Autonics

Counter/Timer
CT SERIES
INSTRUCTION MANUAL

CTY Series CTS Series CTM Series

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

■ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.

※Safety considerations are categorized as follows.
⚠**Warning** Failure to follow these instructions may result in serious injury or death.
⚠**Caution** Failure to follow these instructions may result in personal injury or product damage.

※The symbols used on the product and instruction manual represent the following
⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ Warning

1. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
   Failure to follow this instruction may result in personal injury, fire, or economic loss.
2. **The unit must be installed on a device panel before use.**
   Failure to follow this instruction may result in electric shock.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in electric shock.
4. **Do not disassemble or modify the unit. Please contact us if necessary.**
   Failure to follow this instruction may result in electric shock or fire.

⚠ Caution

1. **Do not use the unit outdoors.**
   Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock.
2. **When connecting the power input and relay output cables, use AWG20 (0.05mm²) cables and make sure to tighten the terminal screw bolt above 0.74N·m to 0.90N·m.**
   Failure to follow this instruction may result in fire due to contact failure.
3. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in shortening the life cycle of the unit, or fire.
4. **Do not use loads beyond the rated switching capacity of the relay contact.**
   Failure to follow this instruction may result in insulation failure, contact melt, contact failure, relay broken, or fire.
5. **Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.**
   Failure to follow this instruction may result in electric shock or fire.
6. **Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.**
   Failure to follow this instruction may result in fire or explosion.
7. **Keep dust and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.

■ Manual

For more information about counter/timer, refer to user manual and user manual for communication.
Visit our website **(www.autonics.com)** and download it.

■ Ordering Information

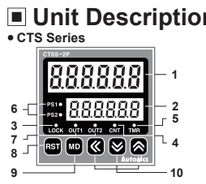
CT 6 M – 2P 4 T

Communication	**No-mark**	None
	T	RS485 communication output
Power supply	**2**	24VAC 50/60Hz, 24-48VDC
	4	100-240VAC 50/60Hz
Output	**1P**	1-stage preset
	2P	2-stage preset
	I※1	Indicator
Size	**S**	DIN W48×H48mm
	Y	DIN W72×H36mm
	M	DIN W72×H72mm
Display digits	**4**	9999 (4 digits)
	6	999999 (6 digits)
Item	**CT**	Counter/Timer

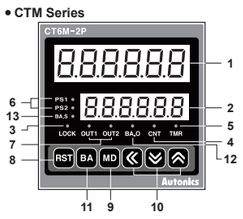
※1: CT4S model does not support indicator type.

■ Unit Description

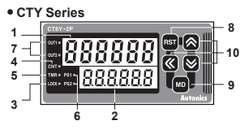
• **CTS Series**



• **CTM Series**



• **CTY Series**



Model	Changed	Note
CT6Y-1P CT6S-1P CT4S-1P CT6M-1P	PS2→PS OUT2→OUT	No PS1, OUT1 LEDs
CT6Y-I CT6S-I CT6M-I	PS2→PS	No PS1, OUT1, OUT2 LEDs

※CT4S model does not support indicator type.

1. **Counting value display component (red)**
   RUN mode: Displays counting value for counter operation or time progress value for timer operation.
   Function setting mode: Displays setting item.
2. **Setting value display component (yellow-green)**
   RUN mode: Displays setting value.
   Function setting mode: Displays setting content.
3. **Key lock indicator (LOCK):** Turns ON for key lock setting.
4. **Counter indicator (CNT):** Turns ON for counter operation.
5. **Timer indicator (TMR):** Flashes (progressing time) or Turns ON (stoping time) for timer operation.
6. **Preset value checking and changing indicator (PS1, PS2):**
   Turns ON when checking and changing preset value.
7. **Output indicator (OUT1, OUT2):** Turns ON for the dedicated control output ON.
8. **RST key**
   RUN mode: Press the RST key to reset the counting value.
   BATCH counter mode: Press the RST key to reset the batch counting value.
9. **MD key**
   RUN mode: Hold the MD key over 3 sec. to enter function setting mode(parameter setting).
   Hold the MD key over 5 sec. to enter function setting mode(communication setting).
   Function setting mode: Press the MD key to select function setting mode parameter.
   Hold the MD key over 3 sec. to return RUN mode.
10. **Ⓚ, Ⓥ, Ⓐ key**
    1) Ⓚ key
    RUN mode: Press the Ⓚ key to enter preset mode.
    Preset mode: Press the Ⓚ key to move preset digits.
    2) Ⓥ, Ⓐ key
    RUN mode: Hold the Ⓐ key over 1 sec. to enter Function setting check mode.
    Preset mode: Used for increasing or decreasing preset value.
    Function setting mode: Changes the settings.
    Function setting check mode: Press the Ⓥ key to move the previous parameter.
    Press the Ⓐ key to the next parameter.
11. **BA key**
    RUN mode: Press the RST key to enter BATCH counter indication mode.
12. **BATCH output indicator (BA.O) (red)**
13. **BATCH preset value checking and changing indicator (BA.S) (yellow-green):**
    Turns ON when checking and changing BATCH preset value.

