

Intelligent counter/length counter T9C

Technical Manual

Version number: EN-V1-02



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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

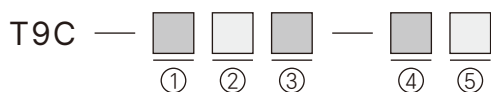
- DIN 48×96mm standard size, 0.52-inch high-brightness LED digital display.
- The humanized operation interface design makes the setting of mode parameters for single row display easy to operate.
- The prescaling function (signal and display ratio) is 0.0001~99.9999, which can convert the counter into a length counter for use.
- A variety of input mode and output mode, but also with data storage power failure memory function.
- Supports RS485 communication interface, adopts the internationally recognized MODBUS-RTU communication protocol, and is friendly connection to the industrial internet.
- With counting value transmission as 4~20mA or 0~20mA output function.
- 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 | T9C-N□-□ | T9C-1P□-□ | T9C-2P□-□ |
| Functional Category | Display Private Type | 1-stage preset counter | 2-stage preset counter |
| External dimension (mm) | 48(high)×96(wide)×99(depth) | | |
| Hole size (mm) | 45(high)×92(wide) | | |
| Power supply | AC100~240V 50/60Hz or AC/DC12~24V | | |
| Permissible voltage range | 85~110% | | |
| Power consumption | About 5VA (AC240V), about 3.2VA (DC24V) | | |
| Display mode | LED Nixie tube display | | |
| Display Range | -99999~999999 (-5~6 digits) | | |
| Input Mode | UP (Increment), increment/decrement UP/DOWN-A (command input), UP/DOWN-B (individual inputs), or UP/DOWN-C (quadrature inputs) | UP (Increment), DOWN (decrement), increment/decrement UP/DOWN-A (command input), UP/DOWN-B (individual inputs), or UP/DOWN-C (quadrature inputs) | |
| Output mode | None | N, F, C, R, L, K, D | N, F, C, R, L, K, D, H |
| Prescaling function | Yes (0.0001~99.9999 can be freely set) | | |
| Decimal point adjustment | Yes (right most 4 digits) | | |
| Counting speed | 5Hz, 30Hz, 1KHz, 5KHz (selectable settings) | | |
| Input signal | CP1, CP2, RESET | | |
| 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: 3Vmax 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, power reset (except for power outage memory function) | Manual reset, external signal reset, power reset (except for power outage memory function) | |
| External reset minimum signal | 1ms or 20ms | | |
| Automatic reset time | 0.01~9999.99 seconds | | |
| Control output | None | 1-way relay output (standard configuration), Contact capacity: 3A/AC250V resistive load | 2-way relay output (standard configuration), Contact capacity: 3A/AC250V resistive load |

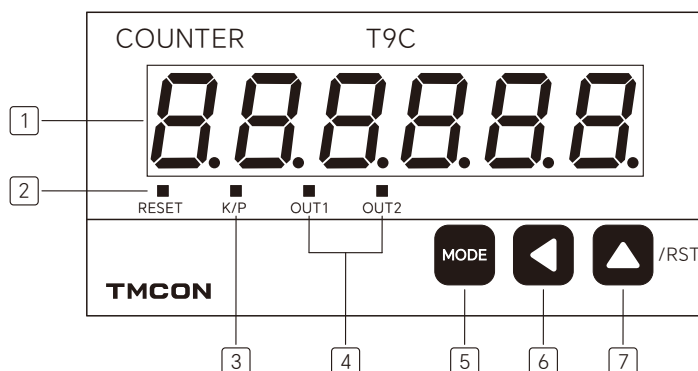
| | | | |
|------------------------|--|---|---|
| Control output | None | Customizable 1-way transistor output: NPN open collector output | Customizable 2-way transistor output: NPN open collector output |
| | | Customizable 1-way SSR drive voltage (DC12V 100mA) output | Customizable 2-way SSR drive voltage (DC12V 100mA) output |
| Linear current output | 0-20mA or 4-20mA can be freely defined (output voltage $\geq 10.5V$) | | |
| Auxiliary power output | 12VDC $\pm 10\%$ 100mA Max | | |
| Power outage memory | EEP-ROM Data held for more than 10 years | | |
| Communication function | RS485 communication interface, Modbus-RTU communication protocol (Only models with S are equipped with this feature) | | |
| Communication protocol | Modbus-RTU communication protocol | | |
| Usage environment | Temperature -10~+60°C (not freezing or exposed), humidity: 25~85% RH | | |

