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Digitized Automation for a Changing World

# Delta Temperature Controller
# DT Series



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# Features

## Many Sizes Available:

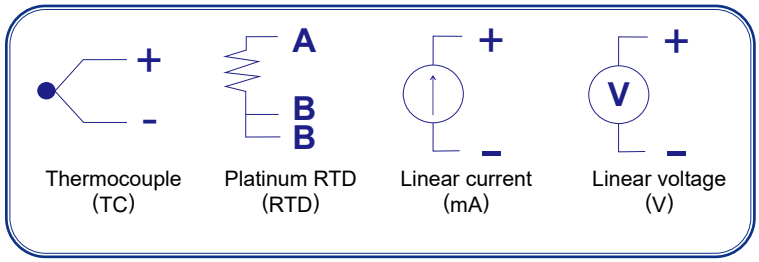
- From 48 × 24 mm to 96 × 96 mm, all panel sizes comply with international standards

## 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

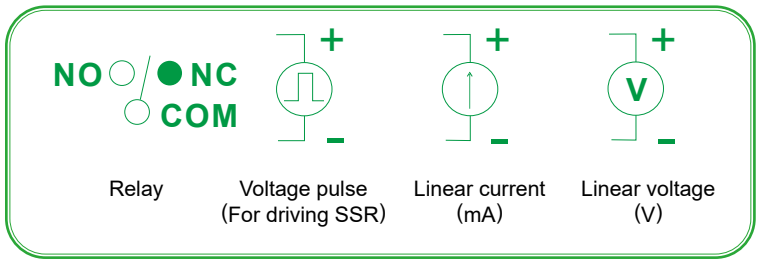
## Supports Various Sensors:

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



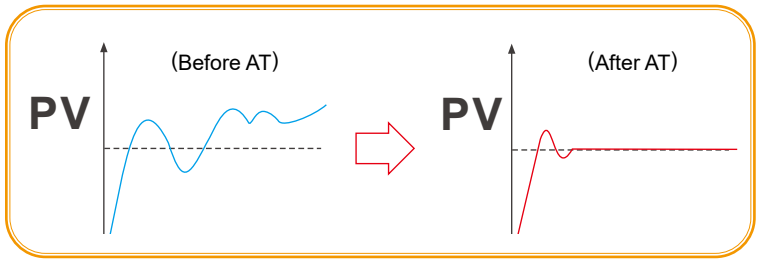

## Various Output Modes:

- 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):

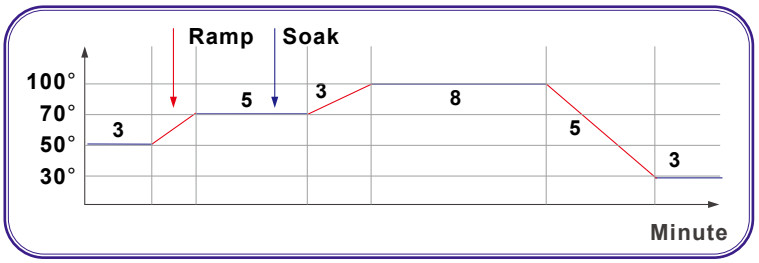
- CT can enable the off-line alarm and detect overloaded current





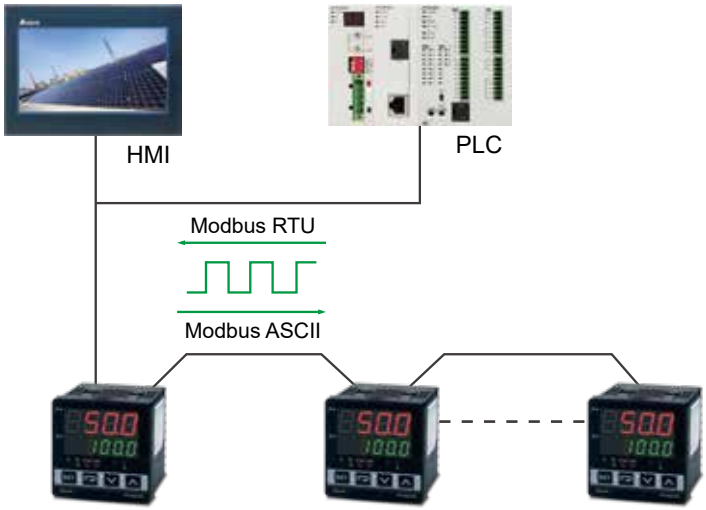
## Programmable Control:

