

High performance digital counter/length counter T4GC/T4DC

Technical Manual

Version number: V1-01



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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

Easy to read display, high cost-effectiveness, and friendly connection to industrial internet

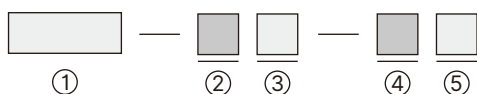
- DIN 48×48mm standard size, adopting a color LCD display screen, the white font is easy to read from a long distance, and the side illuminated backlight is paired with an advanced LCD display screen, resulting in a soft and clear display effect.
- The ultra-thin panel and large screen LCD are paired with a new trend industrial aesthetic shell, giving a more advanced feel.
- Plastic handle waterproof button, the surface of the button is sturdy and wear-resistant, and the operating feel is clear and smooth.
- The built-in waterproof sealing ring and the external installation of waterproof sealing ring can achieve good waterproof performance.
- Ultra-short fuselage with a depth of only 65mm behind the plat.
- The prescaling function (signal and display ratio) is 0.001~999.9, which can convert the counter into a length counter for use.
- Both low-speed signals and high-speed signals can accurately measure. The maximum counting speed is 10kHz, which can cope with the application scenario of high pulse digital encoders.
- Multiple input and output modes can be set to meet different application requirements.
- Supports RS485 communication interface, adopts the internationally recognized MODBUS-RTU communication protocol, and is friendly connection to the industrial internet.
- Equipped with power outage memory data storage function.
- Very strong anti-interference performance, accurate and reliable counting.
- NPN/PNP input signals can be selectable settings.

■ Technical reference

Models	T4□C-1P-□	T4□C-1PS-□
Functional categories	1-stage preset counter (without RS485 communication interface)	1-stage preset counter (with RS485 communication interface)
External dimension (mm)	48(high)×48(wide)×65(depth)	
Hole size (mm)	45(high)×45(wide)	
Power supply	AC100~240V 50/60HZ or AC/DC12~24V (The model suffix has "-D" is 12~24V, and the model suffix does not have "-D" is 100~240V)	
Permissible voltage range	85~110%	
Power consumption	About 5VA (AC240V), about 3.2 VA (DC24V)	
Display mode	Color LCD display (count value white light, set value green light, indicator light orange light)	
Display Range	-999~9999 (-3~4 digits)	
Prescaling function	Yes (0.001~999.9 can be freely set)	
Decimal point adjustment	Yes (right most 4 digits)	
Counting speed	5Hz, 30Hz, 1KHz, 10KHz (selectable settings)	
Input signal	CP1, CP2, RESET1	
Input mode	No-voltage (NPN) input/voltage (PNP) input (switchable) No-voltage inputs: ON impedance: 1KΩ max (Leakage current: 12 mA 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)	
Input Mode	UP (Increment), DOWN (decrement), increment/decrement UP/DOWN-A (command input), UP/DOWN-B (individual inputs), or UP/DOWN-C (quadrature inputs)	
Output mode	N, F, C, R, K-1, P, Q, A, K-2, D, L	
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 collector output	
	Customizable SSR drive voltage (DC12V/100mA) output	
Communication function	Not	RS485 communication interface, Modbus-RTU communication protocol

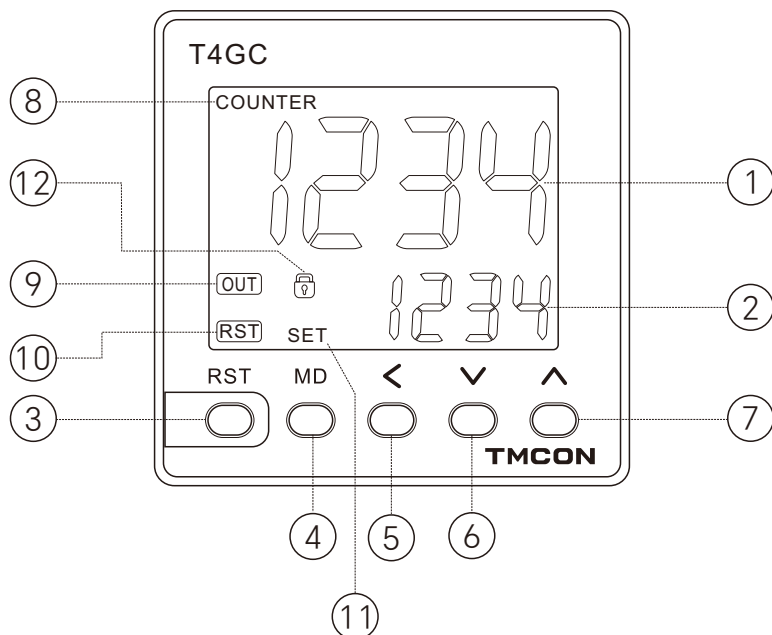
Auxiliary power output	12VDC \pm 10% 100mA Max
Power outage memory	EEP-ROM Data held for more than 10 years
Insulation withstand voltage	AC2000V 50/60Hz 1min
Usage environment	Temperature -10~+55°C (not freezing or exposed), humidity: 25~85% RH

