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Autonics sensors & controllers

Autonics
Sensors & Controllers

Programmable Counter/Timer

CT Series

User Manual

CT Series

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Preface

Thank you for purchasing Autonics product.

Please familiarize yourself with the information contained in the Safety Precautions section before using this product.

This user manual contains information about the product and its proper use, and should be kept in a place where it will be easy to access.

User Manual Guide

Please familiarize yourself with the information in this manual before using the product.

- This manual provides detailed information on the product's features. It does not offer any guarantee concerning matters beyond the scope of this manual.
- This manual may not be edited or reproduced in either part or whole without permission.
- A user manual is not provided as part of the product package. Visit our web site (www.autonics.com) to download a copy.
- The manual's content may vary depending on changes to the product's software and other unforeseen developments within Autonics, and is subject to change without prior notice. Upgrade notice is provided through out homepage.
- We contrived to describe this manual more easily and correctly. However, if there are any corrections or questions, please notify us these on our homepage.

User Manual Symbols

Symbol	Description
 **Note**	Supplementary information for a particular feature.
 **Warning**	Failure to follow instructions can result in serious injury or death.
 **Caution**	Failure to follow instructions can lead to a minor injury or product damage.
 **Ex.**	An example of the concerned feature's use.
※1	Annotation mark.

Safety Precautions

- Following these safety precautions will ensure the safe and proper use of the product and help prevent accidents, as well as minimizing possible hazards.
- Safety precautions are categorized as Warnings and Cautions, as defined below:

Warning	**Warning**	Failure to follow these instructions may result in serious injury or death.
Caution	**Caution**	Failure to follow these instructions may result in personal injury or product damage.

Warning

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

Caution

- Do not use the unit outdoors.
  Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock.
- When connecting the power input and relay output cables, use AWG20 (0.50mm^2) cables and make sure to tighten the terminal screw bolt above 0.74N·m to 0.90N·m.
  Failure to follow this instruction may result in fire due to contact failure.
- Use the unit within the rated specifications.
  Failure to follow this instruction may result in shortening the life cycle of the unit, or fire.
- Do not use loads beyond the rated switching capacity of the relay contact.
  Failure to follow this instruction may result in insulation failure, contact melt, contact failure, relay broken, or fire.
- Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.
  Failure to follow this instruction may result in electric shock or fire.
- Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.
  Failure to follow this instruction may result in fire or explosion.
- Keep dust and wire residue from flowing into the unit.
  Failure to follow this instruction may result in fire or product damage.

The specifications and dimensions of user manual are subject to change and some models may be discontinued without notice.

Cautions During Use

- **Power ON/OFF**
  The inner circuit voltage rises within 100ms after supplying the power to the unit.
  The input is unavailable at this period. Be sure that the inner circuit voltage drops within 500ms after turning OFF the power.
- **In case of 24VAC / 24-48VDC model, power supply should be insulated and limited voltage/current or Class 2 power supply device.**
- **Input signal line**
  ① Shorten the cable from the sensor to the unit.
  ② Use shield cable when input cable is longer.
  ③ Wire the input signal line separately from power line.
- **Input logic selection**
  Before selecting input logic, must cut off the power to counter/timer. Select the input logic following the instruction.
- **Contact counting input (counter operation)**
  If counting speed for counter is high speed mode (1k, 5k, 10kcps) and counting input is contact, it may cause input signal error by chattering of contact switching.
  Set counting speed as low speed mode (1cps or 30cps) for contact counting input.
- **Testing dielectric voltage or insulation resistance when the unit is installed at control panel**
  ① Isolate the unit from the circuit of control panel.
  ② Short all terminals of the unit.
- **Do not use the unit in the following environments.**
  ① Environments with high vibration or shock.
  ② Environments with strong alkali or strong acid materials
  ③ Environments with exposure to direct sunlight
  ④ Near machinery which produce strong magnetic force or electric noise
- **This product may be used in the following environments.**
  ① Indoors
  ② Max. altitude: 2,000m
  ③ Pollution degree 2
  ④ Installation category II

Note

Failure to follow these instructions may result in product damage.

Table of Contents

1 Product Overview

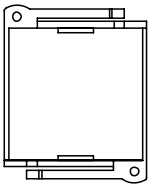
1.1 Features

- Prescale value setting range
  - 6-digit model: 0.00001 to 99999.9/ 4-digit model: 0.001 to 999.9
- Communication function supported (communication model): RS485 (Modbus RTU)
- One-shot output time setting range: 0.01 sec to 99.99 sec by setting per 10ms
- [Counter]
  9 input modes/ 11 output modes
  BATCH counter, Count start point (counting initial value) setting function
- [Timer]
  13 output modes
  Various time setting range
  - 6-digit model: 0.001 sec to 99999.9 hour/ 4-digit model: 0.001 sec to 9999 hour
  '0' time setting function
  Selectable timer memory retention function for indicator model

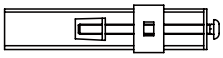
1.2 Components and Accessories

1.2.1 Components

CT Series

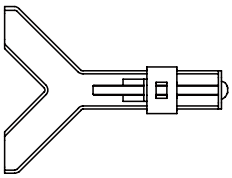


For CTY

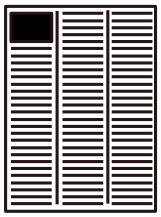


For CTM

Sold separately (bracket)



For CTM



Instruction manual

Note

Make sure all of the above components are included with your product package before use.

If a component is missing or damaged, please contact Autonics or your distributor.

1.2.2 Sold separately

(1) Communication converter

SCM-38I (RS232C to RS485 converter)	SCM-US48I (USB to RS485 converter)
	

(2) Display unit (DS/DA-T Series)
(RS485 communication input type display unit)

- **DS16-□T**

- **DS22/DA22-□T**

- **DS40/DA40-□T**

- **DS60/DA60-□T**

Note

Connect RS485 communication input type display unit (DS/DA-T Series) and RS485 communication output model of CT Series, the display unit displays present value of the device without PC/PLC.

1.3 Ordering information

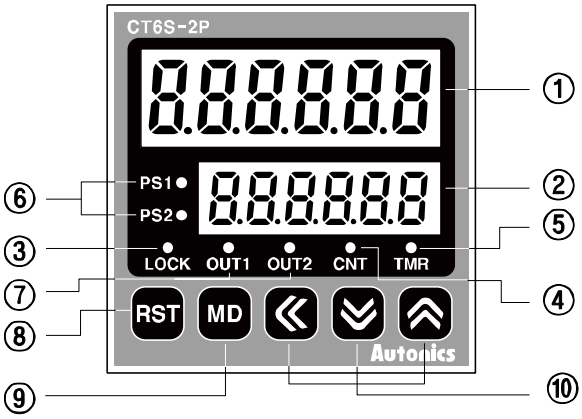
CT	6	M	-	2P	4	T
①	②	③		④	⑤	⑥

Item		Description
① Item	CT	Counter/Timer
② Display digit	4	9999 (4-digit)
	6	999999 (6-digit)
③ Size	S	DIN W48 × H48mm
	Y	DIN W72 × H36mm
	M	DIN W72 × H72mm
④ Output	1P	1-stage preset
	2P	2-stage preset
	I※1	Indicator
⑤ Power supply	2	24VAC 50/60Hz, 24-48VDC
	4	100-240VAC 50/60Hz
⑥ Communication	No-mark	None
	T	RS485 communication output

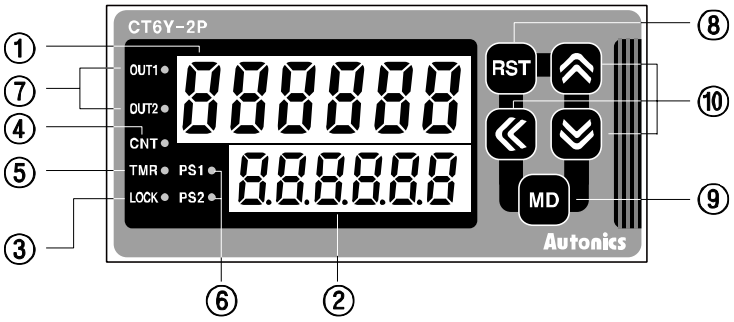
※1: CT4S model does not support indicator type.

1.4 Part description

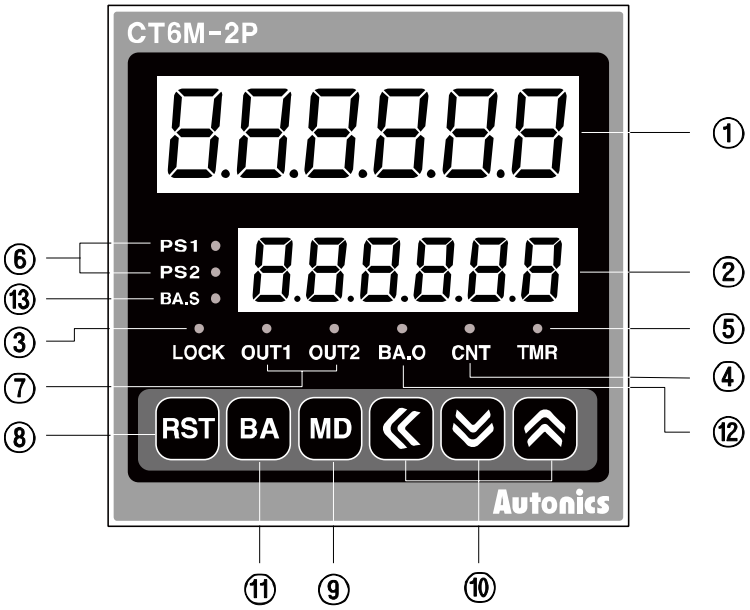
1.4.1 CTS Series



1.4.2 CTY Series



1.4.3 CTM Series



① Counting value display component (red)
RUN mode: Displays counting value for counter operation or time progress value for timer operation.
Setting mode: Displays parameter.

② Setting value display component (green)
RUN mode: Displays setting value.
Setting mode: Displays parameter setting value.

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 Setting value checking and changing indicator (PRESET1, PRESET2)
: Turns ON when checking and changing setting 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 (CTM Series)
: Press the RST key to reset the batch counting value.

⑨ MD key
RUN mode: Enters parameter setting mode or communication setting mode.
Setting mode: Saves setting value and return to RUN mode.

⑩ ≪, ≫, ∧
- ≪ key
  RUN mode: Enters setting value change mode.
  Setting value change mode: Moves setting value digits.
- ≫ key
  Setting value change mode, Setting mode: Changes setting value.
  Setting value check mode: Checks setting value of the previous parameter.
- ∧ key
  RUN mode: Enters setting value check mode.
  Setting value change mode, Setting mode: Changes setting value.
  Setting value check mode: Check setting value of the next parameter.

⑪ BA key
RUN mode: Enters BATCH counter indication mode.

⑫ BATCH output indicator (BA.O) (red)
: Turns ON when BATCH output is ON.

⑬ BATCH setting value checking and changing indicator (BA.S) (green)
: Turns ON when checking or changing BATCH setting value.

Note

Model	Changed	Note
CT4S-1P	PRESET2 → PRESET OUT2 → OUT	No PRESET1, OUT1 LEDs
CT6S-1P		
CT6Y-1P		
CT6M-1P		
CT6S-I	PRESET2 → PRESET	No PRESET1, OUT1, OUT2 LEDs
CT6Y-I		No PRESET1, OUT1, OUT2, BA.S, BA.O LEDs. No BA key.
CT6M-I		

※ CT4S model does not support indicator type.

2 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 digit			4-digit	6-digit	6-digit	6-digit
Display method			7-segment (counting value: red, setting value: 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			
		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, INHIBIT, RESET, BATCH RESET signal: Selectable 1ms / 20ms
	Repeat error		In case of power ON start: Max. ±0.01% ±0.05s In case of signal ON start: Max. ±0.01% ±0.03s			
	SET error					
	Voltage error					
	Temperature 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			

Series				CTS		CTY		CTM	
Model	1-stage preset			CT4S-1P□□	CT6S-1P□□	CT6Y-1P□□		CT6M-1P□□	
	2-stage presert			CT4S-2P□□	CT6S-2P□□	CT6Y-2P□□		CT6M-2P□□	
	Indicator			–	CT6S-I□□	CT6Y-I□□		CT6M-I□□	
				Standard	Comm.	Standard	Comm.	Standard	Comm.
Control output	Contact (Relay)	Type	1-stage	SPDT(1c): 1		SPDT(1c) : 1		SPDT(1c) : 1	
			2-stage	SPST(1a): 2		SPST (1a): 1, SPDT (1c): 1	SPST (1a): 2	SPST(1a): 1, SPDT(1c): 1	
		Capacity		250VAC 5A resistive load		250VAC 3A resistive load		250VAC 5A resistive load	
	Solid state (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				Front part: IP65 (IEC standards)					
Environ-ment	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 parentheses is for unit only.

※ Environment resistance is rated at no freezing or condensation.

3 Communication Specification

Comm. protocol	Modbus RTU (16bit CRC)
Connection type	RS485
Application standard	Compliance with EIA RS485
Max. connection	31 units (address: 1 to 127)
Synchronous method	Asynchronous
Comm. type	Two-wire half duplex (half duplex)
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: 2bit)

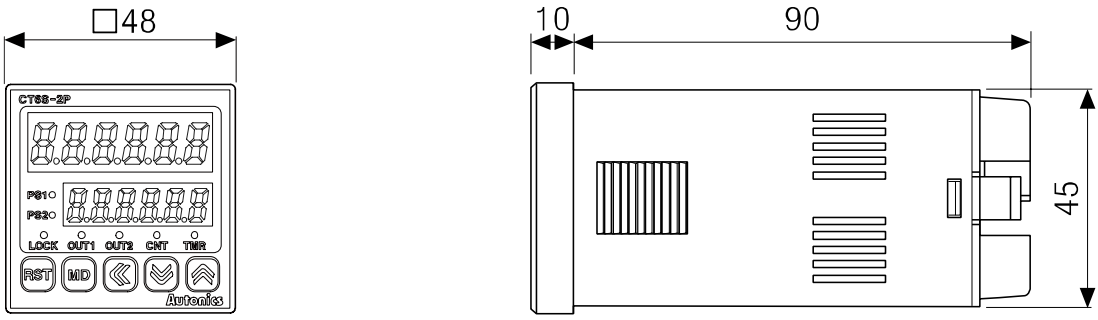
Note

It is recommended to use communication converter RS232C to RS485 (SCM-38I, sold separately), USB to RS485 (SCM-US48I, sold separately). Communication cable should be twisted pair cable for RS485 communication.