- 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



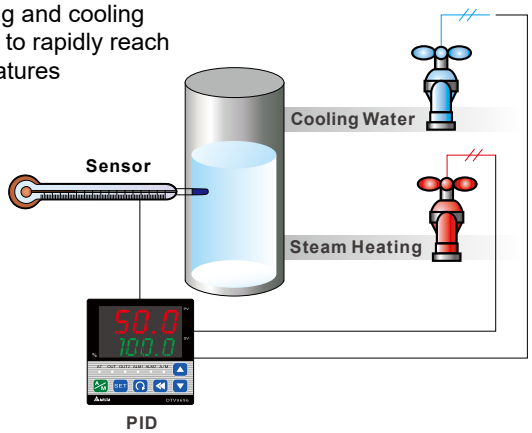

## Safety:

- 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

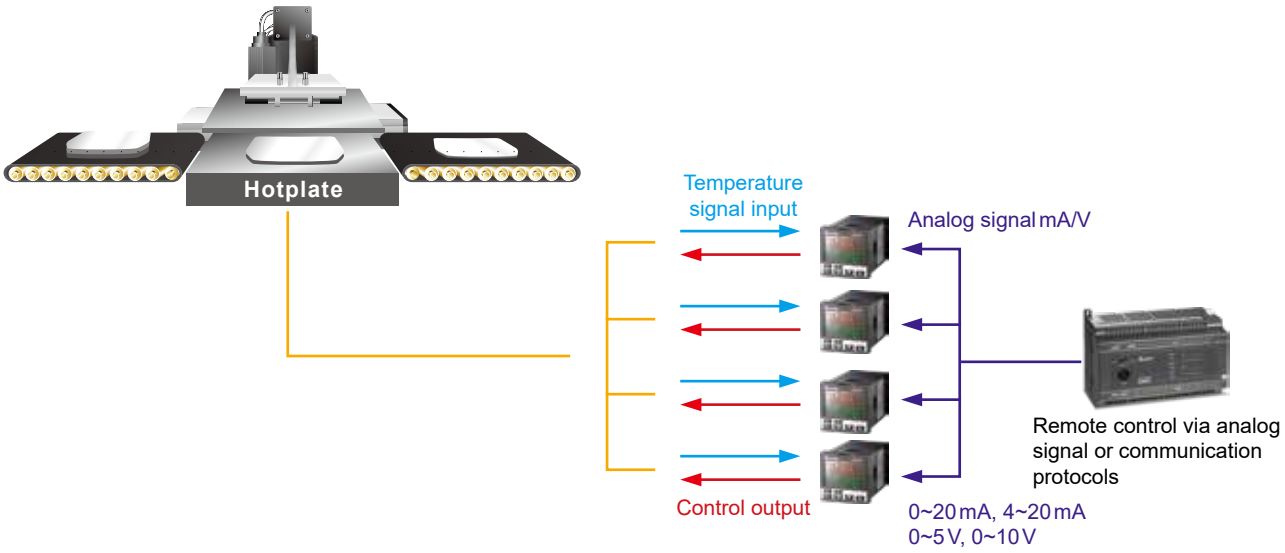
## DT3 High-speed Intelligent Temperature Controller

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.



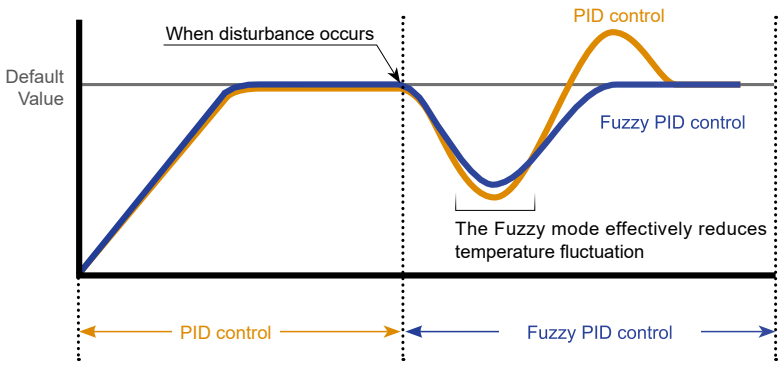
## Remote Control

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



## User-defined Function Keys

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




## Large Tri-color LCD Display

Tri-color temperature controller



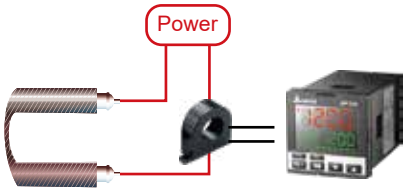
## Point-to-point Control (Proportional Output mA)

Sets the target value by point-to-point control



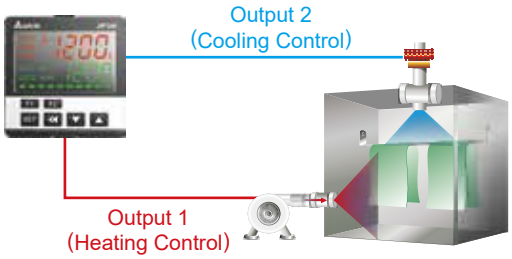
## Heater Disconnection Detection

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

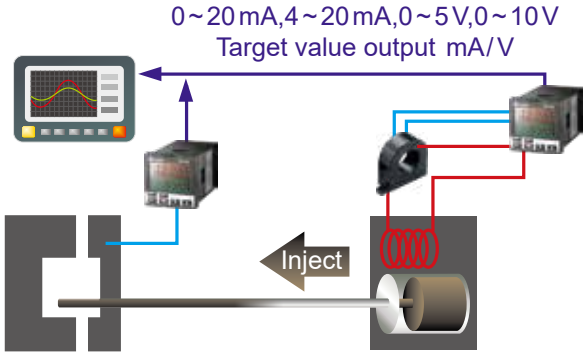



## Dual-output Control

- 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




## Retransmission Output



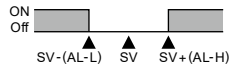
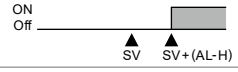
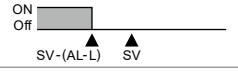
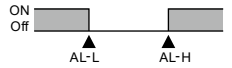
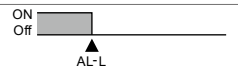
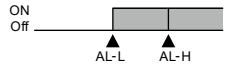
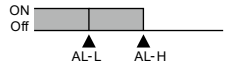
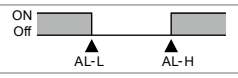



