

# CTT Series - Digital Counter / Timer

## / Tachometer

### Counter Mode

#### Counter Performance Specifications

|                                  |  |
|----------------------------------|--|
| <b>Counter Functions</b>         | 1-Stage Counting, 2-Stage Counting, Batch Counting, Total Counting, Dual Counting (See descriptions below)   |
| <b>Input Modes</b>               | Counting Up, Counting Down, Counting Up / Command Counting Down, Counting Up / Counting Down, Quadrature, Addition, Subtraction (see descriptions below) |
| <b>Output Modes</b>              | F, N, C, R, K, P, Q, A, S, T, D (For explanation see the manual available at <a href="http://www.AutomationDirect.com">www.AutomationDirect.com</a> )    |
| <b>Timer Precision</b>           | Power On start max 0.01% 0.05 sec. Signal start max 0.01% 0.03 sec   |
| <b>External Reset</b>            | Minimum reset input signal width 1ms or 20ms (selectable)  |
| <b>Output Duration (flicker)</b> | 10-9990ms variable every 10ms  |
| <b>Number of Digits</b>          | 6 digits on each line  |
| <b>Display</b>                   | Current values: red LED, character height 8mm; Preset value: green LED character height 6mm  |

## Counter Functions

### 1-Stage Counting

A single count setting value SV is available in 1-Stage Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

### 2-Stage Counting

In 2-Stage Counting, count setting value SV1 controls Output 1 and count setting value SV2 controls Output 2. Outputs will turn ON momentarily or will be maintained ON depending on the output mode selected.

### Batch Counting

In Batch Counting, count setting value SV controls Output 2 which will turn ON momentarily or will be maintained ON depending on the output mode selected. Count setting value BATCH SV controls Output 1 which will be maintained ON.

### Total Counting

A single count setting value SV is available in Total Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

### Dual Counting

A single count setting value SV is available in Dual Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.



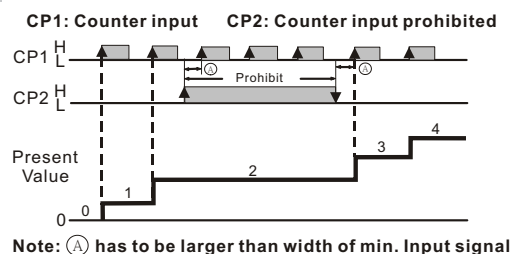
Click on the above thumbnail or go to <https://www.automationdirect.com/VID-RL-0004> for a short Counter demo video.



Click on the above thumbnail or go to <https://www.automationdirect.com/VID-RL-0003> for a Counter Set-up video.

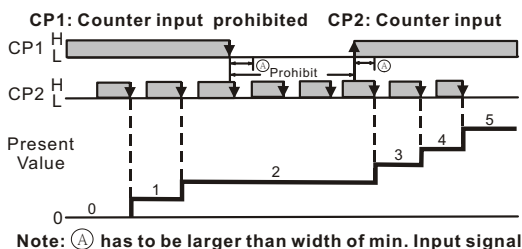
## Counter Input Modes

### Counting up



### Counting Up

With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will increment the count present value PV by 1. Turning ON the input signal at CP2 will prohibit the input signal at CP1 from incrementing the PV.

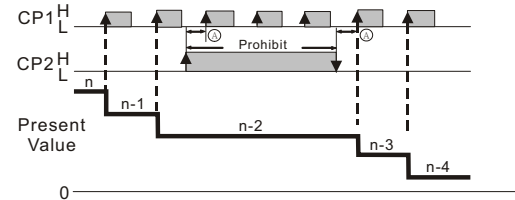


With the input signal ON at input CP1, each trailing edge of the input signal at CP2 will increment the count present value PV by 1. Turning OFF the input signal at CP1 will prohibit the input signal at CP1 from incrementing the PV.

# CTT Series - Digital Counter / Timer / Tachometer

## Counting down

CP1: Counter input CP2: Counter input prohibited

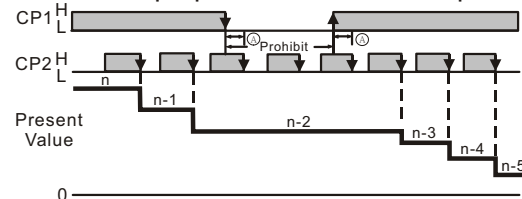


Note: (A) has to be larger than width of min. Input signal

## Counting Down

With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will decrement the count present value PV by 1. Turning ON the input signal at CP2 will prohibit the input signal at CP1 from decrementing the PV.

