CT Series-Multi function Counter/Timer

Features:

1.Maximum counting speed is 10Kcps.
2. Coefficent can be set as 0.001-99.999
3. Pulse input , PNP and NPN input can be set in the menu
4. With timing function , 9 kinds timing mode can be selected
5. Two loop alarms output for counting length/quantity , one alarm for batch counting
6. Can be applied to the measure and control in light industry, machinery , packing and food industry.

For your safe, please read the below content carefully before you use the timer/counter!

Safe Caution

※ For your safety, please read the below content carefully before you use the meter !

Please comply with the below important points:

⚠ Warning An accident may happen if the operation does not comply with the instruction.

⚠ Notice An operation that does not comply with the instruction may lead to product damage.

※ The instruction of the symbol in the manual is as below:
⚠ An accident danger may happen in a special condition.

⚠ Warning

1. A safety protection equipment must be installed or please contact with us for the relative information if the product is used under the circumstance such as nuclear control, medical treatment equipment ,automobile, train, airplane, aviation, entertainment or safety equipment, etc. Otherwise, it may cause serious loss, fire or person injury.
2. Apanel must be installed, otherwise it may cause creepage (leakage).
3. Do not touch wire connectors when the power is on, otherwise you may get an electric shock.
4. Do not dismantle or modify the product, If you have to do so, please contact with us first. Otherwise it may cause electric shock and fire.
5. Please check the connection number while you connect the power supply wire or input signal, otherwise it may cause fire.

⚠ Caution

1. This product cannot be used outdoors. Otherwise the working life of the product will become shorter, or an electric shock accident may happen.
2. When you connect wire to the power input connector or signal input connectors, the moment of the No.20AWG (0.50 mm2) scrwew tweaked to the connector is 0.74n.m-0.9n.m. Otherwise the connectors may be damaged or get fire.
3. Please comply with the rated specifications. Otherwise it may cause fire after the working life of the product becomes shorter.
4. Do not use water or oil base cleaner to clean the product. Otherwise it may cause electric shock or fire, and damage the product.
5. This product should be avoid working under the circumstance that is flammable, explosive, moist, under sunshine, heat radiation and vibration.
6. In this unit it must not have dust or deposit, otherwise it may cause fire or mechanical malfunction.
7. Do not use gasoline, chemical solvent to clean the cover of the product because such solvent can damage it. Please use some soft cloth with water or alcohol to clean the plastic cover.

1. Model Illustration

CT 6□ – 2P 4

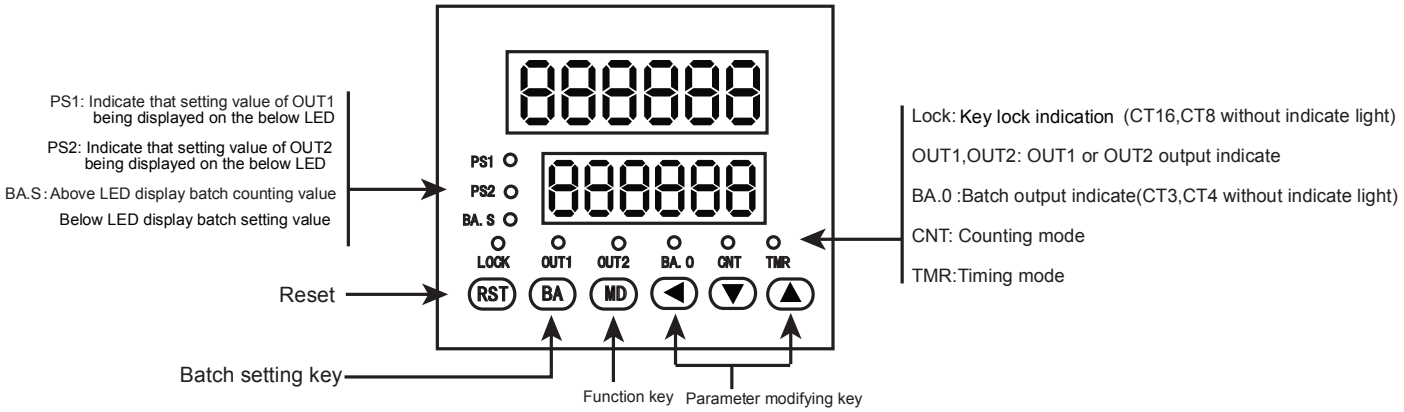
- 4: Design code
- 2P: 2 loop preset , 1P: 1 loop preset
- □: S: 48H*48Wmm M:72H*72Wmm Y:36H*72Wmm
- 6: Display: 6: 6 digit display
- CT: CT Series Timer/Counter Multi-function

* 24 Power Supply is also available as special order. Please indicate your requirement in your order

2. Technical Specification

Power Supply		100-240V AC/DC
Allowable Voltage Range		90~110% of rated voltage(AC power)
INA INB input frequency		1Hz, 30Hz, 1KHz , 5KHz ,10KHz are selectable
Min.input Signal width	Counter	Reset input: Selectable 1ms or 20ms
	Timer	INA, INHIBIT, RESET, BATCH RESET: Selectable 1ms or 20ms
Input		Selectable voltage input or Non-voltage input Voltage input : Input impedance:5.4kΩ, H level:5-30VDC, L level: 0-2VDC, L level: Max.2VDC, Non-voltage input :Short-circuit impedance:Max.1k,Residual voltage:Max.2VDC, OPen-circuit impedance:Min.100kΩ
One-shot output		10/50/100/200/500/1000/2000/5000ms
Control Output	Contact Point Capacity	NO:250VAC 3A at resistive load, NC:250VAC 2A at resistive load
	Solid State Relay Capacity	Max. 30VDC , Max. 100mA
Memory time		memory datasheet for 10 years
External sensor power		12V DC ± 10%, Maximum 100mA
Timing Accuracy		Power on start accuracy: ± 0.05%±0.05sec Signal start accuracy : ± 0.05% ± 0.03sec
Insulation resistance		Min 100MΩ (at 500V DC)
Dielectric Strength		2000V AC 50/60Hz 1minute
Anti-interfere		± 2kV , the square wave generator interference (pulse width: 1uS)
Vibration	Mechnical	amplitude : 0.75mm , frequency : 10~55Hz, X , Y , Z directions each for 1 hour
	Malfunction	amplitude: 0.5mm , frequency:10~55Hz , X , Y , Z directions each for 10 minutes
Shock	Mechnical	300/S² (about: 30G) X , Y , Z directions for 3 times each
	Malfunction	100/S² (about: 10G) X , Y , Z directions for 3 times each
Relay life cycle	Mechnical	more than 10,000,000 times
	Electrical	More than 100,000 times , (NO: 250VAC 3A load , NC: 250V AC 2A load)
Work temperature		-10~+50℃(at non-freezing status)
Storage temperature		+65℃ (at non-freezing status)
Storage humidity		35~85%RH

3.Panel Indication

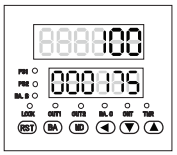


4.Operation Procedure:

5.1.Change of the setting value of Counter

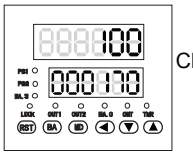
1. How to change preset value : To change the preset value from 175 to 180.

