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.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ **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.

⚠ 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 fire, personal injury, or economic loss.
2. **Install on a device panel to use.**
   Failure to follow this instruction may result in electric shock or fire.
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 or fire.
4. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.
5. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in electric shock or fire.

⚠ Caution

1. **When connecting communication, the power/sensor input and relay output, use AWG 20(0.50mm²) cable or over, and tighten the terminal screw with a tightening torque of 0.74 to 0.90N·m.**
   Failure to follow this instruction may result in fire or malfunction due to contact failure.
2. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
3. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
   Failure to follow this instruction may result in electric shock or fire.
4. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in fire or explosion.
5. **Keep metal chip, dust, and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.

■ Manual

For the detail information and instructions, please refer to user manual and user manual for communication, and be sure to follow cautions written in the technical descriptions (catalog, homepage).
Visit our homepage (www.autonics.com) to download manuals.

■ Ordering Information

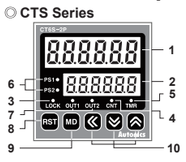
CT 6 M – 2P 4 T

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-digit)
	6	999999 (6-digit)
Item	**CT**	Counter/Timer

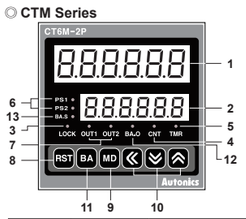
※1: CT4S model does not support indicator type.

■ Unit Description

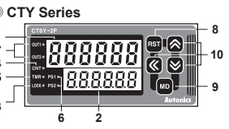
◎ CTS Series



◎ CTM Series



◎ CTY Series



Model	Changed	Note
CT4S-1P		
CT6S-1P	PS2→PS	There are no PS1, OUT1 LEDs
CT6Y-1P	OUT2→OUT	
CT6M-1P		
CT6S-I		There are no PS1, OUT1, OUT2, BA.S, BA.O LEDs, BA key.
CT6Y-I	PS2→PS	
CT6M-I		

※CT4S model does not support indicator type.

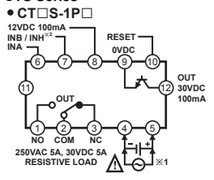
1. **Counting value display component (red)**
   RUN mode
   : Displays counting value for counter operation or time progress value for timer operation.
   Function setting mode: Displays setting item.
2. **Setting value display component (yellow-green)**
   RUN mode: Displays setting value.
   Function 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.

■ Connections

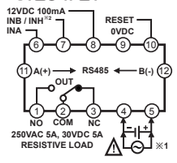
◎ CTS Series

Be sure that connection is varied by supporting RS485 communication.

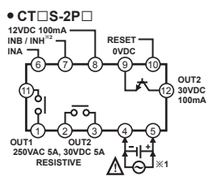
● CT□S-1P□



● CT□S-1P□T



● CT□S-2P□



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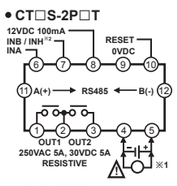
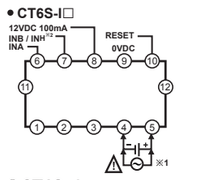


● CT6S-I□



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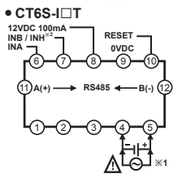
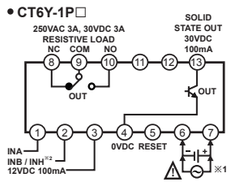
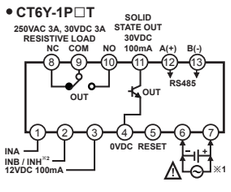


◎ CTY Series

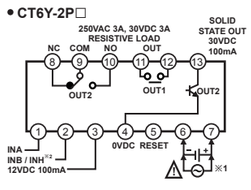
● CT6Y-1P□



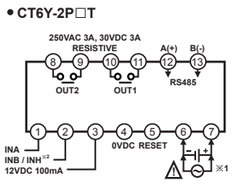
● CT6Y-1P□T



● CT6Y-2P□



● CT6Y-2P□T



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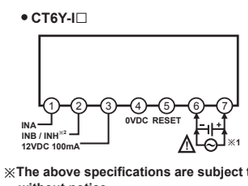

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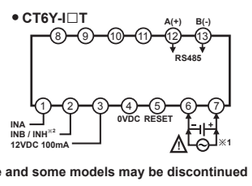


※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual, user manual and the technical descriptions (catalog, homepage).