# Specifications

| | |
|---|---|
| **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

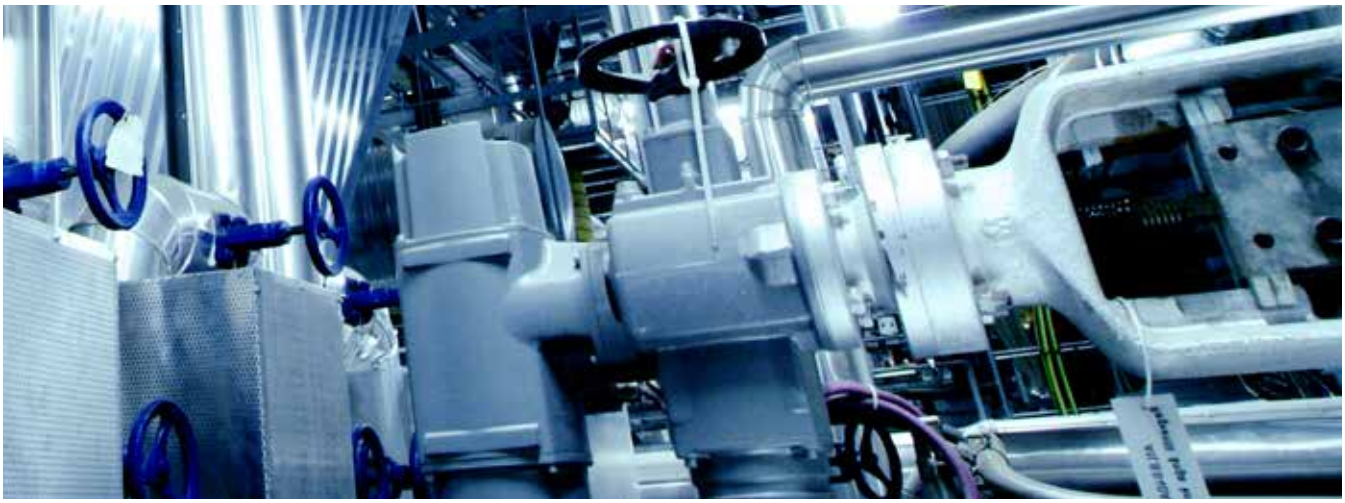
The DT3 offers 3 alarm outputs, and each alarm output has 18 alarm modes to choose from in the initial setting mode. When the target temperature exceeds or falls below the set point, the alarm output is enabled.

| SV | Alarm Mode | Alarm Output Operation |
|---|---|---|
| 0 | Alarm function disabled | |
| 1 | Deviation upper- and lower-limit:<br>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:<br>This alarm output operates when PV value is higher than the set value SV+(AL-H). |  |
| 3 | Deviation lower-limit:<br>This alarm output operates when PV value is lower than the set value SV-(AL-L). |  |
| 4 | Absolute value upper- and lower-limit:<br>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:<br>This alarm output operates when PV value is higher than the set value AL-H. |  |
| 6 | Absolute value lower-limit:<br>This alarm output operates when PV value is lower than the set value AL-L. |  |
| 7 | Hysteresis upper-limit alarm output:<br>This alarm output operates if PV value is higher than the set value SV+(AL-H).<br>This alarm output is Off when PV value is lower than the set value SV+(AL-L). |  |
| 8 | Hysteresis lower-limit alarm output:<br>This alarm output operates if PV value is lower than the set value SV-(AL-H).<br>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. | |

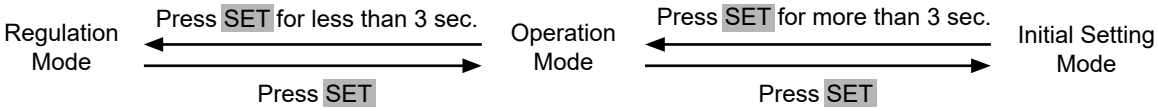
# RS-485 Communication

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.<br>8002H: Temperature not yet acquired<br>8003H: Not connected to sensor<br>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,<br>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,<br>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)<br>Press ◀◀ ▽ | 1234 Use ▲ ▼ to set up target temperature<br>Press ◀◀ ▽ | InPt Set up input type<br>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) |
| 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 |
| AIMR Adjust upper limit compensation for analog Output 1* | A3LP Record lowest temperature of Alarm 3 | EXEC Select auxiliary function |


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# 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 |
| AtMA Adjust upper limit compensation for Retransmission* | o1Mc Set up lower limit percentage for Output 1 | bPS Set up baudrate |
| AtMc 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 |
| | toF0 Set up the 0th PID integral deviation | toF5 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 | EM00 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<br>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 |


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# 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