(1)

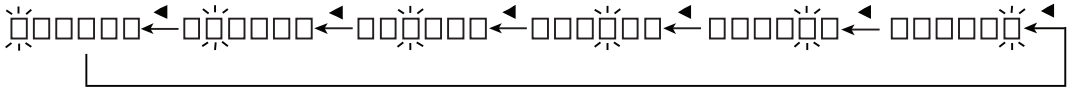


Under measuring status, press ◄ to enter setting value modify status , press ◄ continuously , select digit "5" to make it flicker

(2)

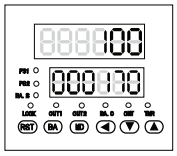


Change "5" to "0" by pressing ▼ or ▲ 5 times



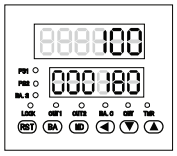
∴ Under measuring status , press ◄ key to enter the setting value modify status , the selected digit always flickers from right to left.

(3)



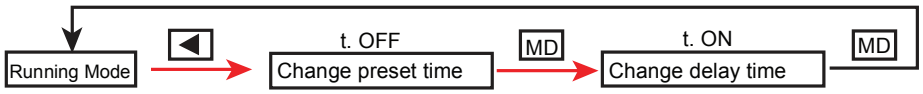
Press ◄ key to select data "7" flickering .

(4)



Press ▲ once,change "7" to "8",then press MD to confirm and return to measuring status .

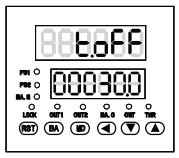
5.2 Change the setting value of the timer



In the status of changing preset value, if no press any key during 60 seconds, the timer will return to Running Mode.

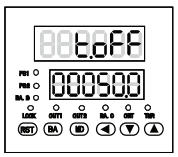
2. How to change t. OFF time from 30 sec. to 50 sec., t.ON setting from 40 sec. to 20 sec. (Output mode: FLK, Timer range: 0.1s-99999.9s)

(1)

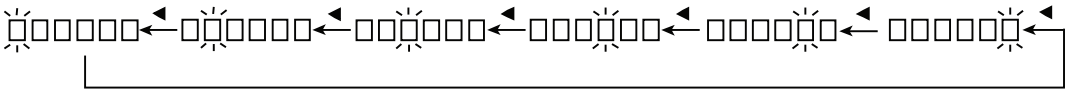


Press ◄ key to enter the status of changing preset time. Make the data "3" flicker by pressing ◄ key twice.

(2)

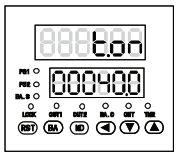


Change "3" to "5" by pressing ▲ key twice. Pressing MD key to complete t.OFF time setting then enter the status of changing t.ON time.



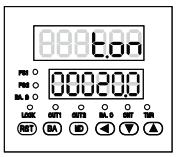
In timing status ,press ◄ to enter setting value modify status .The sequence of the selected data flickering from right to left .

(3)



Press ◄ key twice to move the flickering to digit "4"

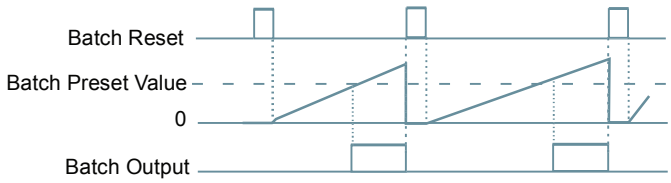
(4)



Press ▼ key twice to change "4" to "2"
Pressing MD key to complete the setting , then return to RUN mode.

5.Batch Counting and Batch Preset

1. Batch Output Action



Batch counting

※ Batch counting value is up counting , it only can be reset by the external batch reset signal .
※ When batch counting value is beyond 999999 , it will reset to zero automatically , and restart to count.
※ Batch counting value is not affected by RST key or external reset signal.

(1) Batch counting under counting mode

When counting alarm output times reaching to the preset batch value , batch alarm output .
When using batch control output , up counting time interval will be more than 10ms

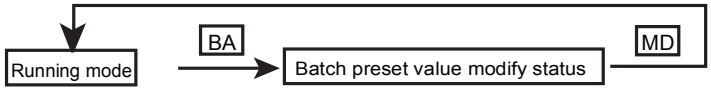
(2) Batch counting under timing mode

When timing alarm output times reaches to the preset batch value , batch alarm output .

Under FLK output mode , when the batch counting value is increasing , preset time of Toff and Ton will pass .

※ Batch output function
If batch output is ON , it will keep ON status till batch reset signal comes .
If batch output is ON , the meter power off and power on again , batch output should keep ON status till external reset signal comes.

2. Modify batch preset vaule



※ Under running status , press BA key to enter batch preset value modify status.
The method of modifying batch output preset value is the same as setting counting value , press ◄ key to select the data need to be modified and make it flickering . Press ▲ ▼ key to modify the value , press MD to complete the setting and return to measuring status.
When entering batch preset value modifying mode , the above line LED display the present batch counting value.

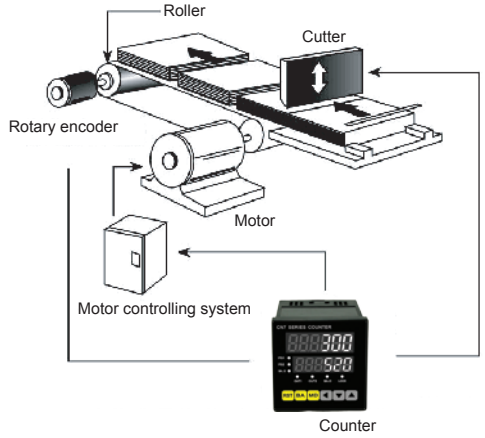
※ When batch preset value is beyong batch counting value , change the batch preset value equal to or smaller than the batch counting value , batch output will make action.

※ If batch preset value is set as 0 , batch output is on OFF status .

※ In batch setting satus , if there is no any operation in 60S , the meter will come back to measure status automatically .

For Example:Pulse number is a number of pulse generated by rotary encoder, L is the measured length, Prescale value is equal to L divides P.

◎ To use counter and rotary to control length



$$\text{Prescale Value} = \frac{\pi \times \text{Diameter of the roller(D)}}{\text{Pulse number per 1 revolution of the encoder}}$$

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

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

Set 0.069 of prescale value at perscale value ste mode.

The diameter of the wheel which connects the rotary coder is 22mm,
The pulses number per 1 revolution of encoder is 1000 pcs.

6.Lock Key Setting

Lock Key function is used for avoiding key mis-pressing.
L.OFF (LOCK OFF): Cancel Lock Key function.
LOC.1(LOCK LEVEL1): Lock RST Key
LOC.2(LOCK LEVEL2): Lock◄ and ▲ and ▼ Key.
LOCK.3(LOCK LEVEL3): Lock RST and ◄ and ▲ and ▼ Key.

7. Counting function mode setting

Setting mode	Selection and setting （▼、▲）
Input mode (in)	→ U → d → Ud-A → Ud-b → Ud-C When output mode is S , T ,D , the input mode only can be Ud-A , B , C.
Maximum counting speed (CPS)	→ 1 → 30 → 1K → 5K → 10K Counting speed means the allowable maximum inpu frequency of INA and INB . Eg: If set CPS as 5K , when input frequency signal is larger than 5K , the counting will be not correct.
Output mode (oUt)	● Up or Down inut mode → F → n → C → r → Y → P → 9 → A ● Up/Down- A, B, C inut mode → F → n → C → r → Y → P → 9 → A → S → t → d
OUT2 output time (oUt2)	→ 10 → 50 → 100 → 200 → 500 → 1000 → 2000 → 5000 Unit: ms
OUT1 output time (oUt1)	→ 10 → 50 → 100 → 200 → 500 → 1000 → 2000 → 5000 → HoLd Unit: ms
Input logic (S, G)	Use ▲ or ▼ to select PnP or nPn
Min.reset time (rSt)	1 ⇄ 20 Min. external RESET signal width Unit: ms
Decimal point (dP)	→ ------ → ------ → ------ → ------ * * *
Prescale value (SCL)	◀ : Shift the flickering digit ▼、▲ : Change the prescale value Set range of prescale value 6 Digit: 0.001 ~ 99.999 prescale value: It is actual length or other measure unit per one pulse
Memory retention (dAtA)	CLEr ⇄ rEC CLEr : Power reset for counting value. (Reset counting value when power off) rEC : Memorize counting value (Memorize counting value when power off)
Lock key (LoCK)	→ L.oFF → LoC.1 → LoC.2 → LoC.3
Counter/Timer (C-t)	CoUn ⇄ tiME ※CoUn : Counter tiME : Timer

MD

※ If select F or N mode , when counting value reaches the preset value , output will maintain , therefore there is no “OUT2 output time” menu in function setting mode.

