Digital Counter/Timer/Tachometer
CTT Series

Quick Start Guide

2012-01-18

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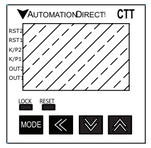
CUMMING, GA 30040-5860



Description:

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, included panel mounting clip and gasket make panel mounting a snap. The CTT is available in 120-240VAC and 24VDC powered models.

Counter Functions	*Counter Input Modes*	*Counter Output Modes*
1-Stage 2-Stage Batch Total Dual	Up Down Up / Command Down Up/ Down Quadrature Addition Subtraction	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	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

Timer + Counter		
Timer Functions (Up or Down)	*Counter Input Modes*	*Counter Output Modes*
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	Up Down	Select from eight (8) different output modes (F, N, C, R, K, P, Q, A)

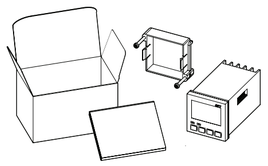
Tachometer Output Modes
Select from four (4) different output modes 2Lo/1Lo 2Lo/1Hi 2Hi/1Lo 2Hi/1Hi

For additional product information, please download the complete product manual which can be found at:
www.AutomationDirect.com

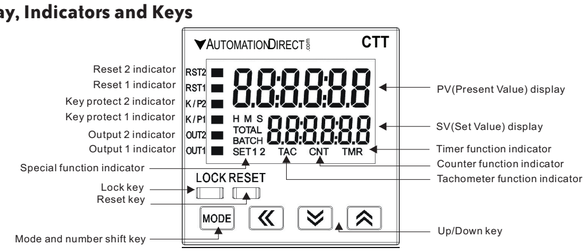
Box Contents and Unpacking Instructions

After receiving the CTT Counter/Timer/Tach, please check for the following:

- Make sure that the package includes the CTT Counter/Timer/Tachometer, the mounting bracket and hardware, and the Quick Start Guide.
- Inspect the unit to insure it was not damaged during shipment.
- Make sure that the part number indicated on the label corresponds with the part number of your order.
- If anything is missing or damaged, immediately call the AutomationDirect returns department @ 1-800-633-0405.
- For additional product information, please download the complete product manual which can be found at: www.AutomationDirect.com



Display, Indicators and Keys



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

Key Operation	
▼ ▲	Increase and decrease SV or change paramter settings
◀	Left move 1 digit of the selected digit. The indicator of the selected digit will flash.
MODE	Save the set parameters or switch among functions.
LOCK	Prevent settings from being changed. Key-protected mode still works after power cycle. Press LOCK to enter key-protected mode. In non-key-protected status, press LOCK to enter Lock 1, press LOCK again to enter Lock 2. Press MODE and ◀ at the same time to disable key-protected mode. LOCK (Lock 1) disables the functions of all keys. LOCK (Lock 2) allows users to change SV and functions of RESET remain. LOCK only functions in non-key-protected status.
RESET	Clear and reset PV.
Modes: Operation Mode and Configuration Mode	
Operation	When the power is on, the timer/counter/tachometer is in the operation mode. Press ▼ ▲ to change SV, or ◀ to select to change digit. The indicator of the selected digit will flash. After the change is made, press MODE to save the setting. If SV or paramters are not changed, press MODE once to switch between SET1 and SET2.
Configuration	Press MODE in operation mode for more than 3 seconds to enter configuration mode. Press MODE once to switch among parameters. To return to operation mode, press MODE for more than 3 seconds.

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At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

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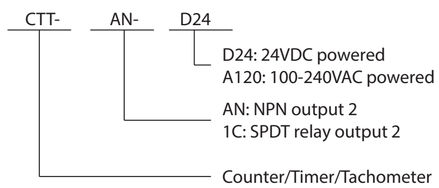
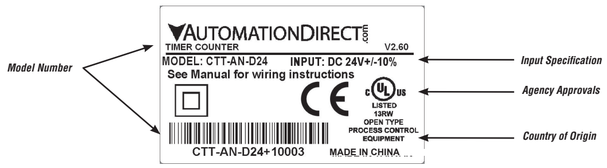
Model Number Explanation