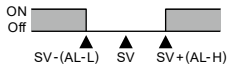
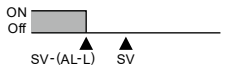
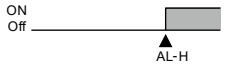
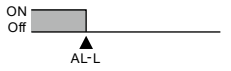
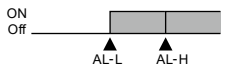
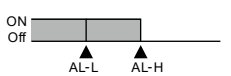

- **A** PV: Present Value
- **B** SV: Set Value
- **C** ºC, ºF: Celsius, Fahrenheit temperature indicator
- **D** 1, 2: ALM1, ALM2 alarm output indicator
- **E** A/M: Auto-tuning and manual modes indicator
- **F** OUT1, OUT2: Output indicators
- **G** Select/Set key
- **H** Value adjustment key

# Electrical Specifications

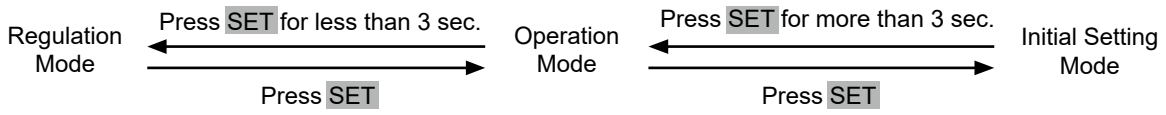
| | |
|---|---|
| **Power supply** | 100 ~ 240 $V_{AC}$ , 50 / 60 Hz |
| **Display** | LCD display. PV: red, SV: green |
| **Input temperature sensors** | Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK |
| | Platinum RTD: Pt100, JPt100 |
| | RTD: Cu50, Ni120 |
| **Control methods** | On / Off, PID, 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 :<br>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 :<br>This alarm output operates when PV value is higher than the set value SV + (AL - H). |  |
| 3 | Deviation lower-limit :<br>This alarm output operates when PV value is lower than the set value SV - (AL - L). |  |
| 4 | Absolute value upper- and lower-limit :<br>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 :<br>This alarm output operates when PV value is higher than the set value AL - H. |  |
| 6 | Absolute value lower-limit :<br>This alarm output operates when PV value is lower than the set value AL - L. |  |
| 7 | Hysteresis upper-limit alarm output :<br>This alarm output operates if PV value is higher than the set value SV+ (AL - H).<br>This alarm output is Off when PV value is lower than the set value SV+(AL - L). |  |
| 8 | Hysteresis lower-limit alarm output :<br>This alarm output operates if PV value is lower than the set value SV - (AL - H).<br>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 )<br>Press ▽ | 1234 Use ▲ ▼ to set up target temperature<br>Press ▽ | InPt Set up input type<br>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 |


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# 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

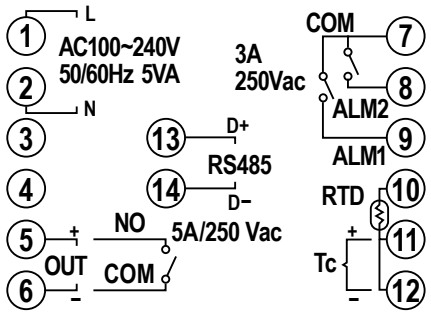
| Input Sensors | Display | Temperature Range |
|---|---|---|
| Platinum RTD: Pt100 | Pt | -200~850°C |
| Platinum RTD: JPt100 | JPt | -100~400°C |
| Copper resistance: Cu50 | Cu | -50~150°C |
| RTD Ni120 | nI | -80~300°C |
| Thermocouple B | b | 100~1,800°C |
| Thermocouple S | S | 0~1,700°C |
| Thermocouple 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 | txt | -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<br>30: 7272, 72 × 72 mm | 40: 4896, 1/8 DIN 48 × 96 mm<br>60: 9696, 1/4 DIN 96 × 96 mm |
| 3 Output 1 options | R: Relay, 250 $V_{AC}$, 5 A<br>V: Voltage pulse, 12 V, -10 % ~ +20 % | C: DC current, 4 ~ 20 mA<br>L: Linear voltage, 0 ~ 10 $V_{DC}$ |
| 4 Power supply | A: AC 100 ~ 240 V<br>D: DC 24 V | |
| 5 Output 2 options | R: Relay, 250 $V_{AC}$, 5 A<br>V: Voltage pulse, 12 V, -10 % ~ +20 % | C: DC current, 4 ~ 20 mA<br>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).<br>It has less extension function.<br>• DT330□A-0 has 1 output, 1 alarm output, and has no extension functions<br>• DT330□A has 1 output, 2 alarm outputs, but no extension functions (similar to DTA7272□0)<br>• DT330□A-0200 has 1 output, 2 alarm outputs, and has no extension functions.<br>It supports RS-485 communication function (similar to DTA7272□1) | RETRANS: Retransmission<br>REMOTE: Remote set point<br>CT30A: 30A CT<br>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<br>4896: 48 × 96 mm | 7272: 72 × 72 mm<br>9696: 96 × 96 mm |
| 5 Output options | R: Relay, 250 $V_{AC}$, 5A<br>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<br>4896: 1/8 DIN 48 × 96 mm<br>9696: 1/4 DIN 96 × 96 mm | 7272: 72 × 72 mm<br>9648: 96 × 48 mm |
| 5 Output | R: Relay, SPDT, 250 $V_{AC}$, 5 A (SPST: 1/16 DIN)<br>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<br>4848: 1/16 DIN 48 × 48 mm | 4896: 1/8 DIN 48 × 96 mm<br>9696: 1/4 DIN 96 × 96 mm |
| 5 Output 1 options | R: Relay, SPDT, 250 $V_{AC}$, 5 A<br>(SPST: 1/16 DIN and 1/32 DIN size)<br>V: Voltage pulse, 14 V, -20 % ~ +10 %(Max. 40 mA) | C: DC current, 4 ~ 20 mA<br>L: Linear voltage, 0 ~ 10 $V_{DC}$ |
| 6 Output 2 options | R: Relay, SPDT, 250 $V_{AC}$, 5 A<br>(SPST: 1/16 DIN and 1/32 DIN size) | V: Voltage pulse, 14 V, -20 % ~ +10 %<br>(Max. 40 mA) |
| 7 Event inputs / Current Transformer function (optional) | None: No Event input; no CT<br>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<br>2: Extension unit |
| 2 **Number of auxiliary outputs** | 0: Standard 2 outputs, no auxiliary output |
| 3 4 **Optional function** | 00: Standard function<br>01: With CT input |
| 5 **Output** | R: Relay, SPST, 250 $V_{AC}$, 3 A<br>V: Voltage pulse output, 12V, -10 % ~ +20 %<br>C: DC Current, 4 ~ 20 mA<br>L: Linear voltage, 0 ~ 10 V |