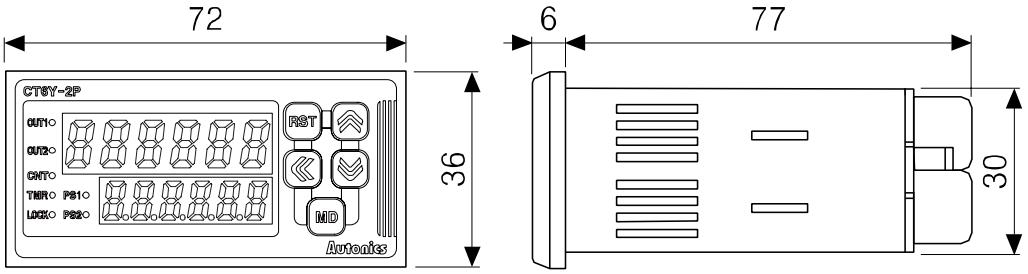
4 Dimensions

(unit: mm)

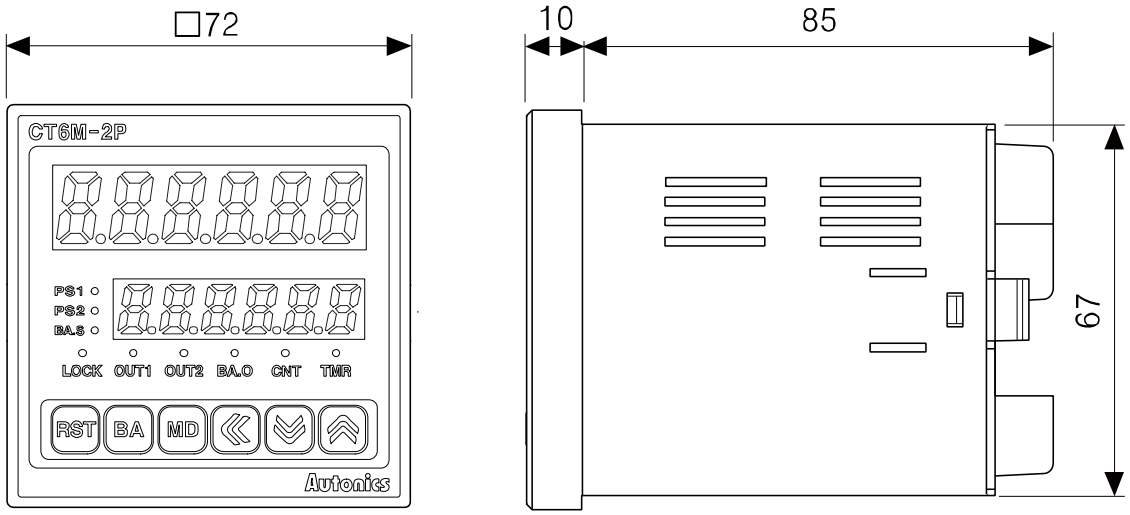
4.1 CTS Series



4.2 CTY Series



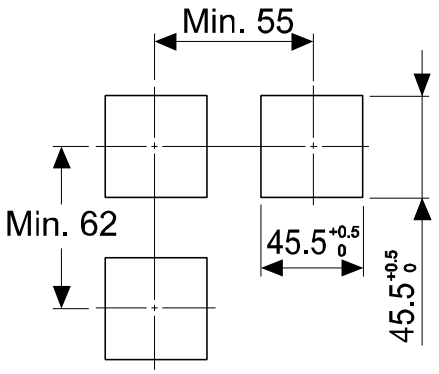
4.3 CTM Series



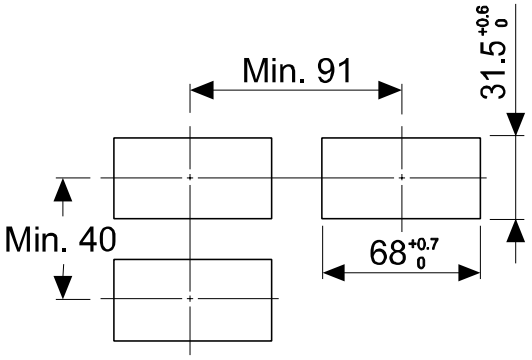
4.4 Panel cut-out dimensions

(unit: mm)

4.4.1 CTS Series



4.4.2 CTY Series



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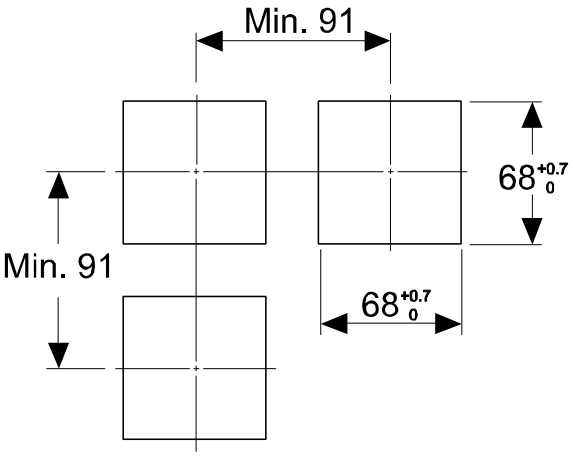
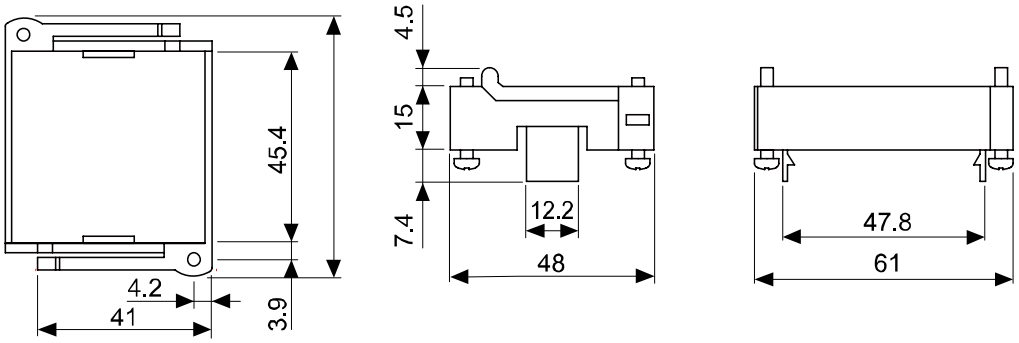


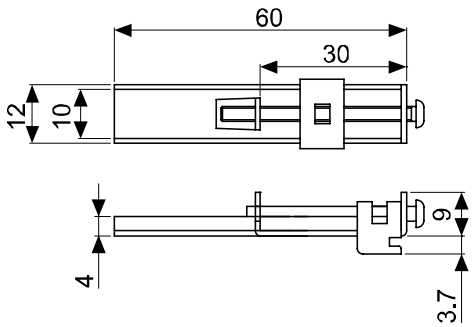
4.5 Bracket

(unit: mm)

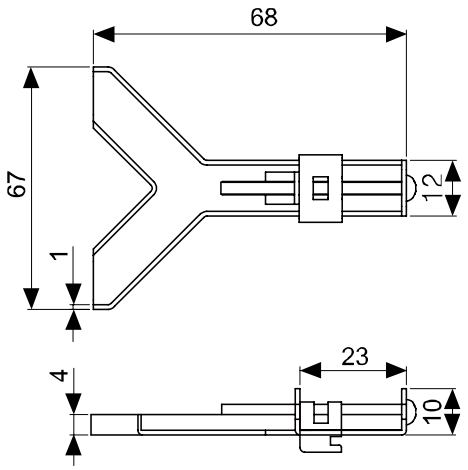
4.5.1 CTS Series



4.5.2 CTY Series



4.5.3 CTM Series

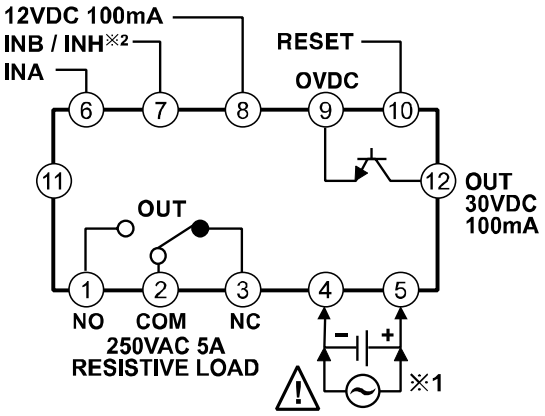


5 Guide For Connection

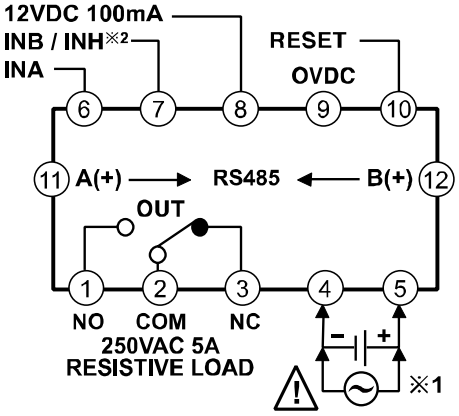
5.1 Connections

5.1.1 CTS Series

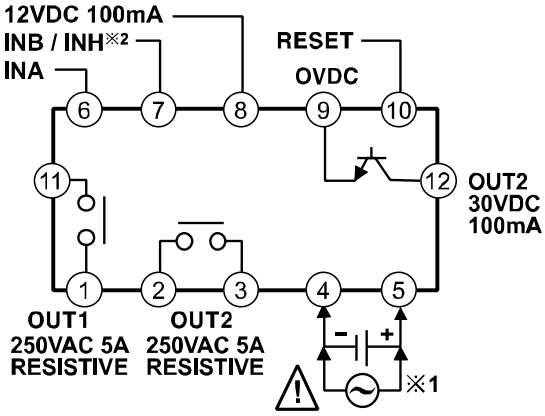
(1) CT□S-1P□



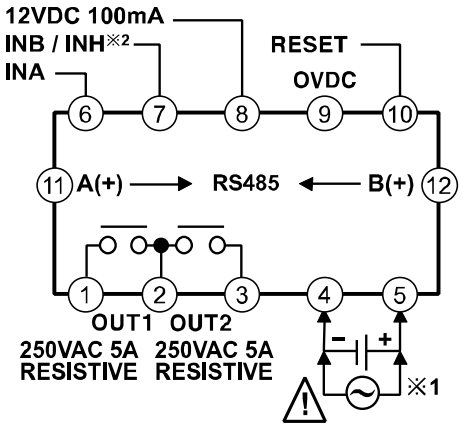
(2) CT□S-1P□T



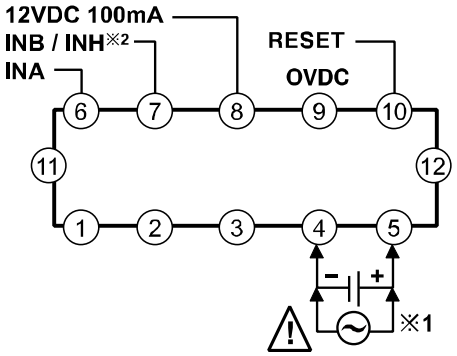
(3) CT□S-2P□



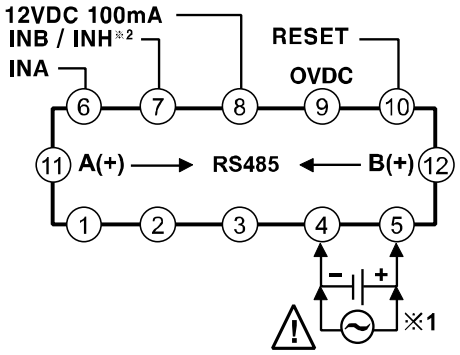
(4) CT□S-2P□T



(5) CT6S-I□



(6) CT6S-I□T



Warning

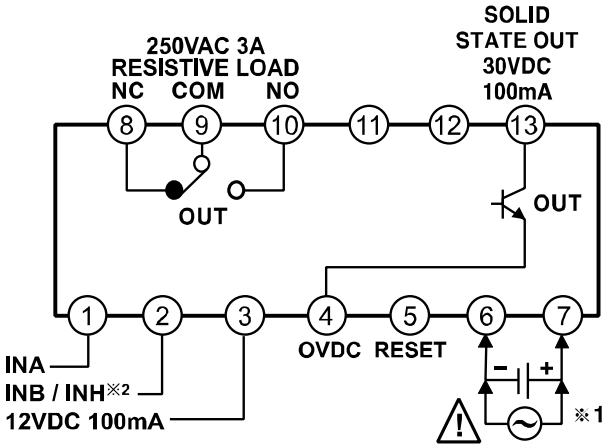
Be sure that connection is varied by supporting RS485 communication.

※1: AC voltage: 100-240VAC 50/60Hz
AC/DC voltage: 24-48VDC, 24VAC 50/60Hz

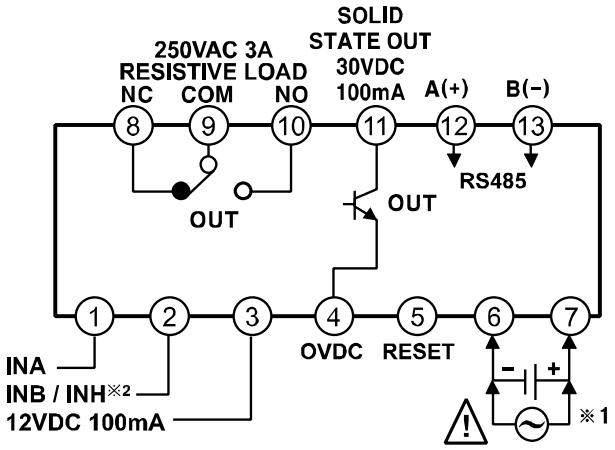
※2: Counter operation: If INHIBIT signal is applied, count input will be prohibited.
Timer operation: If INHIBIT signal is applied, time progressing will stop.(HOLD)

5.1.2 CTY Series

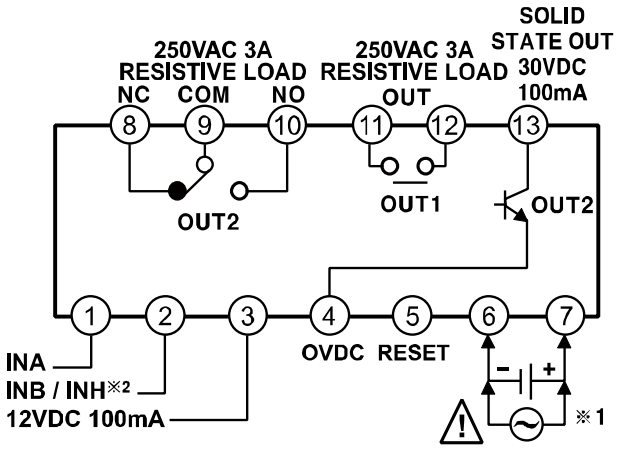
(1) CT6Y-1P□



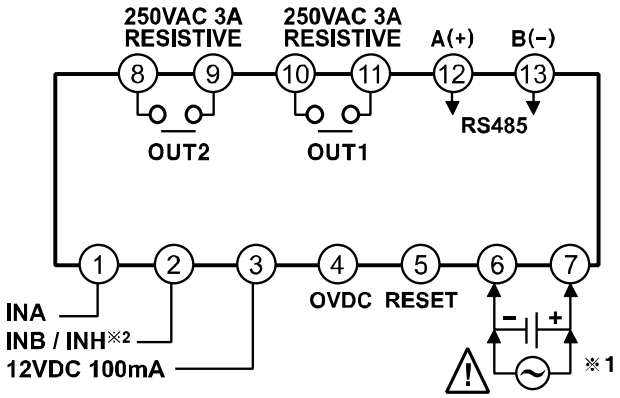
(2) CT6Y-1P□T



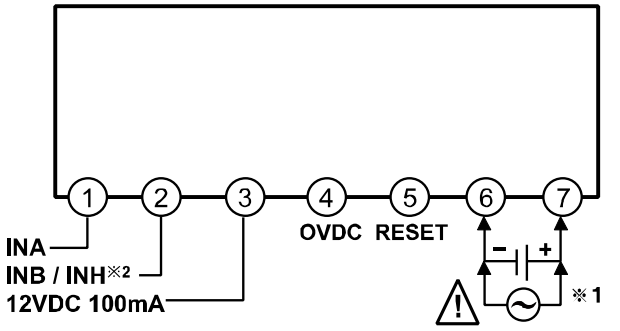
(3) CT6Y-2P□



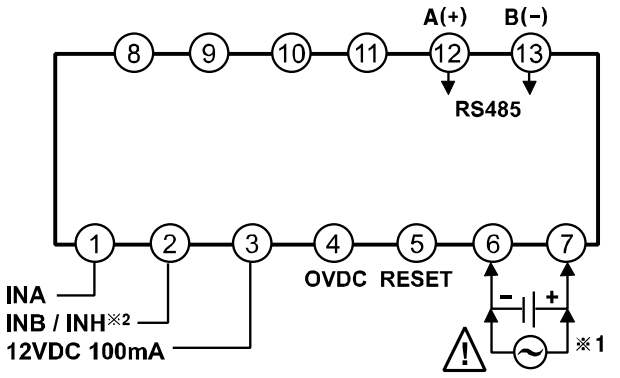
(4) CT6Y-2P□T



(5) CT6Y-I□



(6) CT6Y-I□T



Warning

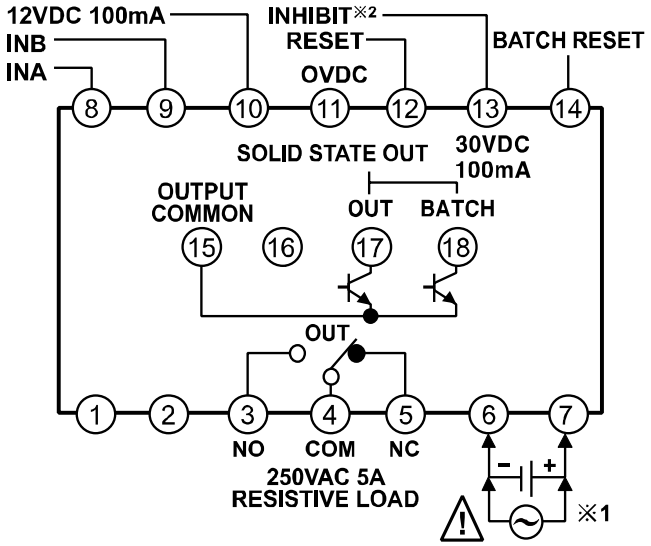
Be sure that connection is varied by supporting RS485 communication.

