, E, N, R, S, B, U, L, TXK
	Platinum RTD: Pt100, JPt100
Display scale	1 digit after decimal point, or no decimal point
Control methods	PID, On/Off, Manual
Output types	Relay: 250 V_{AC}, 5 A, SPDT (DTA4848: SPST)
	Voltage pulse: 14 V_{DC}, Max. output current: 40 mA
	Current: DC 4~20 mA (Load resistance < 600 Ω)
Sampling rate	0.5 second
Communication	RS-485 digital communication, 2,400~38,400 bps (optional)
Communication protocol	Modbus protocol, ASCII/RTU format (optional)
Vibration resistance	10~55 Hz, 10 m/s² for 10 mins in X, Y, Z directions
Shock resistance	Max. 300 m/s² , 3 times in each of 3 axes, 6 directions
Ambient temperature	0°C~50°C
Storage temperature	-20°C~+65°C
Altitude	< 2,000 m
Ambient humidity	35~85% RH (non-condensing)
IP rating (panel)	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 a 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

Power supply	100~240 V_{AC}, 50/60 Hz; 24 V_{DC} ±10 %
Voltage range	85~110 % rated voltage
Power consumption	< 5 VA
Display	2-line 7-segment LED display, 4 digits available, PV: red, SV: green
Input temperature sensors	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
Display scale	1 digit after decimal point, or no decimal point
Control methods	PID, programmable PID, On/Off,, Manual
Output types	Relay: SPDT (DTB4848/DTB4824: SPST), Max. load: 250 V_{AC}, Resistive load: 5 A
	Voltage pulse: 14 V_{DC}, Max. output current: 40 mA
	Current: DC 4~20 mA (Load resistance < 600 Ω)
	Analog voltage: 0~10 V
Sampling rate	Analog input: 0.15 second, Thermocouple or platinum RTD: 0.4 second
Communication	RS-485 digital communication, 2,400~38,400bps
Communication protocol	Modbus protocol, ASCII/RTU format
Vibration resistance	10~55 Hz, 10 m/s² for 10 mins in X, Y, Z direction
Shock resistance	Max. 300 m/s², 3 times in each of 3 axes, 6 directions
Ambient temperature	0°C~+50°C
Storage temperature	-20°C~+65°C
Altitude	< 2,000 m
Ambient humidity	35~85 % RH (non-condensing)
IP rating (panel)	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

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

Power supply	24 V_{DC}, isolated switching power supply
Voltage range	90 ~ 110 % rated voltage
Power consumption	Max. 10 W + 3 W × number of DTC2000 controllers connected in parallel (Max. 7)
Input temperature sensors	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100 RTD: Cu50; Ni120
Control methods	PID, programmable PID, On / Off, Manual
Output types	Relay: SPST, Max. load: 250 V_{AC}, Resistive load: 3 A
	Voltage pulse: 12 V_{DC}, Max. output current: 40 mA
	Current: DC 4 ~ 20 mA (Load resistance < 500 Ω)
	Analog voltage: 0 ~ 10 V (Load resistance > 1,000 Ω)
Sampling rate	Thermocouple or platinum RTD: 1.0 second / all inputs
Communication	RS-485 digital communication, 2,400 ~ 115,200 bps
Communication protocol	Modbus protocol, ASCII/RTU format
Vibration resistance	10 ~ 55 Hz, 10 m/s² for 10 mins in X, Y, Z direction
Shock resistance	Max. 300 m/s², 3 times in each of 3 axes, 6 directions
Ambient temperature	0 °C ~ +50 °C
Storage temperature	-20 °C ~ +65 °C
Altitude	< 2,000 m
Ambient humidity	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