# DTE

1 2 3

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

# DTV

1 2 3 4 5

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

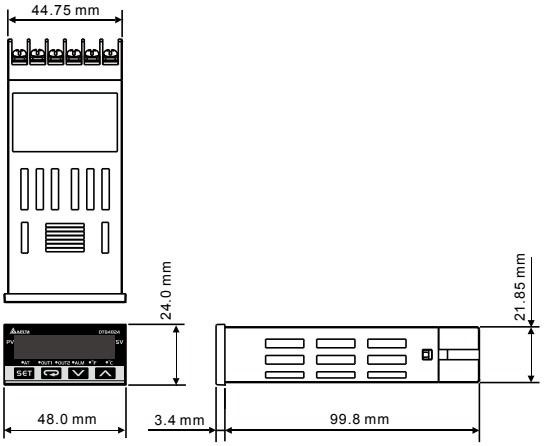


# Dimensions

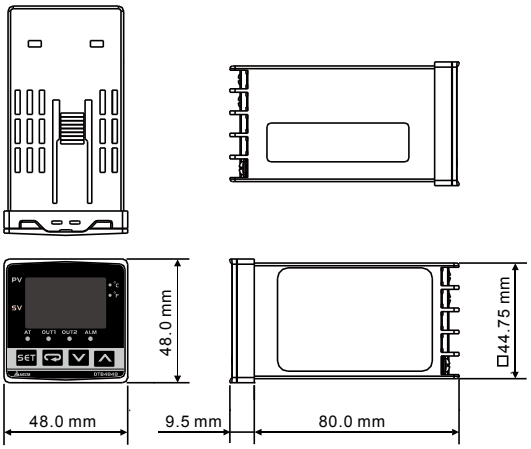
## DTB

### 4824

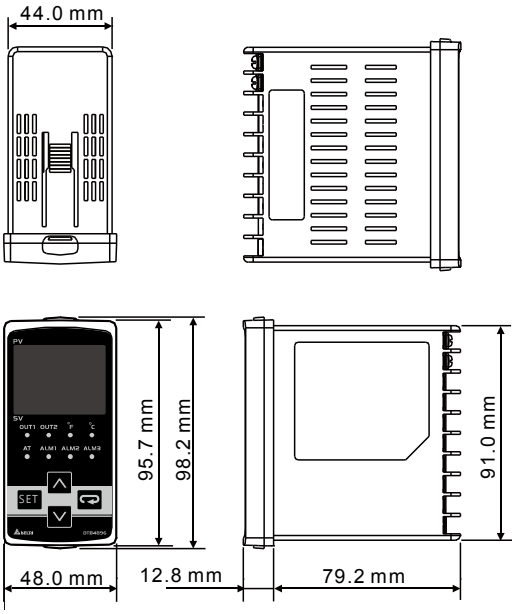
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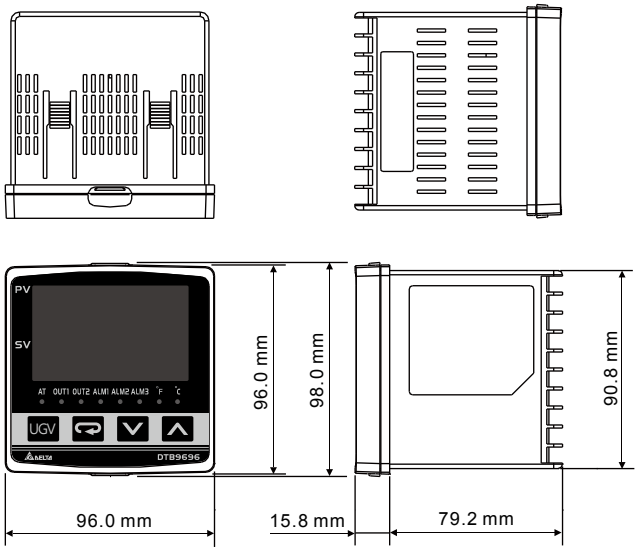