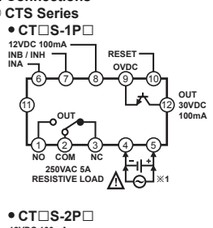
■ Guide for connection

1. Connections

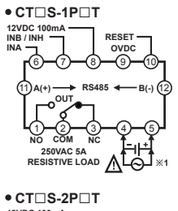
⚠ **Be sure that connection is varied by supporting RS485 communication.**

◎ **CTS Series**

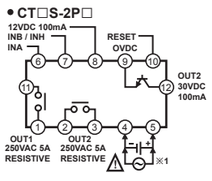
• **CT□S-1P□**



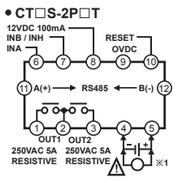
• **CT□S-1P□T**



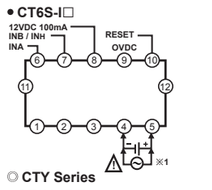
• **CT□S-2P□**



• **CT□S-2P□T**



• **CT6S-I□**



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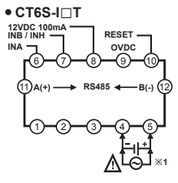
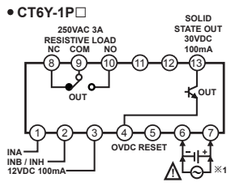
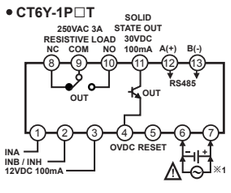


◎ **CTY Series**

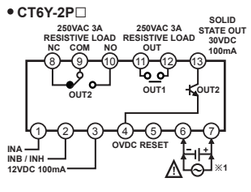
• **CT6Y-1P□**



• **CT6Y-1P□T**



• **CT6Y-2P□**



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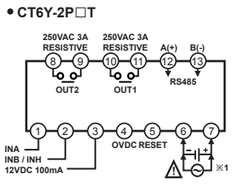
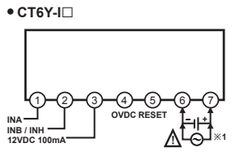


• **CT6Y-I□**



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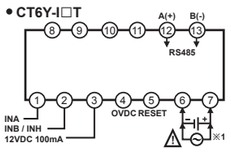


※**The above specifications are subject to change and some models may be discontinued without notice.**

■ Specifications

Series		CTS		CTY	CTM
Model	1-stage preset	CT4S-1P□□	CT6S-1P□□	CT6Y-1P□□	CT6M-1P□□
	2-stage preset	CT4S-2P□□	CT6S-2P□□	CT6Y-2P□□	CT6M-2P□□
	Indicator	—	CT6S-I□□	CT6Y-I□□	CT6M-I□□
Display digits		4 digits	6 digits	6 digits	6 digits
Display method		7 segment (counting value: red, setting value: yellow-green) LED method			
Character size(W×H)	Counting value	6.5×10mm	4.5×10mm	4.2×9.5mm	6.6×13mm
	Setting value	4.5×8mm	3.5×7mm	3.5×7mm	5×9mm
Power supply	AC voltage	100-240VAC 50/60Hz			
	AC/DC voltage	24VAC 50/60Hz, 24-48VDC			
Permissible voltage range		90 to 110% of rated voltage			
Power consumption	AC voltage	Max. 12VA			
	AC/DC voltage	AC: Max. 10VA, DC: Max. 8W			
Counter	INA/INB Max. counting speed	Selectable 1cps/30cps/1kcps/5kcps/10kcps			
	Counting range	-999 to 9999	-99999 to 999999		
	Scale	Decimal point up to third digit	Decimal point up to fifth digit		
	Min. signal width	RESET signal: Selectable 1ms/20ms			
Timer	Time range	999.999s, 9999.99s, 99999.9s, 999999s, 99m59.99s, 999m59.9s, 9999m59s, 99999.9m, 999999m, 99h59m59s, 9999h59m, 99999.9h			
	Operation method	Count up, Count down, Count Up/Down			
	Min. signal width	INA, INH, RESET signal: Selectable 1ms/20ms			INA, RESET, INHIBIT, BATCH RESET signal: Selectable 1ms/20ms
	Repeat error	In case of power ON start: Max. ±0.01% ±0.05s In case of signal start: Max. ±0.01% ±0.03s			
	Set error				
	Voltage error				
	Temp. error				
Input method		Selectable voltage input or no-voltage input [Voltage input]-input impedance: 5.4kΩ, [H]: 5-30VDC, [L]: 0-2VDC [No-voltage input]-short-circuit impedance: Max. 1kΩ, short-circuit residual voltage: Max. 2VDC			
One-shot output time		0.01s to 99.99s setting			