Model definition



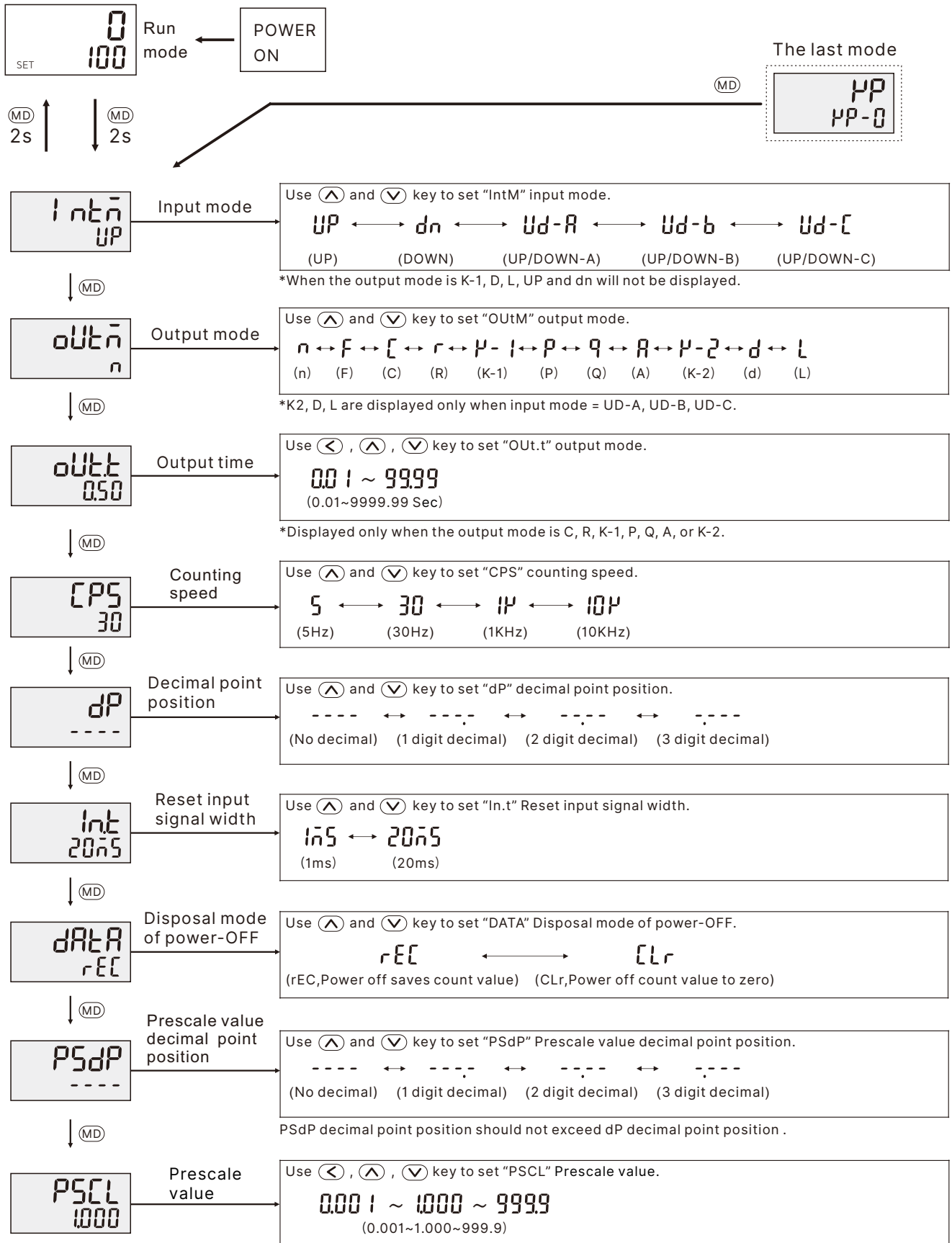
①	②	③	④	⑤	Description
Models	Category	Communication function	Power supply	Control output	
T4GC					DIN48×48mm High performance counter
T4DC					DIN72×72mm High performance counter
	1P				1-stage preset counter
		N			No communication
		S			With RS485 communication port
			N or Not to write		Power Supply 100~240V AC
			D		Power Supply 12~24V AC/DC
				N or Not to write	Relay control output
				T	Transistor control output
				Q	SSR drive voltage output