### 4848

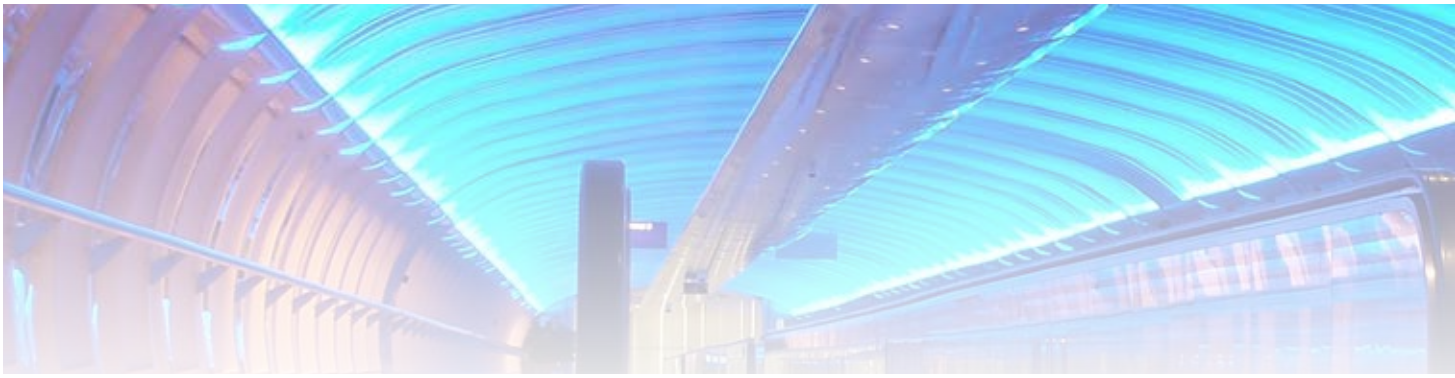



### 4896



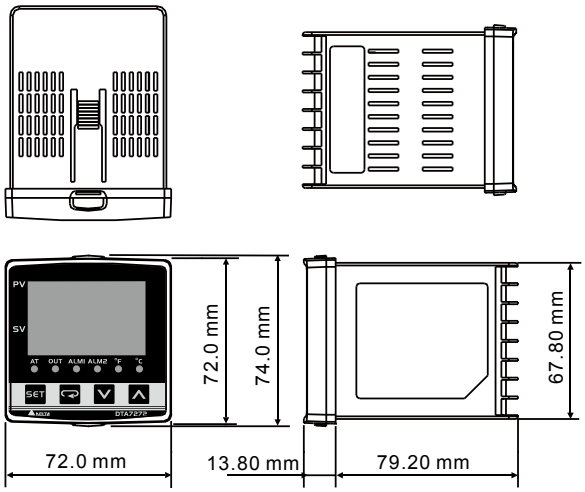

### 9696





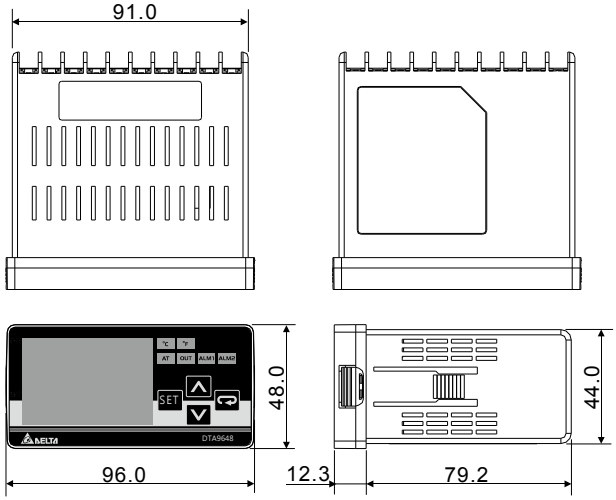
# DTA

## 7272

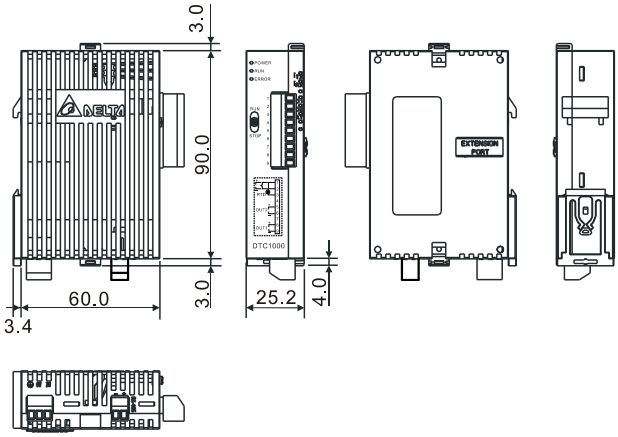



## 9648

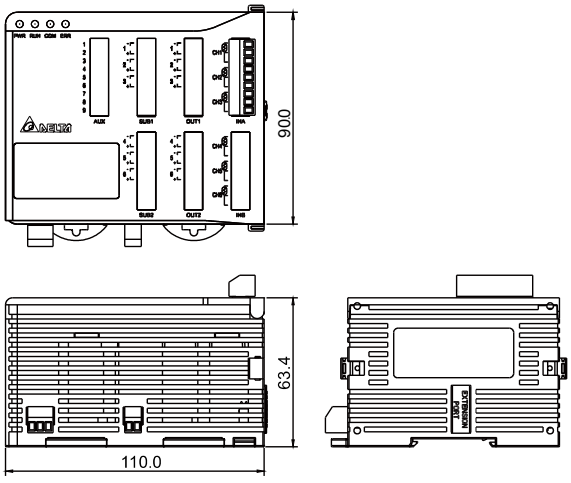
Unit: mm




# DTC



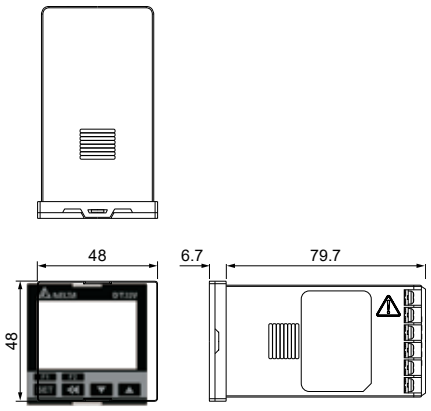