				Standard	Comm.	Standard	Comm.	Standard	Comm.
Control output	Contact output	Type	1-stage	SPDT(1c): 1		SPDT(1c): 1		SPDT(1c): 1	
			2-stage	SPST(1a): 2		SPST(1a): 1, SPDSPST(1a): 2T(1c): 1		SPST(1a): 1, SPDT(1c): 1	
		Capacity		250VAC 5A resistive load		250VAC 3A resistive load		250VAC 5A resistive load	
	Solid state output (NPN open collector)	Type	1-stage	1	—	1	1	2	2
			2-stage				—	3	
		Capacity		Max. 30VDC, 100mA					

External power supply		Max. 12VDC ±10%, 100mA	
Memory retention		Approx. 10 years (non-volatile memory)	
Insulation resistance		Over. 100MΩ (at 500VDC megger)	
Dielectric strength		2,000VAC 50/60Hz for 1 min.	
Noise resistance		Square-wave noise by noise simulator (pulse width 1μs) ±2kV	
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction for 1 hour	
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction for 10 minutes	
Shock	Mechanical	300m/s² (approx. 30G) in each X, Y, Z direction for 3 times	
	Malfunction	100m/s² (approx. 10G) in each X, Y, Z direction for 3 times	
Relay life cycle	Mechanical	Min. 10,000,000 operations	
	Malfunction	Min. 100,000 operations	
Protection structure		IP65 (front part, IEC standards)	
Environ-mental	Ambient temp.	-10 to 55℃, storage: -25 to 65℃	
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH	
Approval		CE c UL us	
Weight※1		Approx. 212g (approx. 159g)	Approx. 228g (approx. 140g) / Approx. 322g (approx. 252g)

※1: The weight includes packaging. The weight in parentheses is for unit only.
※: Environment resistance is rated at no freezing or condensation.

■ Communication Specifications

• Interface

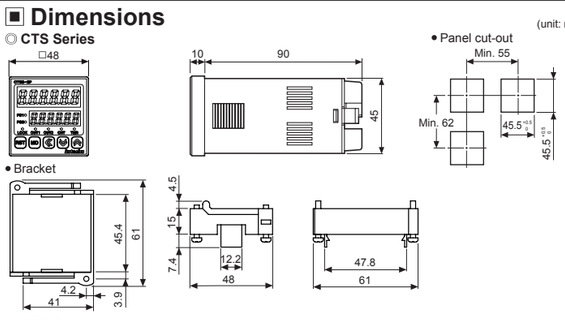
Comm. protocol	Modbus RTU with 16-bit CRC
Connection type	RS485
Application standard	Compliance with EIA RS485
Max. connection	31 units (address: 1 to 127)
Comm. type	Two-wire half duplex
Synchronous method	Asynchronous
Comm. distance	Max. 800m
Comm. speed	2400, 4800, 9600(factory default), 19200, 38400bps
Comm. response time	5 to 99ms (factory default: 20ms)
Start bit	1-bit (fixed)
Data bit	8-bit (fixed)
Parity bit	None(factory default), Even, Odd
Stop bit	1, 2-bit (factory default: 2-bit)

※It is recommended to use communication converter, RS485 to Serial converter(SCM-38I, sold separately), USB to RS485 converter(SCM-US48I, sold separately). Please use a proper twist pair for RS485 communication.

■ Dimensions

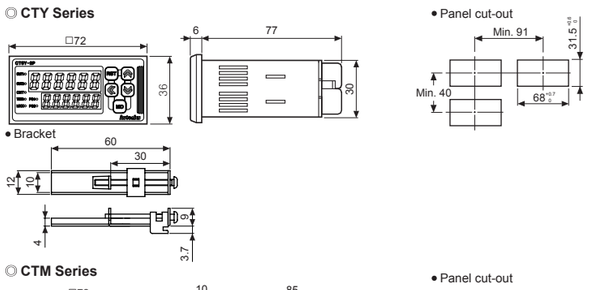
(unit: mm)

