

Multifunctional digital counter/length counter TMC7CX

Technical Manual

Version number: EN-V1-03



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Thank you very much for choosing TMCON products,
In order to better use this product, please read the following before using.

■ Safety precautions

Attention

Do not touch the terminals while power is on, otherwise minor injuries may occur due to electric shock.



Do not allow metal objects, conductors, debris (such as cuttings) from installation work, moisture, or other foreign matter to enter the digital controller, the setup tool ports, or between the pins on the connectors on the Setup Tool cable. Otherwise it may cause electric shock, short circuit or machine malfunction.



Do not use the product where subject to flammable or explosive gas. Otherwise, it may cause mild injury due to the explosion.



Never disassemble, modify, or repair the product or touch any of the internal parts. Otherwise, it may cause mild electric shock, fire, and equipment failure.



This equipment is an open processing controller. Do not use it in a control cabinet where fire may occur. When using more than 2 open-circuit switches, please turn off all switches before repair inspection, so that the product is in a power-off state.



If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.



■ Main features

Multifunctional digital counter/meter counter

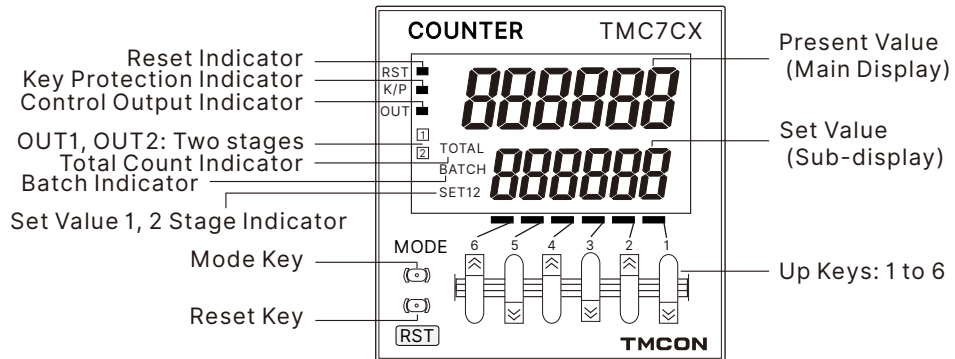
- Bright and easy to read color LCD display.
- Independent setting keys are provided for all six digits, So the setting is very convenient and fast, and it also has keys protection switches to prevent misoperation.
- Detachable terminal protection cover, convenient wiring and can prevent electric shock.
- Multiple input and output modes can be selected and set to meet different application needs.
- The prescaling function (signal and display ratio) is 0.0001~99.9999, which can convert the counter into a length counter for use.
- Series models are available for selection, in addition to commonly used 1-stage/2-stage preset counter functions, there are also specialized models for total+preset counter, batch counter, dual counter.
- Equipped with power outage memory data storage function.
- Strong anti-interference performance, accurate and reliable counting.
- NPN/PNP input signals can be selectable settings.

■ Technical reference

Models	TMC7CX -C	TMC7CX -CP	TMC7CX -CWP	TMC7CX -CTP	TMC7CX -CAP	TMC7CX -CBP	TMC7CX -CDP
Type	1-stage preset counter (Basic type)	1-stage preset counter (With Prescalin g function)	2-stage preset counter	Total+prese t counter (Total value can be set)	Total+pr eset counter (Total value not set)	Batch counter	Dual counter (Dual channel counting)
Input Mode	UP (Increment), DOWN (decrement), increment/decrement UP/DOWN-A (command input), UP/DOWN-B (individual inputs), or UP/DOWN-C (quadrature inputs)			UP (Increment)	UP, DOWN, UP/DOWN-A, UP/DOWN-B, UP/DOWN-C		ADD
Output mode	N, F, C, R, L		N, F, C, R, L, K, D, H	N, F, C, R	N, F, C, R, L, K, D		
Prescaling function	None	Yes (0.001~99.999 can be freely set)					
Decimal point adjustment	None	Yes (right most 3 digits)					
External dimension (mm)	48(high)×48(wide)×86 (depth)						
Hole size (mm)	45(high)×45 (wide)						
Power supply	AC100~240V 50/60Hz or AC/DC12~24V (The default delivery is 100~240V, If you need 12~24V, please declare the voltage at the time of ordering)						
Permissible voltage range	85~110%						
Power consumption	About 5VA (AC240V) , about 3.2 VA (DC24V)						
Display mode	Color LCD display						
Display Range	-99999~999999 (-5~6 digits)						
Counting speed	5Hz, 30Hz, 1KHz, 5KHz (selectable settings)						
Input signal	CP1, CP2, RESET1, RESET2						
Input mode	No-voltage (NPN) input/voltage (PNP) input (switchable) No-voltage inputs: ON impedance: 1KΩ max (Leakage current: 12mA at 0Ω) ON residual voltage: 3V max OFF impedance: 100KΩ min Voltage input: High (logic) level: 4.5 to 30VDC Low (logic) level: 0 to 2VDC (Input resistance: approx 4.7KΩ)						
Reset mode	Manual reset, external signal reset, automatic reset (depending on output mode)						
External reset minimum signal	1ms or 20ms						
Automatic reset time	0.01~99.99 seconds						
Control output	Relay output (standard configuration), contact capacity: 3A/AC250V resistive load						