※1: AC voltage: 100-240VAC 50/60Hz
AC/DC voltage: 24-48VDC, 24VAC 50/60Hz

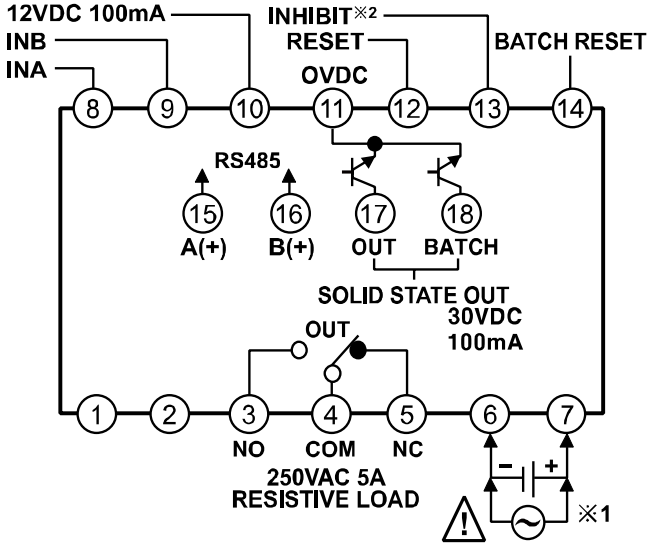
※2: Counter operation: If INHIBIT signal is applied, count input will be prohibited.
Timer operation: If INHIBIT signal is applied, time progressing will stop.(HOLD)

5.1.3 CTM Series

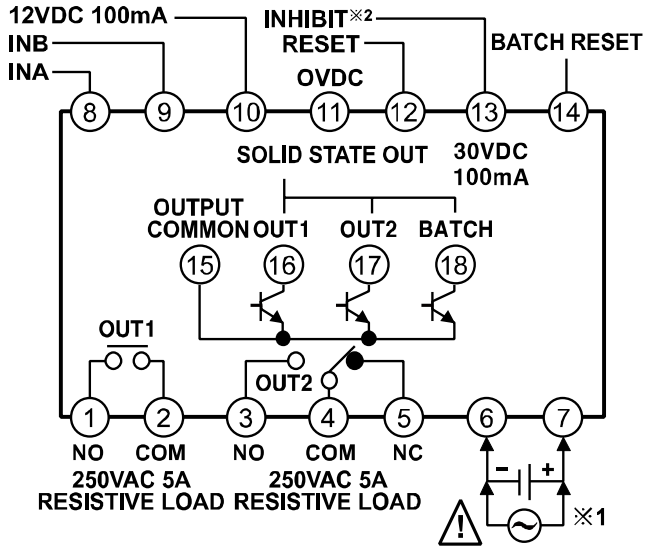
(1) CT6M-1P□



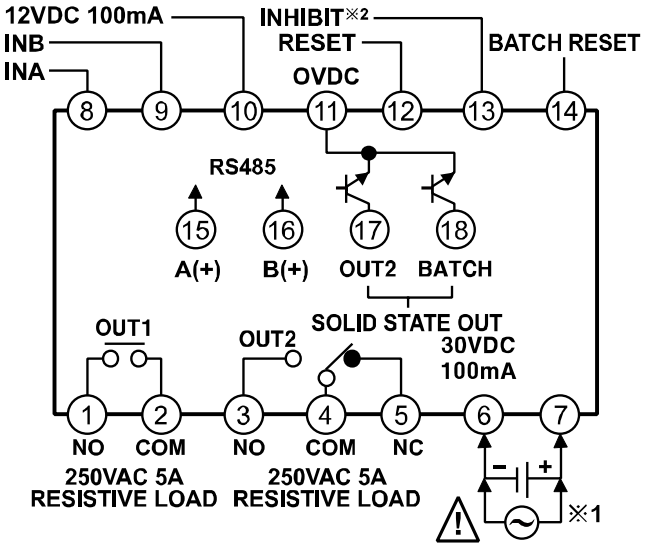
(2) CT6M-1P□T



(3) CT6M-2P□



(4) CT6M-2P□T



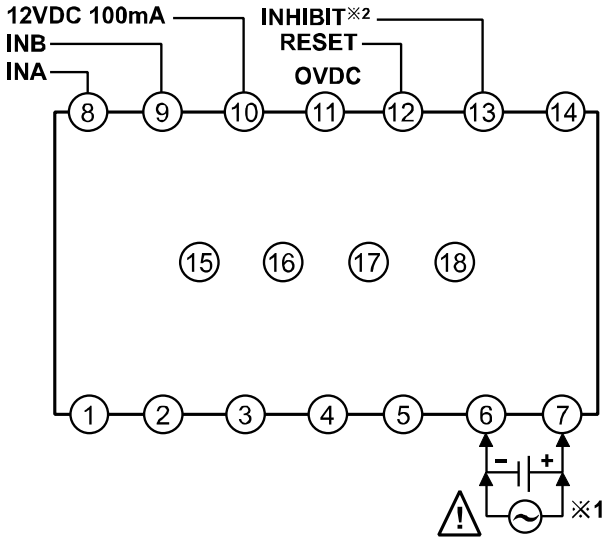
Warning

Be sure that connection is varied by supporting RS485 communication.

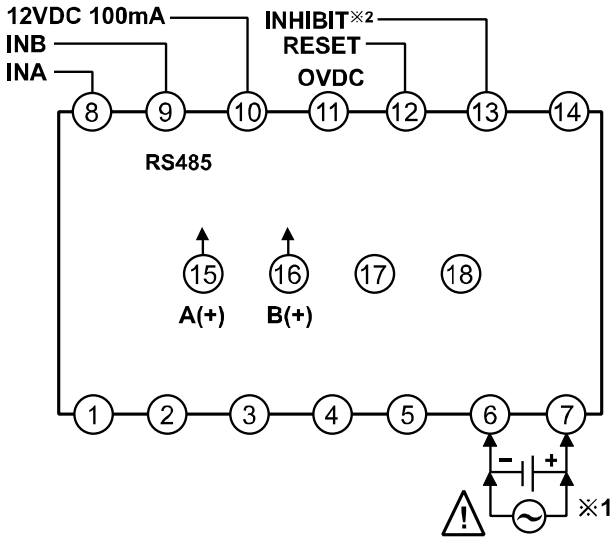
※1: AC voltage: 100-240VAC 50/60Hz
AC/DC voltage: 24-48VDC, 24VAC 50/60Hz

※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)

(5) CT6M-I□



(6) CT6M-I□T



Warning

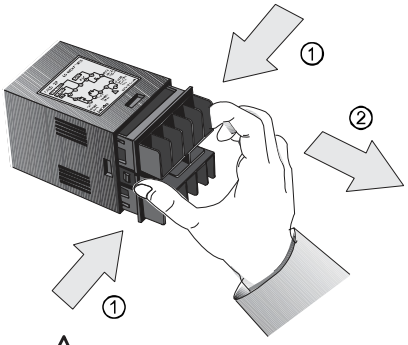
Be sure that connection is varied by supporting RS485 communication.

※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)

5.2 Input and Output connection

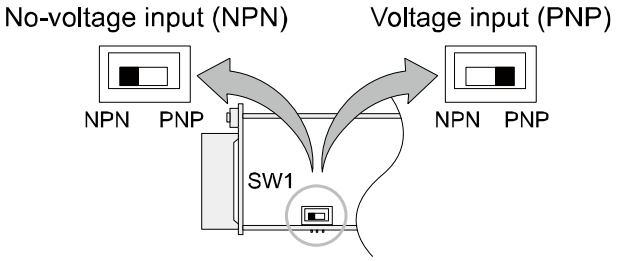
5.2.1 Input logic selection [no-voltage(NPN)/voltage(PNP)]



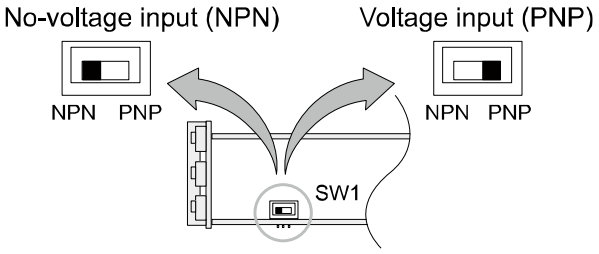
⚠ **Turn OFF the power before changing input logic (PNP/NPN)**

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.

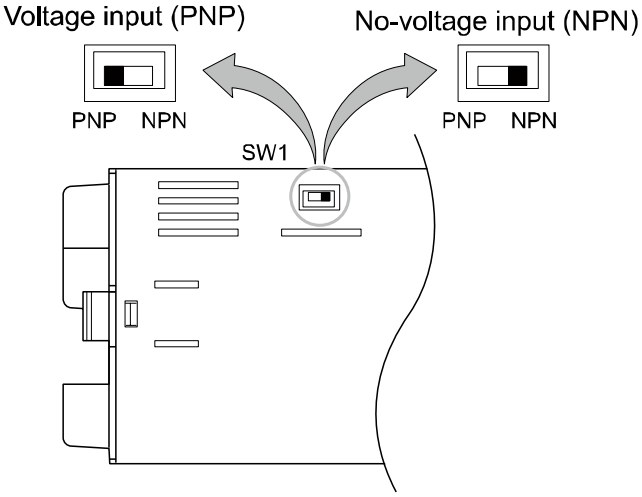
(1) CTS Series



(2) CTY Series



(3) CTM Series



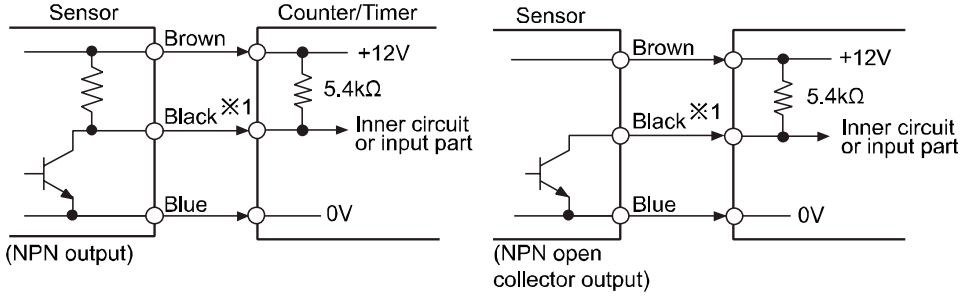
Warning

Turn OFF the power to select or change input logic (PNP/NPN).

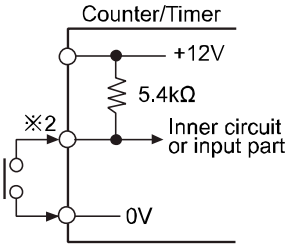
5.2.2 Input connection

(1) No-voltage input (NPN)

- Solid state input (standard sensor: NPN output type sensor)

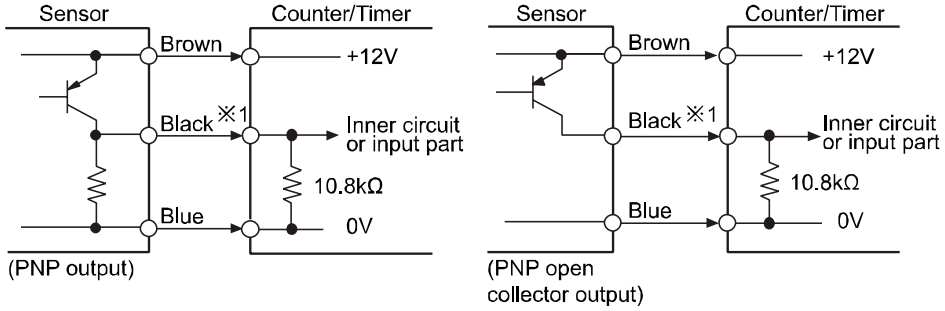


- Contact input

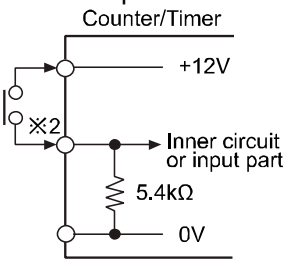


(2) Voltage input (PNP)

- Solid state input (standard sensor: PNP output type sensor)



- Contact input



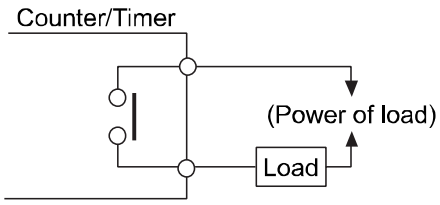
Note

※1: INA, INB/INH, RESET, INHIBIT, BATCH RESET input part

※2: For contact input, counting speed should be set 1cps or 30cps. (Counter)

5.2.3 Output connection

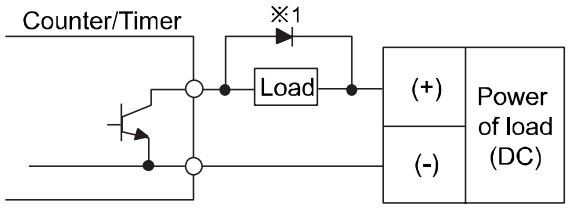
(1) Contact output



Note

Select the load which capacity is not over contact capacity.

(2) Solid state output



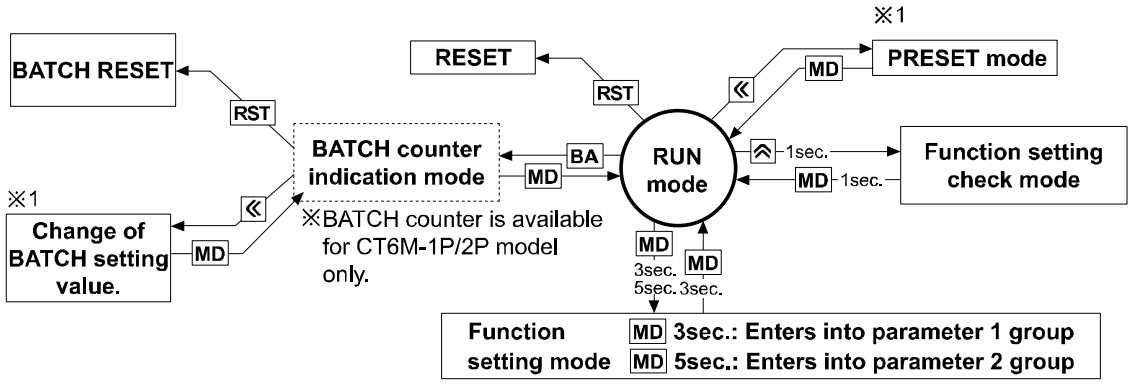
Note

- For solid state output, select load power and load not to be over (max. 30VDC, 100mA), switching capacity.
- Do not supply reverse polarity voltage.

※1: For using inductive load (relay, etc), connect surge absorber (diode, varistor, etc) at the both ends of load.

6 Basic Operations (Counter/Timer/Communication)

6.1 Operations and functions



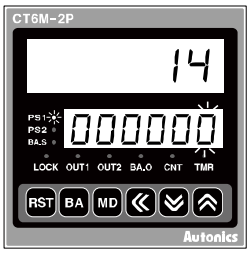
Note

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

6.1.1 Setting value change mode (Counter/Timer)

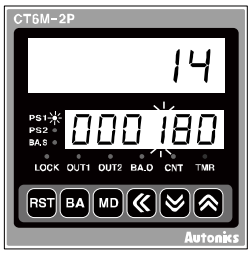
- In RUN mode, press the [«] key to enter setting value change mode.
- Even if changing the setting value, input operation and output control will continue. In addition, the setting value could be set to 0 and the output of 0 setting value turns ON.
- When entering the setting value change mode, the counting value display component displays present value and the setting value display component displays the setting value.
- According to the output mode, setting value could not be set to 0. (When setting to 0, setting value "0" will flash 3 times.)

❶



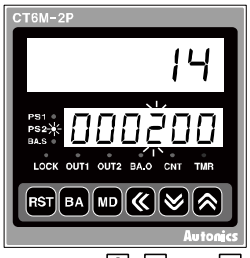
In RUN mode, press the [«] key to enter preset mode. 'PS1' indicator turns ON and first digit of preset value flashes.

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.

※In case of 1-stage preset, indicator model, PRESET2 displays PS and PRESET1 does not displayed.

※Press the [MD] key to save the changing setting value at each parameter and it moves the next parameter or returns in RUN mode.

6.1.2 Setting value check mode

Setting value of setting mode can be confirmed using the ▼ and ▲ keys.

6.1.3 Switching display function in preset indicator

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

6.1.4 RESET

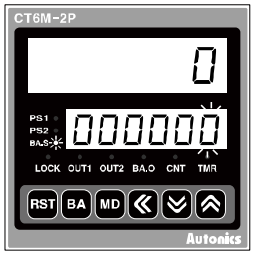
In RUN mode or function setting mode, if pressing RST key or applying the signal to the RESET terminal on the back side, present value will be reset and output will maintain off status. When selecting voltage input (PNP), short no.10 and no. 12 terminals, or when selecting no-voltage input (NPN), short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

6.2 BATCH counter (only for CT6M-1P□□/CT6M-2P□□ model)

BATCH counter displays the repeat same operation to the setting value.

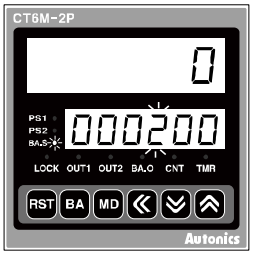
- In RUN mode, press the BA key to enter BATCH counter indication mode.
- In BATCH counter indication mode, 'BATCH counter value' is displayed in count indicator and 'BATCH counter setting value' is displayed in preset indicator.
- In BATCH counter indication mode, press the ◀ key to set BATCH setting value change mode.

❶



It enters into settingvalue change mode using ◀ key.
(BA.S lights, first digit of setting value flashes.)