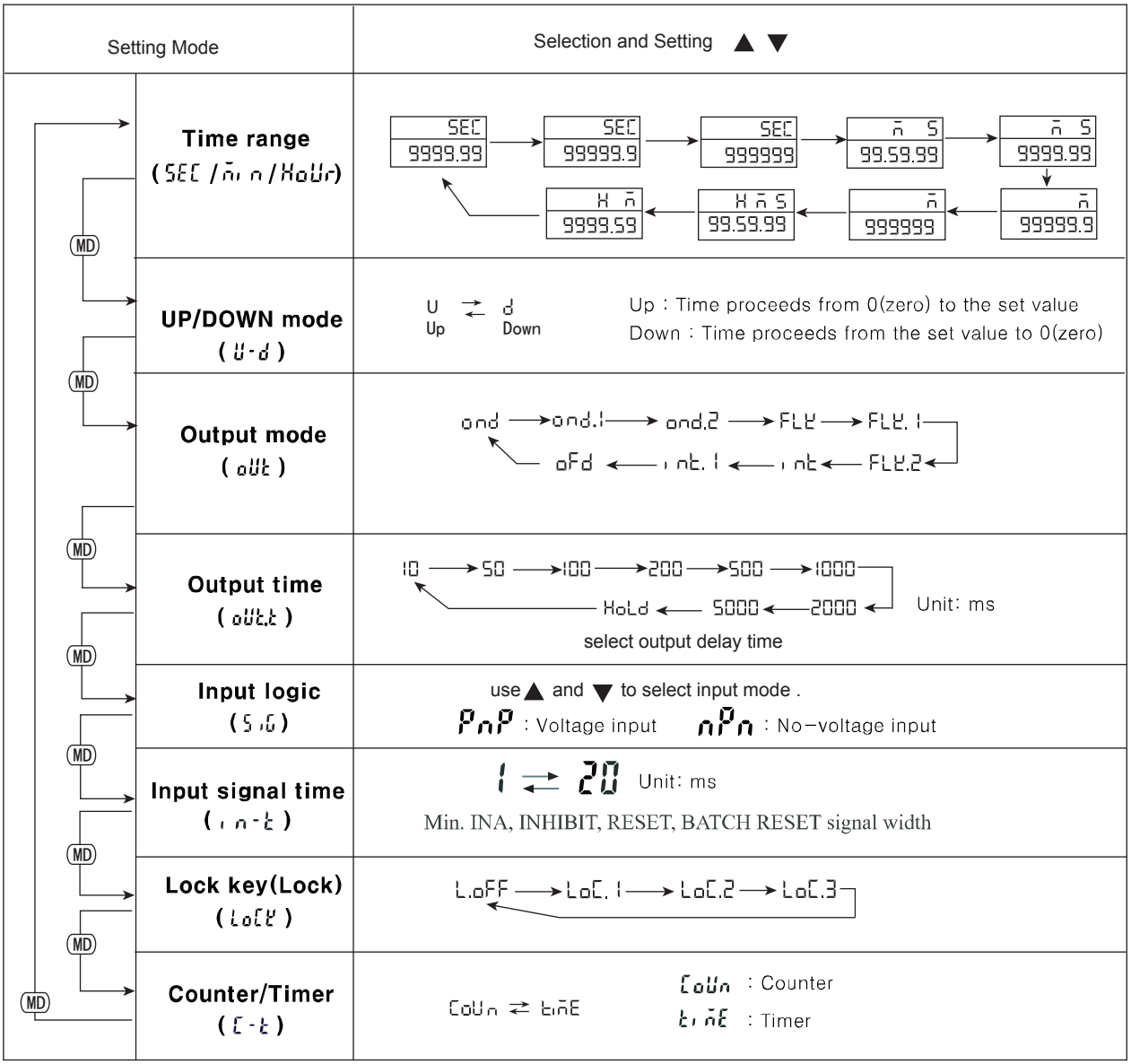
※ If output is S,T, D mode , input mode can only choose Ud-A,B, C mode .If input mode choose Up/Down mode , output mode can select any mode except S , T , D

※ When select D output mode , if counting frequecy more than 1Kcps , as there is a responding time of the relay , it may cause the output action abnormal , so please choose SSR output .

※ When max. counting speed is 5kcps or 10kcps , if change the output mode to “D” mode , counting speed turn to 1k cps automatically .

※ In function setting mode , external input signal still can be recognized , when exit the function setting mode , display value and output will reset automatically .

8 .Timing function mode setting



※When it is in the function setting mode, input signal and output are still going on, but they will be reset when the counter exits the setting mode.

※In case of output mode is FLK, INT, INT1, OFD, there is no output time setting in the function setting mode.

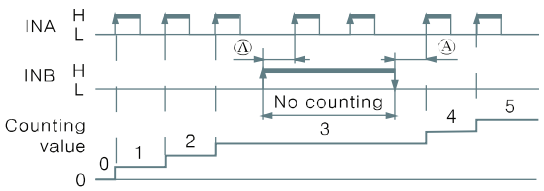
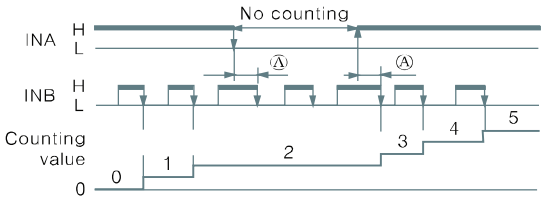
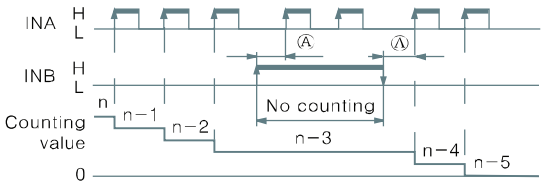
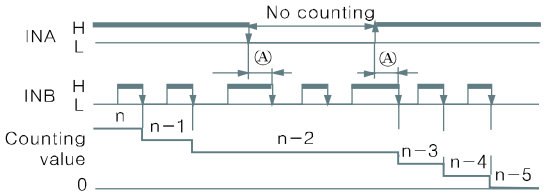
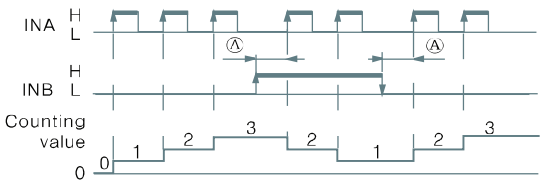
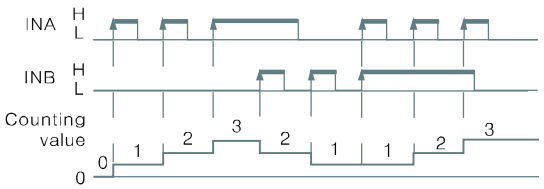
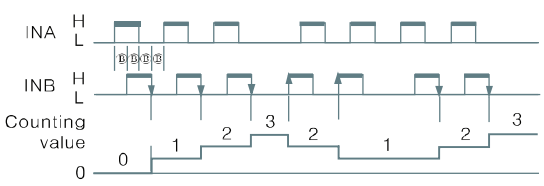
※When in the function setting mode, if no key is touched for 60 sec., the timer will return to RUN mode.