◎ **CTS Series**



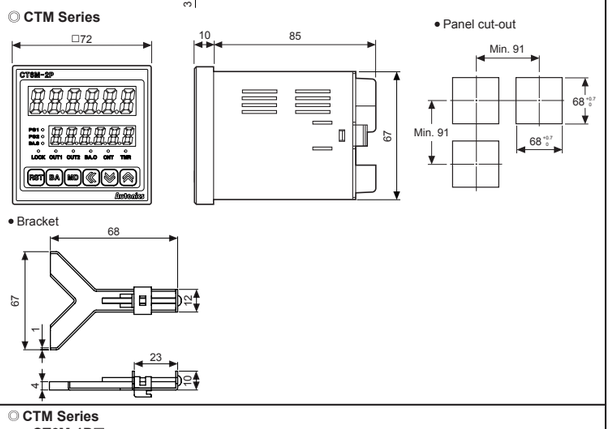
• Bracket

◎ **CTY Series**



• Bracket

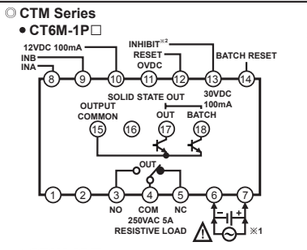
◎ **CTM Series**



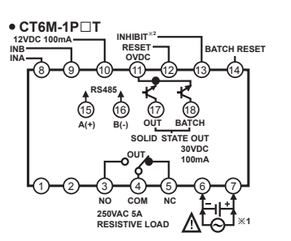
• Bracket

◎ **CTM Series**

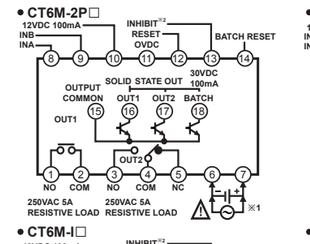
• **CT6M-1P□**



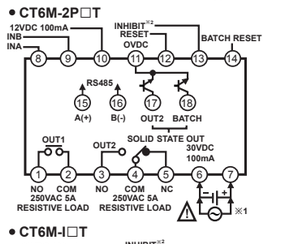
• **CT6M-1P□T**



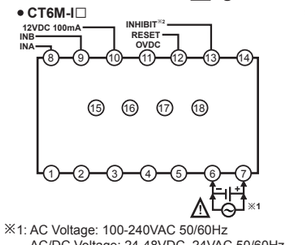
• **CT6M-2P□**



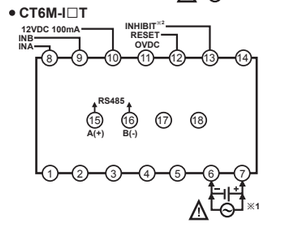
• **CT6M-2P□T**



• **CT6M-I□**



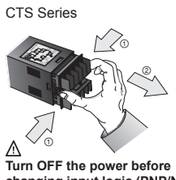
• **CT6M-I□T**



※1: AC Voltage: 100-240VAC 50/60Hz
AC/DC Voltage: 24-48VDC, 24VAC 50/60Hz
※2: Counter operation: If INHIBIT signal is applied, count input will be prohibited.
Timer operation: If INHIBIT signal is applied, time progressing will stop.(HOLD)

2. Input logic selection[No-voltage input(NPN)/Voltage input(PNP)]

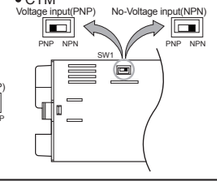
CTS Series



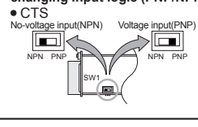
1. **The power must be cut off**.
2. Squeeze toward ① and pull toward ② as the figure. (CTS/CTY Series)
3. Select input logic by using input logic switch (SW1) inside Counter/Timer.
4. Push a case in the opposite direction of ②.
5. Then supply the power to counter/timer.

⚠ **Turn OFF the power before changing input logic (PNP/NPN)**

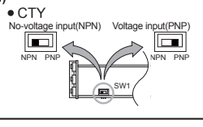
• CTM



• CTS

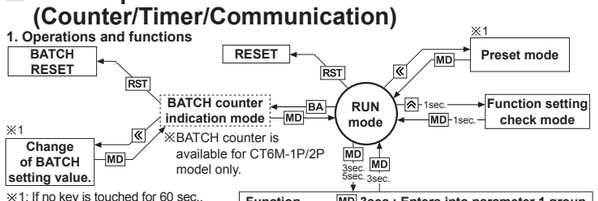


• CTY



■ Basic Operations (Counter/Timer/Communication)

1. Operations and functions

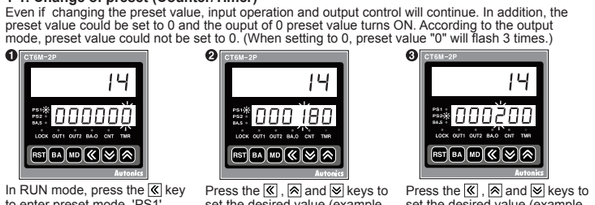


※1: If no key is touched for 60 sec., the counter will return to RUN mode without being restored.

