CTT Series - Digital Counter / Timer / Tachometer

Tachometer Mode

<table>
<thead>
<tr>
<th>Tachometer Performance Specifications</th>
</tr>
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<tbody>
<tr>
<td><strong>Output Modes</strong></td>
</tr>
<tr>
<td><strong>Number of Digits</strong></td>
</tr>
<tr>
<td><strong>Input Frequency</strong></td>
</tr>
<tr>
<td><strong>Display</strong></td>
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<tr>
<td><strong>External Reset</strong></td>
</tr>
<tr>
<td><strong>Output Duration (Flicker)</strong></td>
</tr>
</tbody>
</table>

Tachometer Output Mode Charts

<table>
<thead>
<tr>
<th>2Lo1Lo</th>
<th>2Lo1Hi</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT2 set value</td>
<td>OUT2 set value</td>
</tr>
<tr>
<td>Measurement value</td>
<td>Measurement value</td>
</tr>
<tr>
<td>OUT1 set value</td>
<td>OUT1 set value</td>
</tr>
<tr>
<td>Measurement value ≥ OUT1 set value : OUT1 ON</td>
<td>Measurement value ≥ OUT1 set value : OUT1 ON</td>
</tr>
<tr>
<td>OUT2 ≤ Measurement value ≤ OUT1 set value : OUT2 ON</td>
<td>OUT2 ≤ Measurement value ≤ OUT1 set value : OUT2 ON</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2Hi1Lo</th>
<th>2Hi1Hi</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT2 set value</td>
<td>OUT2 set value</td>
</tr>
<tr>
<td>Measurement value</td>
<td>Measurement value</td>
</tr>
<tr>
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<td>OUT1 set value</td>
</tr>
<tr>
<td>Measurement value ≥ OUT1 set value : OUT1 ON</td>
<td>Measurement value ≥ OUT1 set value : OUT1 ON</td>
</tr>
<tr>
<td>OUT2 ≤ Measurement value ≤ OUT1 set value : OUT2 ON</td>
<td>OUT2 ≤ Measurement value ≤ OUT1 set value : OUT2 ON</td>
</tr>
</tbody>
</table>

Counter Example:

Using the counter feature of the CTT to count the total number of pieces in a box to signal a conveyor to advance to the next station.

Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0006 for a short Tachometer demo video.

Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0005 for a Tachometer Set-up video.
CTT Series - Digital Counter / Timer / Tachometer

Timer Example:
A basic Timer used to control the clamp time of a compression model press. When the operator signals, the mold is loaded with material. When a start button is pressed, the hydraulic cylinder closes the press to make a limit switch which starts the CTT timing. Upon completion of the timer cycle, Output 1 is turned on and the press is opened by the hydraulic cylinder.

Tachometer Example:
Using PScale to convert pulses into engineering units. The PScale feature of the CTT is very useful in converting the pulsed signal from an encoder or sensor into a usable unit of measurement.

For example, if connecting a proximity switch to the CTT to monitor the speed of a motor using a sensing gear, there is a simple calculation to convert the pulses from the sensor to Motor RPMs.

Using the following formula, you can calculate a PScale value to change a pulse signal into RPMs. First, obtain the pulses per revolution (ppr) or number of teeth on the sensing gear.

For example, in the illustration below, there are 38 teeth on the gear or 38 ppr. If the gear is coupled directly to the motor, this is all that is required to perform the calculation.

\[
PScale = \frac{60}{\text{ppr}} \text{ or } \frac{60}{38} \\
PScale = 1.579 \\
\]

With the PScale set to 1.579 for every 38 input cycles the CTT will display a value of 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.

Counter Functions
- 1-Stage
- 2-Stage
- Batch
- Total
- Dual

Counter Input Modes
- Up
- Down
- Up / Command Down
- Up / Down
- Quadrature
- Addition
- Subtraction

Counter Output Modes
- Select from eleven (11) different output modes (F, N, C, R, K, P, Q, A, S, T, D)

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

Counter Output Modes
- Select from eight (8) different output modes (F, N, C, R, K, P, Q, A)

Tachometer Output Modes
- Select from four (4) different output modes
  - 2Lo/1Lo
  - 2Lo/1Hi
  - 2Hi/1Lo
  - 2Hi/1Hi

Visit www.automationdirect.com to download the free comprehensive CTT Series manual.