Model definition




| Models | ① | ② | ② | ③ | ④ | Description |
|--------|----------|------------------------|---------------------|-------------------|-------------------|--|
| | Category | Communication function | Transmission output | Power supply | Control output | |
| T9C | | | | | | 48×96mm Intelligent Counter/length counter |
| | N | | | | | Display private type |
| | 1P | | | | | 1-stage preset |
| | 2P | | | | | 2-stage preset |
| | | N | | | | No communication |
| | | S | | | | With RS485 communication |
| | | | N | | | No transmission output |
| | | | X | | | With 4-20mA transmission output |
| | | | | 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 controlled output |
| | | | | | Q | SSR drive voltage output |

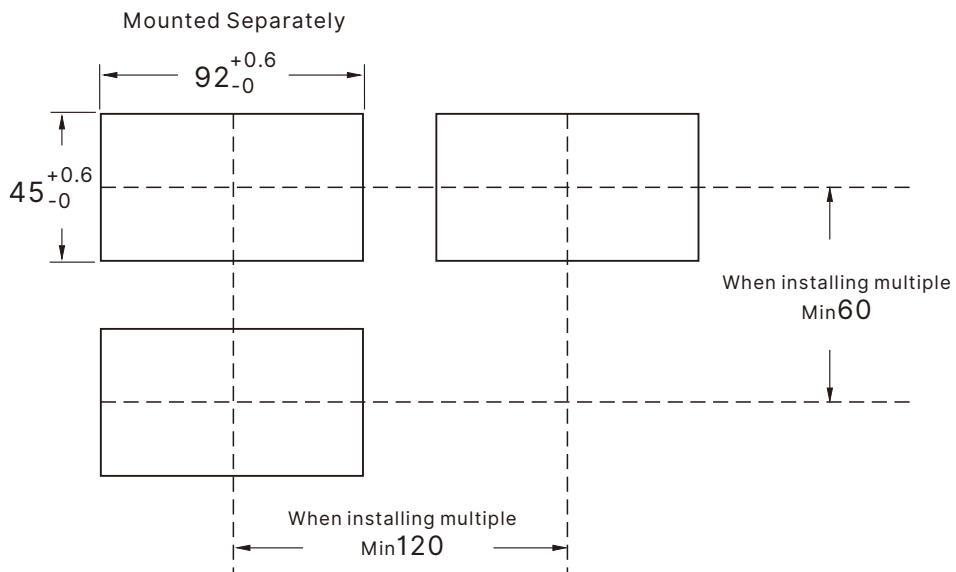
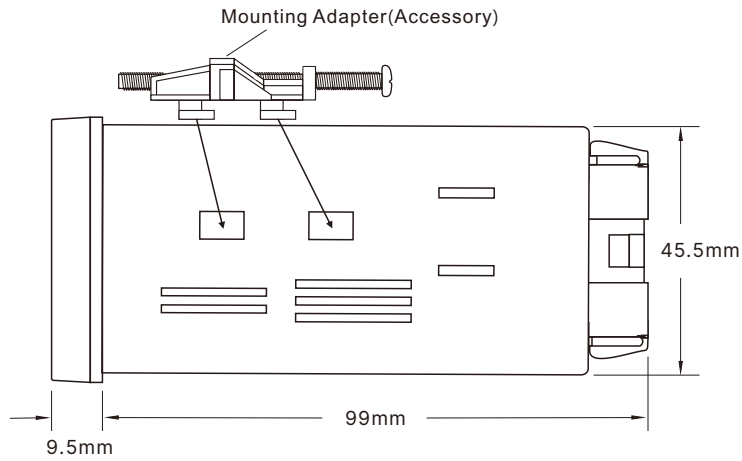
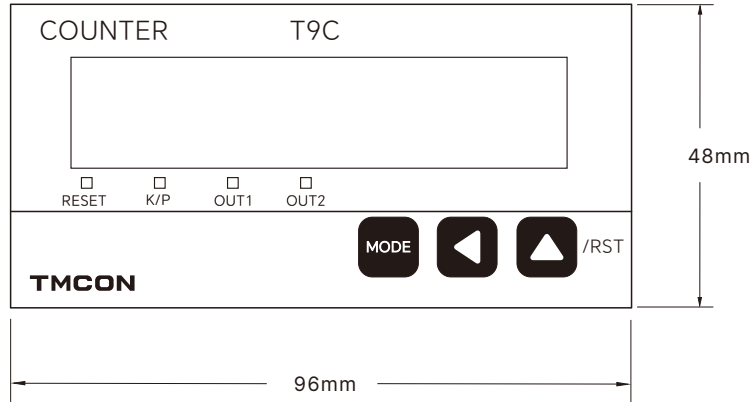
■ The panel and the size(mm)