❷



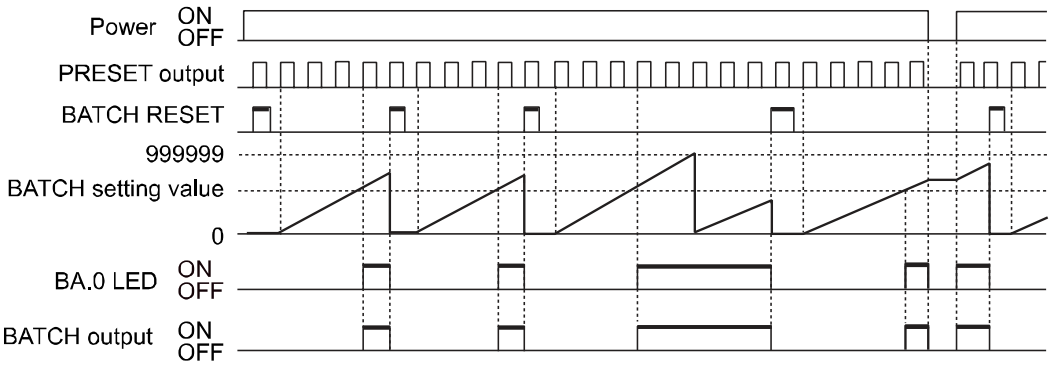
BATCH value is set to '200' using ◀, ▼ and ▲ keys, then press MD key to complete BATCH setting value and move to BATCH counter indication mode.

- Press the MD key to return BATCH counter indication mode.

※If setting BATCH counter setting value as '0', BATCH output does not turn ON.

※In BATCH counter indication mode, press the MD key to return RUN mode.

6.2.1 BATCH counter operation



6.2.2 BATCH counting operation

- BATCH counting value is increasing until BATCH reset signal applied. BATCH counting value will be circulated when it is over 999999.
- BATCH counting operation in Counter: Counts the number of reaching setting value.
- BATCH counting operation in Timer: Counts the number of reaching setting time. (in case of 'FLE' output mode, it counts the number of reaching T.off setting time and T.on setting time.)

6.2.3 BATCH output operation

- If input signal is applied while changing BATCH setting value, counting operation and output control will be performed.
- If BATCH count value equals to BATCH setting value, BATCH output will be ON and maintain ON status until BATCH reset signal is applied.
- When the power is cut off then resupplied in status of BATCH output is ON, BATCH output maintains ON status until BATCH reset signal is applied.

※In case of from 'BATCH setting value > BATCH counting value' to 'BATCH setting value≤BATCH counting value' and returning to RUN mode, BATCH output turns ON.

※In case of from turning ON BATCH output to 'BATCH setting value > BATCH counting value', BATCH output maintains ON until BATCH RESET input applied.

6.2.4 BATCH RESET input

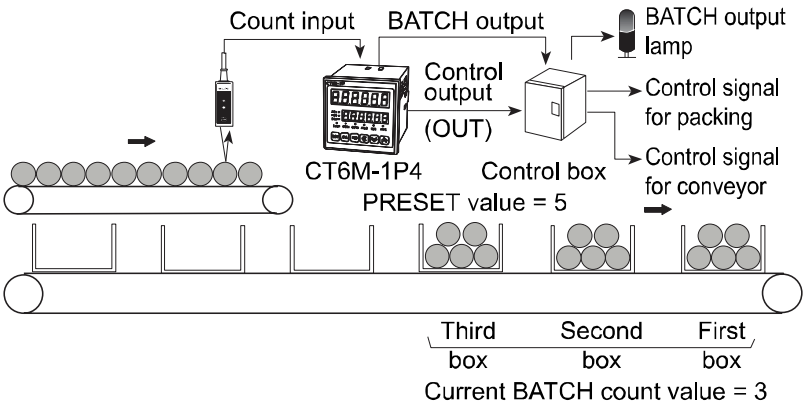
- In BATCH counter indication mode, press the RST key or applying the signal to BATCH reset terminal on the back side panel, BATCH counting value will be reset.
  When selecting voltage input (PNP), short terminals 10 and 14, or when selecting no-voltage input (NPN), short terminals 11 and 14 to reset.
- When BATCH reset is applied, BATCH counting value maintains at 0 and BATCH output maintains in the OFF status.

6.2.5 Example of BATCH counter

(1) Counter

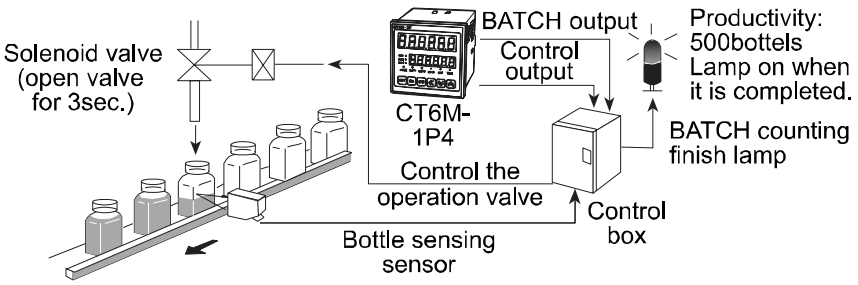
In case, putting 5 products in a box then packing the boxes when they reach to 200.

- Counter setting: Preset setting value=5, BATCH setting value =200
- When the count value of counter reaches to the setting value "5", the control output (OUT) will be on, and at this time the count value of the BATCH counter will be increased by "1". The control box which is received the control output (OUT) repeatedly controls conveyor to move the full box and to place the next empty box for standby.
- When the BATCH count value reaches to "200", BATCH output will be ON. Then the control box stops conveyor and provides a control signal for packing.



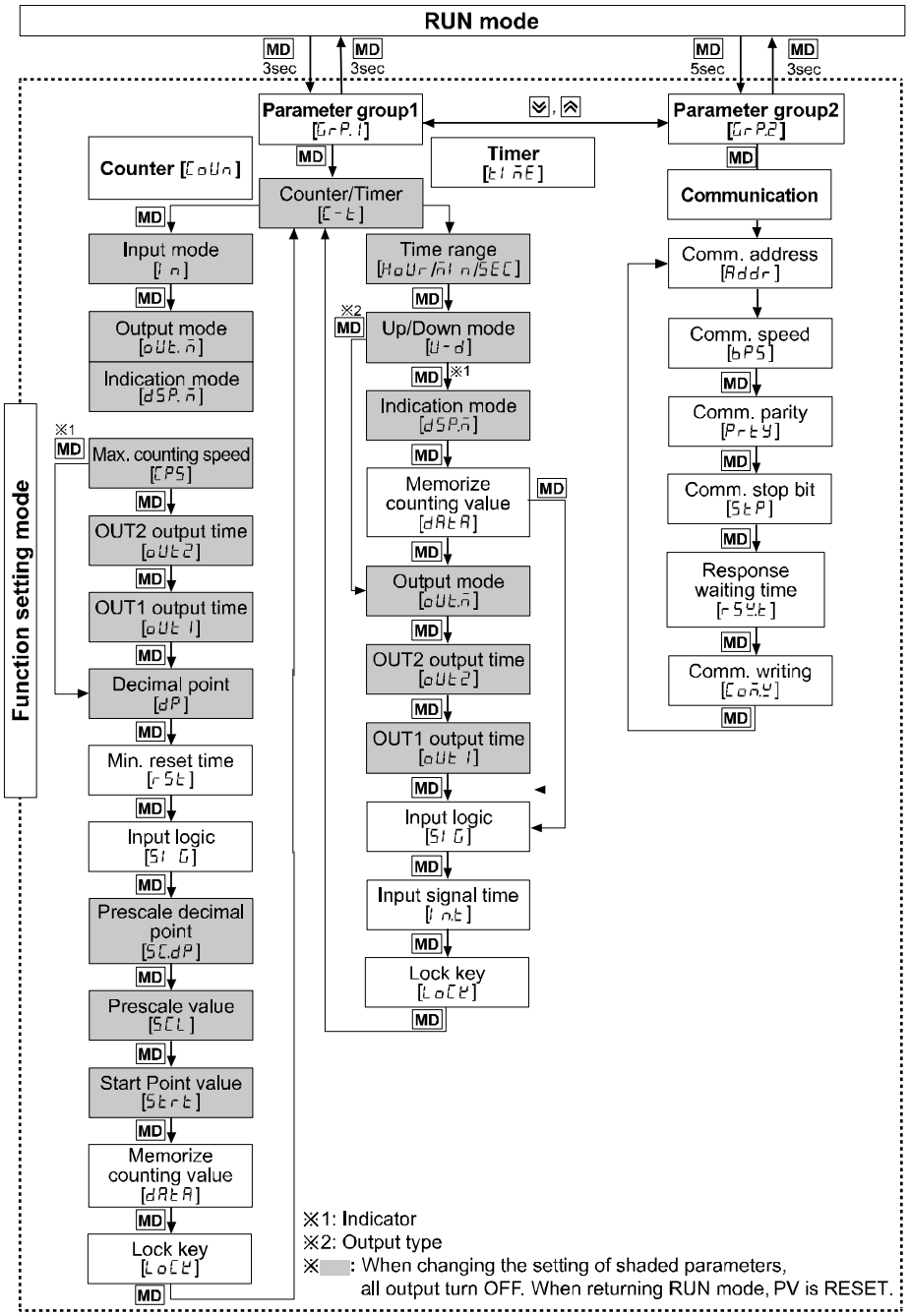
(2) Timer

Fills milk into the bottle for 3 sec (setting time) When 500 bottles are filled, BATCH counting finish lamp is turned on.
(setting time: 3 sec, BATCH setting value: 500)



6.3 Setting mode

- In RUN mode, hold the MD key for 3 sec/5 sec to enter parameter 1 group, parameter 2 group.
- In setting mode, hold the MD key for 3 sec to return RUN mode.



Note

※Counter counting and output control operates continuously even entering setting mode.

※When changing the setting values of parameter 1 group via communication, the display value and output are reset.

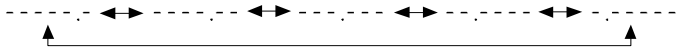
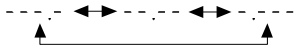
※Parameter 2 group is not available to non-communication models.

7 Counter Mode

7.1 Parameter Setting

(MD key: Moves parameters, ▽, △ key: changes parameter setting value)

Parameter	Parameter setting value
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 [oUt.M]	● Input mode is UP, UP-1, UP-2 or dn, dn-1, dn-2, F ◀▶ n ◀▶ C ◀▶ r ◀▶ E ◀▶ P ◀▶ q ◀▶ A ● Input mode is Ud-A, Ud-b, Ud-C, F ◀▶ n ◀▶ C ◀▶ r ◀▶ E ◀▶ P ◀▶ q ◀▶ A ◀▶ S ◀▶ t ◀▶ d ※ If max. counting speed is 5kcps or 10kcps, and output mode is d, max. counting speed is automatically changed as 30cps, factory default.
Indication mode [dSP.M]	● In case of indicator model, HoLd ◀▶ totAL ※In case of the indicator type, indicate mode selection [dSP.M] is displayed. ※It is the added function to set the setting value when selecting HoLd.
Max. counting speed [CPS]	30 ◀▶ 1E ◀▶ 5E ◀▶ 10E ◀▶ 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: 0.01 to 99.99 sec ※When output 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: 0.01 to 99.99 sec, Hold ※When 1st digit is flashing, press the ◁ key once and HoLd appears. ※When output mode is S, t, d, oUt1 does not appear. (fixed as HOLD)
OUT output time※1 [oUt.t]	※Setting range: 0.01 to 99.99 sec ※When output mode is F, n, S, t, d, oUt.t does not appear. (fixed as HOLD)
Decimal point※2 [dP]	● 6-digit model ------ ◀▶ -----. ◀▶ ----.- ◀▶ ---.-- ◀▶ --.--- ◀▶ -.---- ◀▶ .----- ● 4-digit model ---- ◀▶ ---. ◀▶ --.- ◀▶ -.-- ※Decimal point is applied to counting value and setting value.

Parameter	Parameter 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 (NPN, PNP).
Prescale decimal point※2 [SC.dP]	● 6-digit model  ● 4-digit model  ※Decimal point of prescale should not set smaller than decimal point [dP].
Prescale value [SCL]	※Setting range of prescale value 6-digit model: 0.00001 to 99999.9, 4-digit model: 0.001 to 999.9
Start point value [Strt]	※Setting range is linked with decimal point [dP]. 6-digit model: 0.00000 to 999999, 4-digit model: 0.000 to 9999 ※When input mode is dn, dn-1, dn-2, start point value does not appear.
Memory protection [dAtA]	CLr ◀▶ rEC ※CLr: Resets the counting value when power OFF. rEC: Maintains the counting value when power OFF. (memory protection)
Key lock [LoCK]	L.oFF ◀▶ LoC.1 ◀▶ LoC.2 ◀▶ LoC.3 ※L.oFF: 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

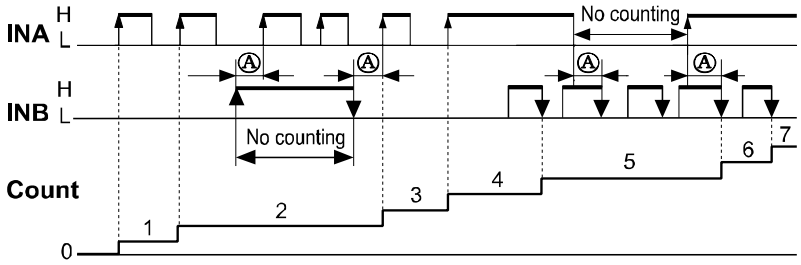
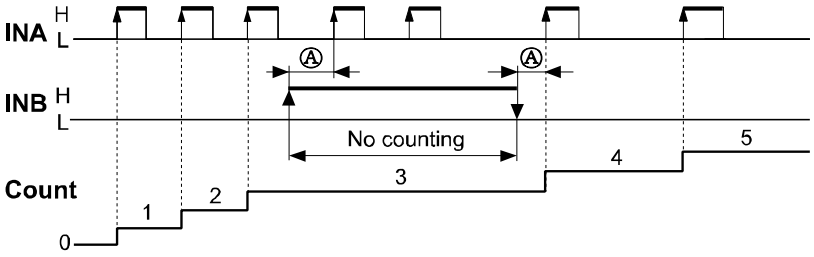
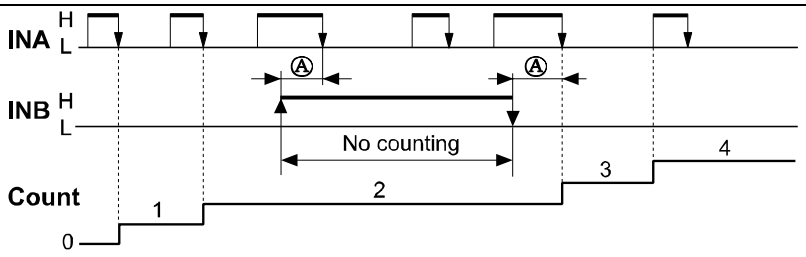
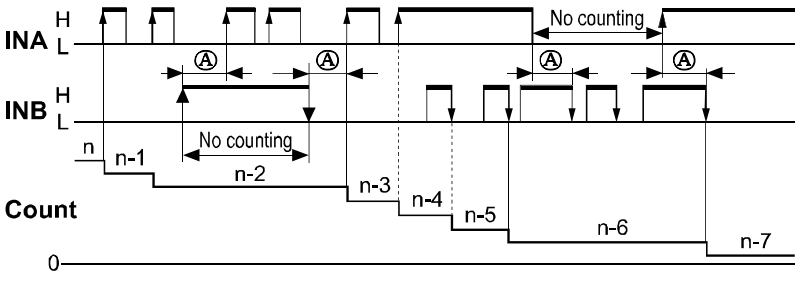
Note

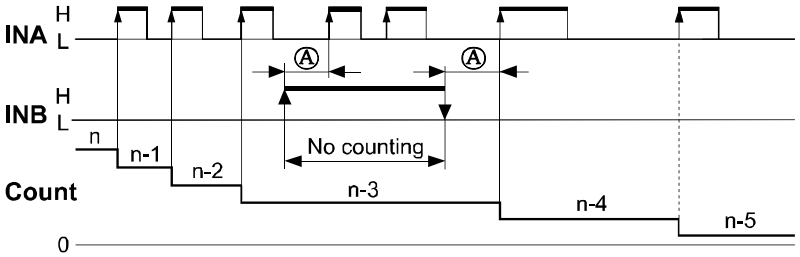
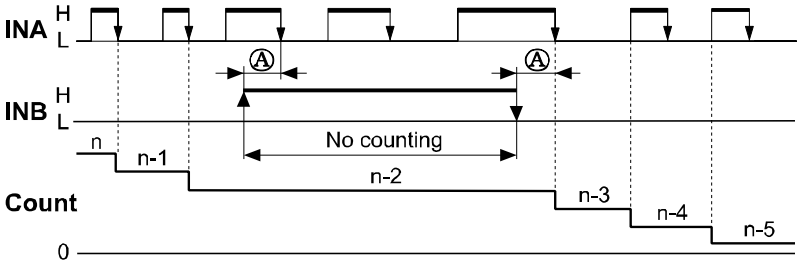
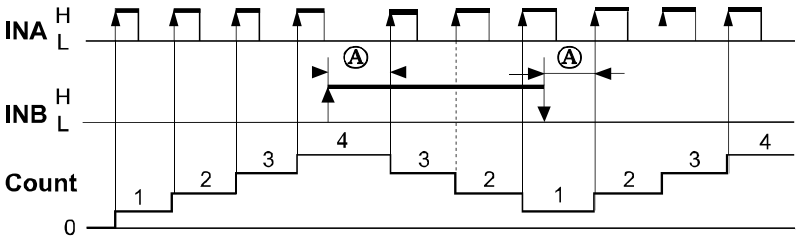
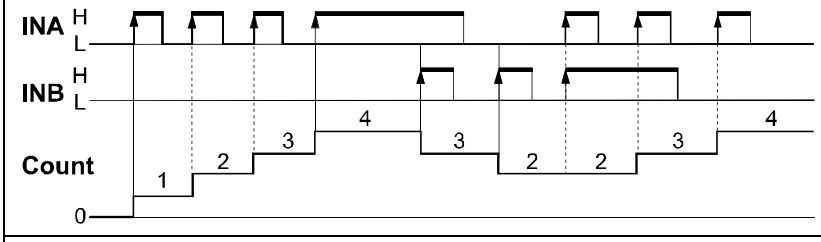
※1: For 1-stage setting value change model, OUT1 does not appear. The output time of OUT2 is displayed as oUt.t .

