DRW171143AA

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 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

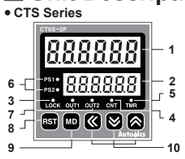
CT 6 M – 2P 4 T

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

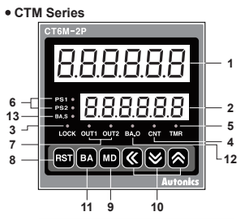
※1: CT4S model does not support indicator type.

■ Unit Description

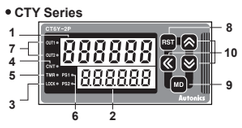
• CTS Series



• CTM Series



• CTY Series



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

※CT4S model does not support indicator type.

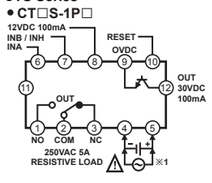
1. Counting value display component (red)
RUN mode: Displays counting value for counter operation or time progress value for timer operation.
Function setting mode: Displays setting item.
2. Setting value display component (yellow-green)
RUN mode: Displays setting value.
Function setting mode: Displays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

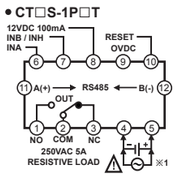
◎ CTS Series

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

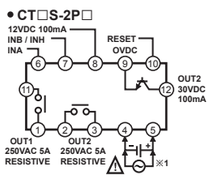
• CT□S-1P□



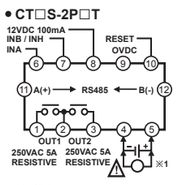
• CT□S-1P□T



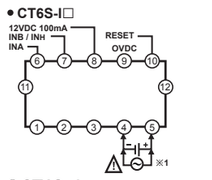
• CT□S-2P□



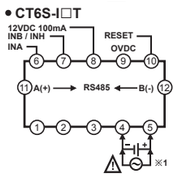
• CT□S-2P□T



• CT6S-I□

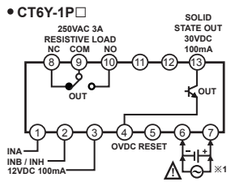


• CT6S-I□T

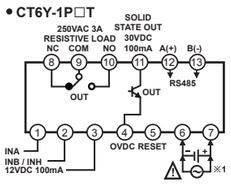


◎ CTY Series

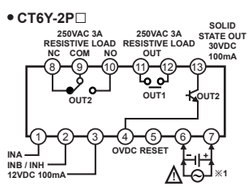
• CT6Y-1P□



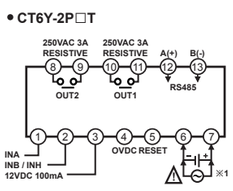
• CT6Y-1P□T



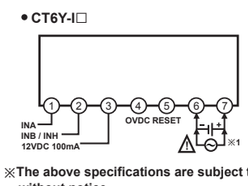
• CT6Y-2P□



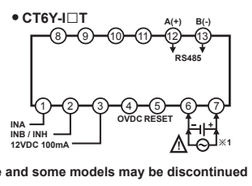
• CT6Y-2P□T



• CT6Y-I□



• CT6Y-I□T



※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		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), SPDT(1c): 1	SPST(1a): 1, SPDT(1c): 1
	Capacity		250VAC∼ 5A resistive load		250VAC∼ 3A resistive load	250VAC∼ 5A resistive load
Control output: Solid state output (NPN open collector)	Type	1-stage	1	—	1	1 / 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			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 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

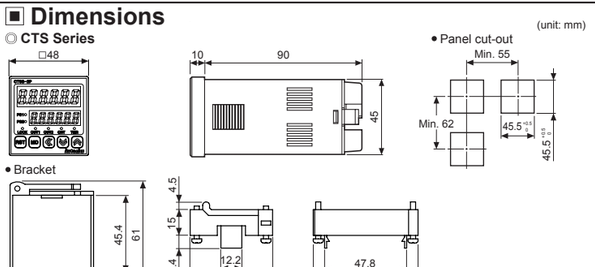
Comm. protocol	Modbus RTU with 16-bit CRC
Connection type	RS485
Application standard	Compliance with EIA RS485
Max. connection	31 units (address: 1 to 127)
Comm. type	Two-wire half duplex
Synchronous method	Asynchronous
Comm. distance	Max. 800m
Comm. speed	2400, 4800, 9600(factory default), 19200, 38400bps
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.