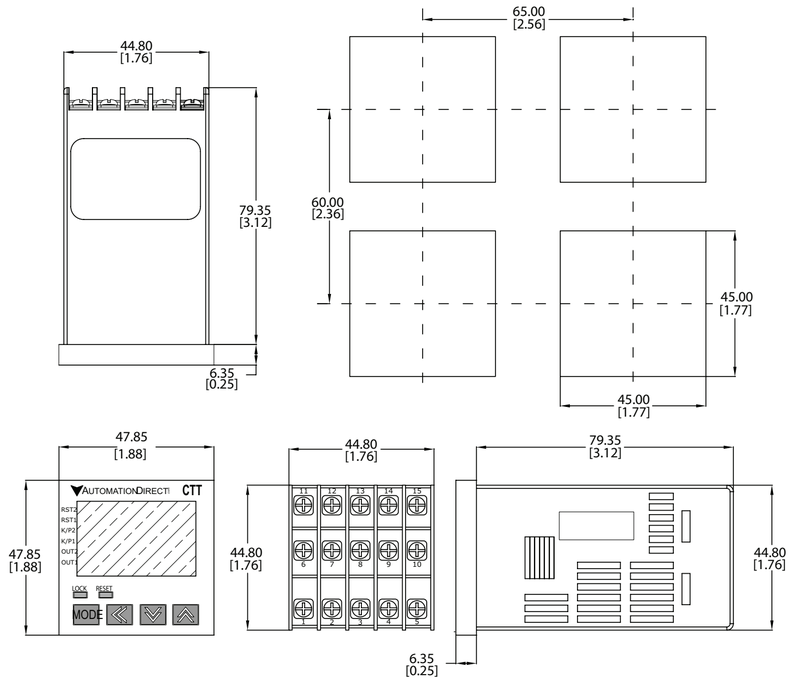
Label Information



General Specifications

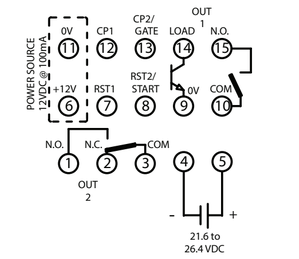
Digital Counter / Timer / Tachometer General Specifications			
Input Power Requirements		100 to 240 VAC 50/60 Hz	24 VDC
Operation Voltage Range		85 to 264 VAC	21.6 to 26.4 VDC
Power Consumption		Less than 10VA	
Power Source		12VDC ±10%, 100mA	
Display		Double-line, 6-digit LCD display (SV = 8mm, PV = 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/30VDC, 5A (resistive load), 4A (inductive load)	
	CTT-AN-xxx	Transistor: NPN open collector. When 100mA @ 30VDC, residual voltage = 1.5VDC max	
Output Switching Time		2 milliseconds max	
Dielectric Strength		2000VAC 50/60Hz for 1 minute	
Vibration Resistance		Without damage: 10 ~ 55Hz, amplitude = 0.75mm, 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	0.5Nm (0.369 ft/lbs)	
Agency Approvals		UL508 listed (E311366), cULus, CE marked	

Dimensions [mm] inch



Terminal Layout

CTT-1C-D24



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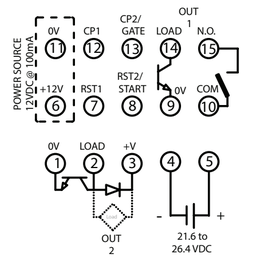
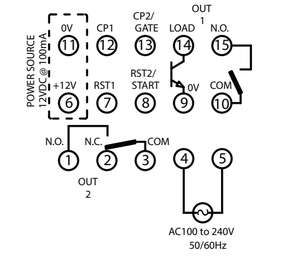
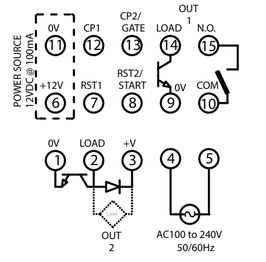


CTT-1C-A120



CTT-AN-A120

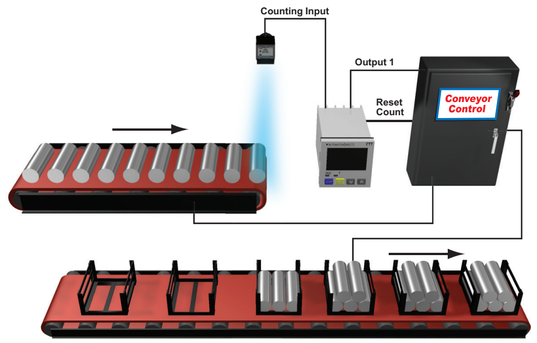


Counter Example:

1-Stage Counting (StAGE 1)

Counting Up (UP)

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.