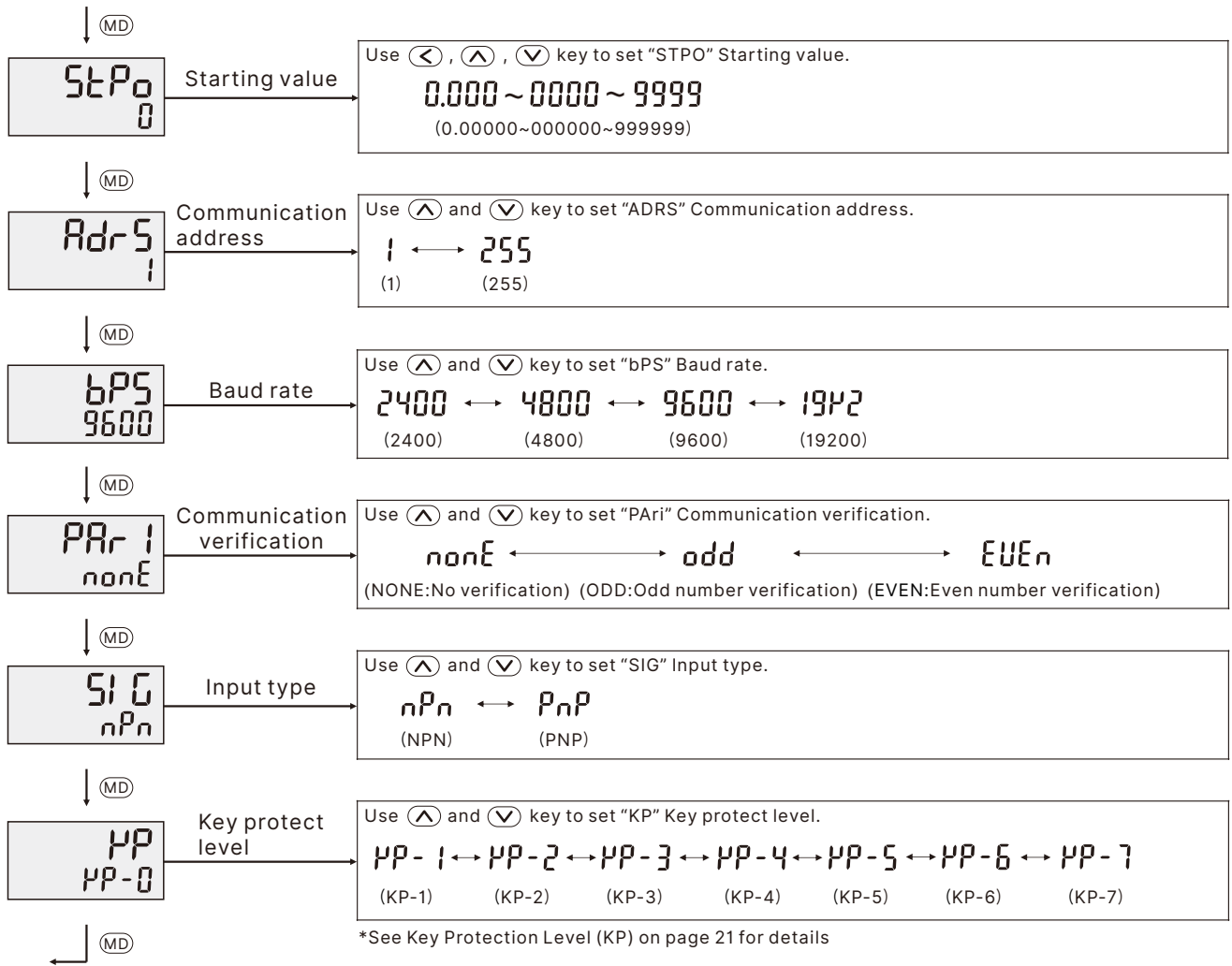
■ Panel description



- | | |
|---------------------|---------------------------------------|
| ① Count value | ⑧ Counter flag |
| ② Setting value | ⑨ Control Output Indicator |
| ③ Reset key | ⑩ Reset indicator |
| ④ Mode key | ⑪ Setting flag |
| ⑤ Data shift key | ⑫ Key lock protection indicator light |
| ⑥ Data decrease key | |
| ⑦ Data increase key | |