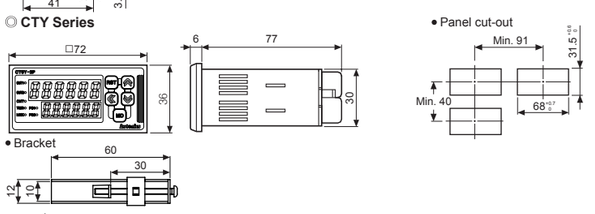
■ Dimensions

(unit: mm)

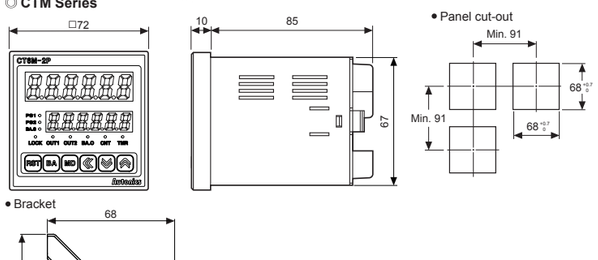
◎ CTS Series



◎ CTY Series



◎ CTM Series



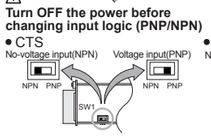
■ Input Logic Selection

CTS Series

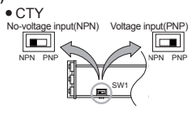
1. The power must be cut off.
2. Squeeze toward ① and pull toward ② as the figure. (CTS/CTY Series)
3. Select input logic by using input logic switch (SW1) inside Counter/Timer.
4. Push a case in the opposite direction of ②.
5. Then supply the power to counter/timer.

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

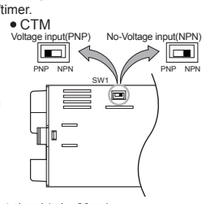
• CTS



• CTY



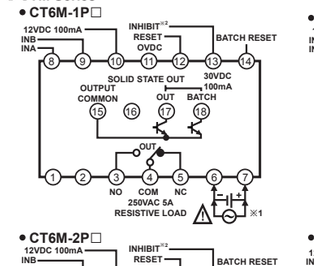
• CTM



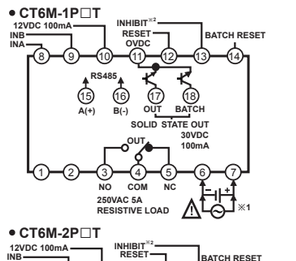
※How to change settings
Power OFF → change settings → power ON → press RST key or input signal (min. 20ms)

◎ CTM Series

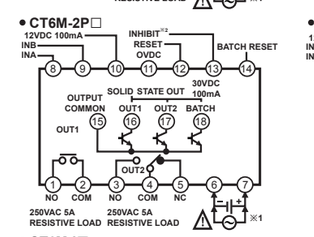
• CT6M-1P□



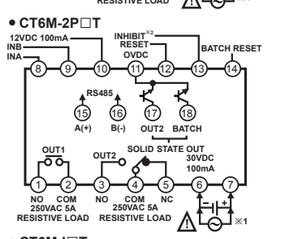
• CT6M-1P□T



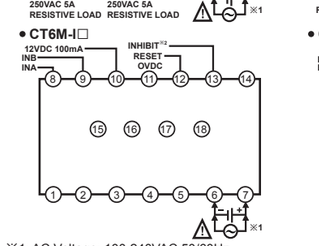
• CT6M-2P□



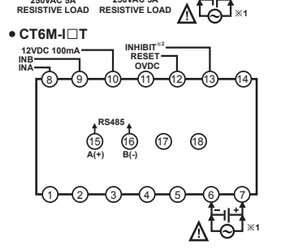
• CT6M-2P□T



• CT6M-I□



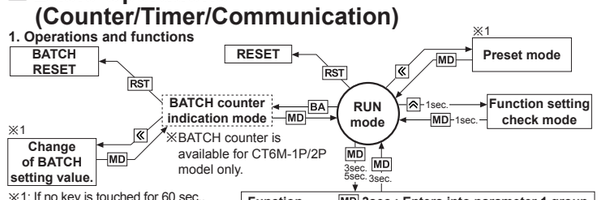
• CT6M-I□T



※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)

■ Basic Operations (Counter/Timer/Communication)

1. Operations and functions

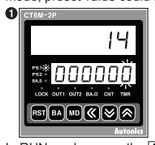


※1: If no key is touched for 60 sec., the counter will return to RUN mode without being restored.

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

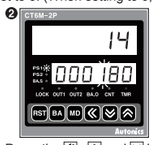
1-1. Change of preset (Counter/Timer)
Even if changing the preset value, input operation and output control will continue. In addition, the preset value could be set to 0 and the ouput of 0 preset value turns ON. According to the output mode, preset value could not be set to 0. (When setting to 0, preset 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