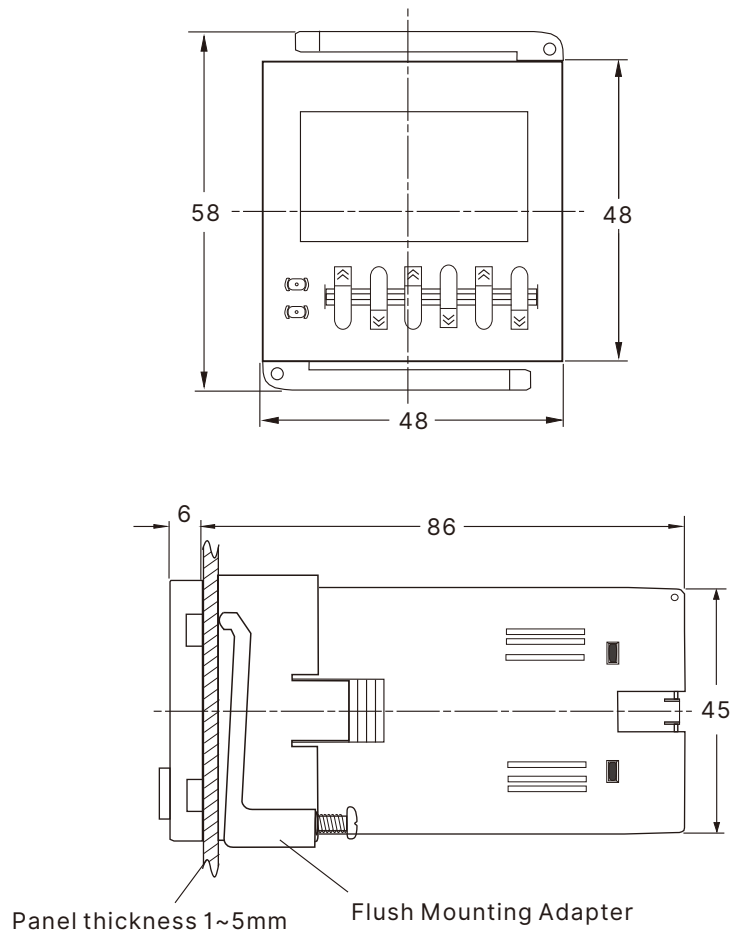
	Customizable transistor output: NPN open-circuit collector output
	Customizable SSR drive voltage (DC12V/100mA) output
Auxiliary power output	12VDC \pm 10% 100mA Max
Power outage memory	EEP-ROM Data held for more than 10 years
Insulation withstand voltage	AC2000V 50/60Hz 1min
Usage environment	Temperature -10~+55°C (not freezing or exposed), humidity: 25~85% RH

■ Panel

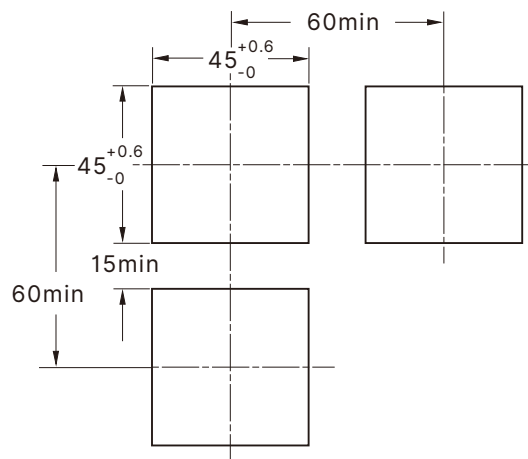


■ Size (mm)