9. Timing Range

Time range	Function setting mode	
	Timing display	Preset display
0.01s to 9999.99s	SEC	9999.99
0.1s to 99999.9s	SEC	99999.9
1s to 999999s	SEC	999999
0.01s to 99m 59.99s	m S	99.59.99
0.1s to 999m 59.9s	m S	999.59.9
0.1m to 99999.9m	m	99999.9
1m to 999999m	m	999999
1s to 99h 59m 59s	H m S	99.59.59
1m to 9999h 59m	H m	9999.59

10. Input operation mode for counter

※Ⓐ : Over Min. signal width, Ⓑ : Over 1/2 of Min. signal width.

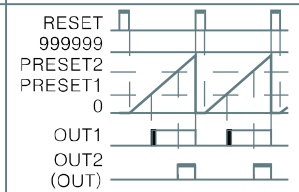
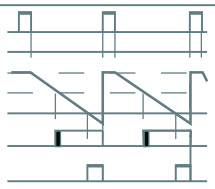
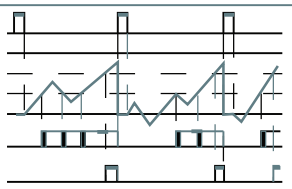
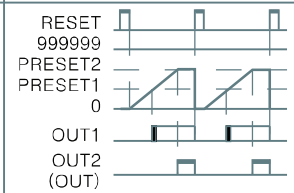
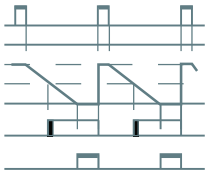
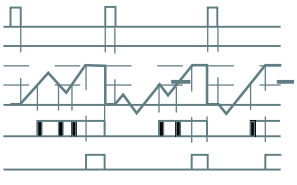
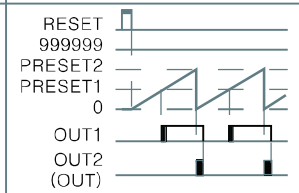
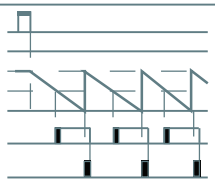
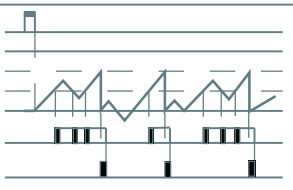
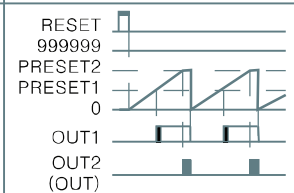
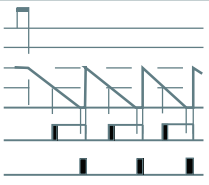
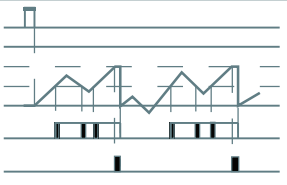
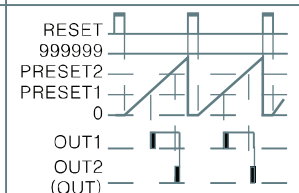
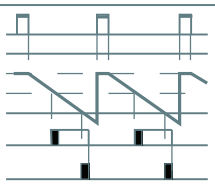
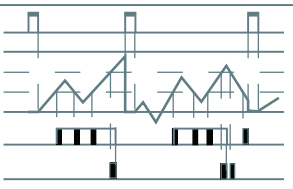
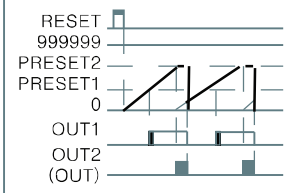
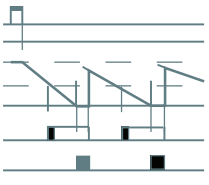
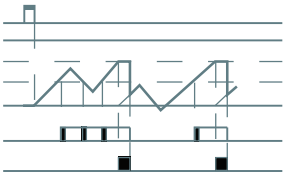
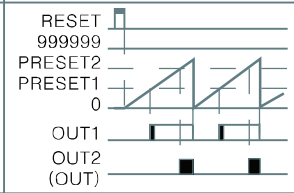
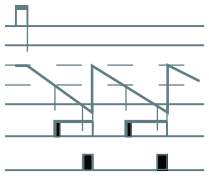
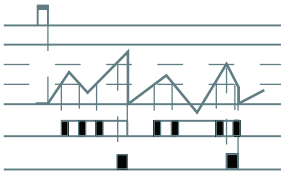
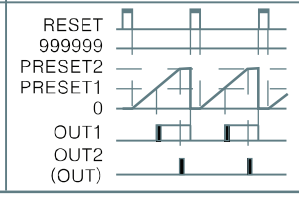
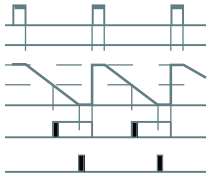
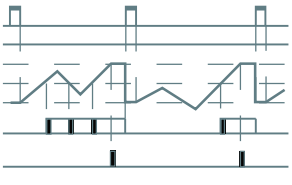
Input mode	Counting chart	Notice
U (UP)		INA: Count input INB: Control input INB=L, INA input pulse count up INB=H , INA forbit counting.
		INA: Control input INB: Count input INA=H, INB input pulse count up INA=L, INB forbit counting
d (DOWN)		INA: Count input INB: Control input INB=L , INA input pulse count down INB=H, INA forbit counting
		※INB : Counting value input ※INA : Inhibit input (Limit counting input of INB) ※n=Preset value ※When INA changes H to L, down count signals on INB will not be accepted.
Ud-A (Up/Down−A) Command input		※INA : Counting input ※INB : Command input for Up/Down counting ※When INB is L, count increases. When INB is H, count decreases.
Ud-b (Up/Down−B) Individual input		※INA : Up count input ※INB : Down count input ※When INA and INB are applied L to H at same time, the count remains unchanged.
Ud-C (Up/Down−C) Phase difference input		※When using A, B phase of encoder and connecting to INA, INB, Please set counter input mode(cn) as phase difference input(Ud-E).

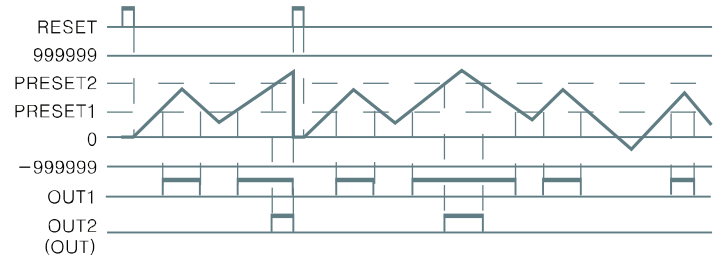
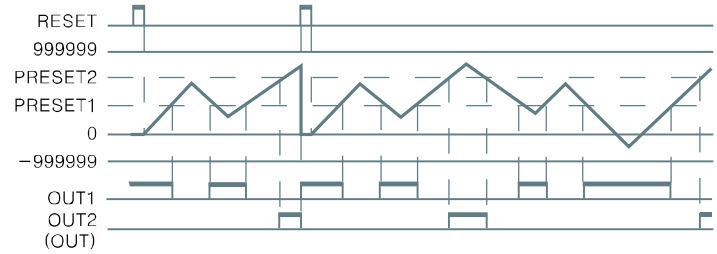
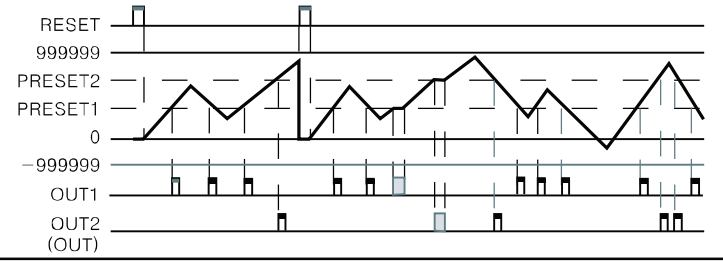
When you use an encoder and connect its phase A and Phase B output to the INA and INB input of the counter, please set the mode of the counter as Ud-C.