■ 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-digit	6-digit	6-digit	6-digit
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 4-digit	9.999s, 99.99s, 999.9s, 9999s, 99m59s, 999.9m, 9999m, 99h59m, 9999h			
	Time range 6-digit	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 (PNP) or no-voltage input (NPN) [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	Comp.	Standard	Comp.	Standard	Comp.
Control output	Contact output	Type	1-stage	SPDT(1c): 1		SPDT(1c): 1		SPDT(1c): 1	
			2-stage	SPST(1a): 2		SPST(1a), SPDT(1c): 1		SPST(1a): 1, SPDT(1c): 1	
		Capacity		250VAC~ 5A, 30VDC⎓ 5A resistive load		250VAC~ 3A, 30VDC⎓ 3A resistive load		250VAC~ 5A, 30VDC⎓ 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 immunity	AC voltage			Square-wave noise by noise simulator (pulse width 1μs) ±2kV					
	AC/DC voltage			Square-wave noise by noise simulator (pulse width 1μs) ±500V					
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 standard)					
Environmental	Ambient temp.			-10 to 55℃, storage: -25 to 65℃					
	Ambient humi.			35 to 85%RH, storage: 35 to 85%RH					
Approval				CE cULus					
Weight※1				Approx. 212g (approx. 159g)		Approx. 228g (approx. 140g)		Approx. 322g (approx. 252g)	

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

■ Communication Specifications

● Interface

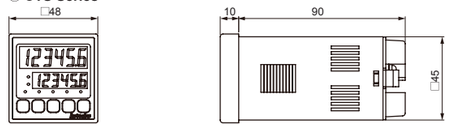
Comm. protocol	Modbus RTU with 16-bit CRC
Connection type	RS485
Application standard	Compliance with EIA RS485
Max. connection	31 units (address: 1 to 127)
Comm. type	Two-wire half duplex
Synchronous method	Asynchronous
Comm. distance	Max. 800m
Comm. speed	2400, 4800, 9600(factory default), 19200, 38400bps
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 Autonics communication converter; SCM-WF48 (Wi-Fi to RS485·USB wireless communication converter, sold separately), SCM-US48I (USB to RS485 converter, sold separately), SCM-38I (RS232C to RS485 converter, sold separately).
※Please use twisted pair wire, which is suitable for RS485 communication, for SCM-WF48, SCM-US48I and SCM-38I.

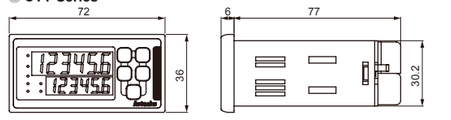
■ Dimensions

(unit: mm)

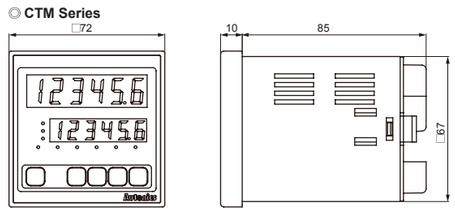
◎ CTS Series



◎ CTY Series

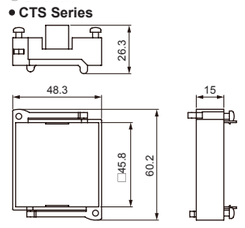


◎ CTM Series

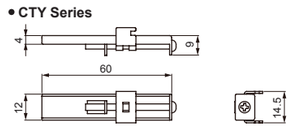


◎ Bracket

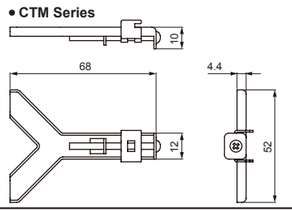
● CTS Series



● CTY Series

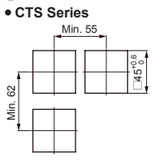


● CTM Series

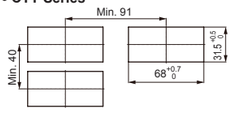


◎ Panel cut-out

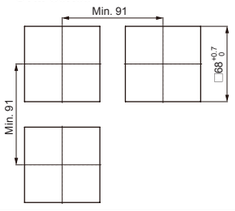
● CTS Series



● CTY Series

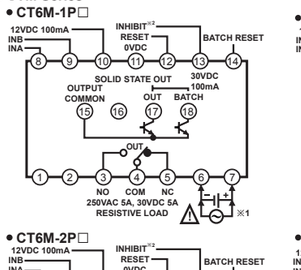


● CTM Series

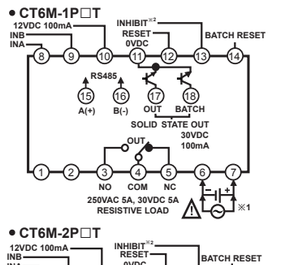


◎ CTM Series

● CT6M-1P□



● CT6M-1P□T



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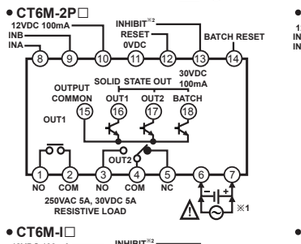