Function setting mode	MD 3sec.: Enters into parameter 1 group MD 5sec.: Enters into parameter 2 group

1-1. Change of preset (Counter/Timer)

Even if changing the preset value, input operation and output control will continue. In addition, the preset value could be set to 0 and the ouput of 0 preset value turns ON. According to the output mode, preset value could not be set to 0. (When setting to 0, preset value "0" will flash 3 times.)



❶ In RUN mode, press the Ⓚ key to enter preset mode. 'PS1' indicator turns ON and first digit of preset value flashes.

❷ Press the Ⓚ, Ⓐ and Ⓥ keys to set the desired value (example, 180). Press the MD key to enter the PS2 setting mode.

❸ Press the Ⓚ, Ⓐ and Ⓥ keys to set the desired value (example, 200). Press the MD key to return RUN mode.

1-2. Function setting check mode

Setting value of function setting mode can be confirmed using the Ⓐ and Ⓥ keys.

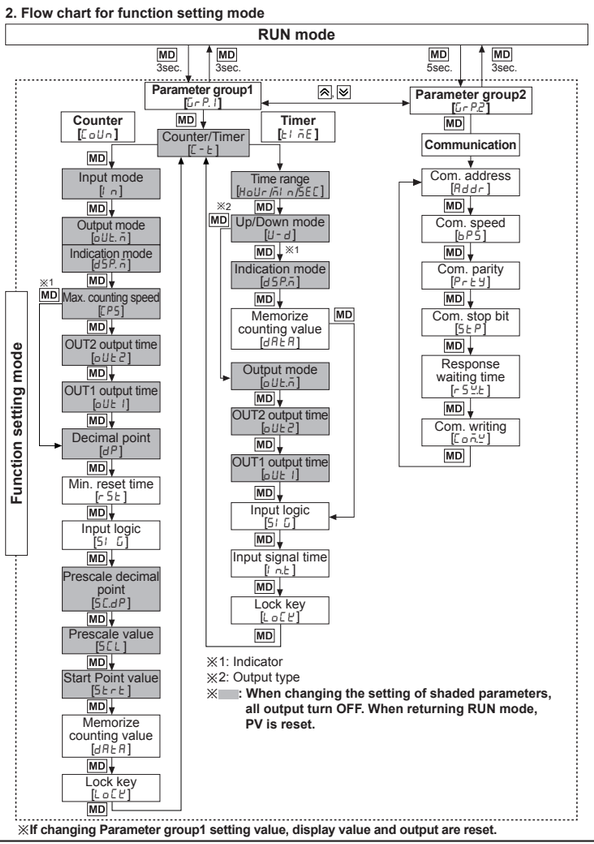
1-3. Switching display function in preset indicator

Setting value 1(PS1) and setting value 2(PS2) are displayed each time pressing MD key in dual preset model. (In timer, it is available for ond, ond.1 or ond2 output mode.)

1-4. Reset

In RUN mode or function setting mode, if pressing RST key or applying the signal to the RESET terminal on the back side, present value will be reset and output will maintain off status. When selecting voltage input (PNP), short no.10 and no. 12 terminals, or when selecting no-voltage input (NPN), short no.11 and no.12 terminals to reset.

2. Flow chart for function setting mode



※1: Indicator
※2: Output type
※ : **When changing the setting of shaded parameters, all output turn OFF. When returning RUN mode, PV is reset.**

※**If changing Parameter group1 setting value, display value and output are reset.**