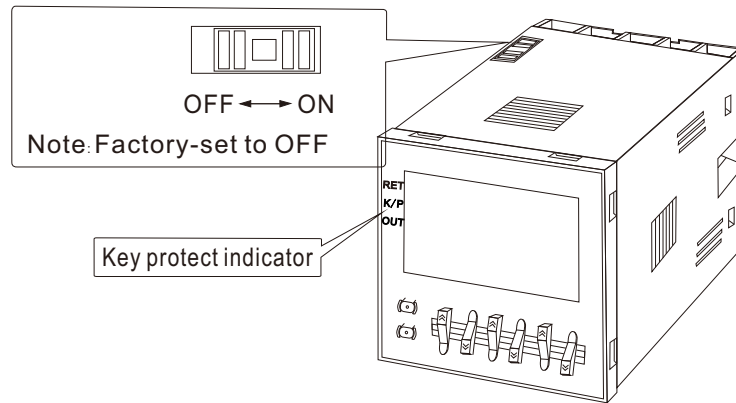
● Outline dimensions



● Mounting hole size



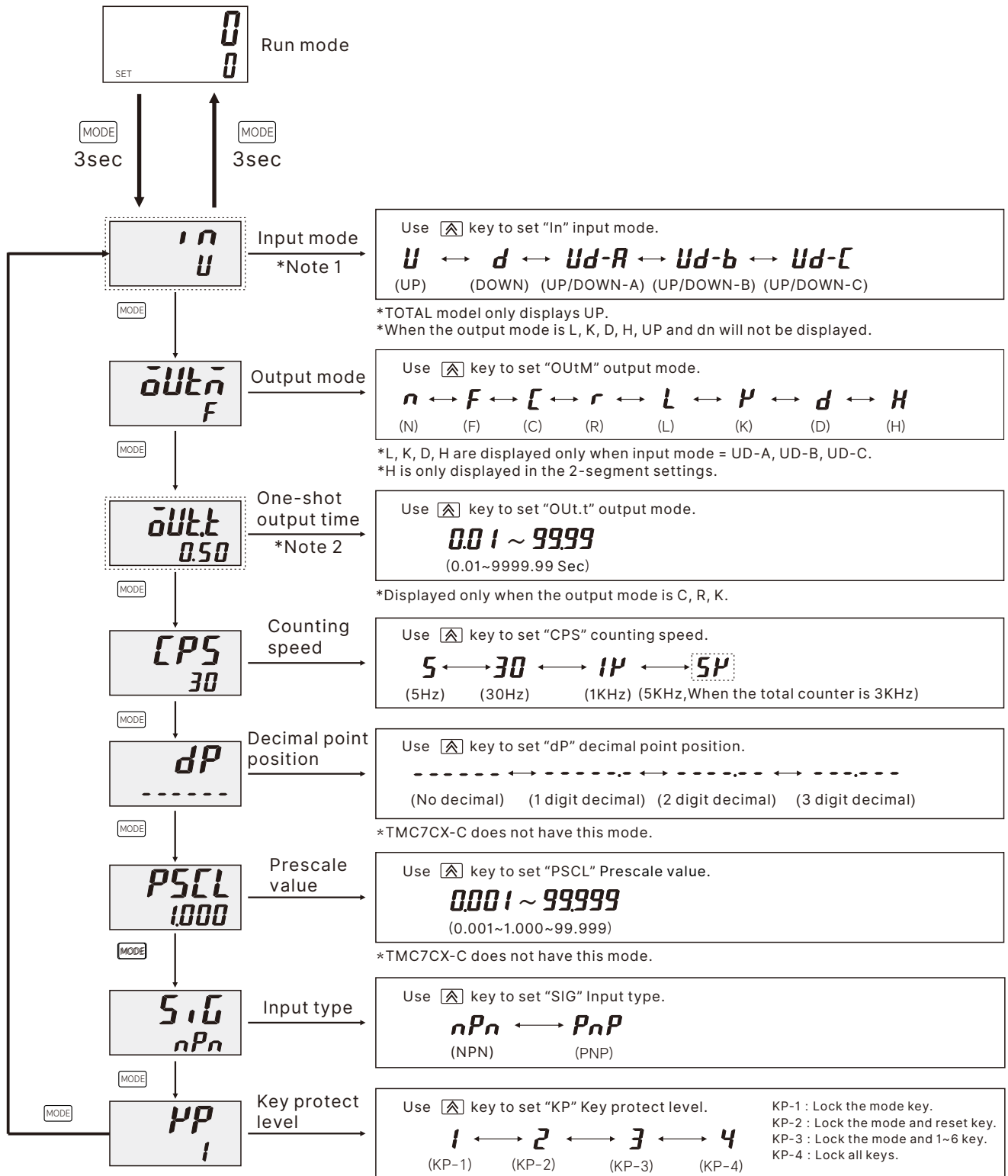
■ Key protection switch



Set the key protect level.

When the key-protect switch is set to ON, it is possible to prevent setting errors by prohibiting the use of certain operation keys by specifying the key protect level (KP-1 to KP-4). The key protect indicator is lit while the key-protect switch is set to ON. Confirm the ON/OFF status of the keyprotectswitch after the TMC7CX is mounted to the panel.

Settings for All Functions



Note 1:

●When using as a total counter(Can set the total number of):



Only dual UP mode

●When using as a dual counter:



Only Dual count calculating mode

Note 2:

●When using as a 2-stage counter:



One-shot output2 time

001 ~ 99.99

Note: Displayed only when the output mode is C, R or K.



One-shot output1 time

Hold/001 ~ 99.99

If the output time is 0.00, hold is displayed.

Note: Displayed for output modes other than D, L, and H.