For latest prices, please check AutomationDirect.com

1-800-633-0405

Relays and Timers
# CTT Series - Digital Counter / Timer / Tachometer

## Part Numbers and Description

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Qty</th>
<th>Wt (lb)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTT-AN-D24</td>
<td>Counter / Timer / Tachometer, Output 1 NPN &amp; SPST relay, Output 2 NPN, 24 VDC powered, panel mounting clip included*</td>
<td>1</td>
<td>0.4</td>
<td>$75.00</td>
</tr>
<tr>
<td>CTT-AN-A120</td>
<td>Counter / Timer / Tachometer, Output 1 NPN &amp; SPST relay, Output 2 NPN, 100-264 VAC powered, panel mounting clip included*</td>
<td>1</td>
<td>0.4</td>
<td>$75.00</td>
</tr>
<tr>
<td>CTT-1C-D24</td>
<td>Counter / Timer / Tachometer, Output 1 NPN &amp; SPST relay, Output 2 SPDT relay, 24 VDC powered, panel mounting clip included*</td>
<td>1</td>
<td>0.4</td>
<td>$75.00</td>
</tr>
<tr>
<td>CTT-1C-A120</td>
<td>Counter / Timer / Tachometer, Output 1 NPN &amp; SPST relay, Output 2 SPDT relay, 100-264 VAC powered, panel mounting clip included*</td>
<td>1</td>
<td>0.4</td>
<td>$75.00</td>
</tr>
</tbody>
</table>

* Spare panel clips part number PANEL-16

## Digital Counter / Timer / Tachometer General Specifications

### Input Power Requirements
- 100 to 240 VAC 50/60 Hz
- 24 VDC

### Operation Voltage Range
- 85 to 264 VAC
- 21.6 to 26.4 VDC

### Power Consumption
- Less than 10VA

### Power Source
- 12VDC ±10%, 100mA

### Display
- Double-line, 6-digit LCD display (SV = 8mm, PV = 6mm)

### Input Signal
- NPN ON impedance 1K ohm max. ON residual voltage: 2V max.
- PNP 4.5 to 30VDC, low level: 0 to 2VDC

### Output 1
- Relay: SPST max. 250VAC, 5A (resistive load), 4A (inductive load); Transistor: NPN open collector. When 100mA @ 30VDC, residual voltage = 1.5VDC max

### Output 2
- CTT-1C-xxx: Relay: SPDT max. 250VAC, 5A (resistive load), 4A (inductive load)
- CTT-AN-xxx: Transistor: NPN open collector. When 100mA @ 30VDC residual voltage = 1.5VDC max

### Life Expectancy
- Mechanical: 10,000,000 operations (frequency 18,000 operations/hr)
- Electrical: 100,000 operations (frequency 900 operations/hr)

### Output Duration (where used)
- 0.00 (latching) / 0.01 to 99.99 seconds

### Output Switching Time
- 2 milliseconds max

### Dielectric Strength
- 2000VAC 50/60 Hz for 1 minute

### Vibration Resistance
- Without damage: 10 ~ 55 Hz, amplitude = 0.75 mm, 3 axes for 2 hours

### Shock Resistance
- Without damage: drop 4 times, 300m/s² 3 edges, 6 surfaces and 1 corner

### Ambient Temperature
- +32°F to +122°F (0°C to +50°C)

### Storage Temperature
- -4°F to +149°F (-20°C to +65°C)

### Altitude
- 2000m or less

### IP Rating
- IP 66 (with proper enclosure installation)

### Case Materials
- Case = ABS Plastic, Lens = Polycarbonate

### Ambient Humidity
- 35% to 85% RH (non-condensing)

### Memory Backup upon Power Failure
- EEPROM writing up to 100,000 times; Memory duration: 10 years

### Terminals
- Conforming Wiring: 0.25-1.65mm² (24 to 16 AWG)
- Permitted Torque: 0.5 N·m (0.369 ft·lb)

### Agency Approvals
- UL508 listed (E311366), cULus, CE marked

## Wiring

### CTT-1C-D24
![Wiring Diagram]

### CTT-AN-D24
![Wiring Diagram]

### CTT-1C-A120
![Wiring Diagram]

### CTT-AN-A120
![Wiring Diagram]

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For latest prices, please check AutomationDirect.com

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1-800-633-0405

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Relays and Timers

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tREL-70
CTT Series - Digital Counter / Timer / Tachometer

Display, Indicators & Keys

LCD Display and Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RST 1/2</td>
<td>Light on when reset signal is detected</td>
</tr>
<tr>
<td>K/P 1/2</td>
<td>Light on when key-protected mode is enabled</td>
</tr>
<tr>
<td>OUT 1/2</td>
<td>Light on when output is executing</td>
</tr>
<tr>
<td>H M S</td>
<td>Hour, minute, second, unit of timer, displayed in Timer function</td>
</tr>
<tr>
<td>TOTAL</td>
<td>&quot;Total Counting Mode&quot; in Counter function</td>
</tr>
<tr>
<td>BATCH</td>
<td>&quot;Batch Counting Mode&quot; in Counter</td>
</tr>
<tr>
<td>SET 1 2</td>
<td>SV1, SV2 display</td>
</tr>
<tr>
<td>TAC</td>
<td>Light on in Tachometer function</td>
</tr>
<tr>
<td>CNT</td>
<td>Light on in Counter function</td>
</tr>
<tr>
<td>TMR</td>
<td>Light on in Timer function</td>
</tr>
</tbody>
</table>

CTT Series Dimensions

mm [inches]