■ Timer Mode

1. Parameter setting (MD key: Moves the settings, Ⓥ, Ⓐ key: Changes the settings)

Parameter	Setting
Counter/Timer [C-t]	CoUn ↔ tImE ※CoUn: Counter, tImE: Timer
Time range [HoUr/Min/SEC]	• **6 digits type** SEC 999999 (0.001s to 999.999s) / SEC 999999 (0.01s to 9999.99s) / SEC 999999 (0.1s to 99999.9s) / SEC 999999 (1s to 999999s) / m S 995999 (0.01s to 99m59.99s) HoUr 999999 (0.1h to 99999.9h) / m S 999599 (0.1s to 999m59.9s) H m 999959 (1m to 9999h59m) / H m S 995959 (1s to 99h59m59s) / min 999999 (1m to 999999m) / min 999999 (0.1m to 99999.9m) / m S 999959 (1s to 9999m59s) • **4 digits type** SEC 9.999 (0.001s to 9.999s) / SEC 99.99 (0.01s to 99.99s) / SEC 999.9 (0.1s to 999.9s) / SEC 9999 (1s to 9999s) / m S 9959 (1s to 99m59s) HoUr 9999 (1h to 9999h) / H m 9959 (1m to 99h59m) / min 9999 (1m to 9999m) / min 9999 (0.1m to 999.9m)
Up/Down mode [U-d]	UP ↔ dn ※UP: Time progresses from '0' to the setting time. dn: Time progresses from the setting time to '0'.
Indication mode [dSPn]	totAL ↔ HoLd ↔ ontd ※Used for the indicator type only. ※It is added that the feature which set the setting time when selecting HoLd or ontd
Memory protection [dAtA]	Clr ↔ rEC ※Used for the indicator type only. ※Clr: Reset time value when power is off. rEC: Memorizes time value at the moment of power off.
Output mode [oUtn]	ond ↔ ond.1 ↔ ond2 ↔ FLt ↔ FLt.1 ↔ FLt2 ↔ Int ↔ Intg ↔ nFd.1 ↔ nFd ↔ oFd ↔ Int2 ↔ Int.1
OUT2 output time [oUt2]※1	※Set one-shot output time of OUT2. ※Setting range: 00.01 to 99.99sec., Hold. ※When 1st digit is flashing, press the Ⓚ key once and HoLd appears.
OUT1 output time [oUt 1]※1	※Set one-shot output time of OUT1. ※Setting range: 00.01 to 99.99sec., Hold. ※When 1st digit is flashing, press the Ⓚ key once and HoLd appears.
OUT output time [oUtt]※1	※Setting range: 00.01 to 99.99sec., Hold. ※When 1st digit is flashing, press the Ⓚ key once and HoLd appears.
Input logic [SIG]	nPn: No-voltage input, PnP: Voltage input ※Check input logic value(PNP, NPN).
Input signal time [Int]	1 ↔ 20, unit: ms ※CTS/CTY: Set min. width of INA, INH, RESET signal. ※CTM: Set min. width of INA, RESET, INHIBIT, BATCH RESET signal.
Key lock [LoCt]	LoFF ↔ LoC.1 ↔ LoC.3 ↔ LoC.2 ※LoFF: Unlock keys, key lock indicator turns OFF. LoC.1: Locks RST key, key lock indicator turns ON. LoC.2: Locks Ⓚ, Ⓥ, Ⓐ keys, key lock indicator turns ON. LoC.3: Locks RST, Ⓚ, Ⓥ, Ⓐ keys, key lock indicator turns ON

※1: When output mode is FLt.1, FLt2, Intg and ond, ond.1, ond2 of 1-stage preset model, oUt 1 does not appear. The output time of oUt2 is displayed as oUtt.
When output mode is ond, ond.1, ond2, Int2, oUt 1 appears.
※2: Int2 mode is available only for 2-stage preset model.

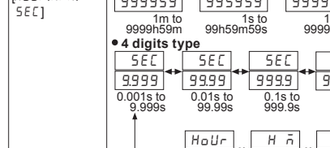
2. Timer '0' time setting — One-shot output (0.01 to 99.99 sec.) / Retained output

2-1. Timer output mode for '0' time setting [ond, ond.1, ond2, nFd, nFd.1] — One-shot output / Retained output

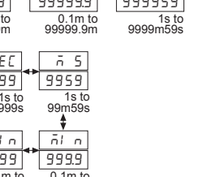
2-2. Operations by output mode ('0' time setting)

A. OND (Signal ON Delay) mode [ond]

• Set '0' for setting time 1.

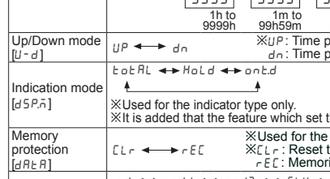


• Set '0' for setting time 2.

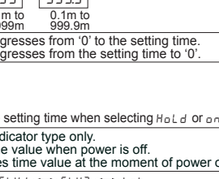


B. OND.1 (Signal ON Delay 1) mode [ond.1]

• Set '0' for setting time 1.

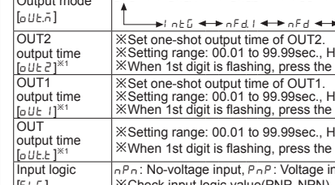


• Set '0' for setting time 2.

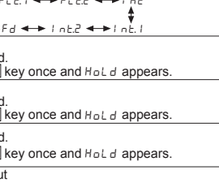


C. OND.2 (Power ON Delay) mode [ond2]

• Set '0' for setting time 1.

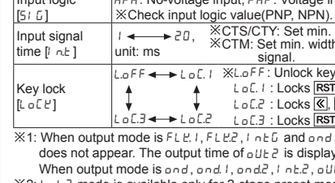


• Set '0' for setting time 2.

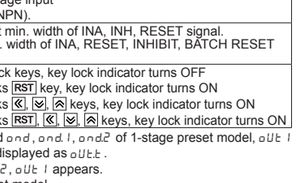


D. NFD (ON-OFF Delay) mode [nFd]

• Set '0' for Off_Delay setting time.