Input Mode

Counting Up (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.

Output Mode

Mode F (F)

When the count present value PV counts up to the count setting value SV both outputs 1 and 2 will turn ON.

The count PV will continue to increment with each input signal. The leading edge of "a reset" input signal at RST1 will turn OFF both outputs, reset the count PV to 0, and prohibit an input signal from incrementing the count PV. The trailing edge of the "reset" signal at RST1 enables counting to begin.

Keypad set up of the parameters in the Counter for 1-Stage Counting:

To enter the page for parameter setting of the counter, press MODE for the main menu for more than 3 seconds. After the setup is completed, press MODE for more than 3 seconds under any of the parameter page you are in and return to the main menu.

Select functions: There are 4 modes in CTA, (left to right) timer, counter, tachometer and timer + counter.

FUnC or tiME or Cont or tACH or nLY

MODE

Select counter functions: 1-stage counting, 2-stage counting, batch counting, total counting, dual counting.

CntFUn or StAGE 1 or StAGE2 or bAtCH or totAL or dUAL

MODE

Select input modes: counting up, counting down, command counting up/down, individual counting up/down, quadrature input.

C inPt or UP or dOWn or Ud A or Ud b or Ud C

MODE

Select output modes: CTA offer 11 output modes, among which mode S, T and D are only valid with input modes Ud_A, Ud_b and Ud_C.

C otMd or F or n or C or r or E or P

MODE

or Q or A or S or L or d

Select counting speed: Maximum 10Kcps; others 5K, 1K, 200, 30 and 1cps.

C SPEd or 10K or 5K or 1K or 200 or 30 or 1

MODE

Pulse width of output 1: The default output time is 0.02 second. When the parameter is set to 0.00 second, the output status will continue.

t oUt 1 or 002 or 000

MODE

Pulse width of output 2: This paramter is adjustable according to different output modes selected. If the output mode is C, the default output time will be 0.02 second, When the parameter is set to 0.00 second, the output status will continue.

t oUt2 or 002 or 000

MODE

Set up the position of decimal point: 0 (no decimal point), 1 (one digit after decimal point), 2 (two digits after decimal point), 3 (three digits after decimal point).

PoInt or 0 or 1 or 2 or 3

MODE

Set up pre-scale value: 1.000 (default 1:1) Range: 0.001 to 99.999

PSCALE or 1000

MODE

Save the data while switching off the power: When SAVE is selected, the PV will be saved; when CLEAR is selected, the PV will not be saved.

PUErS or CLEAr or SAvE

MODE

Set up minimum width of reset signal: Default = 20ms; 1ms is also selectable

rtSr or 20 or 1

MODE

Select input signal types: NPN and PNP

InPtLC or nPn or PnP

MODE

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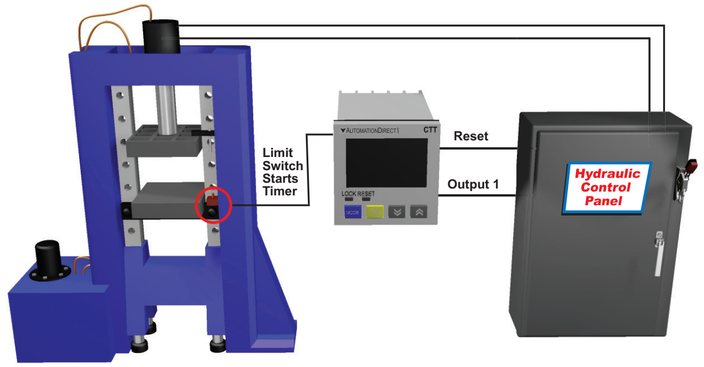
Timer Example:

A basic Timer used to control a clamp time of a compression model press.When the operator signals the mold is loaded with material by pressing the start button 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.