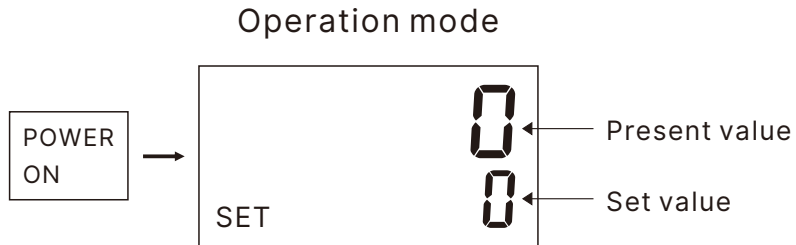
Function Setting Mode





KP This is the last mode, pressing the **MD** key will loop to the first mode at the beginning.

■ Operation in Run Mode



●Present Value

Shows the present count value.

●Set Values

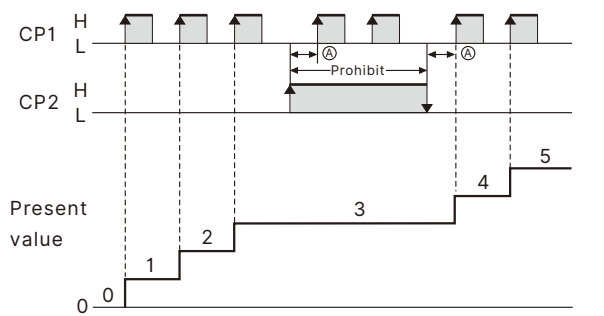
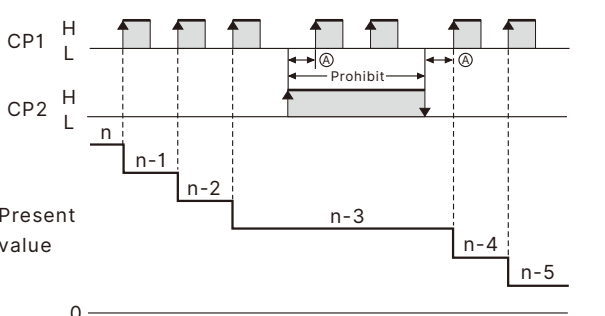
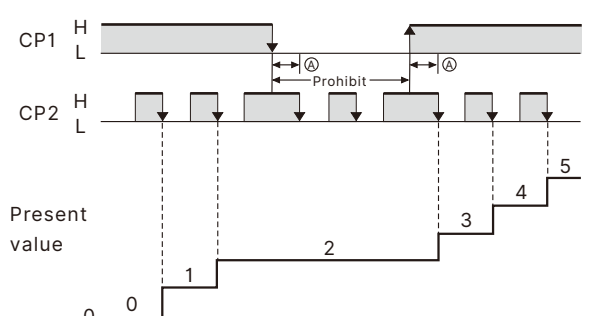
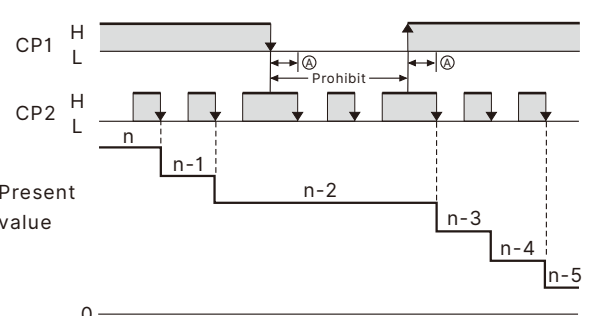
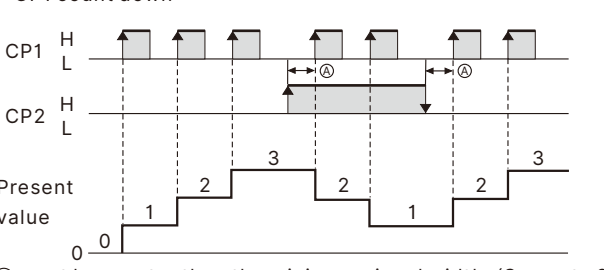
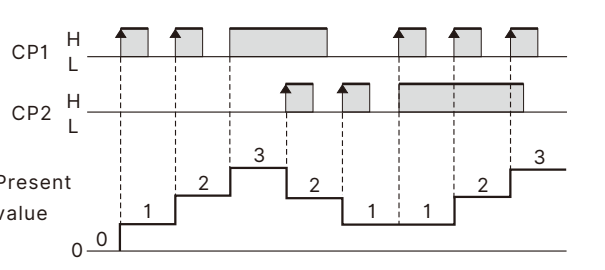
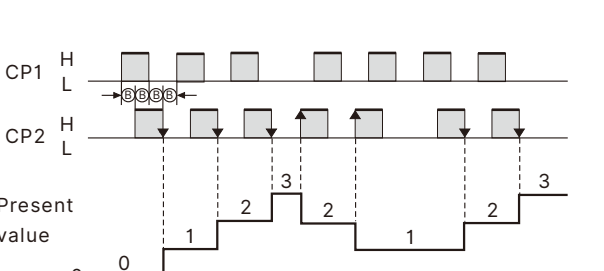
Setting the set values.