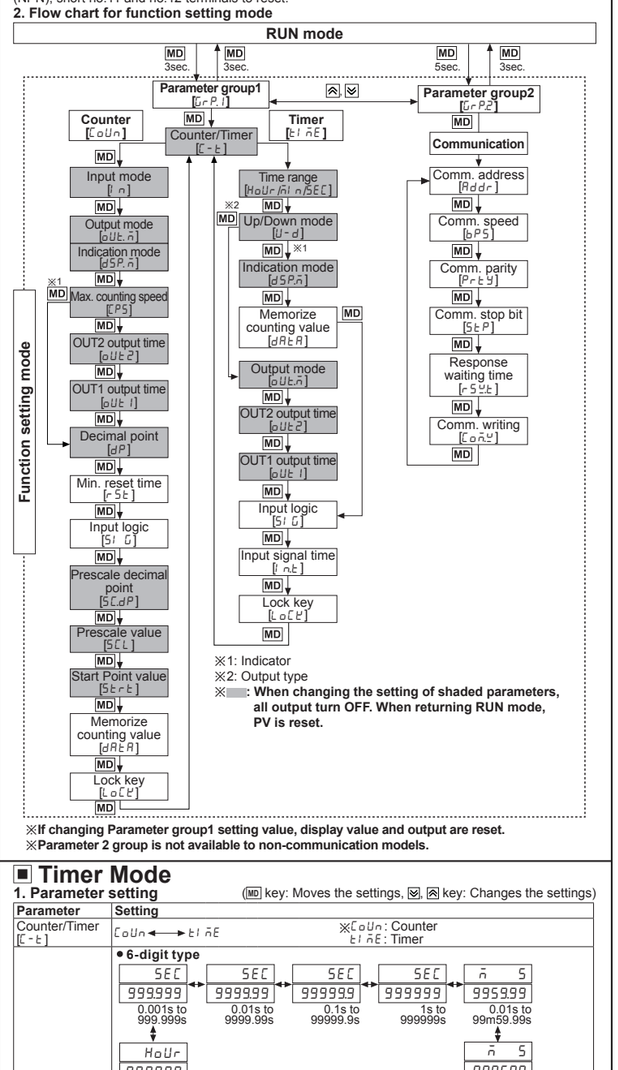
Press the ◁, △ and ▽ keys to set the desired value (example, 200). Press the MD key to return RUN mode.

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 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. 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



※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 [HourMin/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) / M S 999999 (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 999599 (1s to 99h59m59s) / MIn 999999 (1m to 999999m) / MIn 999999 (0.1m to 99999.9m) / M S 999599 (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) / M S 9999 (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 [dSPM]	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 [oUtM]	and ↔ and.1 ↔ and2 ↔ 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 [oUt1]※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 ※LoFF: Unlock keys, key lock indicator turns OFF. LoC.1: Locks RST key, key lock indicator turns ON. LoC2: Locks ◁, ▽, △ keys, key lock indicator turns ON. LoC3: Locks RST, ◁, ▽, △ keys, key lock indicator turns ON.

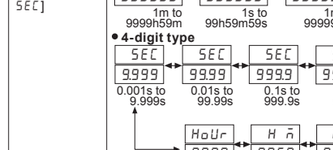
※1: When output mode is FLt.1, FLt2, Int.G and and, and.1, and2 of 1-stage preset model, oUt1 does not appear. The output time of oUt2 is displayed as oUtt.
When output mode is and, and.1, and2, Int2, oUt1 appears.
※2: Int2 mode is available only for 2-stage preset model.

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

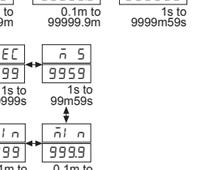
2-1. Timer output mode for '0' time setting [and, and.1, and2, nFd, nFd.1] — One-shot output / Retained output

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

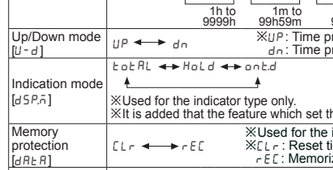
A. OND (Signal ON Delay) mode [and]
• Set '0' for setting time 1.



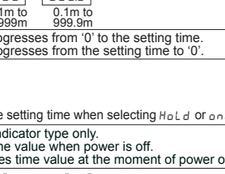
• Set '0' for setting time 2.



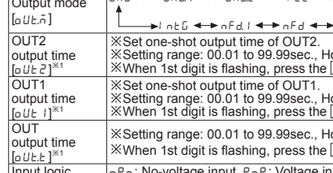
B. OND.1 (Signal ON Delay 1) mode [and.1]
• Set '0' for setting time 1.



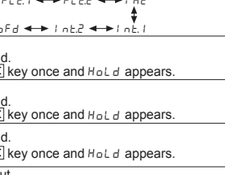
• Set '0' for setting time 2.



C. OND.2 (Power ON Delay) mode [and2]
• 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 [oUtM]	• 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 [dSPM]	• In case of the indicator type Hold ↔ totAL ※In case of the indicator type, indicate mode selection [dSPM] is displayed. ※It is the added function to set the preset value when selecting Hold.
Max. counting speed [CPS]	30 ↔ 1Y ↔ 5Y ↔ 10Y ※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 [oUt1]	※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, oUt1 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 ※LoFF: Unlock keys, key lock indicator turns OFF. LoC.1: Locks RST key, key lock indicator turns ON. LoC2: Locks ◁, ▽, △ keys, key lock indicator turns ON. LoC3: Locks RST, ◁, ▽, △ keys, key lock indicator turns ON.

※1: For 1-stage preset model, oUt1 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 coun