- ① Present Value/Set Value
- ② Reset Indicator
- ③ Key Protection Indicator
- ④ Control Output Indicator
- ⑤ Mode Key(Used to switch mode and setting items.)
- ⑥ Data shift key
- ⑦ Data increase key and reset key

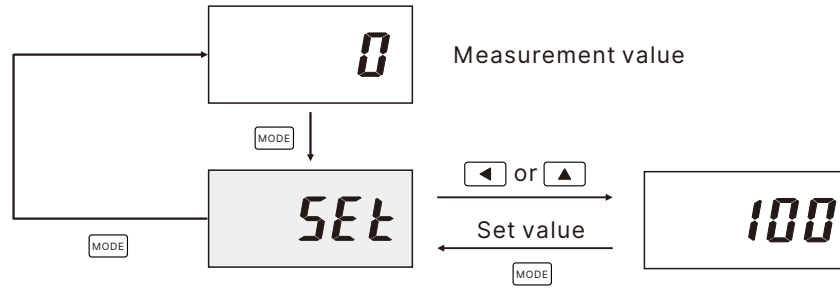
*  /RST Under normal measurement mode: As RESET Reset key.
Under the parameter setting state: As UP key.

■ Size(in mm) and parts and installation description

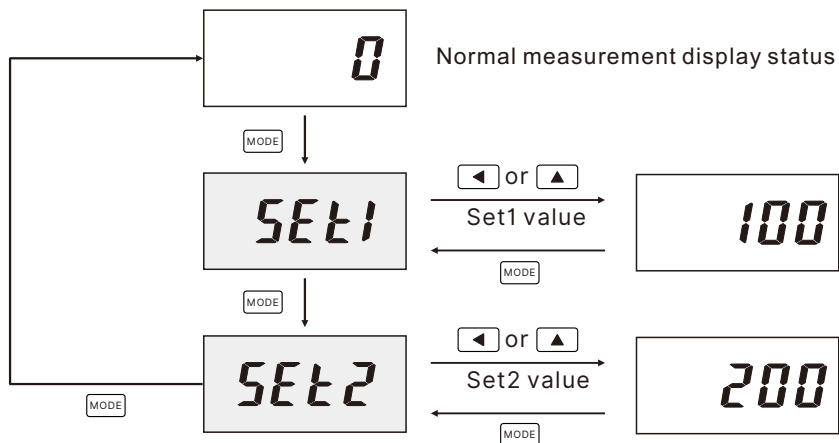


■ Preset count value (T9C-N doesn't have this set)