Power supply	100~240 V_{AC}, 50/60 Hz
Voltage range	85~110 % rated voltage
Power consumption	< 5 VA
Display	2-line 7-segment LED display, 4-bit or 2-bit valve action level display available
	PV: red, SV & action level of valve: green
Input temperature sensors	Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK
	Platinum RTD: Pt100, JPt100
	Analog input: 0~5 V, 0~10V, 0~20 mA, 4~20 mA, 0~50 mA
Display scale	1 digit after decimal point, or no decimal point
Control methods	PID, programmable PID, On/Off, Manual
Output types	Relay: SPST, Max. load: 250 V_{AC}; resistive load: 5 A
	Current: DC 4~20 mA
Sampling rate	Analog input: 0.15 second; thermocouple or platinum RTD: 0.4 second
Communication	RS-485 digital communication, 2,400~38,400 bps
Communication protocol	Modbus protocol, ASCII/RTU format
Vibration resistance	10~55 Hz, 10 m/s² for 10 mins in X, Y, Z directions
Shock resistance	Max. 300 m/s², 3 times in each of 3 axes, 6 directions
Ambient temperature	0°C~+50°C
Storage temperature	-20°C~+65°C
Altitude	< 2,000 m
Ambient humidity	35~85 % RH (non-condensing)
IP rating (panel)	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_{AC}, 5 A V: Voltage pulse, 12 V, -10 % ~ +20 %	C: DC current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10 V_{DC}
4 Power supply	A: AC 100 ~ 240 V D: DC 24 V	
5 Output 2 options	R: Relay, 250 V_{AC}, 5 A V: Voltage pulse, 12 V, -10 % ~ +20 %	C: DC current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10 V_{DC}
6 Optional function 1ST	0: None, 1: Event input 3, 2: RS-485 communication	
7 Optional function 2nd	0: None, 1: Event input 2, 2: CT input 2, 3: Retransmission output	
8 Optional function 3rd	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 Event 3	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 Event 3	CTI: CT Input
	DT330 is a substitute for DTA7272 (with basic function). It has less extension function. • DT330□A-0 has 1 output, 1 alarm output, and has no extension functions • DT330□A has 1 output, 2 alarm outputs, but no extension functions (similar to DTA7272□0) • DT330□A-0200 has 1 output, 2 alarm outputs, and has no extension functions. It supports RS-485 communication function (similar to DTA7272□1)	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_{AC}, 5A V: Voltage pulse, 12 V, -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_{AC}, 5 A (SPST: 1/16 DIN) V: Voltage pulse, 14 V, -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 2nd output as alarm mode.
Note 2: DTB4848 series: only one alarm output when optional function supported, but user can set 2nd output as 2nd 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_{AC}, 5 A (SPST: 1/16 DIN and 1/32 DIN size) V: Voltage pulse, 14 V, -20 % ~ +10 %(Max. 40 mA)	C: DC current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10 V_{DC}
6 Output 2 options	R: Relay, SPDT, 250 V_{AC}, 5 A (SPST: 1/16 DIN and 1/32 DIN size)	V: Voltage pulse, 14 V, -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 ~ 240 V	D: DC 24 V

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_{AC}, 3 A V: Voltage pulse output, 12V, -10 % ~ +20 % C: DC Current, 4 ~ 20 mA L: Linear voltage, 0 ~ 10 V

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

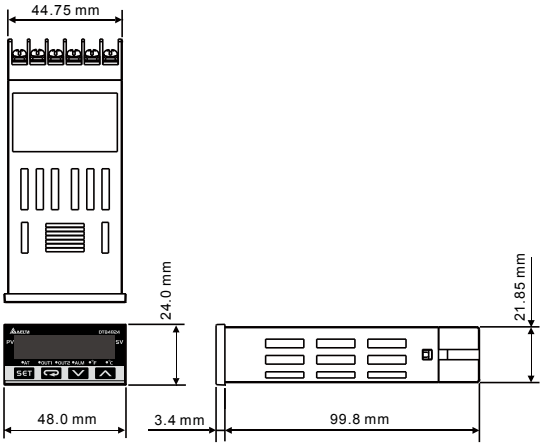
Series Name	Delta DTV Series Temperature Controller
1 2 3 4 **Panel dimensions (W x H)**	4896: 1/8 DIN 48 × 96 mm 9696: 1/4 DIN 96 × 96 mm
5 **Output**	R: Relay, SPDT, 250 V_{AC}, 5 A C: DC Current, 4 ~ 20 mA