Signal On Delay 1 (Sond 1)

With power applied to the CTT, the leading edge of an input signal at START will begin the timing period setting value SV (timing up or down based on parameter (t nodE). At the end of the timing period both outputs will turn ON momentarily for the time set in the output pulse width parameter (t oUt 1) or will be maintained ON if the output pulse width parameter (t oUt 1) is set to 0.00. The trailing edge of the "start" signal has no effect on the outputs or timing period. The leading edge of an "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr) or DIP Switch 8. The leading edge of an "pause" signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal. When power is removed, both outputs will turn OFF and the timing period will be reset.



Keypad set up of the parameters in the Timer:

To enter the page for parameter setting of the timer, press MODE in the main menu for more than 3 seconds. After the setup is complete, press MODE for more than 3 seconds under any of the parameter page you are in and return to the main menu.

Select funtions: There are 4 modes in CTT, (left to right) timer, counter, tachometer and timer + counter.

FUnC or tiME or Cont or tACH or nLY

MODE

Select timer mode: timing up and timing down

t nodE or UP or dOWn

MODE

Select output modes: There are 12 output modes in the timer. The user can choose the mode that best meets the demand.

t otMd or Sond 1 or Sond2 or SoFFd or Son or Pond or PondH

MODE

or rCY or rCYH or rCY2 or SCon or Ston or StoFF

Select display unit: the min. unit 10ms to the max. unit hour are selectable. Refer to table below.

t UnIt or S 00 1 or S 01 or S 1 or HS 00 1 or HS 01 or H 01

MODE

H 1 or HHS 1 or HH 1 or H 1

Select pulse width of output 1: The default output time is 0.02 second. When the parameter is set to 0.00 second, the output status will continue.

t oUt 1 or 002 or 000

MODE

Select min. width of reset signal: The defaul value is 20ms; can be set to 1ms.

rtSr or 20 or 1

MODE

Select input signal types: NPN and PNP.

InPtLC or nPn or PnP

MODE

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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 some usable unit of measurement.

For example if one was to connect 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 this 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 = 60/ppr or 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.

Keypad set up of the parameters in the Tachometer:

Select functions: There are 4 modes in CTT, (left to right) timer, counter, tachometer and timer + counter.

FUnC or tiME or Cont or tACH or nLY

MODE

Select output modes: There are 4 output modes, 2Lo1Lo, 2Lo1Hi, 2Hi1Lo, and 2Hi1Hi, For example, when you select 2Hi1Lo, and assume the first set value is 100 (2Hi) and the second 50 (1Lo), the output value of the tachometer will be below 100 (2Hi) and above 50 (1Lo) and CTT will not perform an output. If the set value exceeds the range, CTT will perform an output.

tAotMd or 2Lo1Lo or 2Lo1Hi or 2Hi1Lo or 2Hi1Hi

MODE

Select rotation speed: Maximum 10Kcps; others 5K, 1K, 200, 30 and 1cps.

C SPEd or 10K or 5K or 1K or 200 or 30 or 1

MODE

Set up the position of decimal point: 0 (no decimal point), 1 (one digit after decimal point), 2 (two digits after decimal point), 3 (three digits after decimal point).

PoInt or 0 or 1 or 2 or 3

MODE

Set up pre-scale value: 1.000 (default 1:1) Range: 0.001 to 99.999

PSCALE or 1000

MODE

Set up the delay time after switching on the power: 0.0 (default). The tachometer will start to run when the set delay time is due after the power is switched on. Setup range: 0.1 to 99.9 seconds

St tAC or 00

MODE

Set up average value of the input filter: The average value is for making the present value detected by the tachometer more stable. The setup range is 0 to 3 (1 = 2 data, 2 = 4 data, 3 = 8 data). For example, if you select "3", the system will average the 8 present values from the tachometer to make the present value displayed on the screen more stable.

St AvG or 0 or 1 or 2 or 3

MODE

Set up minimum width of reset signal: Default = 20ms; 1ms is also selectable.

rtSr or 20 or 1

MODE

Select input signal types: NPN and PNP.

InPtLC or nPn or PnP

MODE

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- For additional product information, please download the complete product manual which can be found at: www.AutomationDirect.com

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