When the count value reaches the set value,
output the signal according to the corresponding output mode.

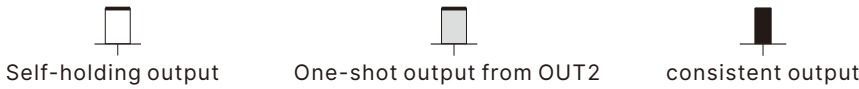
●Setting the set value

Press the ◀ , ▲ , ▼ key in running mode to change the set value.

Input Modes and Present Value

UP (Increment) Mode	DOWN (Decrement) Mode									
<p>CP1: Count input; CP2: Prohibit (gate) input</p>  <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>	<p>CP1: Count input; CP2: Prohibit (gate) input</p>  <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>									
<p>CP1: Prohibit (gate) input; CP2: Count input</p>  <p>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>	<p>CP1: Prohibit (gate) input; CP2: Present value</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>Ⓐ must be greater than the minimum signal width. (See note 2.)</p>	<p>input CP1 UP count, input CP2 count down</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. 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. 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) 3. Counting starts when the CP1 is turned ON after turning ON the power. 4. The meaning of the H and L symbols in the tables is explained below.</p> <table border="1" data-bbox="826 1937 1433 2078"> <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>Ⓑ must be at least 1/2 the minimum signal width. (See note 2.)</p>										

Input/Output Mode Settings



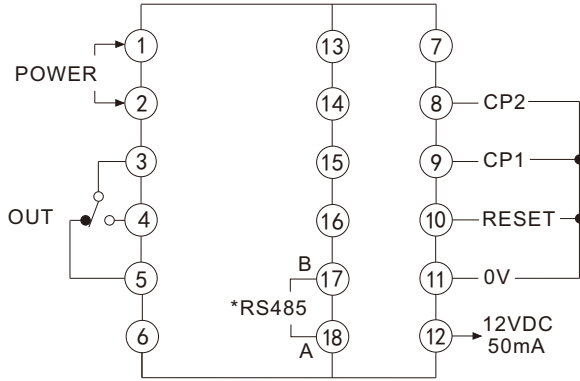
Output mode	Input mode			Operation after count completion
	UP	DOWN	U/D-A, B, C	
N				The outputs and present value display are held until reset/reset 1 is input.
F				The present value display continues to increase/decrease. The outputs are held until reset/reset 1 is input.
C				As soon as the count 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.
R				The present value display returns to the reset start status after the one-shot output time. The outputs repeat oneshot operation.

Output mode	Input mode			Operation after count completion
	UP	DOWN	U/D-A, B, C	
K-1				The present value display continues to increase/decrease.
P				The present value display does not change during the one-shot output time period, but the actual count returns to the reset start status. The output will return to one-shot mode. The outputs repeat one-shot operation.
Q				The present value continues to increase/decrease for the one-shot output time, but returns to the reset start status after the one-shot output time has elapsed. The outputs repeat one-shot operation.
A				The present value display and OUT self-holding output is held until reset/reset 1 is input.

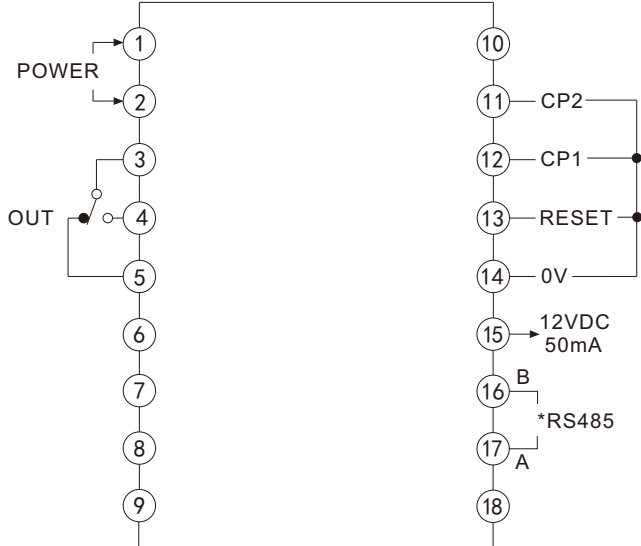
Output mode	Input mode U/D-A, B, C	Operation after count completion
K		<p>The display continues to increase/decrease until the overflow or underflow value is reached. One-shot output only.</p>
D		<p>The display continues to increase/decrease until the overflow or underflow value is reached. The outputs are ON while the count is equal.</p>
L		<p>The display continues to increase/decrease until the overflow or underflow value is reached.</p>