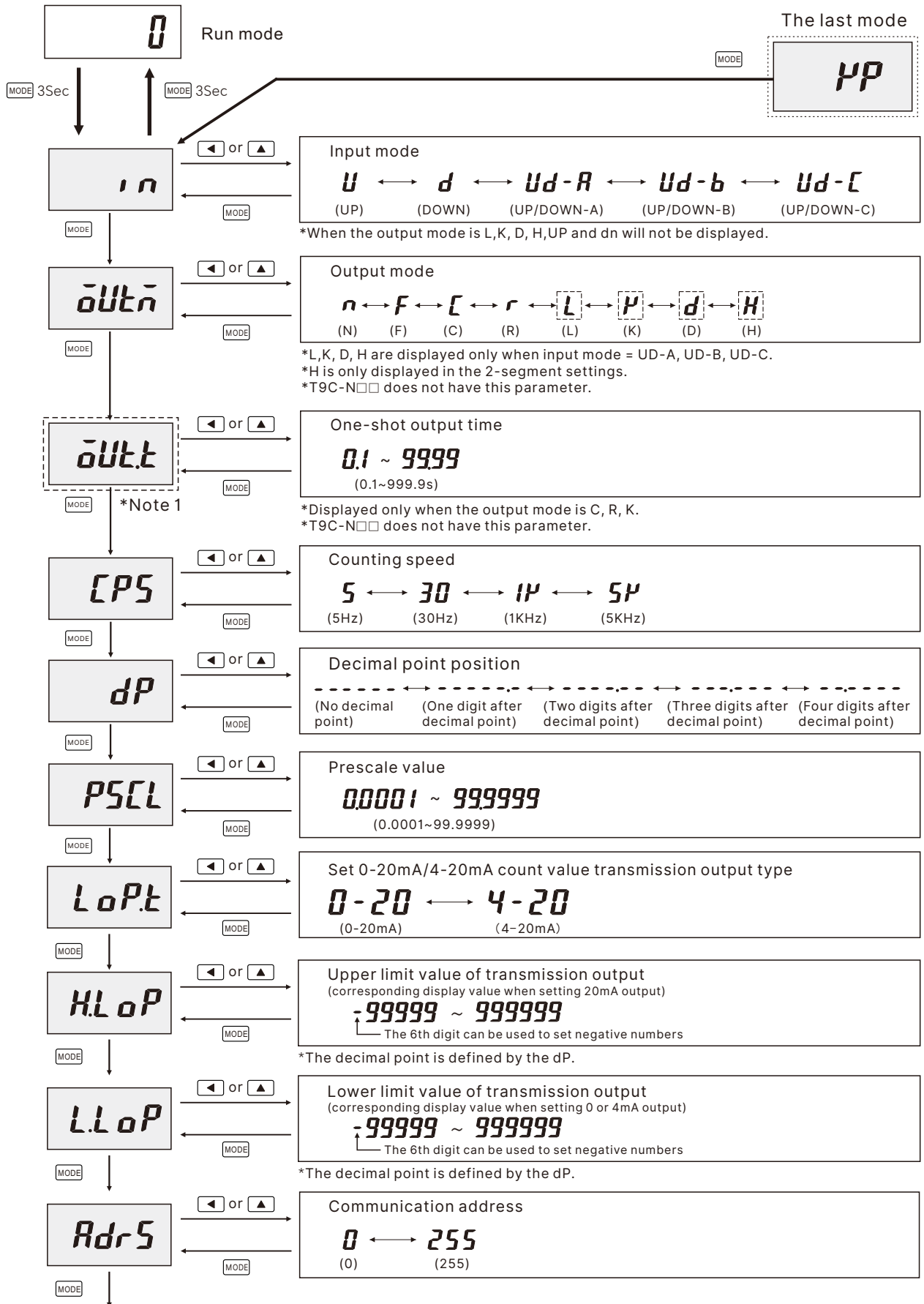
● T9C-1P single preset

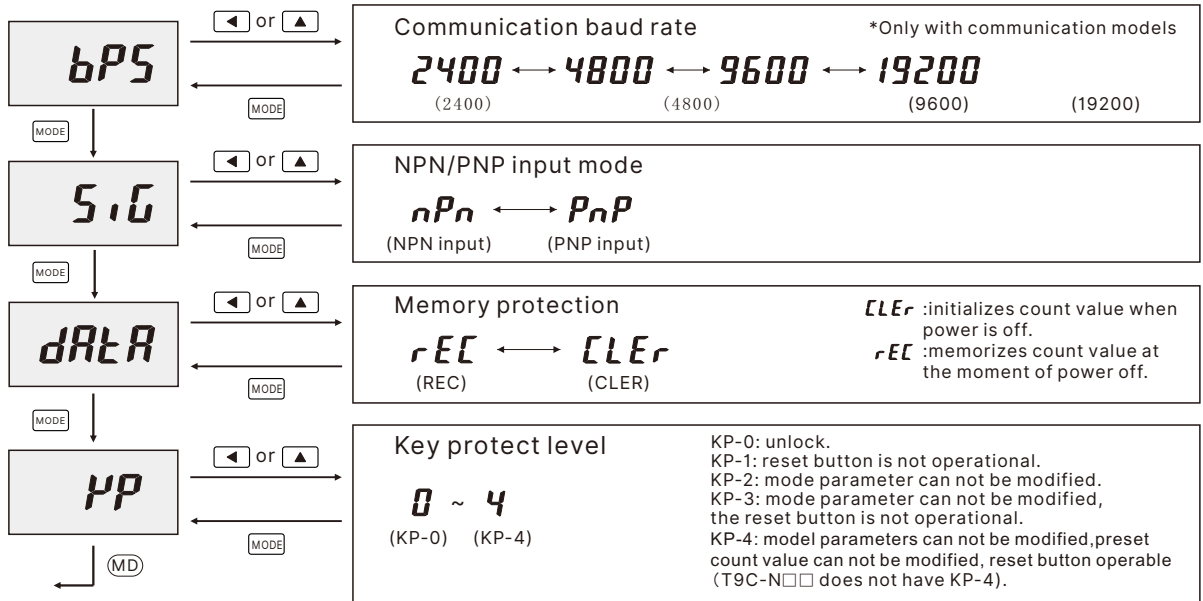


● T9C-2P double preset



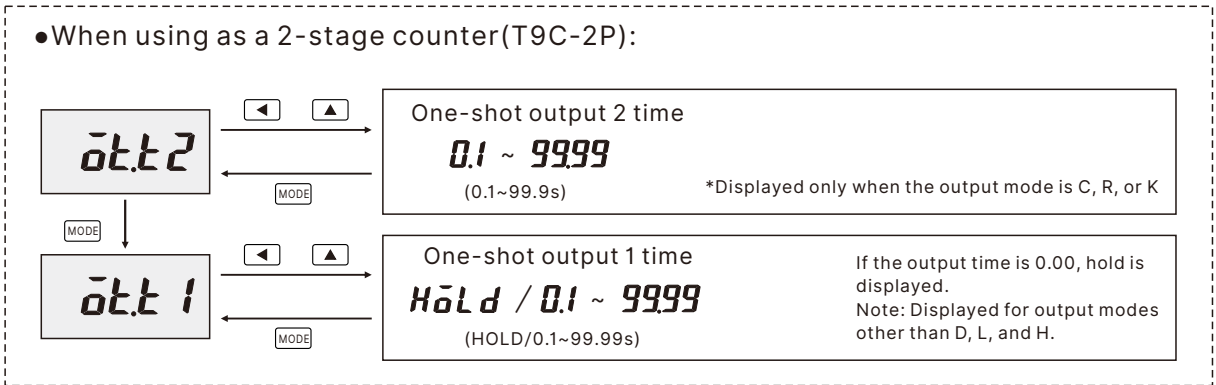
Mode setting flowchart





yP This is the last mode, pressing the (MD) key will loop to the first mode at the beginning.

*Note1



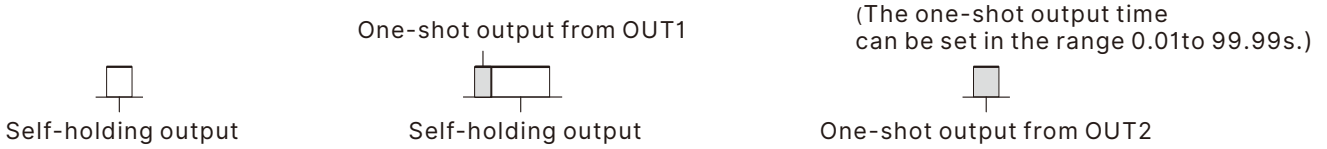
Input Modes and Present Value

| 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 style="text-align: center;">Input method Symbol</th> <th style="text-align: center;">No-voltage input (NPN input)</th> <th style="text-align: center;">Voltage input (PNP input)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">H</td> <td style="text-align: center;">Short-circuit</td> <td style="text-align: center;">DC4.5~30V</td> </tr> <tr> <td style="text-align: center;">L</td> <td style="text-align: center;">Open</td> <td style="text-align: center;">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 |
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| 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> | | | | | | | | | | |

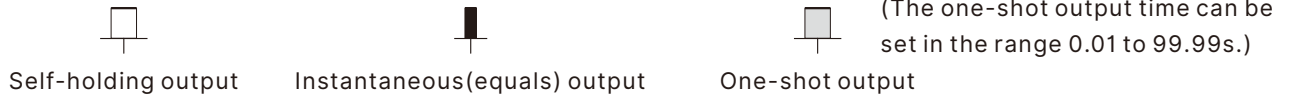
Input/Output Mode Settings (T9C-N□□ does not have this output mode)

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.