●When Using as a batch Counter:



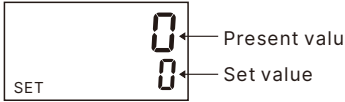
One-shot output2 time

001 ~ 99.99

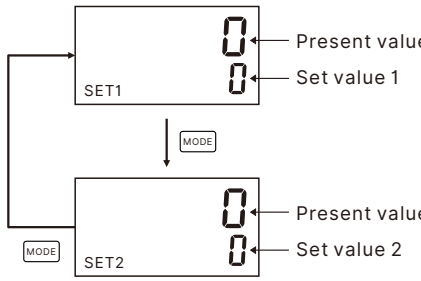
Note: Displayed only when the output mode is C, R or K.

■ Operation in Run Mode

●1-Stage Counter:



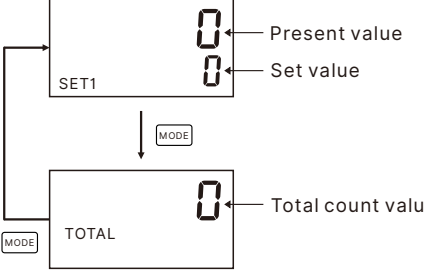
●2-Stage Counter:



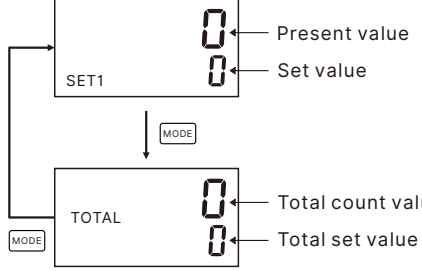
●Present Value
Shows the present count value.

●Set Values (Set Value 1 and Set Value 2)
Set the set value. When the present value reaches the set value, signals are output according to the specified output mode.

●total counter
(The total number can not be set)



●total counter(Can set the total number of)

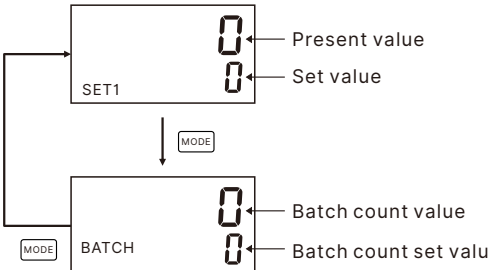


●Present Value/Set Value
Same as 1-stage counter.

●Total Count Value
Shows the present total count value.

●Total set value
Set the total set value. When the total value reaches the set Value, total output(OUT1) turns ON.

●Batch Counter:

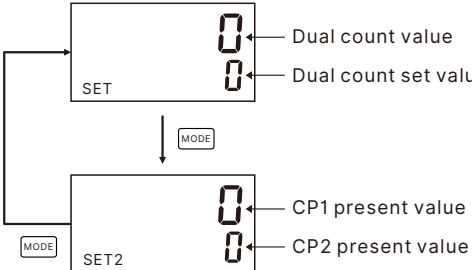


●Present Value/Set Value
Same as 1-stage counter.

●Batch Count Value
Shows the number of times the count has been completed for the present value.

●Batch Count Set Value
Set the batch count set value. When the batch count value reaches the batch count set value, batch output (OUT1) turns ON.

●Dual Counter:



●Dual Count Value
Shows the sum of the CP1 present value and CP2 present value when the dual count calculating mode is ADD and shows the value obtained by subtracting the CP2 present value from the CP1 present value when the dual count calculating mode is SUB.

●Dual Count Set Value
Set the dual count set value. When the dual count value reaches the dual count set value, signals are output according to the specified output mode.

●CP1/CP2 Present Value
Show the present count values for CP1 and CP2 present values respectively.

Input Modes and Present Value

UP (Increment) Mode	DOWN (Decrement) Mode									
<p>CP1: Count input; CP2: Prohibit (gate) input</p> <p>Present value: 0, 1, 2, 3, 4, 5</p> <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>	<p>CP1: Count input; CP2: Prohibit (gate) input</p> <p>Present value: n, n-1, n-2, n-3, n-4, n-5</p> <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>									
<p>CP1: Prohibit (gate) input; CP2: Count input</p> <p>Present value: 0, 1, 2, 3, 4, 5</p> <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>	<p>CP1: Prohibit (gate) input; CP2: Present value</p> <p>Present value: n, n-1, n-2, n-3, n-4, n-5</p> <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>									
UP/DOWN A Command Input Mode	UP/DOWN B Individual Input Mode									
<p>CP2 did not enter CP1 plus count, the CP2 input is valid CP1 count down</p> <p>Present value: 0, 1, 2, 3, 2, 1, 2, 3</p> <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>	<p>input CP1 UP count, input CP2 count down</p> <p>Present value: 0, 1, 2, 3, 2, 1, 1, 2, 3</p>									
UP/DOWN C Quadrature Input Mode	<p>Note: 1. If the configuration selection is set to dual counter, CP1 and CP2 input will operate in the same way as the count input (CP1) of UP (increment) mode.</p> <p>2. Ⓐ must be greater than the minimum signal width and Ⓑ must be at least 1/2 the minimum signal width. If they are less, a count error of ±1 may occur.</p> <p>Minimum signal width: 100ms (when maximum counting speed=5Hz) 16.7ms (when maximum counting speed=30Hz) 500μs (when maximum counting speed=1KHz) 100μs (when maximum counting speed=5KHz)</p> <p>3. Counting starts when the CP1 is turned ON after turning ON the power.</p> <p>4. The meaning of the H and L symbols in the tables is explained below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Input method Symbol</th> <th>No-voltage input (NPN input)</th> <th>Voltage input (PNP input)</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>Short-circuit</td> <td>DC4.5~30V</td> </tr> <tr> <td>L</td> <td>Open</td> <td>DC0~2V</td> </tr> </tbody> </table>	Input method Symbol	No-voltage input (NPN input)	Voltage input (PNP input)	H	Short-circuit	DC4.5~30V	L	Open	DC0~2V
Input method Symbol		No-voltage input (NPN input)	Voltage input (PNP input)							
H	Short-circuit	DC4.5~30V								
L	Open	DC0~2V								
<p>Automatically determine the forward or reverse</p> <p>Present value: 0, 1, 2, 3, 2, 1, 2, 3</p> <p>Ⓑ must be at least 1/2 the minimum signal width. (See note 2.)</p>										