# DTE



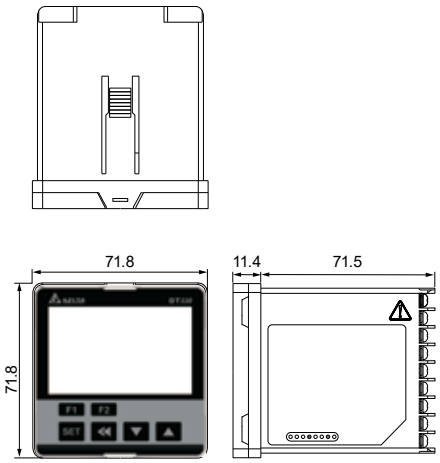


# DT3

## 320

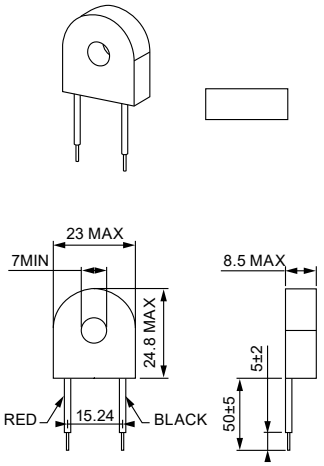



## 330

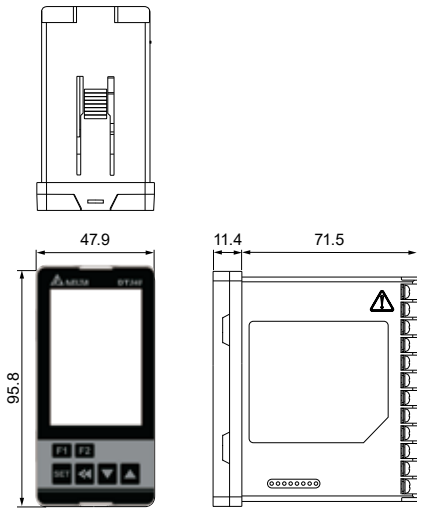



## CT30A

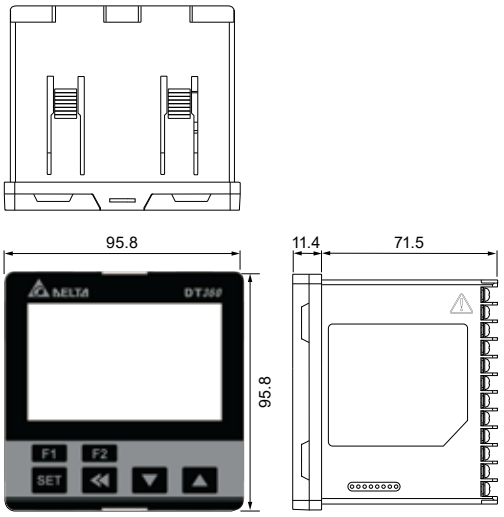
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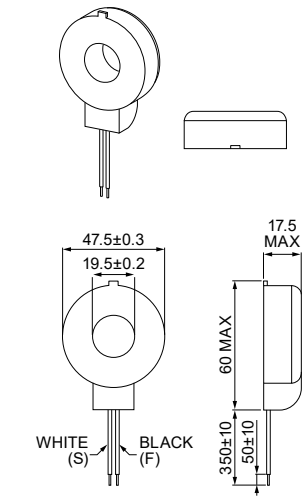