■ Wiring diagram

• T4GC

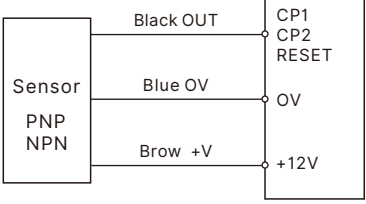
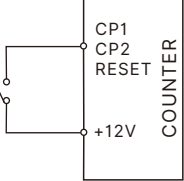
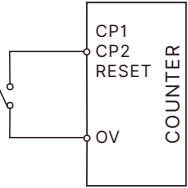
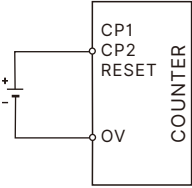
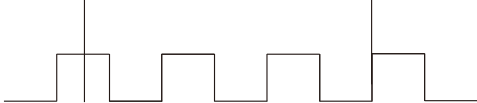
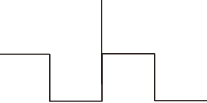
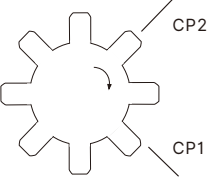
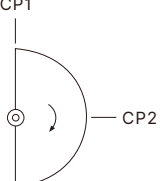


• T4DC



*Only models with this feature will have this feature port.

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>Reversible UD-C pattern can automatically recognize forward (UP count) and reverse (DOWN count) . In order to realize reversible UD-C mode, two sensors need to be installed, and the position of the sensors should be installed as shown in the figure (the installation phase difference of the two sensors is 90 degrees).</p> <p>Rotary encoder can also be used, whose A and B phases are connected to CP1 and CP2 of the counter respectively.</p>	

■ Explanation of Functions

● Counting Speed (CPS)

Set the maximum counting speed (5 Hz/30 Hz/1 kHz/5 kHz) for CP1 and CP2 inputs together.

If contacts are used for input signals, set the counting speed to 30 Hz.

Processing to eliminate chattering is performed for this setting.

● Reset Input Signal Width (IN.t)

Set the reset input signal width (20 ms/1 ms) for reset/reset 1 and total reset/reset 2 inputs together.

If contacts are used for the input signal, set the input signal width to 20 ms. Processing to eliminate chattering is performed for this setting.

● Decimal Point Position (dp)

Decide the decimal point position for the present value, CP1/CP2 present values, set value (SV1, SV2), total count value, and dual count set value.

● Input mode, output mode, output time (automatic reset time)

See the relationship between input mode and count and the relationship between input and output modes and actions.

● Prescale value decimal point (PSDP)

Determine the decimal point position of the PSCL prescale value. The decimal point position of the PSDP cannot exceed the decimal point position of the DP. A maximum of 5 digits of decimal point can be achieved.

● Prescale Value (PSCL)

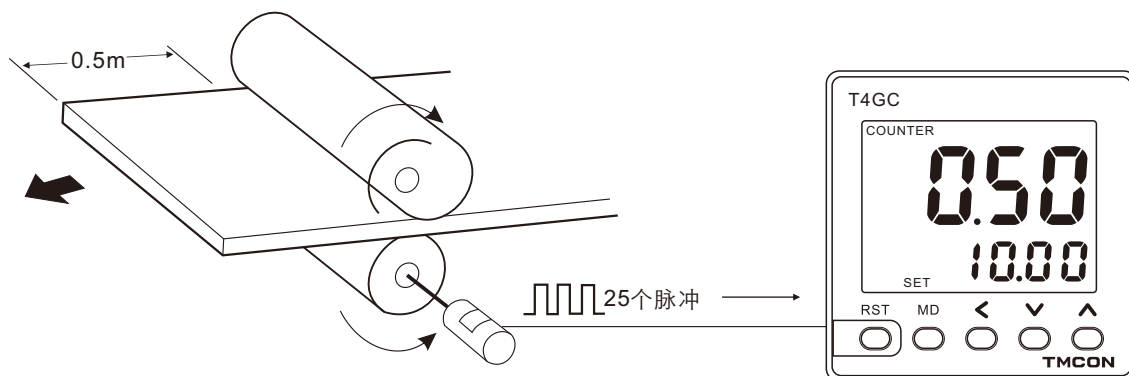
Pulses input to the counter are converted according to the specified prescale value. (Setting range: 0.001~999.9)

Example: To display the feed distance for systems that output 25 pulses for a feed length of 0.5 m in the form

□□.□□ m:

1. Set the decimal point position to 2 decimal places.

2. Set the prescale value to 0.02 ($0.5 \div 25$).



This example realizes that 1 pulse represents 0.02 display value and 25 pulse counters display 0.5.