Input type / Code	Voltage input (PNP)	Contact input (NPN)
H	5-30VDC	Short circuit
L	0-2VDC	Open

11.Output operation mode(Counter)

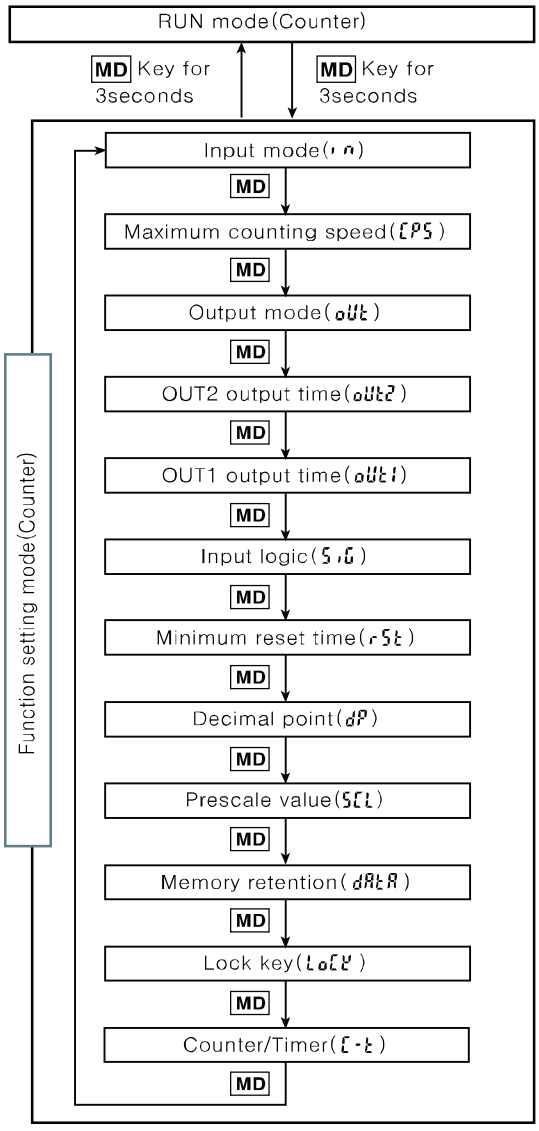
One-shot output (OUT1 output) Self holding output | One-shot output (OUT2 output) | Self holding output | Coincidence output

Output mode	Input mode			Operation
	Up	Down	Up/Down A, B, C	
F (F)				※After Counting up, the display value increases or decreases until the reset signal is applied, and hold outputs will be held.
n (N)				※After counting up, display value and hold output will be held until reset signal is applied.
C (C)				※The display value will be Reset Start at the same time counting up. ※The hold output of OUT1 turns off after one-shot time of OUT2. ※The one-shot output of OUT1 operates regardless to OUT2.
r (R)				※After one shot Time of OUT2, display value will be Reset start counting operation starts again. ※The hold output of OUT1 turns off after one-shot time of OUT2. ※The one-shot output of OUT1 operates regardless to OUT2.
K (K)				※After counting up, the display value increases or decreases until the reset signal is applied. ※The hold output of OUT1 turns off after one-shot time of OUT2. ※The one-shot output of OUT1 operates regardless to OUT2.
P (P)				※After counting up, display value is held for the one-shot time of OUT2, Counter operation starts again at the same time of OUT2 output is ON and count value will be Reset start. ※The hold output of OUT1 turns off after one-shot time of OUT2. ※The one-shot output of OUT1 operates regardless to OUT2.
Q (Q)				※After counting up, display value increases or decreases for the one-shot time of OUT2. ※The hold output of OUT1 turns off after one-shot time of OUT2. ※The one-shot output of OUT1 operates regardless to OUT2.
A (A)				※After counting up, display value and the hold output of OUT1 is held until applying the reset signal. ※The one-shot output of OUT1 operates regardless to OUT2. ※OUT2 returns automatically after one shot time.

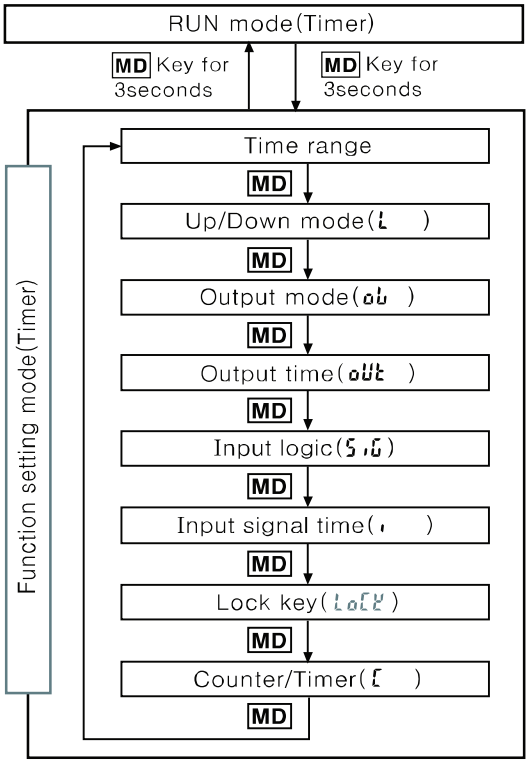
Output mode	Up/Down – A, B, C	Operation
S (S)		※OUT1 and OUT2 keeps ON status in following condition ; Display value ≧ Preset 1 Display value ≧ Preset 2
t (T)		※OUT1 keeps ON status when display value is smaller than Preset 1 value, but if Preset 2 is "0", OUT1 keeps ON status ※OUT2 keeps ON status when display value is equal or larger than Preset 2.
d (D)		※When display value is equal to set value(Preset 1, Preset 2) only, OUT1 or OUT2 output keeps ON status ※When set 1kcps for counting speed, solid state contact output should be used.