## 340

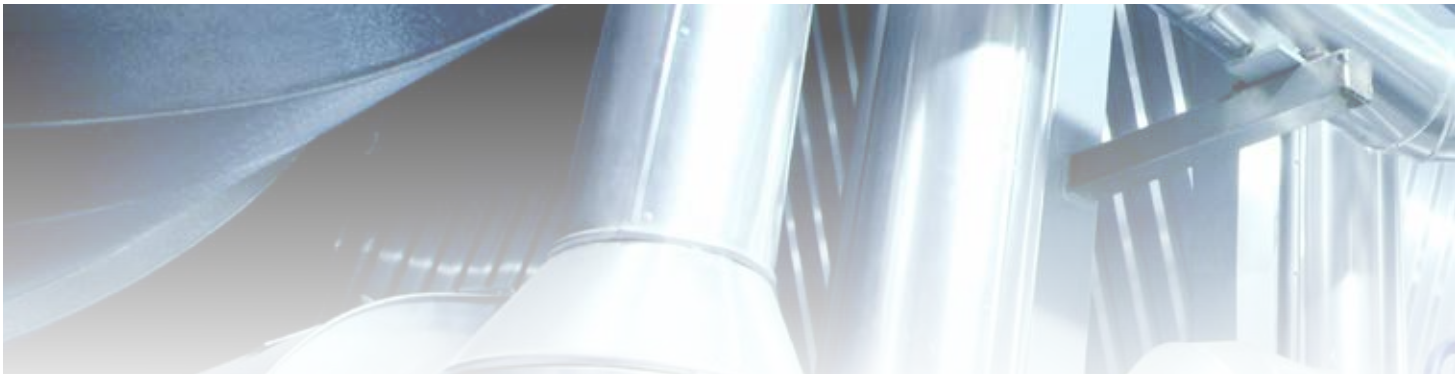



## 360




## CT100A

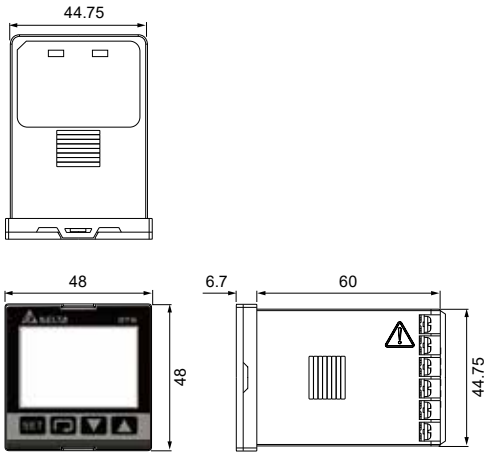




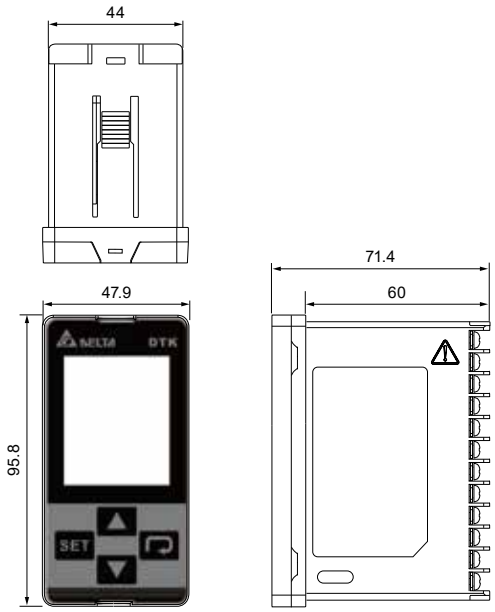
# DTK

Unit: mm

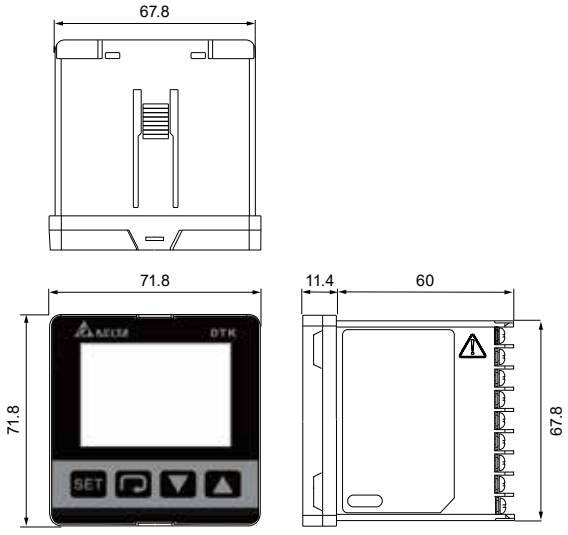
## 4848



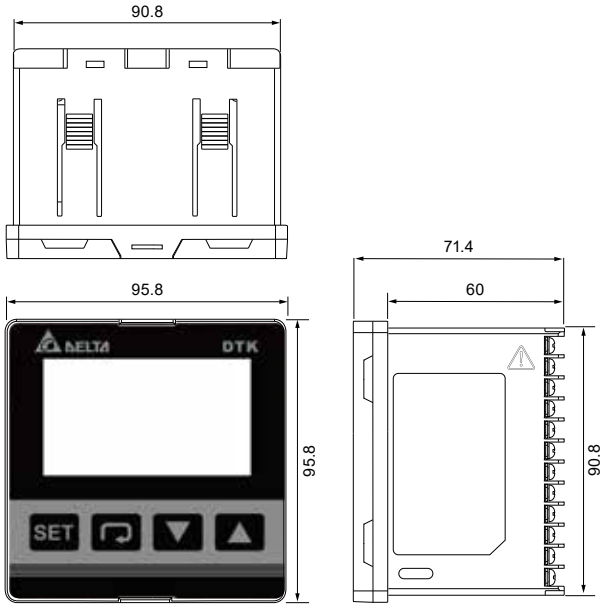

## 4896




## 7272




## 9696





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