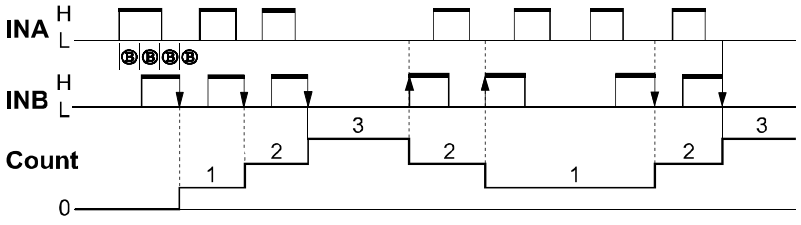
※2: Decimal point and prescale decimal point

- 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.

7.2 Input mode

Input mode	Counting chart
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
Down [dn]	
	※When INA is counting input, INB is no counting input. When INB is counting input, INA is no counting input.

Input mode	Counting chart
Down-1 [dn-1]	
	※When INA input signal is rising (⌐↑) , it counts. ※INA: Counting input ※INB: No counting input
Down-2 [dn-2]	
	※When INA input signal is falling (↓¬) , it counts. ※INA: Counting input ※INB: No counting input
Up/ Down-A [Ud-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 .
Up/ Down-B [Ud-b]	
	※INA: Up counting input INB: Down counting input ※INA: When INA and INB input signals are rising (⌐↑) at the same time, it maintains previous counting value.

Input mode	Counting chart
Up/ Down-C [Ud-C]	
	※When connecting encoder output A, B phase with counter input, INA, INB, set input mode [In.Fn] as phase different input [Ud-C] for counter operation.

※Ⓐ: over min. signal width, Ⓑ: over than 1/2 of min. signal width.
If the signal is smaller than these width, it may cause counting error (±1)

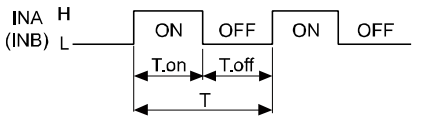
Note

※The meaning of "H", "L"

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

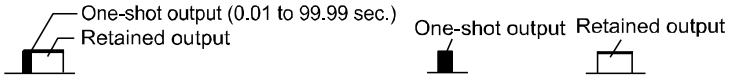
※Min. signal width by counting speed (1cps = 1Hz)

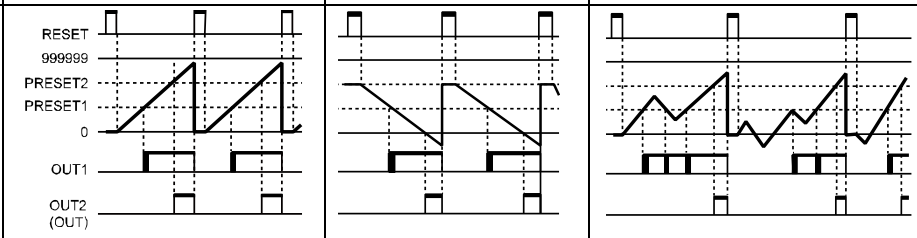
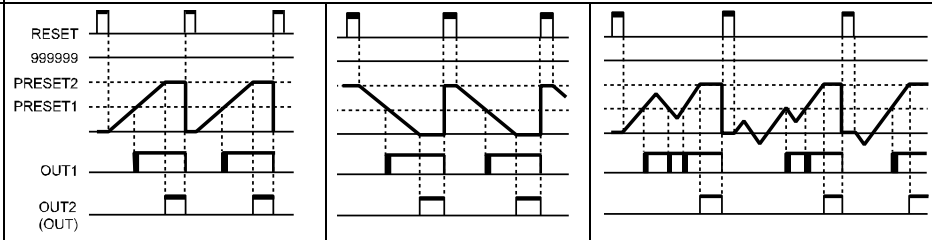
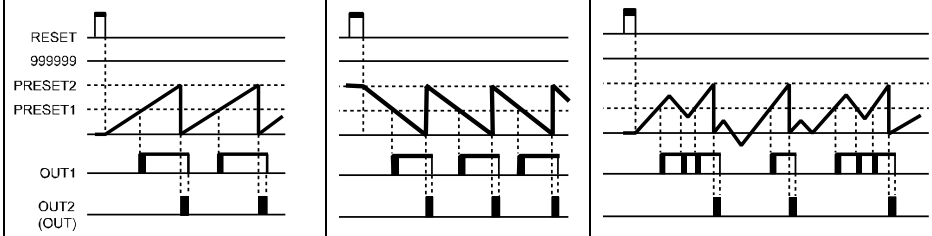
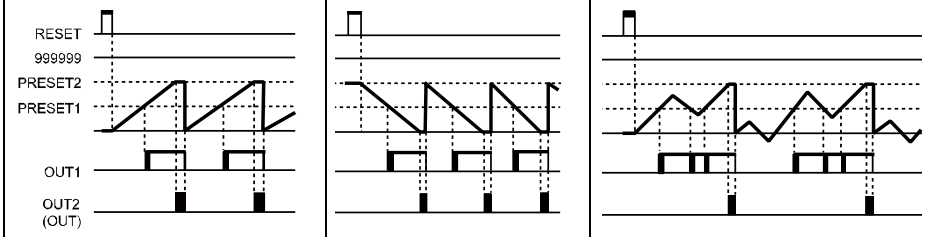
Counting speed	Min. signal width
1cps	500ms
30cps	16.7ms
1kcps	0.5ms
5kcps	0.1ms
10kcps	0.05ms

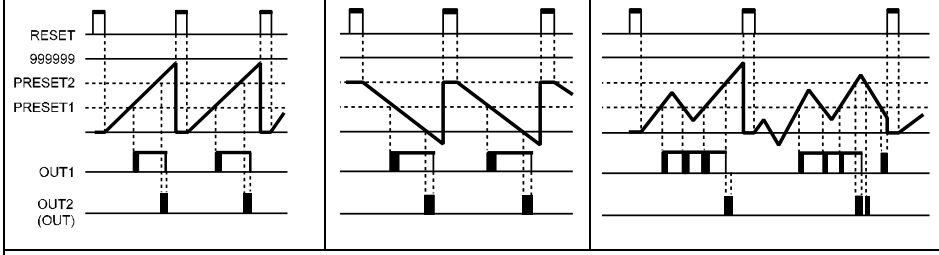


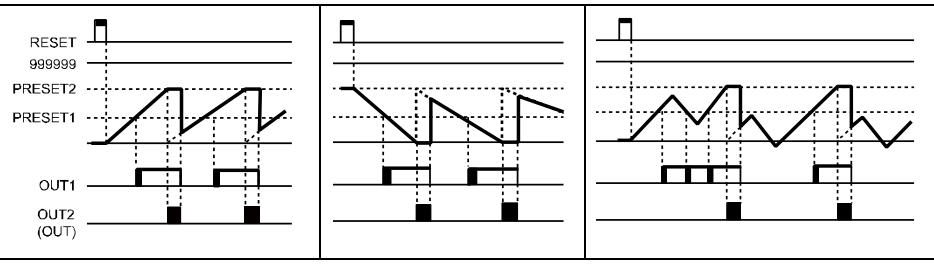
※T.on, T.off: Min. signal width

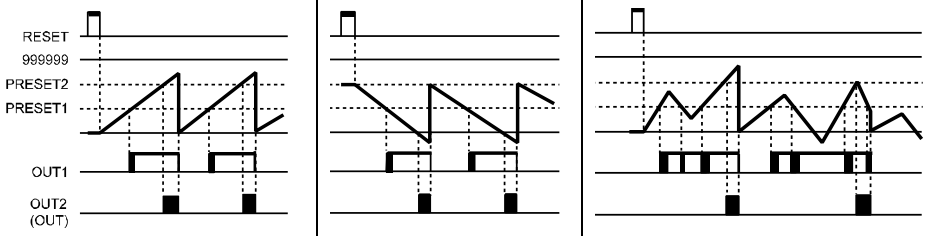
7.3 Output mode

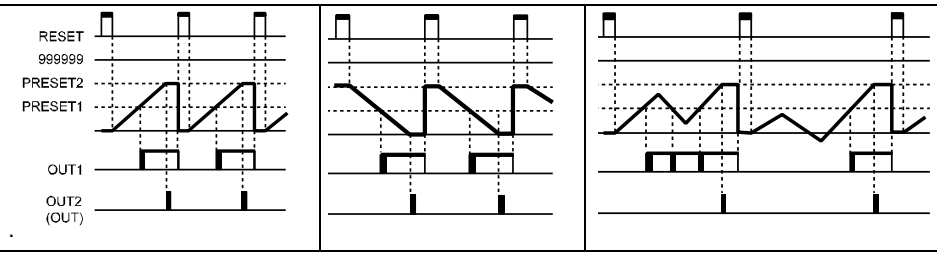


Output mode	Input mode		
	Up, Up-1, 2	**Down, Down-1, 2**	**Up/Down A, B, C**
F [F]			
	※After count-up, counting display value increases or decreases until reset signal is applied and retained output is maintained.		
N [n]			
	※After count- up, counting display value and retained output are maintained until reset signal is applied.		
C [C]			
	※When count-up, counting display value will be reset and count simultaneously. ※OUT1 retained output will be off after OUT2 one- shot time. ※The one-shot output time of OUT1 one-shot output time is operated regardless of OUT2 output.		
R [r]			
	※After count-up, counting value display is reset after one-shot output time of OUT2 and it counts simultaneously. ※OUT1 retained output will be off after OUT2 one-shot time. ※OUT1 one-shot output time is operated regardless of OUT2 output.		

<table>
<tr><th rowspan="2">Output mode</th><th colspan="3">Input mode</th></tr>
<tr><th>Up, Up-1, 2</th><th>Down, Down-1, 2</th><th>Up/Down A, B, C</th></tr>
<tr><td>K [ㅏ]</td><td colspan="3"> 

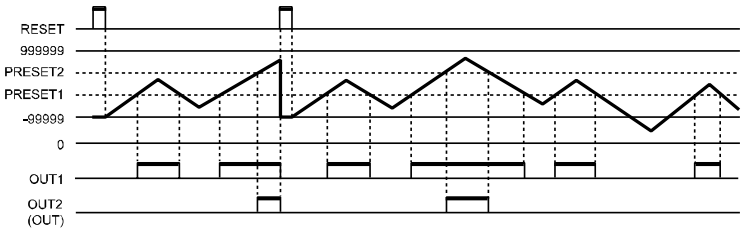
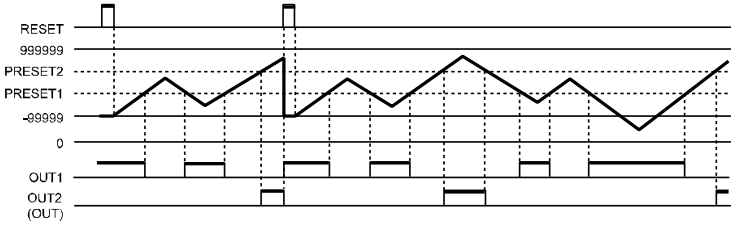
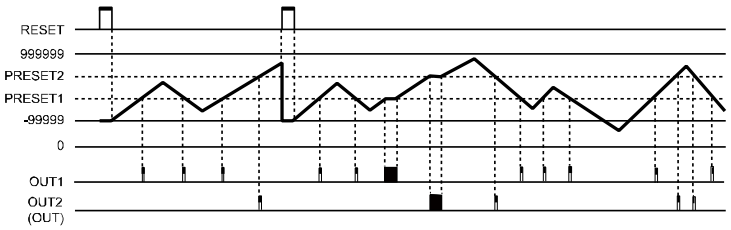
※After count-up, counting display value increases or decreases until RESET input is applied.
※OUT1 retained output is off after OUT2 one-shot time.
※OUT1 one-shot output time is operated regardless of OUT2 output.</td></tr>
<tr><td>P [ㅍ]</td><td colspan="3"> 

※After count-up, counting display value is maintained while OUT2 output is on. Counting value is internally reset and counts simultaneously.
※When OUT2 output is off, displays counting value while OUT2 is ON, and it increases or decreases.
※OUT1 retained output is off after OUT2 one-shot time.
※OUT1 one-shot output time is operated regardless of OUT2 output.</td></tr>
<tr><td>Q [ㅋ]</td><td colspan="3"> 

※After count-up, counting display value increases or decreases during OUT2 one-shot time.
※OUT1 retained output is off after OUT2 one-shot time.
※OUT1 one-shot output time is operated regardless of OUT2 output.</td></tr>
<tr><td>A [ㅁ]</td><td colspan="3"> 

※After count-up, counting display value and OUT1 retained output are maintained until RESET input is applied.
※OUT1 one-shot output time is operated regardless of OUT2 output.</td></tr>
</table>

One-shot output (0.01 to 99.99 sec.)
Retained output
One-shot output
Retained output

Output mode	Up/Down A, B, C
S [S]	
	※OUT1 and OUT2 keep ON status in following condition: Counting display value ≧ PRESET1 Counting display value ≧ PRESET2
T [t]	
	※OUT1 output is off: Counting display value ≧ PRESET1 (when PRESET 1 is 0, OUT1 output maintains ON state.) ※OUT2 keeps ON status in following condition: Counting display value ≧ PRESET2
D [d]	
	※When counting display value is equal to setting value [PRESET1, PRESET2) only, OUT1 or OUT2 output keeps ON status. ※When setting 1kcps for counting speed, solid state contact output should be used. (When using contact output, it is difficult to execute normal output operation due to contact reaction time.)

Note

※OUT output as 1-stage setting value change model operates as output of OUT 2 as 2-stage setting value change model.

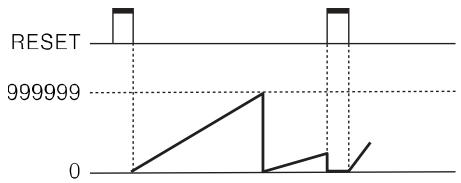
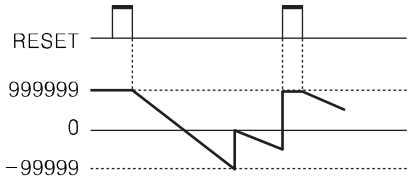
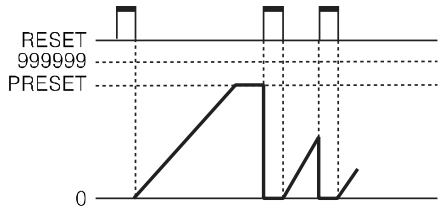
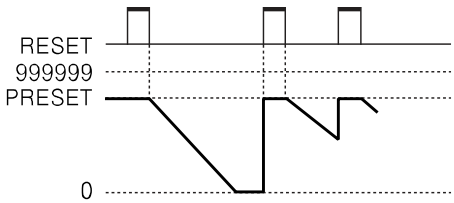
※In case of 2-stage setting value change model, OUT1 output operates as as one-shot output or retained output. (except S, t, d mode)

※OUT1 output is available to set as '0' at every output mode. The output for '0' setting executes.

※In case of C[C], R[r], P[P], Q[q] output mode, OUT2 output is not available to set as '0'.

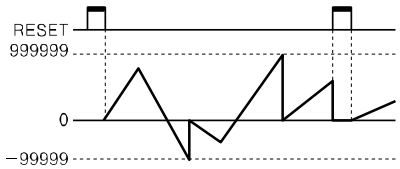
7.4 Counter operation for indicator model

※Only for indicator model.