12. Operation Mode Changing

◎ Operation mode in Counter



◎ Operation mode in Timer

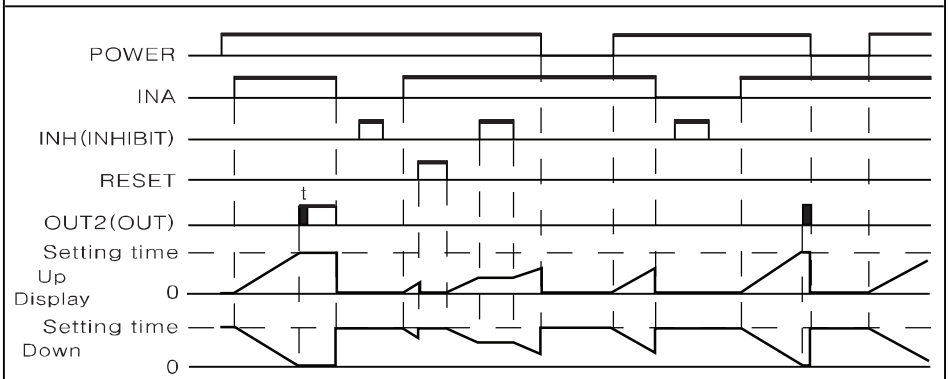
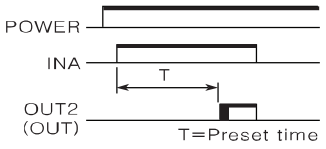
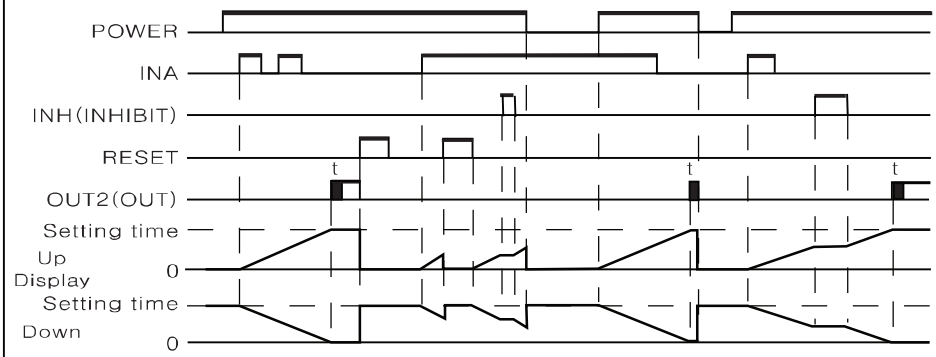
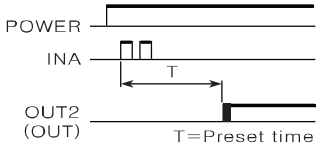
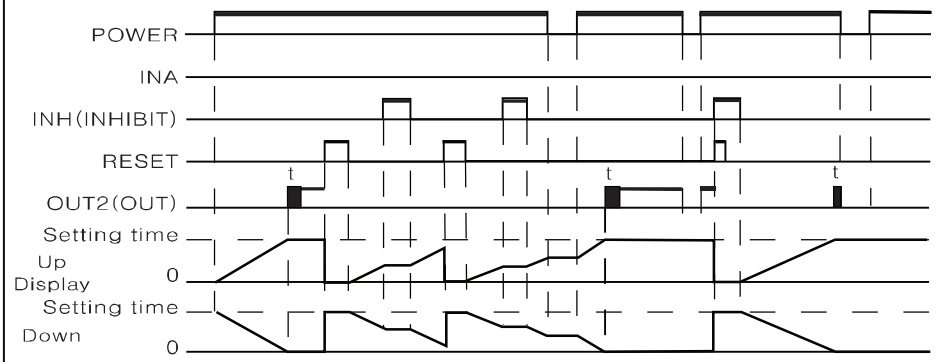
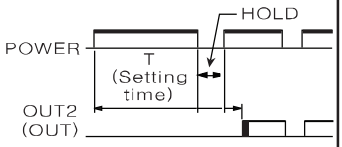
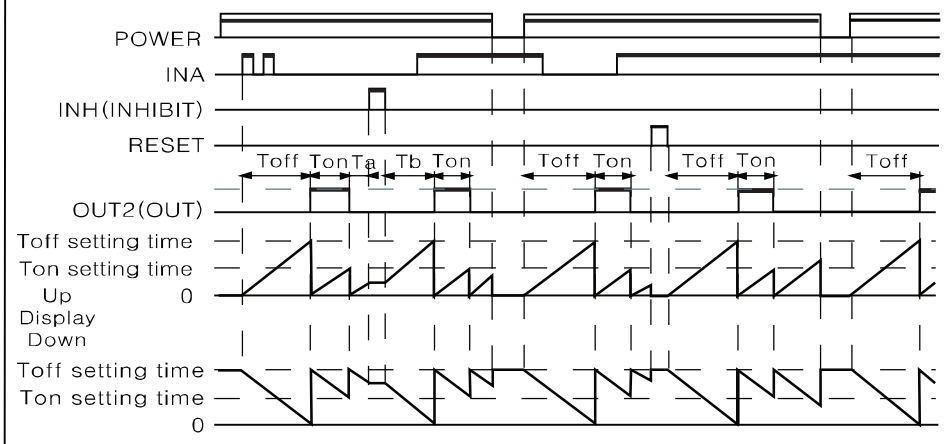
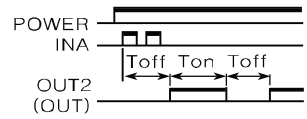


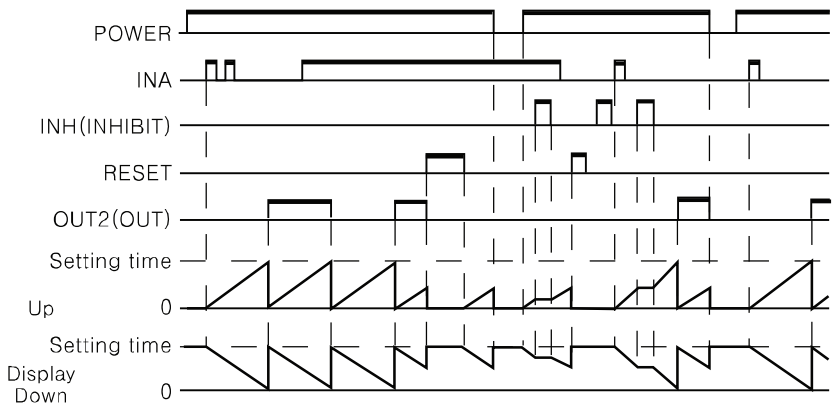
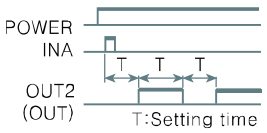
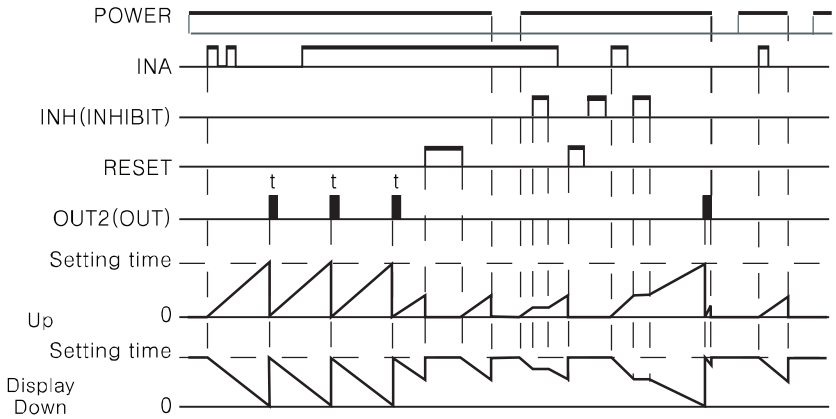
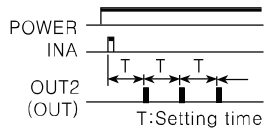
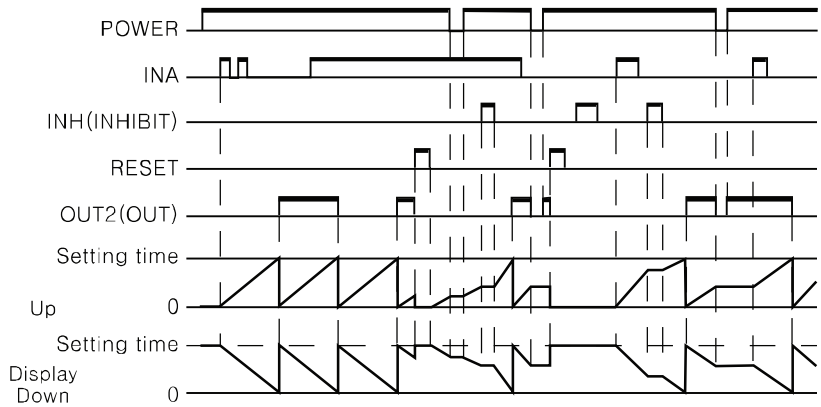
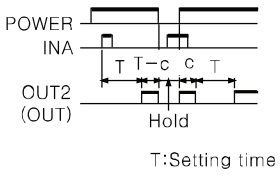
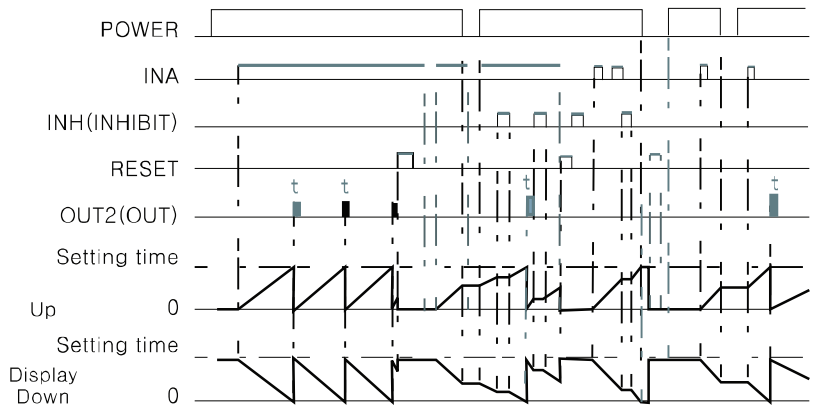
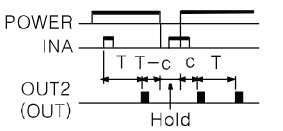
- Pressing MD for over 3sec., it will enter into Timer or Counter function setting mode
- Pressing MD for over 3sec.,it will return to Timer RUN or Counter RUN mode.
- When using this unit as a counter, you can change its mode to Timer(t) in Counter/Timer setting.
- If no keys are touched for over 60sec.,it will return to Timer RUN mode or Counter RUN mode.