● Observe the following points when setting a prescale value.

Set the set value to a value less than (Maximum count value - Prescale value).

Example: If the prescale value is 1.25 and the counting range is 0.00 to 99.99, set the set value to a value less than 98.74 (= 99.99 - 1.25).

If the set value is set to a value greater than this, output will not turn ON.

● Output will turn ON, however, if a present value overflow occurs (FFFFFF).


● If the default zoom value is set incorrectly, it will lead to counting error. Make sure the settings are correct before use.

● PSCL factory set to 1.000, that is, 1 pulse signal display 1, that is, used as a counter.

● NPN/PNP Input Mode (SIG)

Select either NPN input (no-voltage input) or PNP input (voltage input) as the input format. When using a two-wire sensor, select NPN input. The same setting is used for all external inputs.

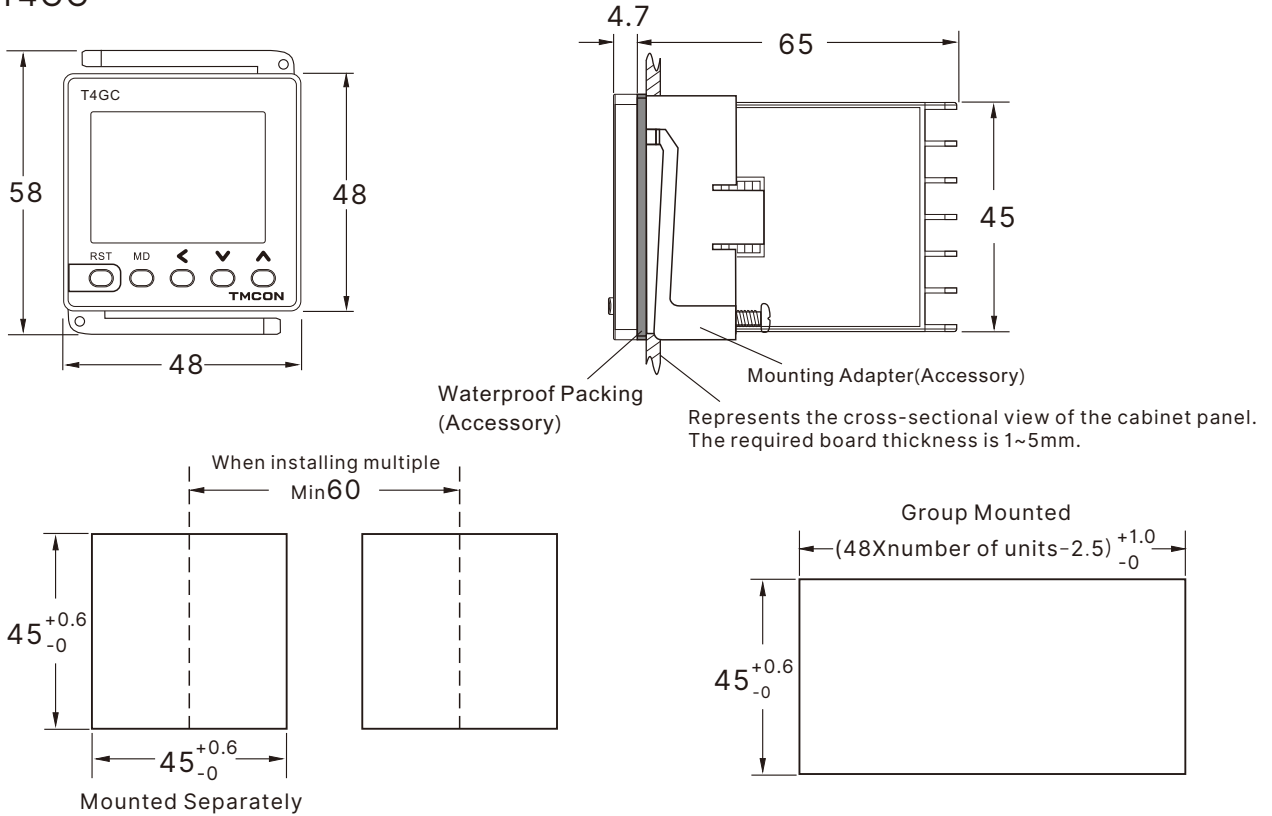
●Key Protect Level (KP)

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-7). When KP=1~7,  indicator lights up.