Input/Output Mode Settings

Operation for 1-stage models is the same as that for OUT2.

When using a 2-stage model as a 1-stage counter, total and preset counter, or dual counter, OUT1 and OUT2 turn ON and OFF simultaneously.

Self-holding output

One-shot output from OUT1

Self-holding output

(The one-shot output time can be set in the range 0.01 to 99.99s.)

One-shot output from OUT2

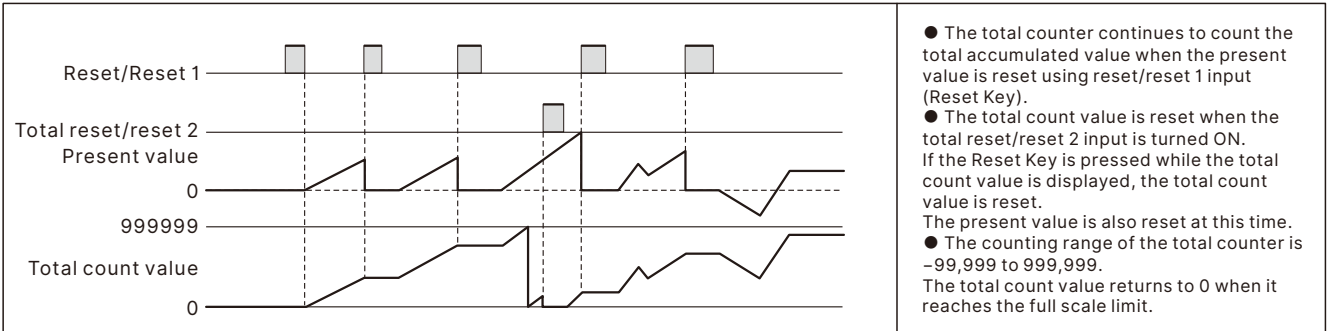
Output mode	Input mode			Operation after count completion
	UP	DOWN	U/D-A, B, C	
N				The outputs and present value display are held until reset/reset 1 is input.
F				The present value display continues to increase/decrease. The outputs are held until reset/reset 1 is input.
C				As soon as the count reaches SV, the present value display returns to the reset start status. The present value display does not show the present value upon countup. The outputs repeat oneshot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.
R				The present value display returns to the reset start status after the one-shot output time. The outputs repeat oneshot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.

Output mode	Input mode U/D-A, B, C	Operation after count completion
K		<p>The display continues to increase/decrease until the overflow or underflow value is reached. One-shot output only.</p>
D		<p>The display continues to increase/decrease until the overflow or underflow value is reached. The outputs are ON while the count is equal.</p>
L		<p>The display continues to increase/decrease until the overflow or underflow value is reached. OUT1 is held while the present value is less than or equal to set value 1. OUT2 is held while the present value is greater than or equal to set value 2.</p>
H		<p>The display continues to increase/decrease until the overflow or underflow value is reached. OUT1 is held while the present value is greater than or equal to set value 1. OUT2 is held while the present value is greater than or equal to set value 2. * H mode is available only when using a model as a 2-stage counter.</p>

total counter, Batch Counte, Dual Counter Explain

total counter (The total number can not be set) TMC7CX-CAP

The TMC7CX has a total counter, separate from the 1-stage preset counter, for counting the total accumulated value. Can replace a preset counter + 1 cumulative counter.