Indication mode [dSP.n]	Counting chart	
	Up input mode (Up, Up-1, Up-2)	**Down input mode (Down, Down-1, Down-2)**
TOTAL [totAL]		
	Count value increases or decreases until RESET input is applied. When input is over max./min. counting value, it displays 0. When Reset input is applied, it displays 0(Up)/999999(Down).	
HOLD [HoLd]		
	Count value increases or decreases until RESET input is applied. When input is reaching setting value(Up)/0(Down), the display value is hold. When Reset input is applied, it displays 0(Up)/setting value(Down).	

Note

※When the command input [Ud-A], individual input [Ud-b], phase difference input [Ud-C] mode,



※In case of UP/DOWN [Ud-A, Ud-b, Ud-C] input mode, indication mode [dSP.n] parameter does not appear.

7.5 Output operation for other conditions

7.5.1 Start point

- In case of counter operation, set start point [5tr t] to count from the set value.
- It is not available for dn, dn- 1, dn-2 input mode for counter.
- When RESET input is applied, the present value is reset as start point value.
- In case of C, r, P, 9 output mode, it counts up and the present reset as start point value.

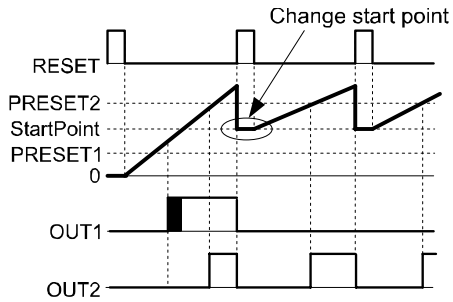
7.5.2 When start point value is larger than setting value, (UP, UP- 1, UP-2, Ud-A, Ud-b, Ud-C mode)

(1) PRESET2 > Start Point > PRESET1

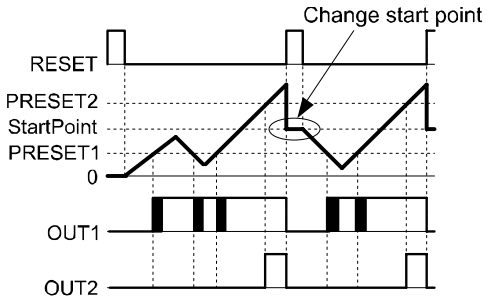
- UP, UP- 1, UP-2 mode: Output of OUT1 does not execute.
- When the present value counts as PRESET 2, output of OUT2 turns ON.
- Ud-A, Ud-b, Ud-C mode: When the present value counts down as PRESET 1, output of OUT1 turns ON.

Ex.

※Output mode: F
Input mode: UP, UP- 1, UP-2



※Output mode: F
Input mode: Ud-A, Ud-b, Ud-C



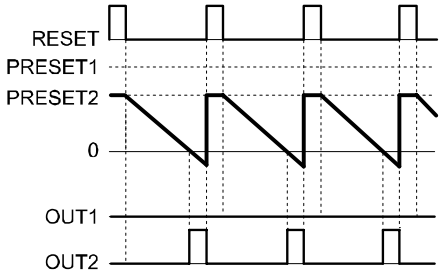
(2) PRESET2 > Start Point = PRESET1

In case of UP, UP- 1, UP-2, Ud-A, Ud-b, Ud-C mode, output of OUT1 turns ON when RESET OFF.

7.5.3 When PRESET 1 is larger or equal than PRESET 2 at at down mode

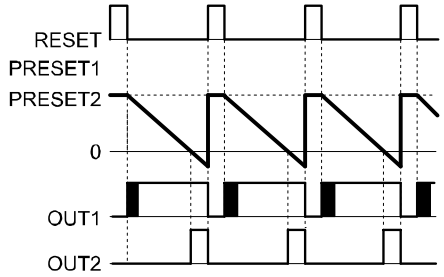
(1) PRESET1 > PRESET2

- Output of OUT1 does not execute.



(2) PRESET1=PRESET2

- Output of OUT1 turns ON for RESET OFF.

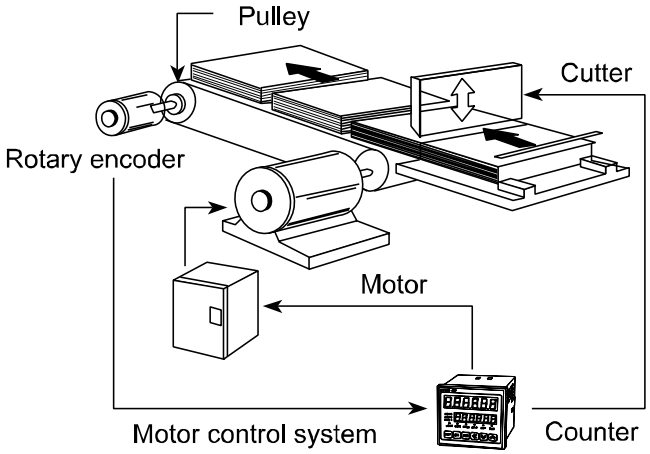


7.6 Prescale

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

Ex.

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



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

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

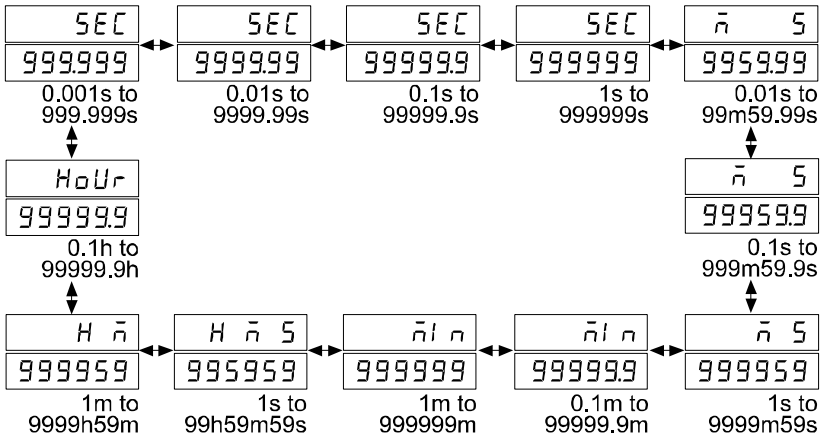
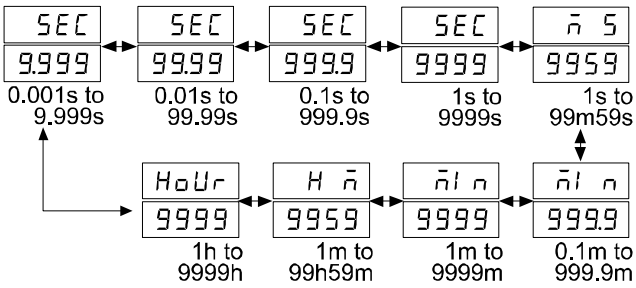
$$= 0.069\text{mm/pulse}$$

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

8 Timer Mode

8.1 Parameter setting

(MD key: Moves parameters, ▼, ▲ key: changes parameter setting value)

Parameter	Parameter setting value
Counter/Timer [C-t]	CoUn ◀▶ tIME ※CoUn: Counter tIME: Timer
Time range [HoUr/MIn/SEC]	● 6-digit model  ● 4-digit model 
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 [dSP.M]	totAL ◀▶ HoLd ◀▶ ontd ※Used for the indicator model 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 model only. ※CLr: Reset time value when power is off. rEC: Memorizes time value at the moment of power off.
Output mode [oUt.M]	ond ◀▶ ond.1 ◀▶ ond.2 ◀▶ FLK ◀▶ FLK.1 ◀▶ FLK.2 ◀▶ Int Int.G ◀▶ nFd.1 ◀▶ nFd ◀▶ oFd ◀▶ Int.2 (※2) ◀▶ Int.1

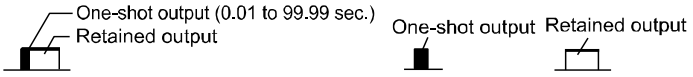
Parameter	Parameter setting value
OUT2 output time※1 [oUt2]	※Set one-shot output time of OUT2. ※Setting range: 0.01 to 99.99 sec, Hold ※When 1st digit is flashing, press the ≪ key once and HoLd appears.
OUT1 output time※1 [oUt 1]	※Set one-shot output time of OUT1. ※Setting range: 0.01 to 99.99 sec, Hold ※When 1st digit is flashing, press the ≪ key once and HoLd appears.
OUT output time※1 [oUt.t]	※Setting range: 0.01 to 99.99 sec, 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 (NPN, PNP).
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

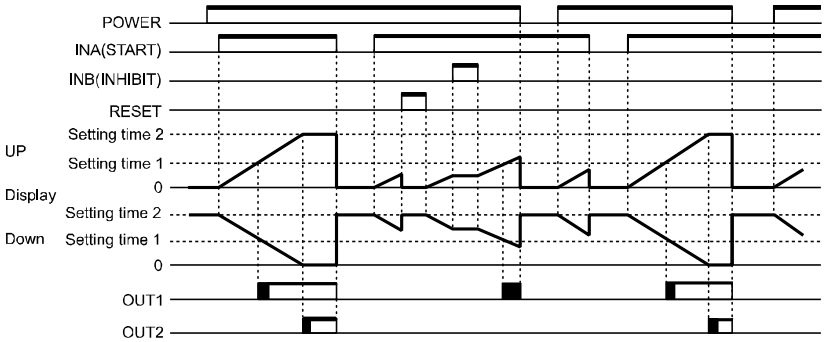
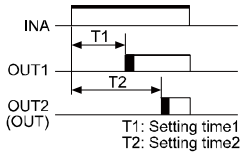
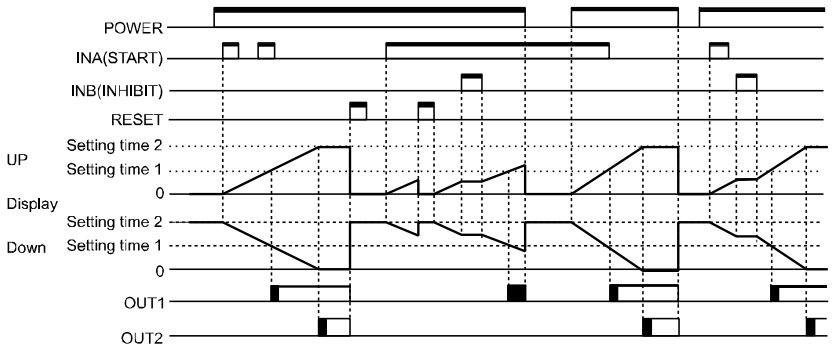
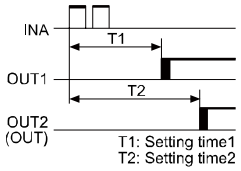
Note

※1: When output mode is FLt.1, FLt.2, Intg and ond, ond.1, ond.2 of 1-stage setting value change model, oUt 1 does not appear. The output time of oUt2 is displayed as oUt.t. When output mode is ond, ond.1, ond.2, Int.2, oUt 1 appears.

※2: Int.2 mode is available only for 2-stage setting value change model.

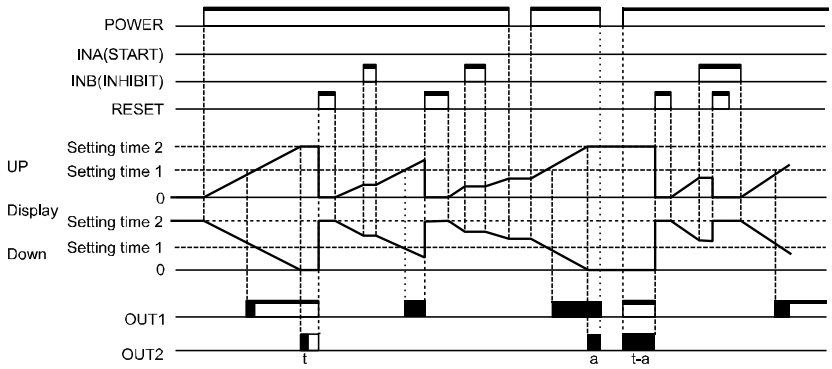
8.2 Output mode



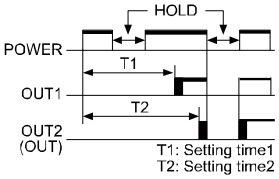
Output mode	Time chart
OND [ond]	Signal ON Delay (Power RESET)
	
	1) Time starts when INA signal turns ON. 2) When INA signal turns OFF, time resets. 3) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 4) Control output operates as retained or one-shot output. 
OND.1 [ond.1]	Signal ON Delay 1 (Power RESET)
	
	1) Time starts when INA signal turns ON. 2) When INA signal is ON: Power ON Time Start is operated RESET OFF Time Start is operated. 3) Control output operates as retained or one-shot output. 4) Only first INA input signal is valid in case INA input signal is repeatedly applied. 

One-shot output (0.01 to 99.99 sec.)
Retained output
One-shot output
Retained output

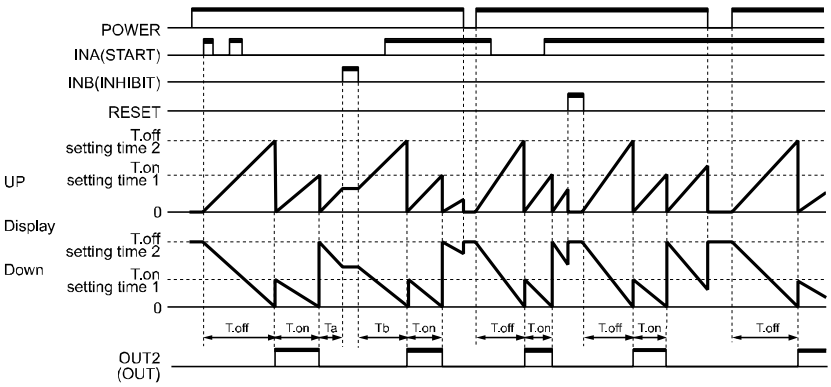
Output mode	Time chart
OND.2 [ond.2]	Power ON Delay 2 (Power Hold)



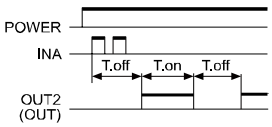
1) Power ON Time Start (There is no INA function.)
2) RESET ON: Time RESET
   RESET ON→OFF: Time Start
3) Control output operates as retained or one-shot output.
4) It memorizes display value at the moment of power OFF.

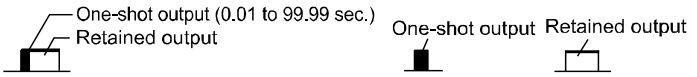


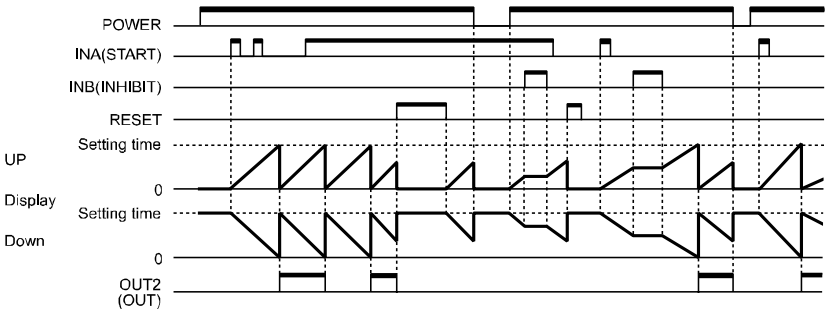
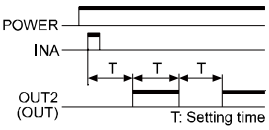
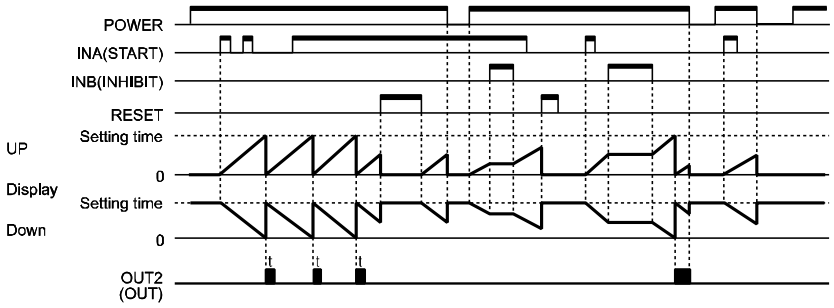
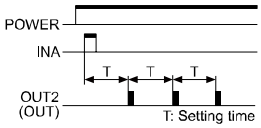
FLK [FLK]	Flicker (Power RESET)

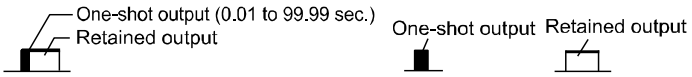


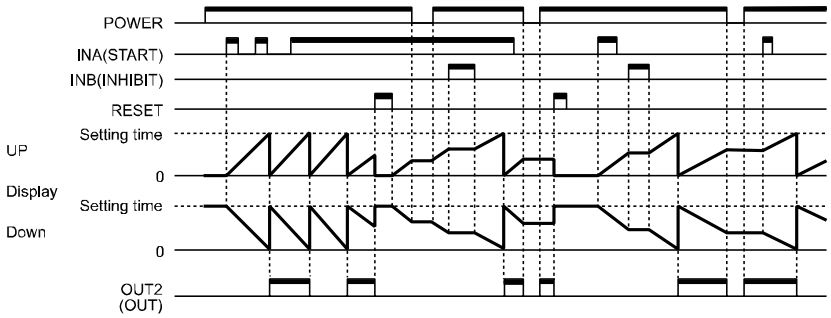
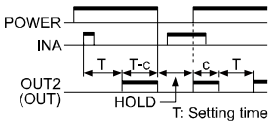
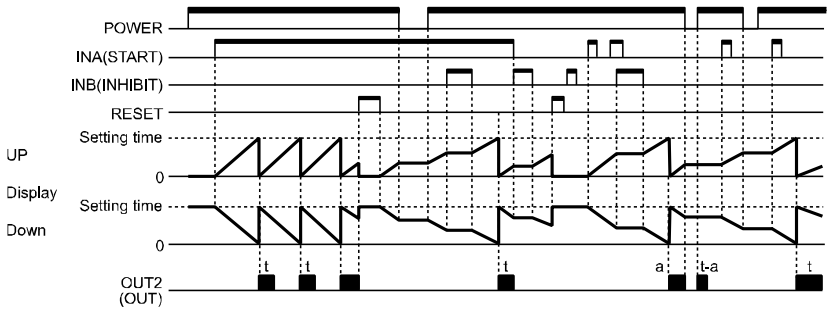
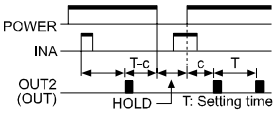
1) Time starts when INA signal turns on.
2) When INA signal is ON: Power ON Time Start is operated.
   RESET OFF Time Start is operated.
3) Control output operates as retained output, output turns off for the T.off time and turns off for the T.off time and turns on for the T.on time repeatedly.
   Ta+Tb = T.off setting time
4) The T.on time and T.off 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
FLK.1 [FLK.1]	Flicker 1 (Power RESET)
	Hold output 
	1) Time starts when INA signal turns on. 2) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 3) Control output operates as retained output. 4) 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. 2) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 3) Control output operates as one-shot output. 4) In case of using the contact output, min. setting time must be set over 100ms. 