• Set '0' for On_Delay setting time.



E. NFD.1 (ON-OFF Delay1) mode [nFd.1]

• Set '0' for Off_Delay setting time.

• Set '0' for On_Delay setting time.

■ Counter Mode

1. Parameter setting (MD key: Moves the settings, Ⓥ, Ⓐ key: Changes the settings)

Parameter	Setting
Counter/Timer [C-t]	CoUn ↔ tImE ※CoUn: Counter, tImE: Timer
Input mode [In]	Ud-C ↔ UP ↔ UP-1 ↔ UP-2 ↔ dn ↔ dn-1 ↔ dn-2 ↔ Ud-A ↔ Ud-b
Output mode [oUtn]	• Input mode is UP, UP-1, UP-2 or dn, dn-1, dn-2, F ↔ n ↔ C ↔ r ↔ U ↔ P ↔ 9 ↔ A • Input mode is Ud-A, Ud-b, Ud-C, F ↔ n ↔ C ↔ r ↔ U ↔ P ↔ 9 ↔ A ↔ S ↔ t ↔ d ※If max. counting speed is 5kcps, and output mode is d, max. counting speed is automatically changed as 30cps, factory default.
Indication mode [dSPn]	• In case of the indicator type HoLd ↔ totAL ※In case of the indicator type, indicate mode selection [dSPn] is displayed. ※It is the added function to set the preset value when selecting HoLd.
Max. counting speed [CPS]	30 ↔ 1U ↔ 5U ↔ 10U ↔ 1 ※Max. counting speed is when duty ratio of INA or INB input signal is 1:1. It is applied for INA, or INB input as same. ※When output mode is d, set max. counting speed one among 1cps, 30cps, or 1kcps.
OUT2 output time※1 [oUt2]	※Set one-shot output time of OUT2. ※Setting range: 00.01 to 99.99sec. ※When input mode is F, n, S, t, d, oUt2 does not appear. (fixed as HOLD)
OUT1 output time※1 [oUt 1]	※Set one-shot output time of OUT1. ※Setting range: 00.01 to 99.99sec., Hold. ※When 1st digit is flashing, press the Ⓚ key once and HoLd appears. ※When input mode is S, t, d, oUt 1 does not appear. (fixed as HOLD)
OUT output time※1 [oUtt]	※Setting range: 00.01 to 99.99sec. ※When input mode is F, n, S, t, d, oUtt does not appear. (fixed as HOLD)
Decimal point※2 [dP]	• **6 digits type** ------.- ↔ -----.-- ↔ ----.--- ↔ ---.---- ↔ --.----- ↔ -.------ • **4 digits type** ---.- ↔ --.-- ↔ -.--- ※Decimal point is applied to counting value and setting value.
Min. reset time [rSt]	1 ↔ 20, unit: ms ※Set min. width of external reset signal input.
Input logic [SIG]	nPn: No-voltage input, PnP: Voltage input ※Check input logic value (PNP, NPN).
Prescale decimal point※2 [SCdP]	• **6 digits type** ------.- ↔ -----.-- ↔ ----.--- ↔ ---.---- ↔ --.----- ↔ -.------ • **4 digits type** ---.- ↔ --.-- ↔ -.--- ※Decimal point of prescale should not set smaller than decimal point [dP].
Prescale value [SCL]	※Setting range of prescale value 6 digits type: 0.00001 to 99999.9, 4 digits type: 0.001 to 999.9
Start point value [Strt]	※Setting range (linked with decimal point [dP]): 6 digits type: 0.00001 to 999999, 4 digits type: 0.001 to 9999 ※When input mode is dn, dn-1, dn-2, start point value does not appear.
Memory protection [dAtA]	Clr ↔ rEC ※Clr: Resets the counting value when power OFF. rEC: Maintains the counting value when power OFF. (memory protection)
Key lock [LoCt]	LoFF ↔ LoC.1 ↔ LoC.3 ↔ LoC.2 ※LoFF: Unlock keys, key lock indicator turns OFF. LoC.1: Locks RST key, key lock indicator turns ON. LoC.2: Locks Ⓚ, Ⓥ, Ⓐ keys, key lock indicator turns ON. LoC.3: Locks RST, Ⓚ, Ⓥ, Ⓐ keys, key lock indicator turns ON

※1: For 1-stage preset model, oUt 1 does not appear. The output time of oUt2 is displayed as oUtt.
※2: Decimal point and prescale decimal point
- Decimal point: Set the decimal point for display value regardless of prescale value.
- Prescale decimal point: Set the decimal point for prescale value of counting value regardless of decimal point of display value.