Dimensions

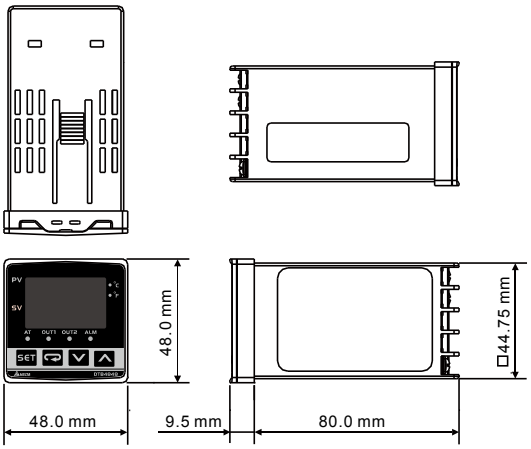
DTB

4824

Unit: mm



4848



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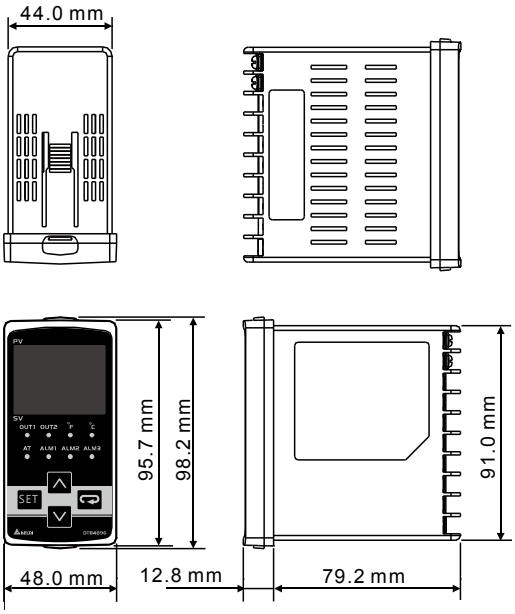

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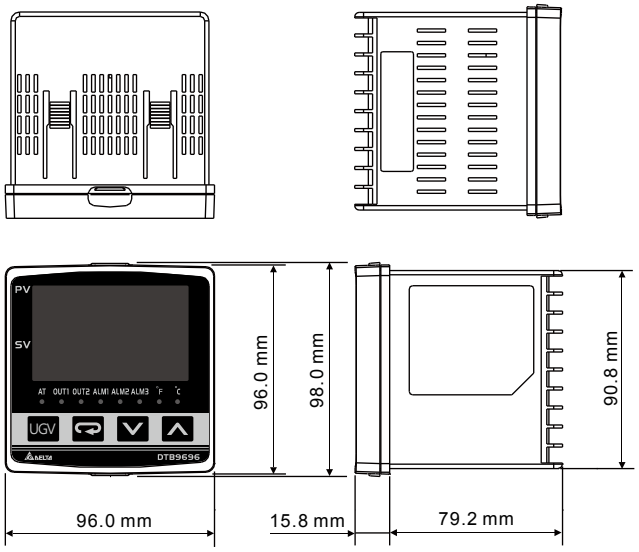
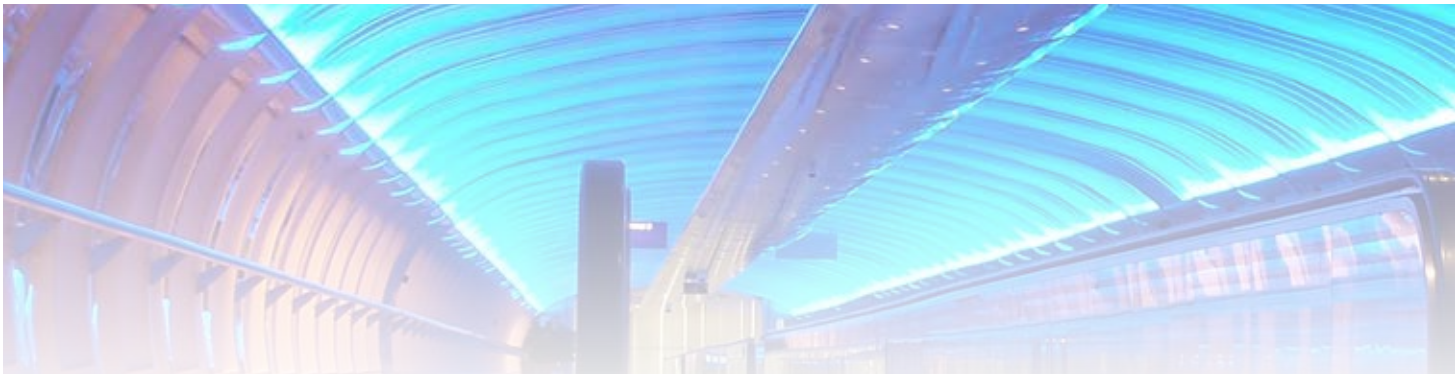
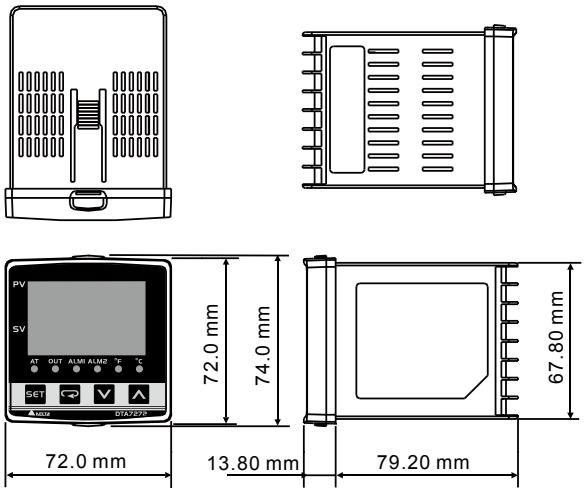