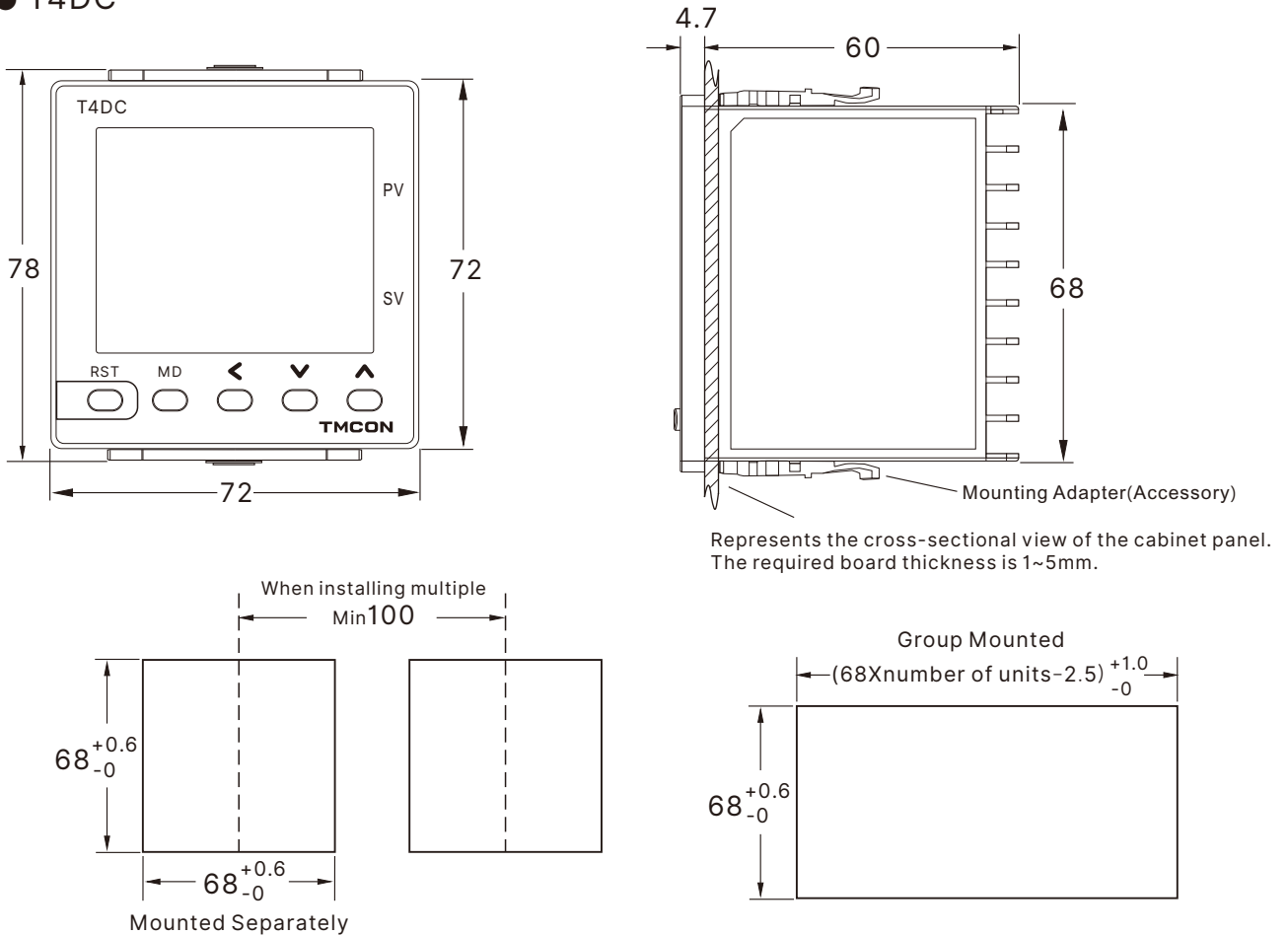
Level	Change mode	Reset key	Set value
KP-0	√	√	√
KP-1	X	√	√
KP-2	√	X	√
KP-3	X	X	√
KP-4	√	√	X
KP-5	X	√	X
KP-6	√	X	X
KP-7	X	X	X

■ Size(in mm) and parts and installation description

● T4GC



● T4DC



■ 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.