2. Input mode

Input mode	Counting chart	Operation
UP [Up]		※When INA is counting input, INB is no counting input. When INB is counting input, INA is no counting input.
UP-1 [Up-1]		※When INA input signal is rising (⎍), it counts. ※INA: Counting input ※INB: No counting input
UP-2 [Up-2]		※When INA input signal is falling (⎌), it counts. ※INA: Counting input ※INB: No counting input
dn [Down]		※When INA is counting input, INB is no counting input. When INB is counting input, INA is no counting input.
dn-1 [Down-1]		※When INA input signal is rising (⎍), it counts. ※INA: Counting input ※INB: No counting input
dn-2 [Down-2]		※When INA input signal is falling (⎌), it counts. ※INA: Counting input ※INB: No counting input
Ud-A [Up/Down-A]		※INA: Counting input INB: Counting command input ※When INB is "L", counting command is up. When INB is "H", it is counting command is down.
Ud-b※1 [Up/Down-B]		※INA: Up counting input INB: Down counting input ※When INA and INB input signals are rising (⎍) at the same time, it maintains previous counting value.
Ud-C※1 [Up/Down-C]		※When connecting encoder output A, B phase with counter input, INA, INB, set input mode [IN.M] as phase different input [Ud-C] for counter operation.

※1: For selectable no-voltage input (PNP), voltage input (NPN) model.
※A: over min. signal width, B: over than 1/2 of min. signal width. If the signal is smaller than these width, it may cause counting error (±1).

※The meaning of "H", "L"

Input method / Character	Voltage input (PNP)	No-voltage input (NPN)
H	5-30VDC	Short
L	0-2VDC	Open

※Min. signal width by counting speed

Counting speed	Min. signal width
1cps	500ms
30cps	16.7ms
1kcps	0.5ms
5kcps	0.1ms

3. Prescale function

This function is to set and display calculated unit for actual length, liquid, position, etc. It is called "prescale value" for measured length, liquid, or position, etc per 1 pulse. For example, when moving L, the desired length to be measured, and P, the number of pulses per 1 revolution of a rotary encoder, occurs, prescale value is L/P.

E.g.) Positioning control by counter and encoder

[Diameter (D) of pulley connected with encoder= 22mm, the number of pulses by 1 rotation of encoder=1,000]

•Prescale value

$$= \frac{\pi \times \text{Diameter (D) of pulley}}{\text{The number of pulses by 1 rotation of encoder}}$$

$$= \frac{3.1416 \times 22}{1000}$$

$$= 0.069\text{mm/pulse}$$

Set decimal point[dP] as [------.-], prescale decimal point [SCdP] as [---.---], prescale value [SCL] as [0.069] at function setting mode. It is available to control conveyer position by 0.1mm unit.

■ Factory Default

	Parameter	Factory default	Parameter	Factory default
Counter	In	Ud-C	rSt	20
	oUtn	F	SIG	nPn
	dSPn	totAL	SCdP	6 digits type: -.----- 4 digits type: -.---
	CPS	30	SCL	6 digits type: 1.00000 4 digits type: 1.000
	oUt2(oUtt)	Hold (fixed)	Strt	000000
	oUt 1	00.10	dAtA	Clr
	dP	------		
Timer	HoUr/Min/SEC	6 digits type: 0.00 1s-999.999s 4 digits type: 0.00 1s-9.999s	oUt2(oUtt)	HoLd
	U-d	UP	oUt 1	00.10
	dSPn	totAL	SIG	nPn
	dAtA	Clr	Int	20
	oUtn	ond		
General	LoCt	LoFF		
	PS1	1000		
	PS2	5000		
Com.	Addr	001	StP	2
	bPS	96	rSvt	20
	PrtY	nonE	ConY	EnA

■ Cautions During Use

1. **Power ON/OFF**
   The inner circuit voltage rises within 100ms after supplying the power to the unit.
   The input is unavailable at this period.
   Be sure that the inner circuit voltage drops within 500ms after turning OFF the power.
2. **In case of 24VAC / 24-48VDC model, power supply should be insulated and limited voltage/current or Class 2 power supply device.**
3. **Input signal line**
   ①Shorten the cable from the sensor to the unit. ②Use shield cable when input cable is longer.
   ③Wire the input signal line separately from power line.
4. **Input logic selection**
   Before selecting input logic, must cut off the power to counter/timer. Select the input logic following the instruction.
5. **Contact counting input (counter operation)**
   If counting speed for counter is high speed mode (1k, 5k, 10kcps) and counting input is contact, it may cause input signal error by chattering of contact switching.
   Set counting speed as low speed mode (1cps or 30cps) for contact counting input.
6. **Testing dielectric voltage or insulation resistance when the unit is installed at control panel**