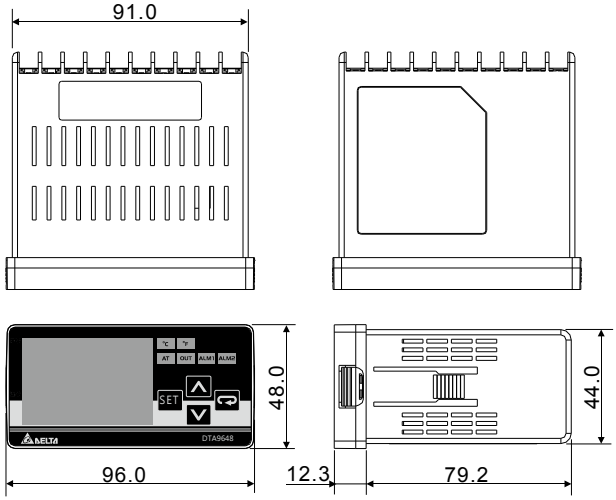
DTA

7272

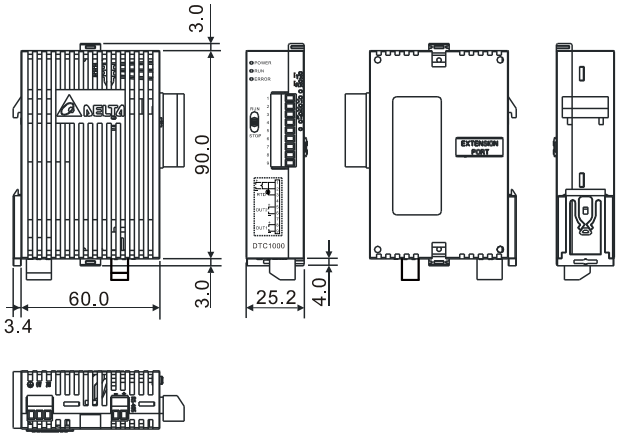


9648

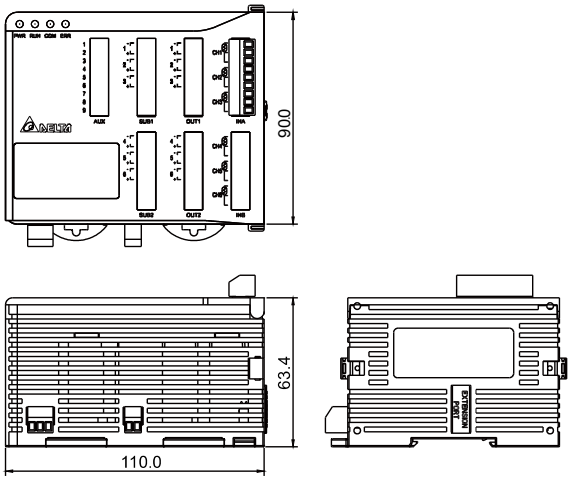
Unit: mm



DTC

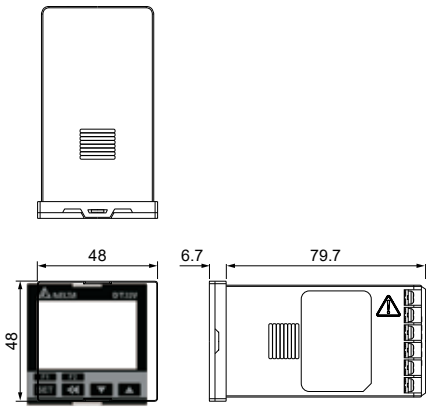


DTE



DT3

320



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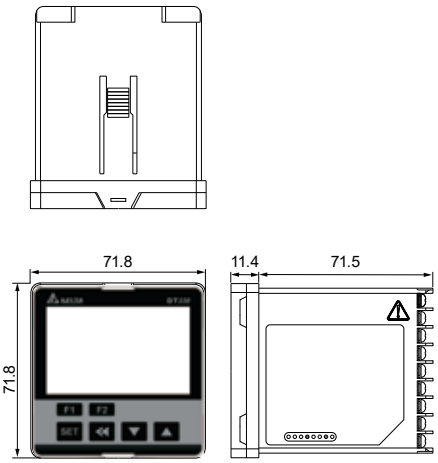
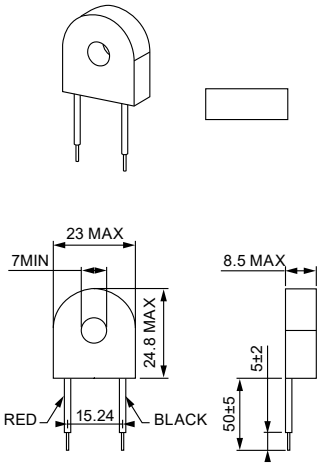


CT30A

Unit: mm