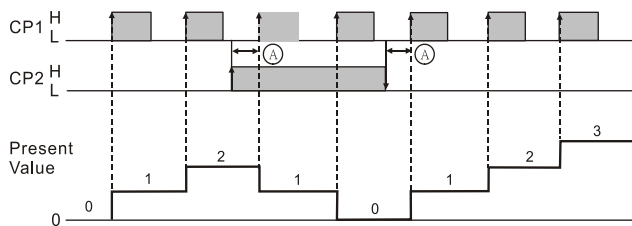
CP1: Counter input prohibited CP2: Counter input



Note: (A) has to be larger than width of min. Input signal

With the input signal ON at input CP1, each trailing edge of the input signal at CP2 will decrement the count present value PV by 1. Turning OFF the input signal at CP1 will prohibit the input signal at CP2 from decrementing the PV.

## Counting Up / Command Counting Down



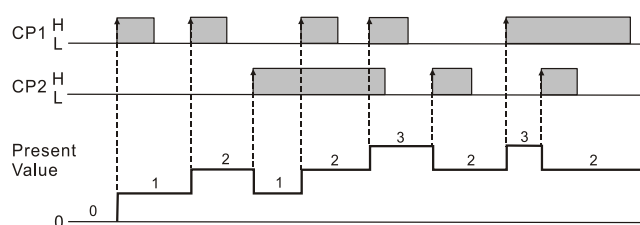
Note: (A) has to be larger than width of min. input signal.

## Counting Up / Command Counting Down

With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will increment the count present value PV by 1.

With the input signal ON at input CP2, each leading edge of the input signal at CP1 will decrement the count present value PV by 1.

## Counting up/down

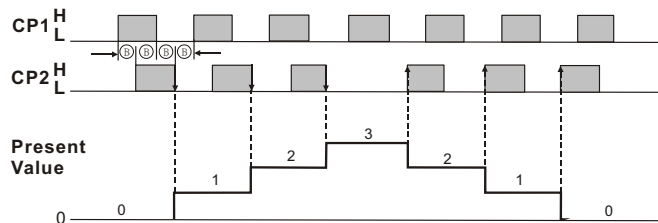


## Counting Up / Counting Down

Each leading edge of the input signal at CP1 will increment the count present value PV by 1.

Each leading edge of the input signal at CP2 will decrement the count present value PV by 1.

## Quadrature input



Note: (B) has to be larger than width of 1/2 min. input signal.

## Quadrature

When the quadrature input signal at CP1 leads the input signal at CP2, the trailing edge of CP2 will increment the count present value PV by 1.

When the quadrature input signal at CP2 leads the input signal at CP1, the leading edge of CP2 will decrement the count present value PV by 1.

## Addition

Each leading edge of the input signal at CP1 will increment the count present value PV by 1.  
Each leading edge of the input signal at CP2 will increment the count present value PV by 1.

## Subtraction

Each leading edge of the input signal at CP1 will increment the count present value PV by 1.  
Each leading edge of the input signal at CP2 will decrement the count present value PV by 1.

# CTT Series - Digital Counter / Timer / Tachometer



## Features

- Can operate as a digital counter, timer, combination timer + counter or tachometer
- Accepts voltage and non-voltage inputs from a wide variety of NPN, PNP, or dry contact sensors
- Selectable counting speeds from 1 to 10,000 cycles per second
- Multiple transistor and relay outputs can operate as momentary or maintained
- Double-line, 6-digit, 2-color LCD display
- Easy configuration with externally accessible DIP switches or the lockable keypad
- Display decimal point selection
- Available in 100-240VAC and 24VDC powered models
- UL508 listed (E311366), cULus, CE marked



## A lot of functionality in one powerful little unit!

The CTT series is an extremely versatile multi-function device that is easily configured for operation as a digital counter, timer, combination timer + counter, or tachometer. Both voltage and non-voltage inputs are accepted from a wide variety of sensor types with NPN, PNP, or dry contact outputs. The first output on the CTT is a single-pole,

single-throw relay and NPN transistor that operate concurrently. The second CTT output can be ordered as either a single-pole, double throw relay or NPN transistor. Parameters are easily set using the externally accessible DIP switches or the lockable keypad. The double-line, 6-digit, two-color LCD display shows the counter, timer, or tachometer present values,

setting values and menu parameters during set-up. Additional individual indicators are provided for inputs, outputs and functions. The standard 1/16 DIN size, with included panel mounting clip and gasket, make panel mounting a snap. The CTT is available in 100-240VAC and 24VDC powered models.