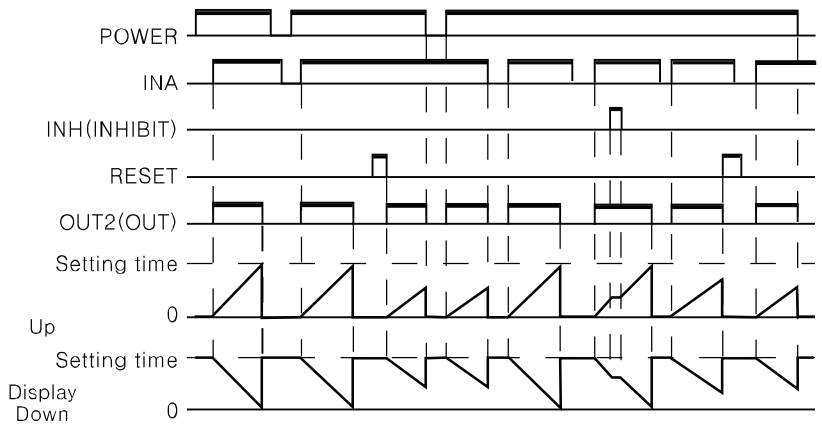
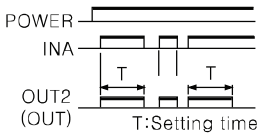
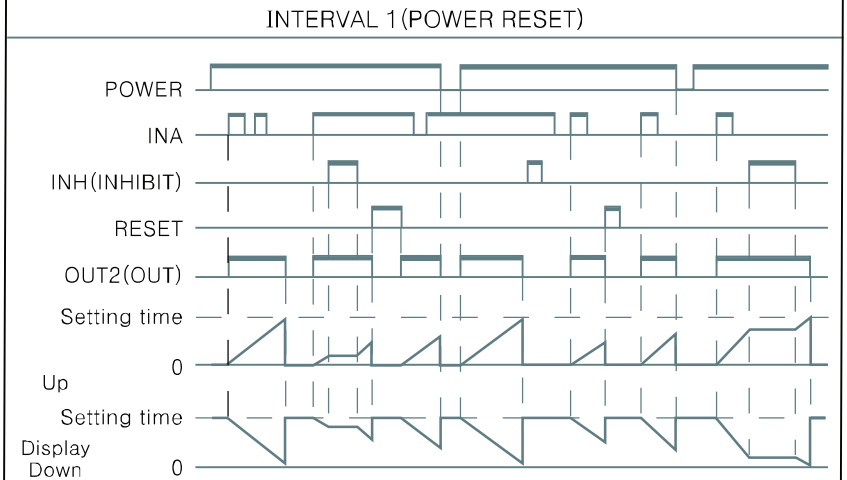
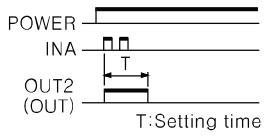
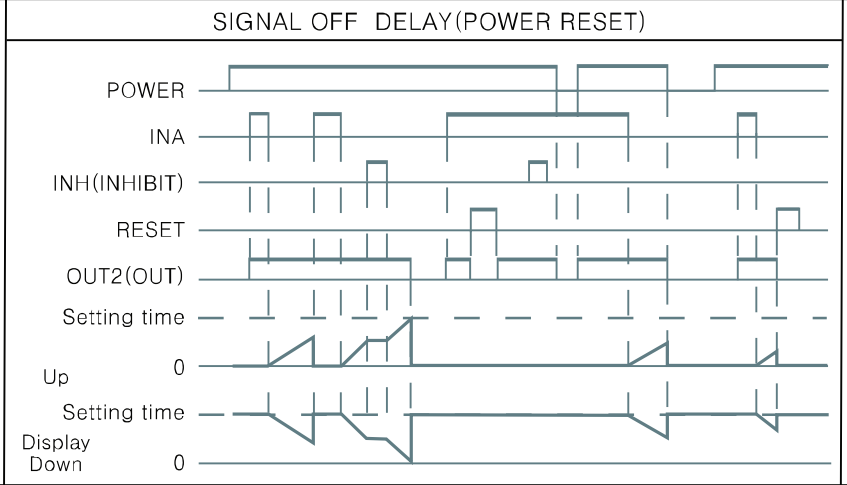
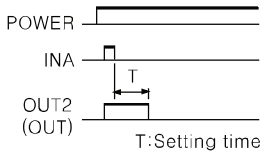
▣ Output operation mode(Timer)

One-shot output (t=One-shot output time) — Self-holding output

Hold output

Output mode	Time chart	Operation
ond (OND)	SIGNAL ON DELAY(POWER RESET) 	1)Time starts when INA signal turns on. When INA signal turns off, time resets. 2)Time starts when power turns on and when reset turns off during INA signal on. 3)Control output operates as hold or one-shot time. 
ond.1 (OND.1)	SIGNAL ON DELAY 1(POWER RESET) 	1)Time starts when INA signal turns on, if INA signal is applied repeatedly, only initial signal is recognized. 2)Time starts when power turns on and when reset turns off during INA signal on. 3)Control output operates as hold or one-shot time. 
ond.2 (OND.2)	POWER ON DELAY(POWER HOLD) 	1)Time starts when power turns on. (There is no INA function) 2)Time resets when reset turns on. Time starts when reset turns off. 3)Control output operates as hold output or one-shot output. 
FLY (FLK)	FLICKER(POWER RESET) 	1)Time starts when INA signal turns on. If INA signal is applied repeatedly, only initial signal is recognized. 2)Time starts when power turns on and when reset turns off during INA signal on. 3)Control output operates as hold output, output turns off for the Toff time and turns on for the Ton time repeatedly. 4)The Ton time and the Toff time must be set individually. 5)In case of using the contact output, min. setting time must be set over 100ms. 