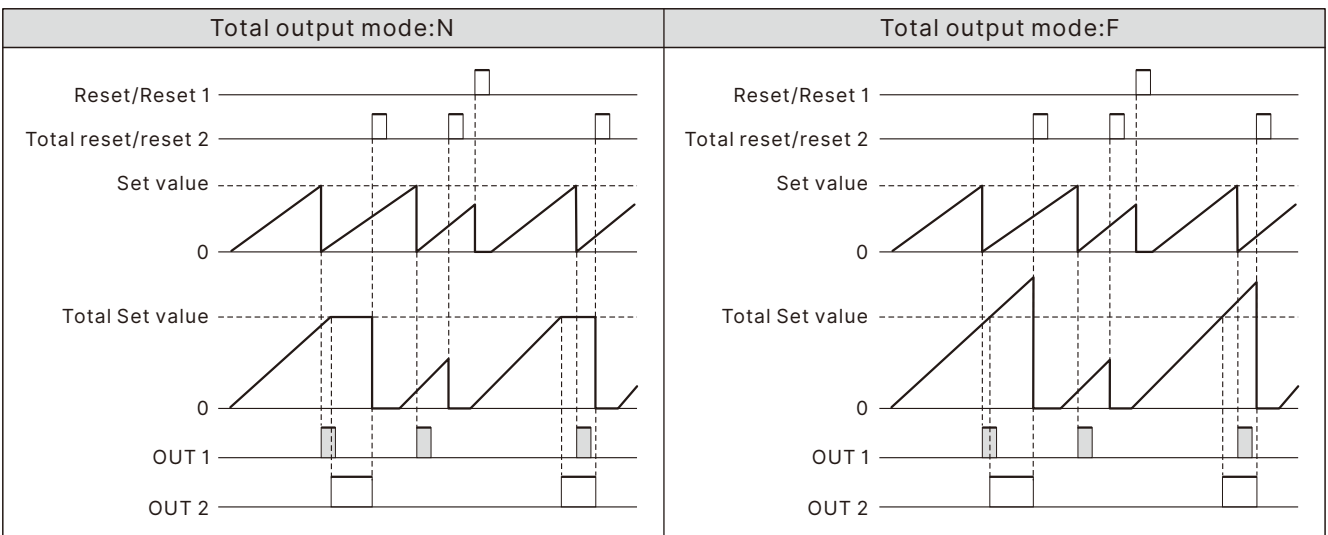


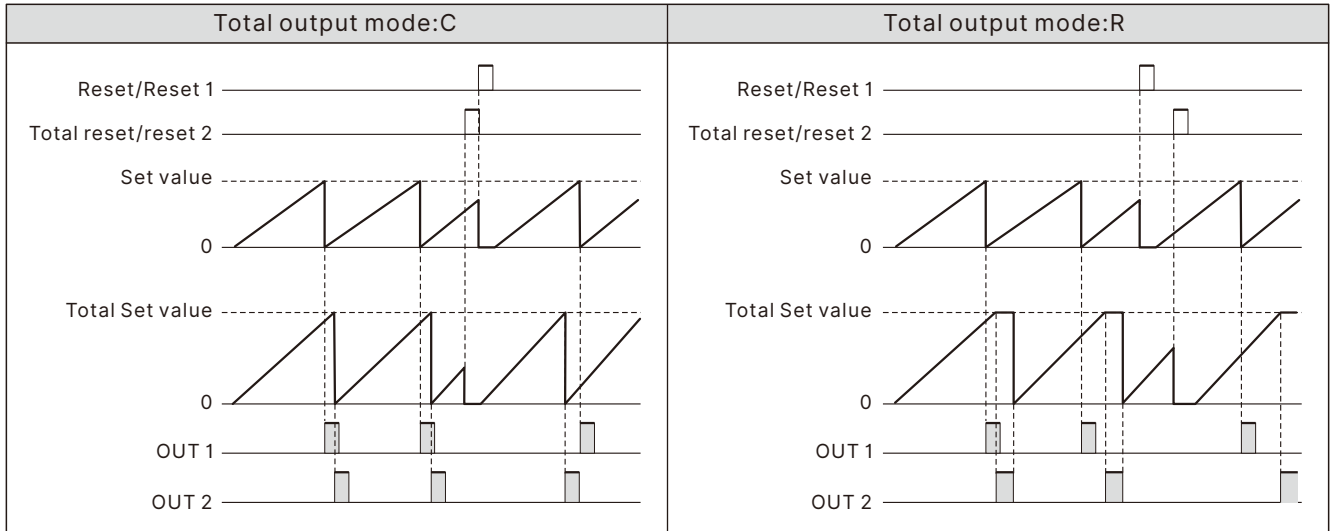
total counter (Can set the total number of) TMC7CX-CTP

Separate from a preset counter, plus the total preset counter.

Principle: each to the total amount of set value OUT1 is One-shot output (Output mode C), while the cumulative total no stop until it reaches Total Count Value OUT2 output. (Total output modes N, F, C, the R can be set). Can replace the two preset counter.