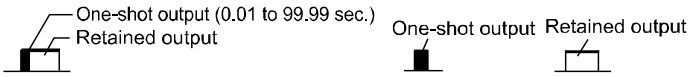


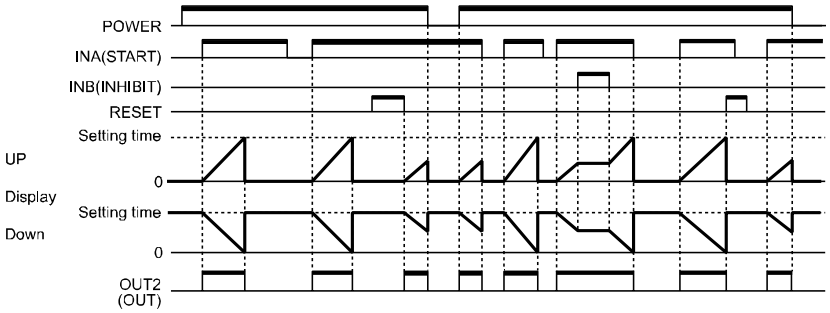
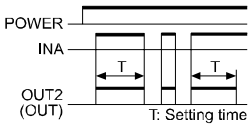
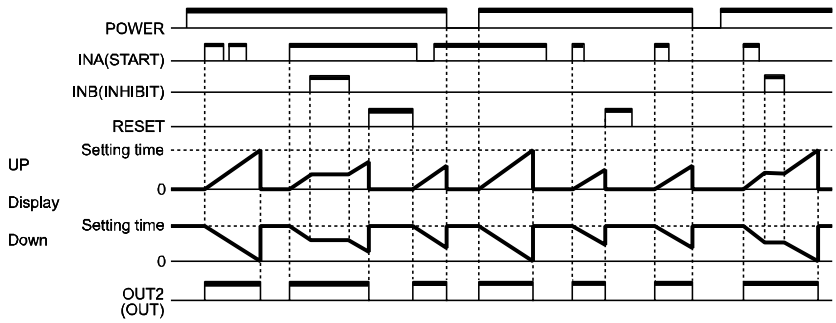
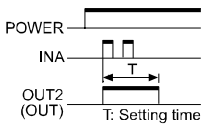
Output mode	Time chart
FLK.2 [FLK.2]	Flicker 2 (Power Hold)
	Hold output 
	1) Time starts when INA signal turns ON and the display value at the moment when power is off is memorized. 2) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 3) Control output operates as retained output. 4) Control output will be reversed when it reaches to setting time. (At the initial start, OUT2 control output is OFF). 5) 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 and the display value at the moment when power is off is memorized. 2) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 3) Control output operates as one-shot output. 4) In case of using the contact output, min. setting time must be set over 100ms. 

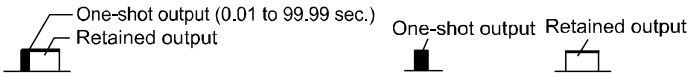
Note

※Power RESET: There is no memory protection. (resets the display value when power is off)

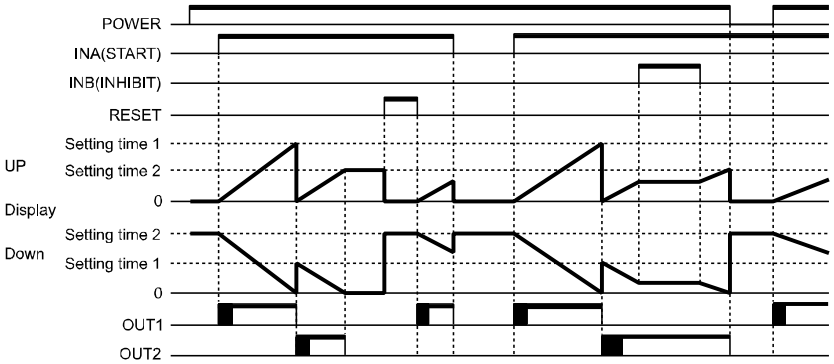
※Power Hold: There is memory protection. (memorizes the display value at the moment of power off, indicates the memorized display value when power is resupplied.)



Output mode	Time chart
INT [I nt]	Interval (Power RESET)  1) Control output turns ON and time starts when INA signal turns ON. 2) When INA signal is OFF, time is reset. 3) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 4) When it reaches setting time, indication value and control output are reset automatically. 5) Control output is ON when time is progressing. 
INT.1 [I nt. 1]	Interval 1 (Power RESET)  1) Control output turns ON and time starts when INA signal turnsn ON. 2) When INA signal is ON: Power ON Time Start is operated. RESET OFF Time Start is operated. 3) When it reaches setting time, indication value and control output are reset automatically. 4) Control output is ON when time is progressing. 5) INA input is ignored while time is progressing. 

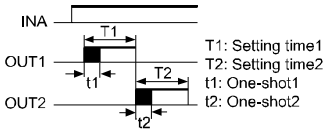


Output mode	Time chart
INT.2 [i nt.2]	Interval 2 (Power RESET)



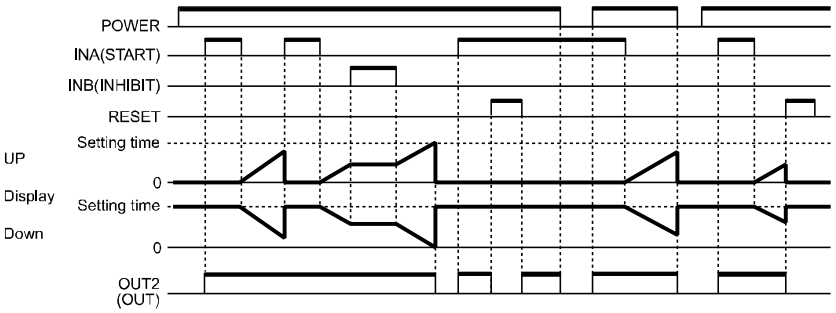
1) Time starts when INA input is ON and resets when INA input is OFF.
2) INA input is ON, OUT1 output is ON during T1 (hold) or t1.
3) When it reaches setting time1, display value resets and OUT2 output is ON during T2 (hold) or t2 output time.

※Output turns OFF when reaching the setting time even if one-shot time is longer than setting time.

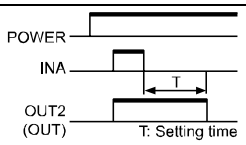


(1-stage preset model has no INT.2 mode)

OFD [oFd]	Signal Off Delay1 (Power RESET)



1) If INA is ON, control output remains ON. (except when power is off and reset is on)
2) When INA signal is OFF, time processes. When it reaches setting time, indication value and control output are reset automatically.

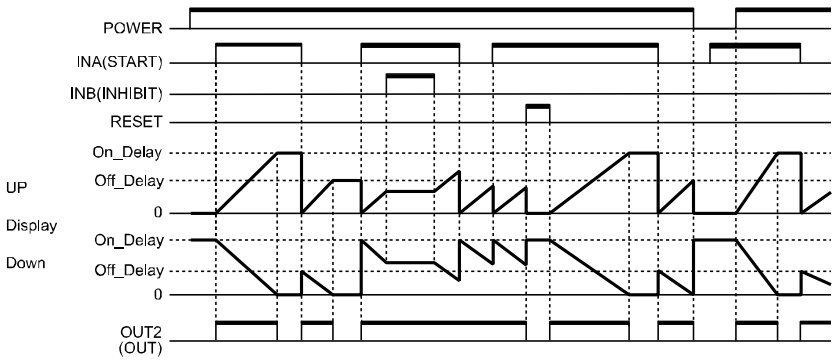
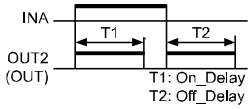
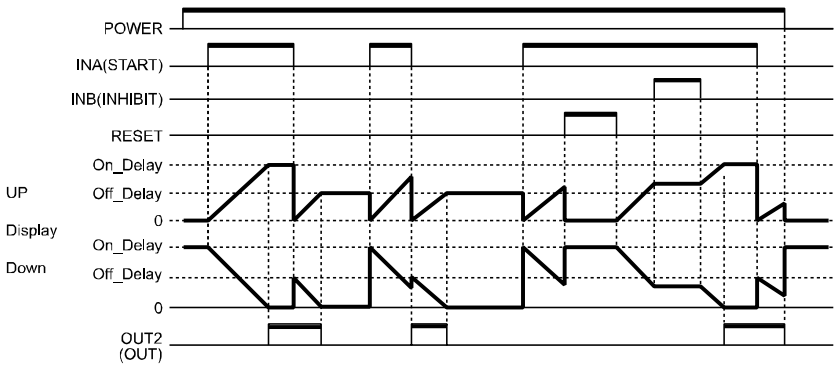
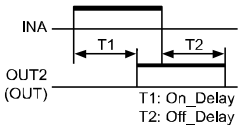


Note

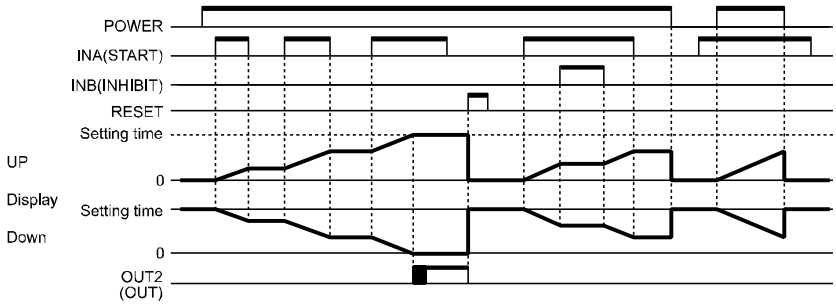
※Power RESET: There is no memory protection. (resets the display value when power is off)

※Power Hold: There is memory protection. (memorizes the display value at the moment of power off, indicates the memorized display value when power is resupplied.)

One-shot output (0.01 to 99.99 sec.)
Retained output
One-shot output
Retained output

Output mode	Time chart
NFD [nFd]	On-Off Delay (Power RESET)
	
	1) When INA input is ON, output is ON and time is progressing, then output is OFF after On_Delay time. 2) When INA input is OFF, output is ON and time is progressing, then output is OFF after Off_Delay time. 3) If INA input is OFF within On_Delay time, step 2 starts again. 4) If INA input is ON within Off_Delay time, step 1 starts again. 
NFD.1 [nFd.1]	On-Off Delay1 (Power Hold)
	
	1) When INA input turns ON, time progresses and output turns ON after On_Delay time. 2) When INA input turns OFF, time progresses and output turns OFF after Off_Delay time. 3) If INA input turns OFF within On_Delay time, output will turn ON and step 2 operate. 4) If INA input turns ON within Off_Delay time, output will turn OFF and step 1 operate. 

One-shot output (0.01 to 99.99 sec.)
Retained output
One-shot output
Retained output

Output mode	Time chart
INTG [I n t G]	Integration Time (Power RESET)  1) Time is progressing while INA input is ON. 2) Time progress stops while INA input is OFF. 3) When it reaches the setting time, output is ON.

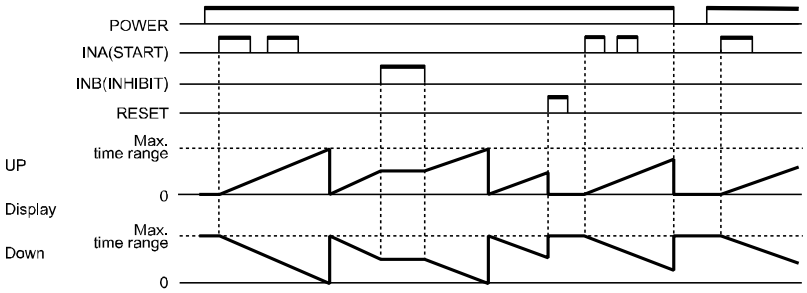
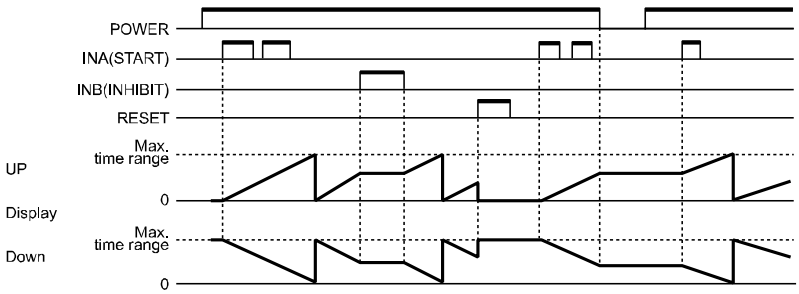
Note

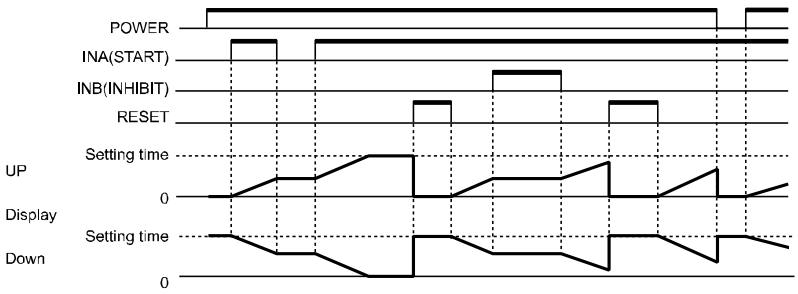
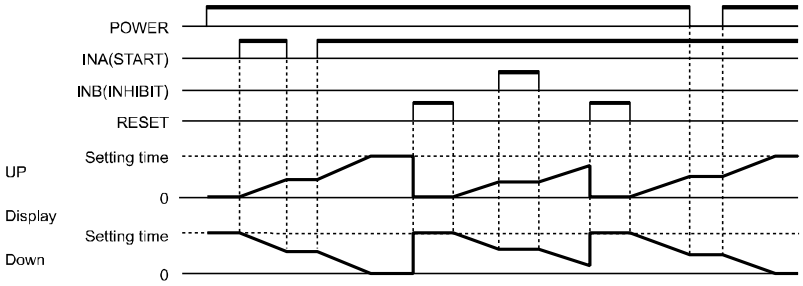
※Power RESET: There is no memory protection. (resets the display value when power is off)

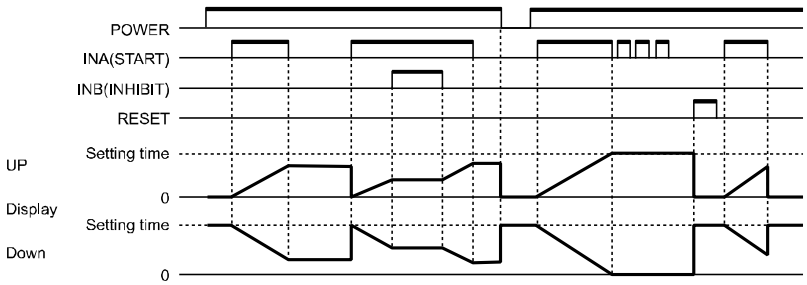
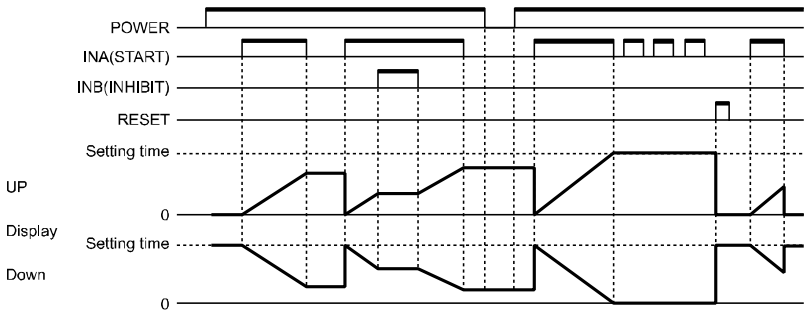
※Power Hold: There is memory protection. (memorizes the display value at the moment of power off, indicates the memorized display value when power is resupplied.)