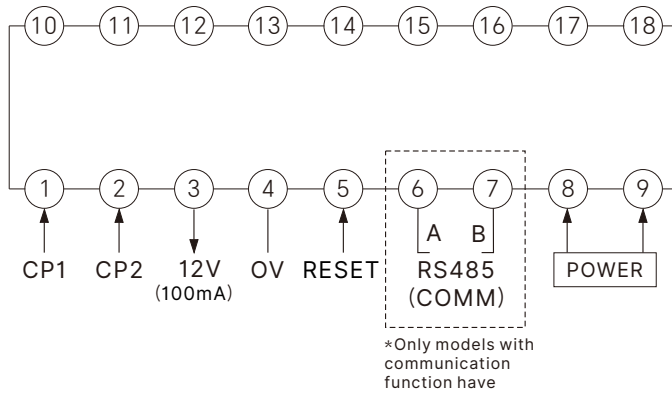
| Output mode | Input mode | | | Operation after count completion |
|-------------|------------|------|-------------|--|
| | UP | DOWN | U/D-A, B, C | |
| N | | | | The outputs and present value display are held until reset / reset 1 is input. |
| F | | | | The present value display continues to increase / 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 count-up. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 oneshot 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 one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 oneshot output time is independent of OUT2. |



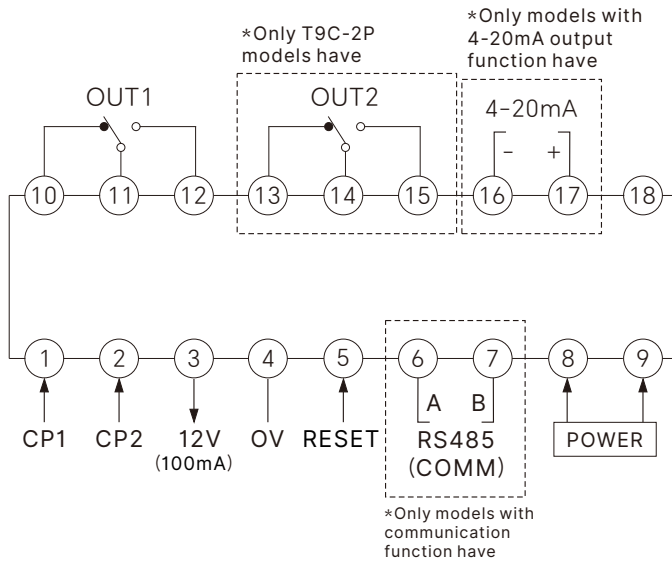
| Output mode | Input mode U/D-A, B, C | Operation after count completion |
|-------------|---------------------------|--|
| K | | The display continues to increase/decrease until the overflow or underflow value is reached. One-shot output only. |
| D | | The display continues to increase/decrease until the overflow or underflow value is reached. The outputs are ON while the count is equal. |
| L | | 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. |
| H | | 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. Note: H mode is available only when using a 6-digit model as a 2-stage counter. |

■ Wiring diagram

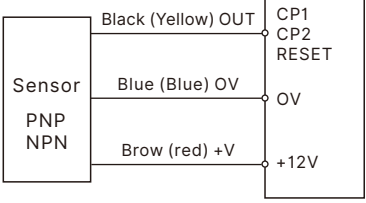
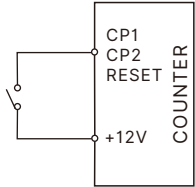
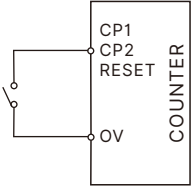
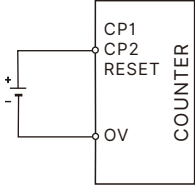
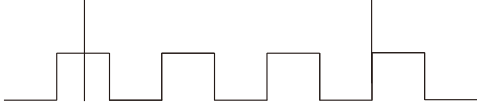
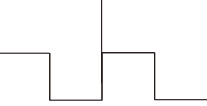
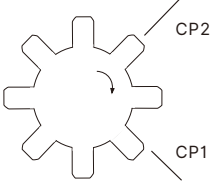
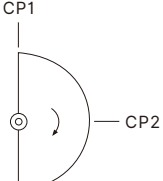
● T9C-N



● T9C-1P/T9C-2P



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 style="margin-top: 20px;">*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> | |

■ Before the use of attention

1 : before use, make sure that the voltage and connection, to avoid lead to instrument damage due to incorrect wiring.

2 : Avoid the instrument used in high temperature, flammable, explosive, corrosive, dust, severe shock, humidity, static electricity, oil and other occasions.

3 : 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.

4 : 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.

5 : 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.