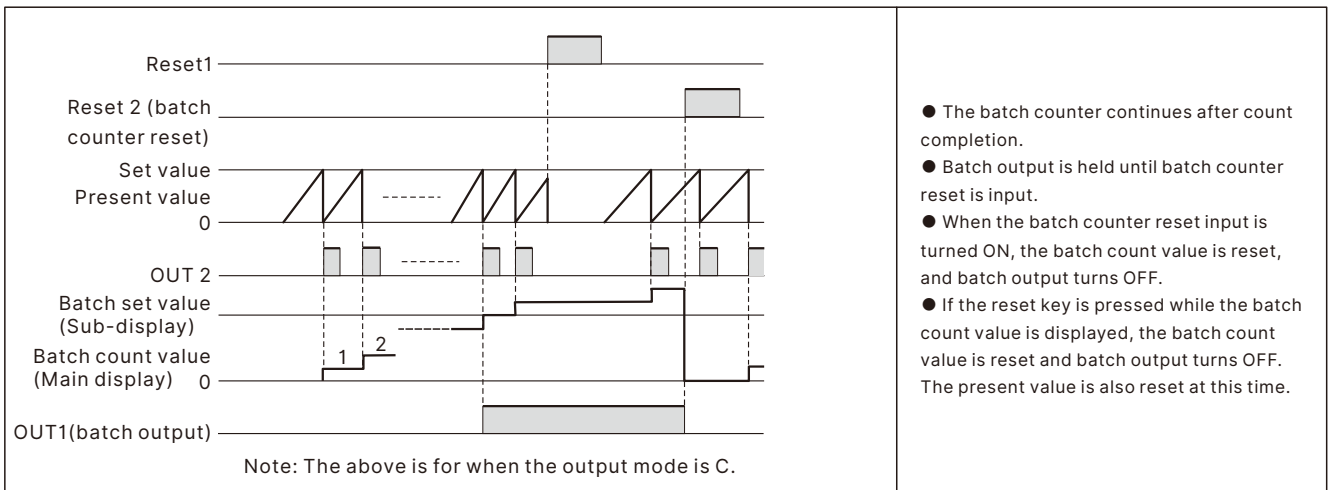
- The total counter continues to count the total accumulated value when the present value is reset using reset input (reset key).
- The total count value is reset when the total reset input is turned ON. If the reset key is pressed while the total count value is displayed, the total count value is reset. The present value is also reset at this time.





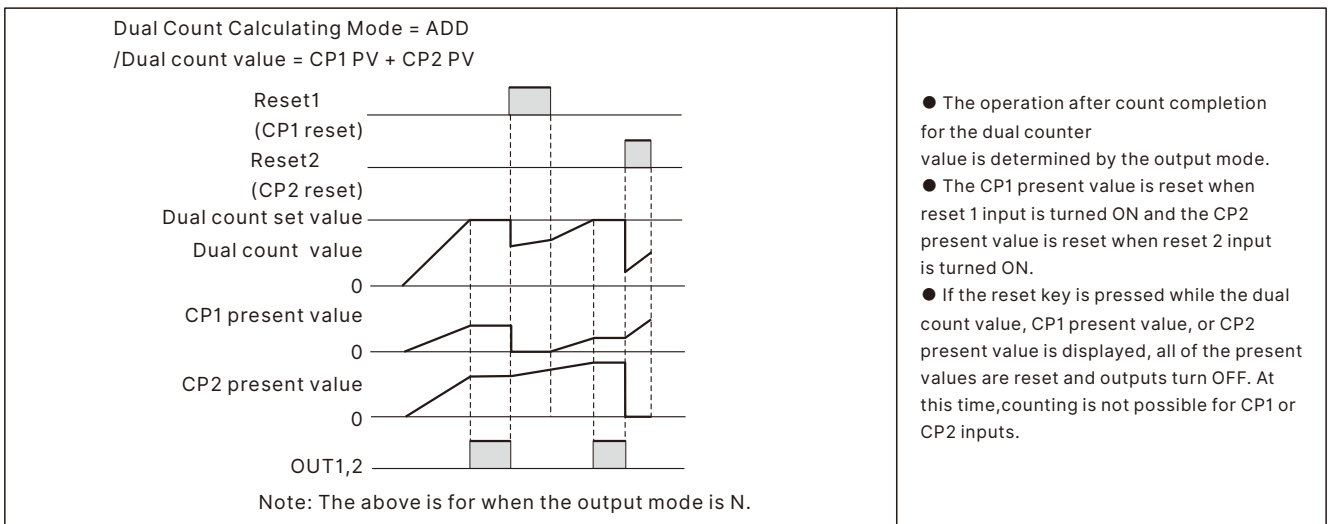
● Batch Counter TMC7CX-CBP

The TMC7CX has a batch counter, separate from the 1-stage preset counter, for counting the number of times the count has been completed.



● Dual Counter TMC7CX-CDP

Using the dual counter allows the count from 2 inputs to be added or subtracted and the result displayed. It is possible to specify a set value for which output turns ON when the set value matches the added or subtracted result. OUT1 and OUT2 turn ON and OFF simultaneously.