Visit [www.Automationdirect.com](http://www.Automationdirect.com) to download the free comprehensive CTT Series manual.

| Counter Functions | Counter Input Modes | Counter Output Modes   |
|-------------------|---------------------|--|
| 1-Stage           | Up                  | Select from eleven (11) different output modes (F, N, C, R, K, P, Q, A, S, T, D) |
| 2-Stage           | Down                |  |
| Batch             | Up / Command Down   |  |
| Total             | Up/ Down            |  |
| Dual              | Quadrature          |  |
|                   | Addition            |  |
|                   | Subtraction         |  |

| Timer + Counter              |                     |   |
|------------------------------|---------------------|---|
| Timer Functions (Up or Down) | Counter Input Modes | Counter Output Modes  |
| Signal On Delay 1            | Up                  | Select from eight (8) different output modes (F, N, C, R, K, P, Q, A) |
| Signal On Delay 2            | Down                |   |
| Signal Off Delay             |                     |   |
| Signal On                    |                     |   |
| Power On Delay               |                     |   |
| Power On Delay Hold          |                     |   |
| Repeat Cycle                 |                     |   |
| Repeat Cycle Hold            |                     |   |

### Counter/Timer/ Tachometer Functions

#### Timer Functions (Up or Down)

|                     |                       |
|---------------------|-----------------------|
| Signal On Delay 1   | Repeat Cycle          |
| Signal On Delay 2   | Repeat Cycle Hold     |
| Signal Off Delay    | Repeat Cycle 2        |
| Signal On           | Signal Cumulate       |
| Power On Delay      | Signal Twin On-Start  |
| Power On Delay Hold | Signal Twin Off-Start |

#### Tachometer Output Modes

Select from four (4) different output modes  
 2Lo/1Lo  
 2Lo/1Hi  
 2Hi/1Lo  
 2Hi/1Hi



Click on the above thumbnail or go to <https://www.automationdirect.com/VID-RL-0001> for a short introductory video for the CTT units.



For a full set of Demo and Set Up videos for the CTT units please scan the QR code or follow the link below.  
<https://www.automationdirect.com/videos/home?t=link&cat1=60>

# CTT Series - Digital Counter / Timer / Tachometer

| Digital Counter / Timer / Tachometer |   |         |          |
|--------------------------------------|---|---------|----------|
| Part Number                          | Description   | Wt (lb) | Price    |
| <a href="#"><u>CTT-AN-D24</u></a>    | Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 NPN, 24 VDC powered, panel mounting clip is included*             | 0.4     | \$122.00 |
| <a href="#"><u>CTT-AN-A120</u></a>   | Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 NPN, 100-264 VAC powered, panel mounting clip is included*        | 0.4     | \$122.00 |
| <a href="#"><u>CTT-1C-D24</u></a>    | Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 SPDT relay, 24 VDC powered, panel mounting clip is included*      | 0.4     | \$122.00 |
| <a href="#"><u>CTT-1C-A120</u></a>   | Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 SPDT relay, 100-264 VAC powered, panel mounting clip is included* | 0.4     | \$122.00 |

\* Spare panel clips part number [PANEL-16](#)