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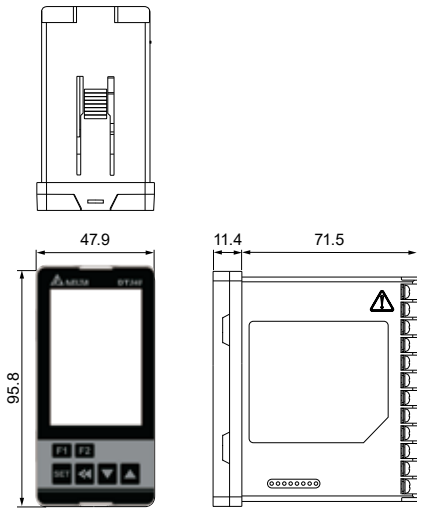

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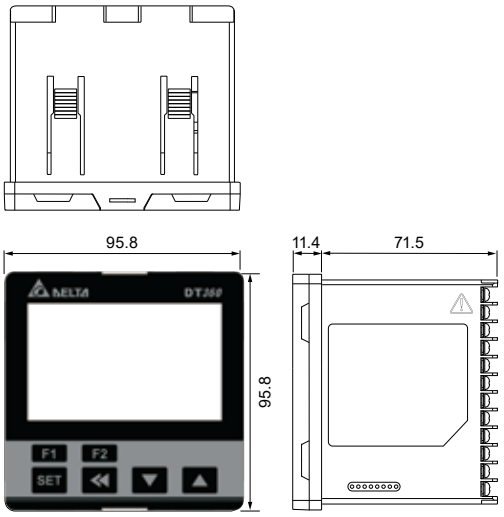

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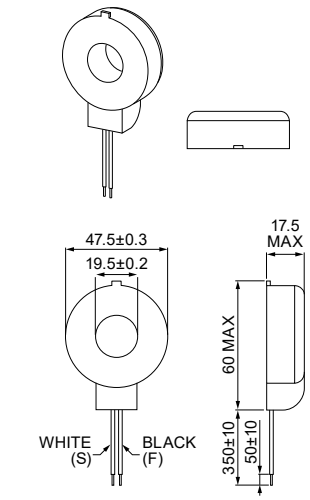
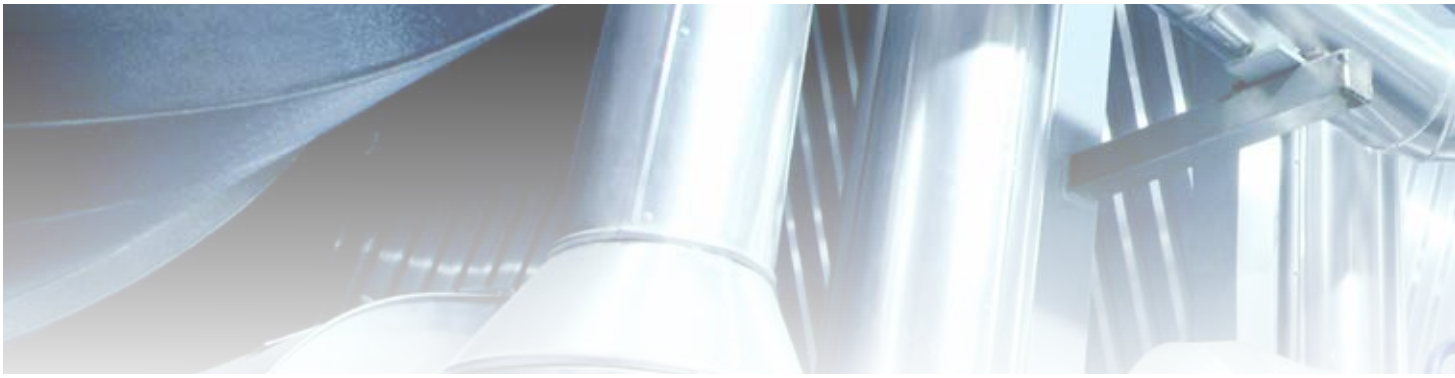
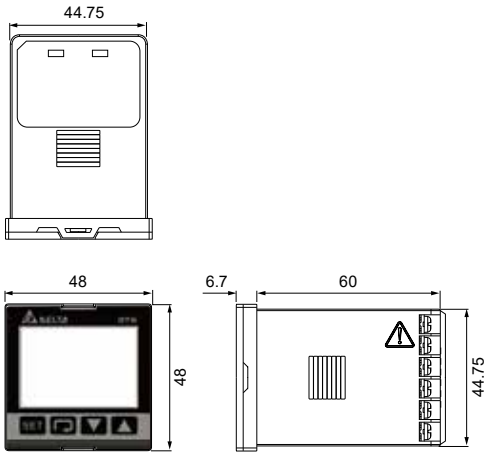