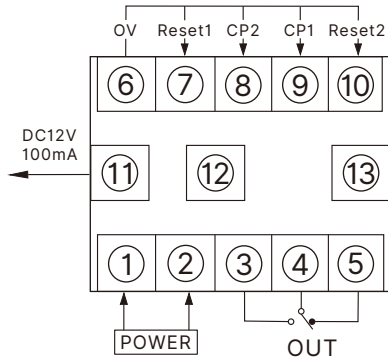


■ Reset Function List

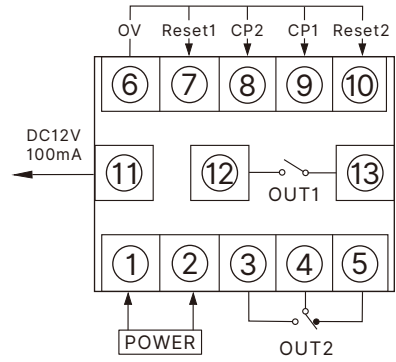
Function	1-stage/2-stage counter	Total and preset counter		Batch counter		Dual counter	
		Present value/ set value	Total count value/Total Set value (TMC7CX-CTP have)	Present value/ set value	Batch count value/batch count set value	Dual count value/dual count set value	CP1 present value/CP2 present value
Screen displayed in run mode	Present value/ set value (1, 2)	Present value/ set value	Total count value/Total Set value (TMC7CX-CTP have)	Present value/ set value	Batch count value/batch count set value	Dual count value/dual count set value	CP1 present value/CP2 present value
Reset/reset 1	Present value and output reset	Present value and output reset		Present value and output reset		Only the CP1 present value is reset	
Total reset/reset 2	No effect	Only the total count value is reset/total output(TMC7CX-CTP have)		Batch count value and batch output reset		Only the CP2 present value is reset	
Reset key	Present value and output reset	Present value and output reset	Present value, total count value, output reset and total output reset	Present value and output reset.	Present value, batch count value, output and batch output reset	CP1 present value, CP2 present value, dual count value, and output reset.	

■ Wiring diagram

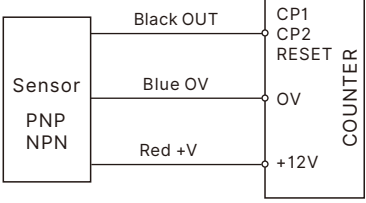
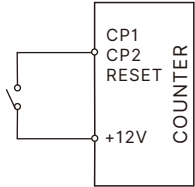
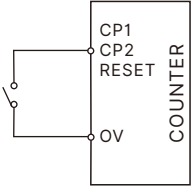
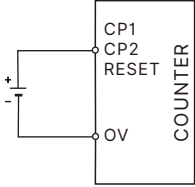
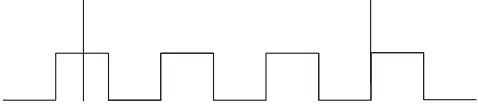
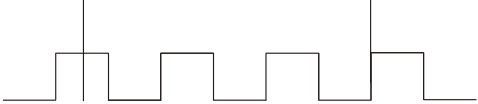
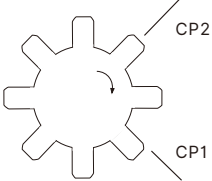
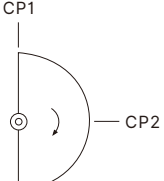
- 1-stage Contact Output
TMC7CX-C/TMC7CX-CP/TMC7CX-CAP/
TMC7CX-CDP



- 2-stage Contact Output
TMC7CX-CWP/TMC7CX-CTP/
TMC7CX-CBP



Signal input connection diagram

<p>●Sensor input:</p> 	<p>●Contact Input:</p>  <p style="text-align: right;">Input signal is set to PNP</p>
<p>●Contact Input:</p>  <p style="text-align: right;">Input signal is set to NPN</p>	<p>●DC voltage pulse signal input:</p>  <p style="text-align: right;">1:Active-high internal set PNP 2:Active-Low internal set NPN</p>
<p>●The UP / DOWN-C output mode of the sensor installation method: *CP1 and CP2 ready position by 90 °</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>The CP1 sensor installation location</p>  </div> <div style="text-align: center;"> <p>The CP2 sensor installation location</p>  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p>*The UP / DOWN-C mode can automatically determine the forward reverse movement, Forward will be added to UP count, the reverse will count down.</p>	

■ Note

- Before use, make sure that the voltage and connection, to avoid lead to instrument damage due to incorrect wiring.
- Avoid the instrument used in high temperature, flammable, explosive, corrosive, dust, severe shock, humidity, static electricity, oil and other occasions.
- Twist of the instrument signal lines and power lines may cause interference Please try to stay away from these strong electric wires, to conduct an independent wiring, and signal lines as far as possible to shorten the wiring distance.
- Contact signal input, the CPS count rate should be set for low-speed 30Hz, can Prevent switch bounce error count. Reasonable speed settings, you can make the count more accurate.
- Output relay, please do not exceed the switching capacity, according to the rated load, otherwise it would contact burned, such as an external high current relay or contactor exceeds its capacity.