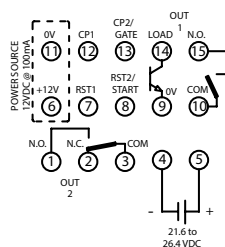
| Digital Counter / Timer / Tachometer General Specifications |                          |   |   |
|---|--------------------------|---|---|
| <b>Input Power Requirements</b>                             |                          | 100 to 240 VAC 50/60 Hz   | 24 VDC                                    |
| <b>Operation Voltage Range</b>                              |                          | 85 to 264 VAC   | 21.6 to 26.4 VDC                          |
| <b>Power Consumption</b>                                    |                          | Less than 10VA  |   |
| <b>Power Source</b>   |                          | 12VDC +10%, 100mA   |   |
| <b>Display</b>  |                          | Double-line, 6-digit LCD display (SV = 8mm, PV = 6mm)   |   |
| <b>Input Signal</b>   |                          | NPN ON impedance 1K ohm max. ON residual voltage: 2V max.<br>PNP 4.5 to 30VDC, low level: 0 to 2VDC   |   |
|   |                          | Counting Speed Setting (Count per second)   | Minimum Input Signal Width (Milliseconds) |
|   |                          | 1cps  | 20ms                                      |
|   |                          | 30cps   | 16.7 ms                                   |
|   |                          | 1K cps  | 0.5 ms                                    |
|   |                          | 5K cps  | 0.1 ms                                    |
|   |                          | 10K cps   | 0.05 ms                                   |
| <b>Output 1</b>   |                          | Relay: SPST max. 250VAC, 5A (resistive load), 4A (inductive load); Transistor: NPN open collector.<br>When 100mA @ 30VDC, residual voltage = 1.5VDC max |   |
| <b>Output 2</b>   | <b>CTT-1C-xxx</b>        | Relay: SPDT max. 250VAC/30VDC, 5A (resistive load), 4A (inductive load)   |   |
|   | <b>CTT-AN-xxx</b>        | Transistor: NPN open collector. When 100mA @ 30VDC residual voltage = 1.5VDC max  |   |
| <b>Life Expectancy</b>                                      | <b>Mechanical</b>        | 10,000,000 operations (frequency 18,000 operations/hr)  |   |
|   | <b>Electrical</b>        | 100,000 operations (frequency 900 operations/hr)  |   |
| <b>Output Duration (where used)</b>                         |                          | 0.00 (latching) / 0.01 to 99.99 seconds   |   |
| <b>Output Switching Time</b>                                |                          | 2 milliseconds max  |   |
| <b>Dielectric Strength</b>                                  |                          | 2000VAC 50/60 Hz for 1 minute   |   |
| <b>Vibration Resistance</b>                                 |                          | Without damage: 10 ~ 55 Hz, amplitude = 0.75 mm, 3 axes for 2 hours   |   |
| <b>Shock Resistance</b>                                     |                          | Without damage: drop 4 times, 300m/s <sup>2</sup> 3 edges, 6 surfaces and 1 corner  |   |
| <b>Ambient Temperature</b>                                  |                          | +32 to +122°F (0 to +50°C)  |   |
| <b>Storage Temperature</b>                                  |                          | -4 to +149°F (-20 to +65°C)   |   |
| <b>Altitude</b>   |                          | 2000m or less   |   |
| <b>IP Rating</b>  |                          | IP 66 (with proper enclosure installation)  |   |
| <b>Case Materials</b>                                       |                          | Case = ABS Plastic, Lens = Polycarbonate  |   |
| <b>Ambient Humidity</b>                                     |                          | 35% to 85% RH (non-condensing)  |   |
| <b>Memory Backup upon Power Failure</b>                     |                          | EEPROM writing up to 100,000 times; Memory duration: 10 years   |   |
| <b>Terminals</b>  | <b>Conforming Wiring</b> | 0.25-1.65mm <sup>2</sup> (24 to 16 AWG)   |   |
|   | <b>Permitted Torque</b>  | 0.5 N·m (0.369 ft·lb)   |   |
| <b>Agency Approvals *</b>                                   |                          | UL508 listed (E311366), cULus, CE marked  |   |

\* To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.

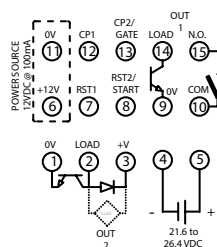
# CTT Series - Digital Counter / Timer / Tachometer