Output mode	Time chart	Operation
FLK.1 (FLK.1)	FLICKER 1(POWER RESET) **Hold output** 	1)Time starts when INA signal turns on. If INA signal is applied repeatedly, only initial signal is recognized. 2)Time starts when power turns on and when reset turns off during INA signal on. 3)Control output operates as hold output. In case of using the contact output, min. setting time must be set over 100ms. 
	One-shot output 	1)Time starts when INA signal turns on, if INA signal is applied repeatedly, only initial signal is applied. 2)Time starts when power turns on and when reset turns off during INA signal on. 3)Control output operates as one-shot. In case of using the contact output, min. setting time must be set over 100ms. 
FLK.2 (FLK.2)	FLICKER 2(POWER HOLD) **Hold output**  ※EEPROM:10 years	1)Time starts when INA signal turns ON. If INA signal is applied repeatedly, only initial signal is recognized. 2)Control output operates as hold output when reaches to the set time. 3)Time starts when power turns ON and when reset turns OFF during INA signal on. 4) In case of using the contact output, min. setting time must be set over 100ms. 
	One-shot output  ※EEPROM:10 years	1)Time starts when INA signal turns ON. If INA signal is applied repeatedly, only initial signal is recognized. 2)Control output operates as one-shot output when reaches to the set time. 3)Time starts when power turns ON and when reset turns OFF during INA signal on. 4)In case of using the contact output, min. setting time must be set over 100ms. 

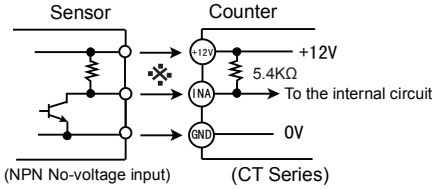
Output mode	Time chart	Operation
int (INT)		1)During INA is ON, time starts and control output turns on. When time reaches to set value, display value and control output will be reset automatically. 2)When INA is OFF, time resets. 3)During INA signal on Power OFF:Processing time and control output Reset Power ON:Time Reset Reset ON:Processing time and control output Reset Rset OFF:Time Reset 
int.1 (INT.1)		1)Control output turns ON and time starts when INA signal turns ON. 2)If INA signal is applied repeatedly, only initial signal is recognized. 3)When reaches to set value, display value and control output are reset automatically. 4)Time starts when power turns ON and when reset turns OFF during INA signal on. 5)Time processes normally while INA signal keeps ON status. 
ofd (OFD)		1)If INA is ON, control output remains ON. 2)When INA signal is OFF, time processes. 3)When time reaches to set value, display value and control output will be reset automatically. 

13.Input connections

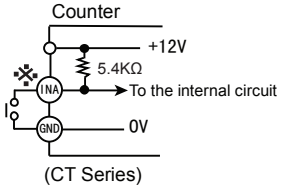
1: Input logic:No-voltage input(NPN)

Solid state relay input

● Standard sensor: NPN output sensor



Contacts connecting input

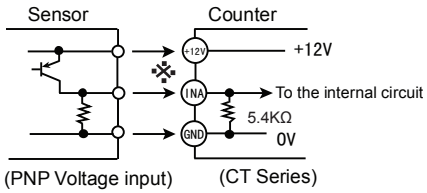


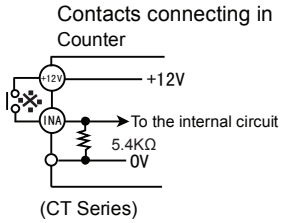
count speed set to 1 or 30cps (counter)

2: Input logic:voltage input(PNP)

(Solid state relay input)

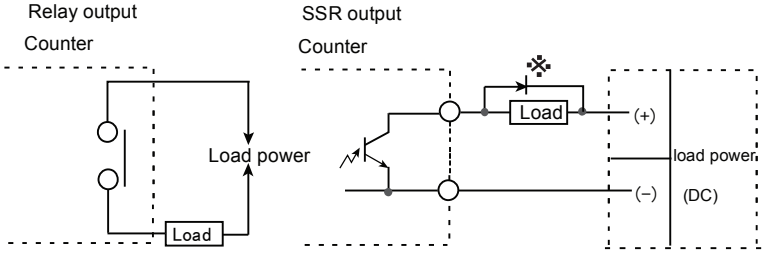
● Standard sensor: PNP output sensor





Counting speed set to 1 or 30cps (counter)

14.Output Connecting



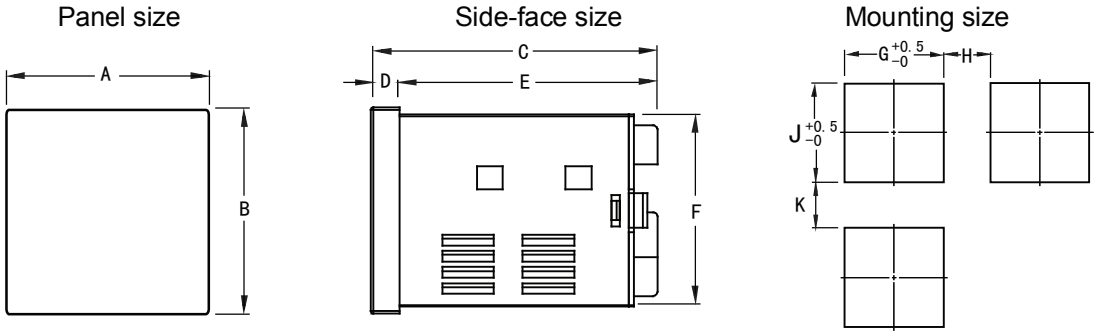
SSR output

1.Adopt proper load and power,output of the SSR can't be too large ,capacity (30VDC.100mA)

2.Make sure the power supply not connected inversally

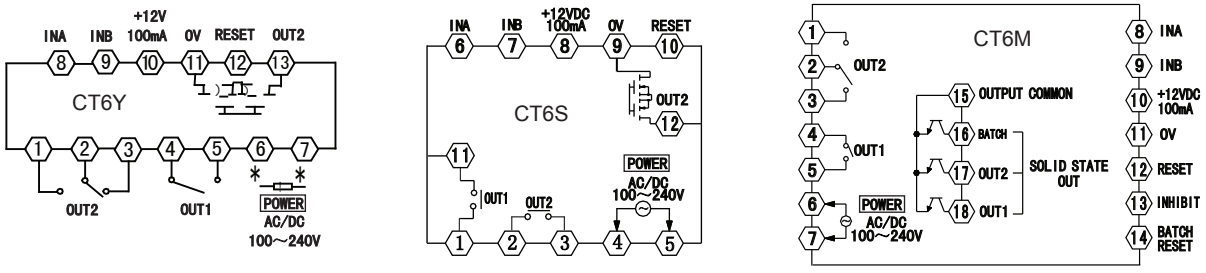
3.When adopt inductive load (such as relay),
Filter circuit (such as diode,rheostat)should be connected between the two ends of the load .

15. Dimension & Mounting size(mm)



Model	A	B	C	D	E	F	G	H(Min)	J	K(Min)
CT6Y:(36*72)	72	36	85.5	6	79.5	30.5	67	25	31	25
CT6S:(48*48)	48	48	101	10	91	45	45.5	25	45.5	25
CT6M:(72*72)	72	72	100	10	90	67.5	68	25	68	25
Remark	Unit (mm) Tolerance+0.5%(Special indicated model is not included)									

16. Connecting Drawing



Please refer to the connection drawing on the meter if have any changes.