DTK

Unit: mm

4848



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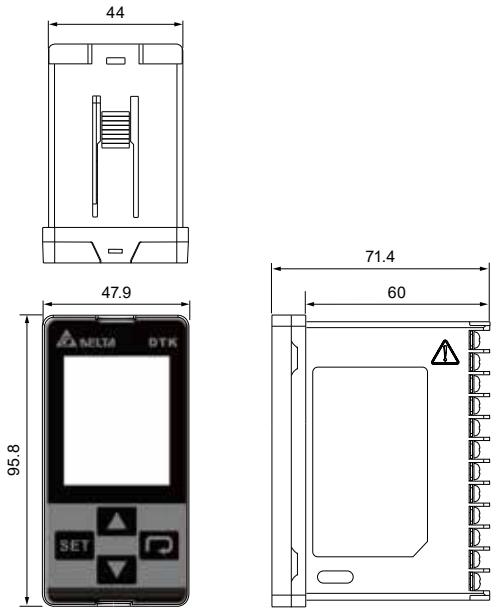

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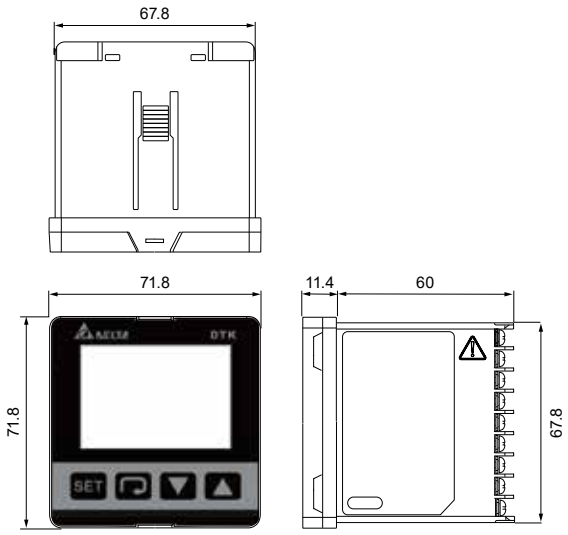

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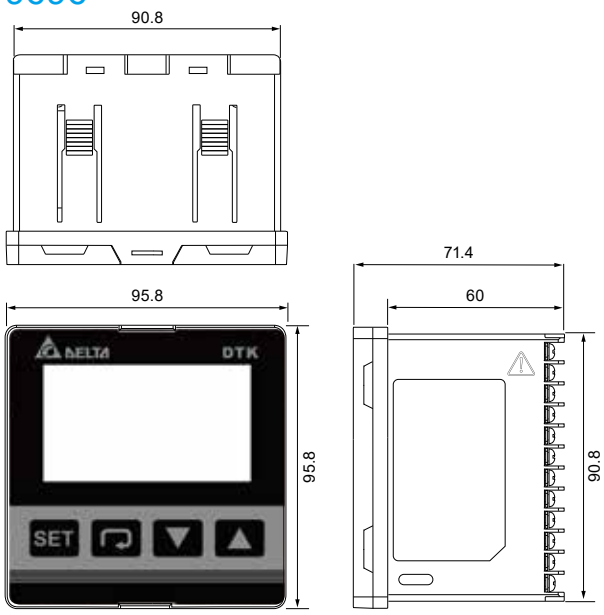

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