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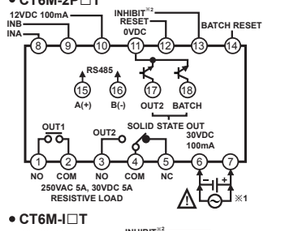

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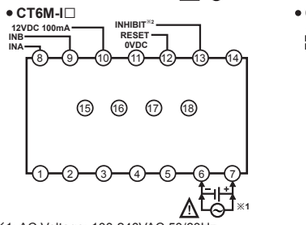
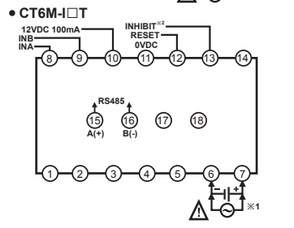


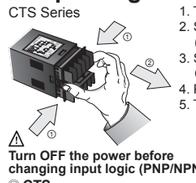
● CT6M-I□T



※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)

■ Input Logic Selection

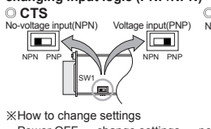
CTS Series



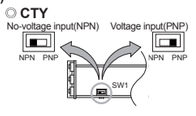
1. The power must be cut off.
2. Squeeze toward ① and pull toward ② as the figure. (CTS/CTY Series)
3. Select input logic by using input logic switch (SW1) inside Counter/Timer.
4. Push a case in the opposite direction of ②.
5. Then supply the power to counter/timer.

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

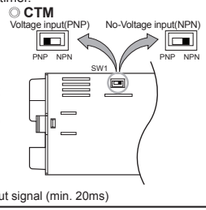
◎ CTS



◎ CTY



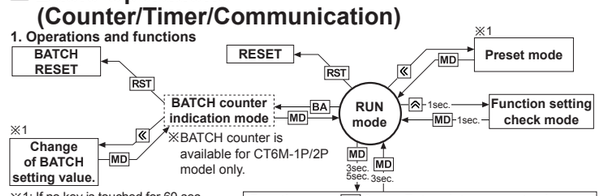
◎ CTM



※How to change settings
Power OFF → change settings → power ON → press RST key or input signal (min. 20ms)

■ Basic Operations (Counter/Timer/Communication)

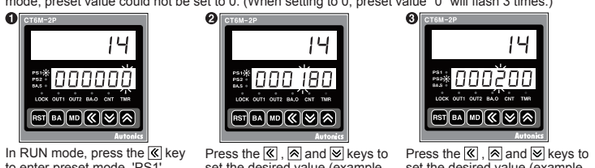
1. Operations and functions



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

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.)



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

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

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.

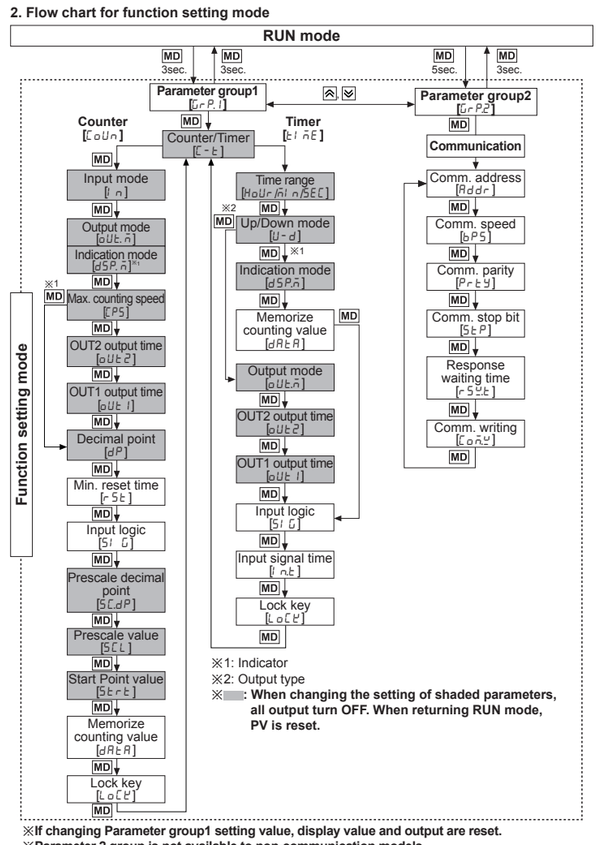
1-3. Switching display function in preset indicator