## Wiring Diagrams

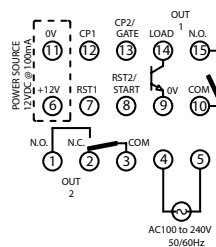
CTT-1C-D24



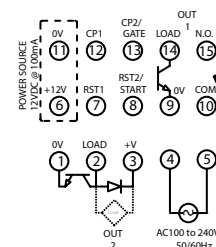
CTT-AN-D24



CTT-1C-A120

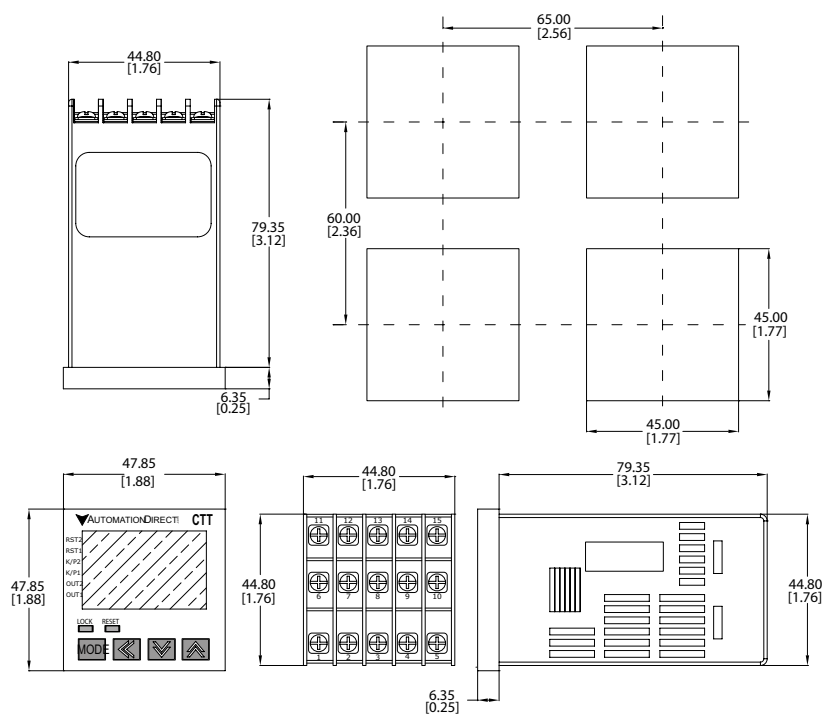


CTT-AN-A120



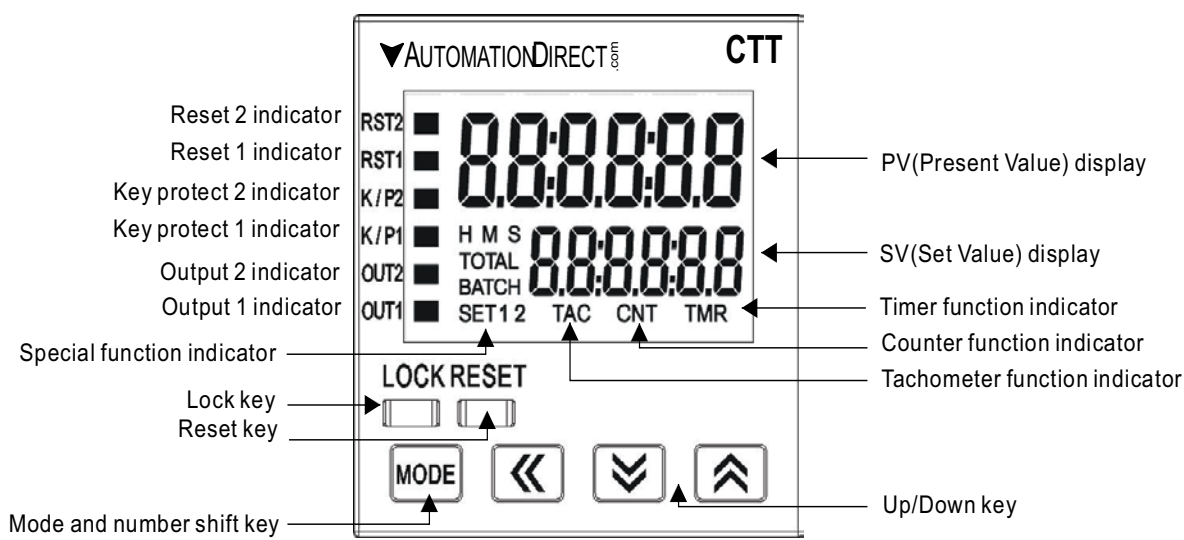
## Dimensions

mm [inches]



# CTT Series - Digital Counter / Timer / Tachometer

## Display, Indicators & Keys



| LCD Display and Indicators |  |                |                                  |
|----------------------------|--|----------------|----------------------------------|
| <b>RST 1/2</b>             | Light on when reset signal is detected                           | <b>BATCH</b>   | "Batch Counting Mode" in Counter |
| <b>K/P 1/2</b>             | Light on when key-protected mode is enabled                      | <b>SET 1 2</b> | SV1, SV2 display                 |
| <b>OUT 1/2</b>             | Light on when output is executing                                | <b>TAC</b>     | Light on in Tachometer function  |
| <b>H M S</b>               | Hour, minute, second, unit of timer, displayed in Timer function | <b>CNT</b>     | Light on in Counter function     |
| <b>TOTAL</b>               | "Total Counting Mode" in Counter function                        | <b>TMR</b>     | Light on in Timer function       |