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 and, and.1 or and2 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.
-CT□S: Short no. 8 and 10 terminals for voltage input (PNP), short no. 9 and 10 terminals for non-voltage input (NPN).
-CT6Y: Short no. 3 and 5 terminals for voltage input (PNP), short no. 4 and 5 terminals for non-voltage input (NPN).
-CT6M: Short no. 10 and 12 terminals for voltage input (PNP), short no. 11 and 12 terminals for non-voltage input (NPN).

2. Flow chart for function setting mode



※If changing Parameter group1 setting value, display value and output are reset.
※Parameter 2 group is not available to non-communication models.

■ 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 [HourIn/SEC]	● 6-digit 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) ◄► n S 999999 (0.01s to 99m59.99s); HOUr 999999 (0.1h to 99999.9h) ◄► n S 999999 (0.1s to 999m59.9s); H n 999999 (1m to 9999h59m) ◄► H n S 999999 (1s to 99h59m59s) ◄► nIn 999999 (1m to 999999m) ◄► nIn 999999 (0.1m to 99999.9m) ◄► n S 999999 (1s to 9999m59s); ● 4-digit type: SEC 9999 (0.001s to 9.999s) ◄► SEC 9999 (0.01s to 99.99s) ◄► SEC 9999 (0.1s to 999.9s) ◄► SEC 9999 (1s to 9999s) ◄► n S 9999 (1s to 99m59s); HOUr 9999 (1h to 9999h) ◄► H n 9999 (1m to 99h59m) ◄► nIn 9999 (1m to 9999m) ◄► nIn 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 [LoCK]	LoFF ◄► LoC.1 ◄► LoC.2 ◄► LoC.3 ※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.

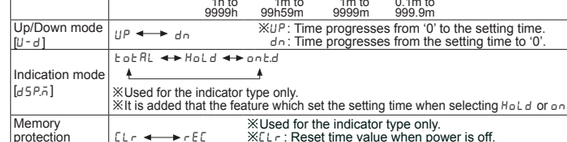
※1: When output mode is FLt.1, FLt2, IntG and and, and.1, and2 of 1-stage preset model, oUt 1 does not appear. The output time of oUt2 is displayed as oUtt. When output mode is and, and.1, and2, Int2, oUt 1 appears.
※2: Int2 mode is available only for 2-stage preset model.

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

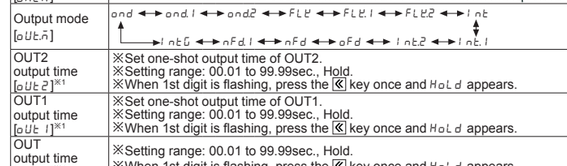
2-1. Timer output mode for '0' time setting [and, and.1, and2, nFd, nFd.1]

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

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



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



C. OND.2 (Power ON Delay) mode [and2]

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

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

■ 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 ◄► Y ◄► P ◄► 9 ◄► A ● Input mode is Ud-A, Ud-b, Ud-C, F ◄► n ◄► C ◄► r ◄► Y ◄► 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 ◄► 1Y ◄► 5Y ◄► 10Y ◄► 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-digit type ● 4-digit 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-digit type ● 4-digit type ※Decimal point of prescale should not set smaller than decimal point [dP].
Prescale value [SCL]	※Setting range of prescale value 6-digit type: 0.00001 to 99999.9, 4-digit type: 0.001 to 999.9
Start point value [Strt]	※Setting range (linked with decimal point [dP]): 6-digit type: 0.00001 to 999999, 4-digit type: 0.001 to 9999 ※When input mode is dn, dn-1, dn-2, start point value does not appear.
Memory protection [dAtA]	※CLr: Resets the counting value when power OFF. rEC: Maintains the counting value when power OFF. (memory protection)
Key lock [LoCK]	LoFF ◄► LoC.1 ◄► LoC.2 ◄► LoC.3 ※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.M1] 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