8.3 Timer operation for indicator model

※Only for indicator model.

<table>
<tr><td rowspan="4">TOTAL
[totAL]</td><td>When memory protection setting is OFF
 
</td></tr>
<tr><td>1) Time starts when INA input is ON.
2) Setting value is initialized when Reset input is ON.
3) Time progress stops when INHIBIT input is ON.
4) Resets when power is OFF.</td></tr>
<tr><td>When memory protection setting is ON
 
</td></tr>
<tr><td>1)Time starts when INA input is ON.
2) Setting value is initialized when Reset input is ON.
3) Time progress stops when INHIBIT input is ON.
4) Display value at the moment of power OFF is memorized.</td></tr>
</table>

HOLD [HoLd]	**When memory protection setting is OFF** 
	1) Time progresses when INA input is ON. 2) Time progress stops while INA input is OFF. 3) When time reaches setting time, display value will stop and flash. 4) When reset input is applied, display value is initialized. 5) Resets when power is OFF.
	When memory protection setting is ON 
	1) Time progresses when INA input is ON. 2) Time progress stops while INA input is OFF. 3) When time reaches setting time, display value will stop and flash. 4) When reset input is applied, display value is initialized. 5) Display value the moment when power is OFF is memorized.

On Time Display [ont.d]	**When memory protection setting is OFF** 
	※ON time indicate mode of INA input 1) Time reset start operates when INA input turns ON. 2) Time progress stops while INA input is OFF. 3) When time progress stops and power is off, the display value is initialized. 4) If progress time is greater than setting time when INA input turns off, display value flashes and operation stops until reset signal is applied.
	When memory protection setting is ON 
	※ ON time indicate mode of INA input 1) Time reset start operates when INA input turns ON. 2) Time progress stops while INA input is OFF. 3) When time progress stops and power is off, the display value is memorized. 4) If progress time is greater than setting time when INA input turns off, display value flashes and operation stops until reset signal is applied.

Note

※TMR mark flashes during timer operating.

※TMR mark turn ON for timer stop or hold.

※The present value is zero blank format for highest unit.
E.g.)In case of time range is 99m59.99s and the present value is 00m04.05s, zero blank is applied for the highest unit, minute. In case of the below digit of decimal point, zero blank is not applied. Therefore, it displays "0.04.05".

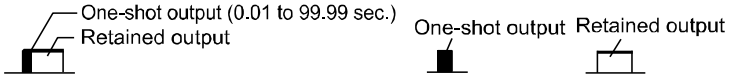
※In case of timer, it is available for PRESET to set as '0' and the output operates.

8.4 Timer '0' Time Setting

8.4.1 Available output mode to set '0' time setting

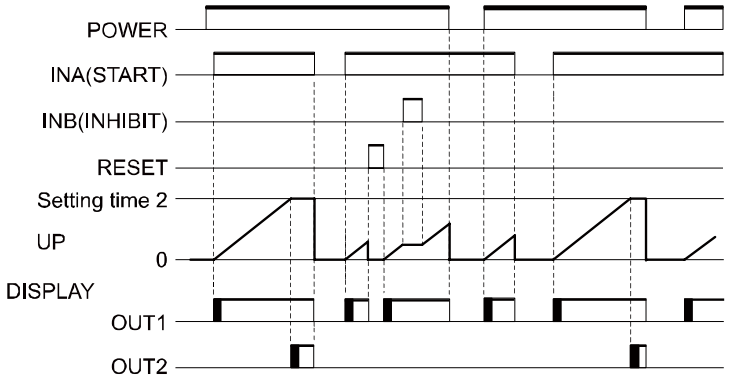
ond, ond.1, ond.2, nFd, nFd.1

8.4.2 Operation by each output mode ('0' time setting)

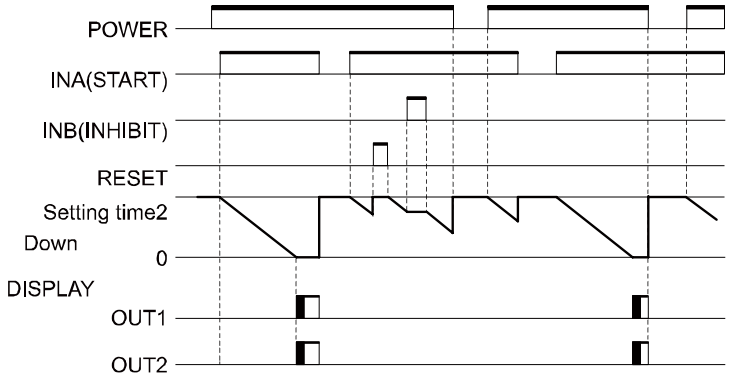


(1) OND (Signal ON Delay) mode [ond]

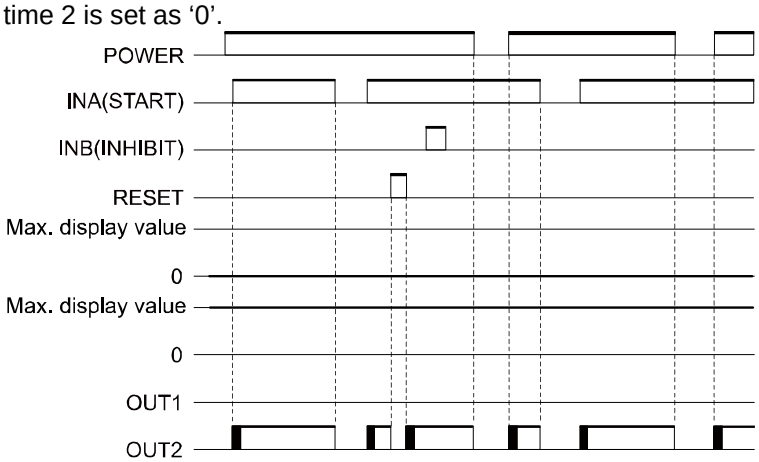
- Setting time 1 is set as '0'.
  1) UP mode

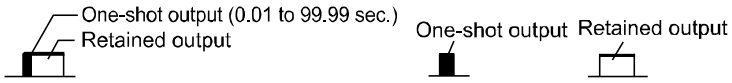


  2) DOWN mode



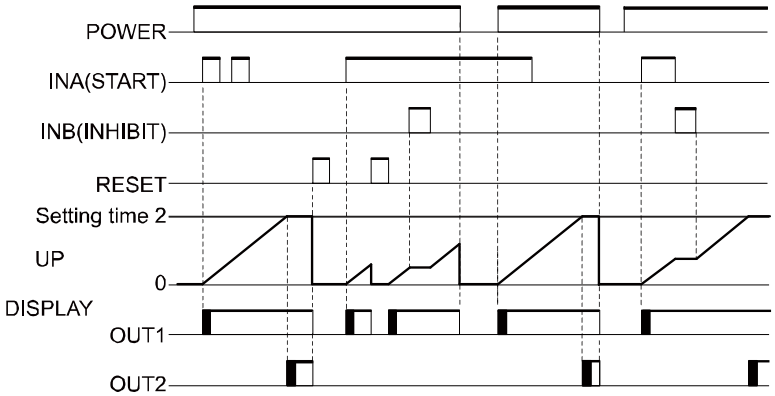
- Setting time 2 is set as '0'.



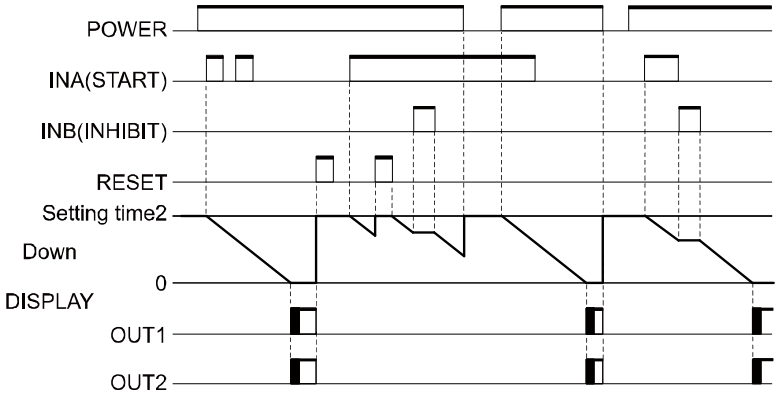


(2) OND.1 (Signal ON Delay 1) mode [ond.1]

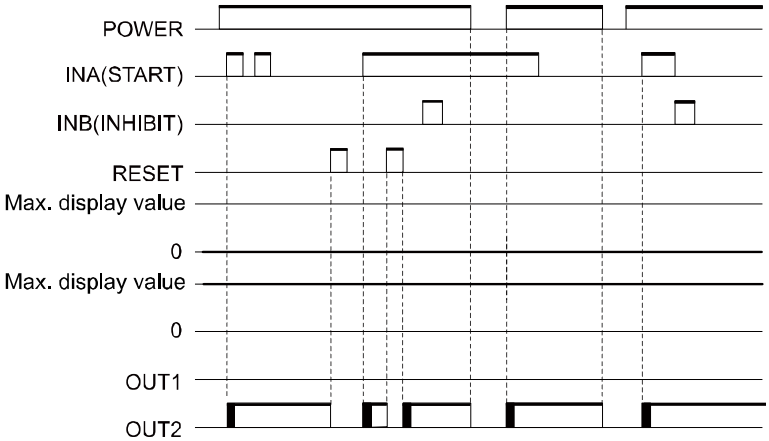
- Setting time 1 is set as '0'.
  1) UP mode

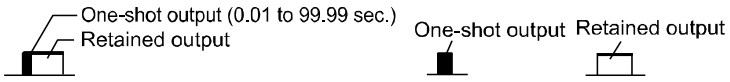


  2) DOWN mode



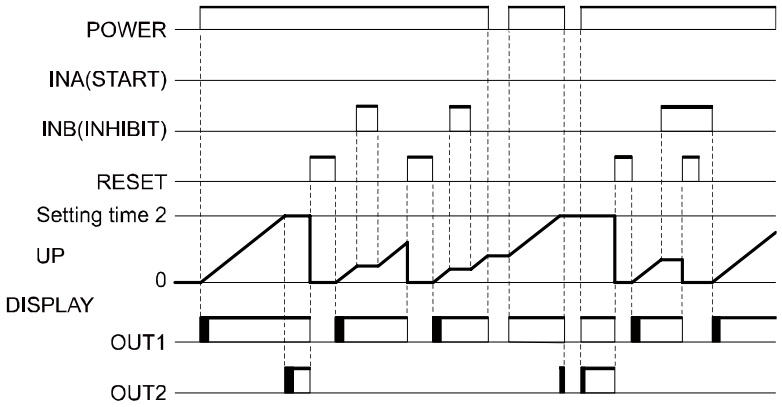
- Setting time 2 is set as '0'.



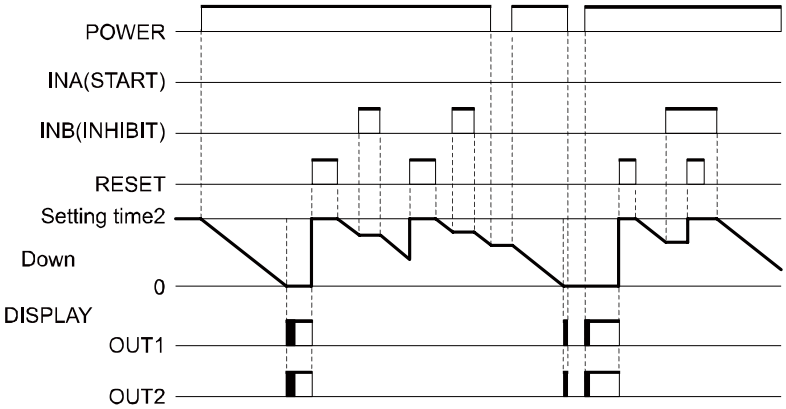


(3) OND.2 (Power ON Delay 2) mode [ond.2]

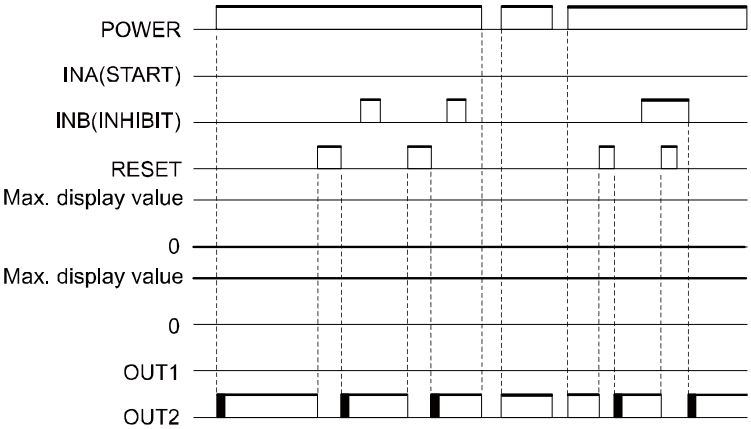
- Setting time 1 is set as '0'.
  1) UP mode

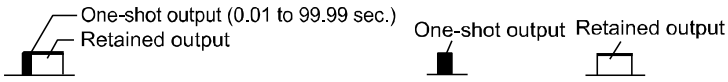


  2) DOWN mode



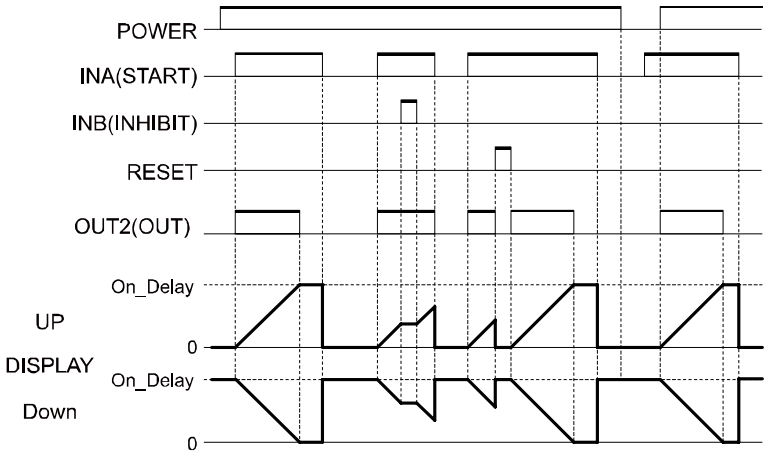
- Setting time 2 is set as '0'.



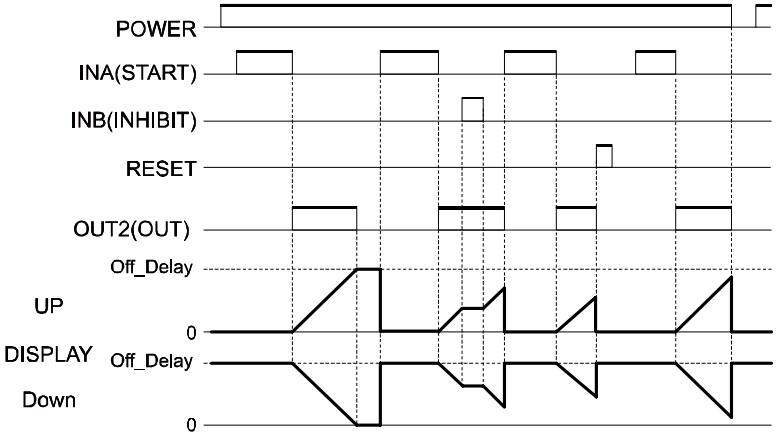


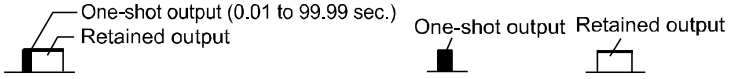
(4) NFD (ON-OFF Delay) mode [nFd]

1) Off_Delay setting time 1 is set as '0'.



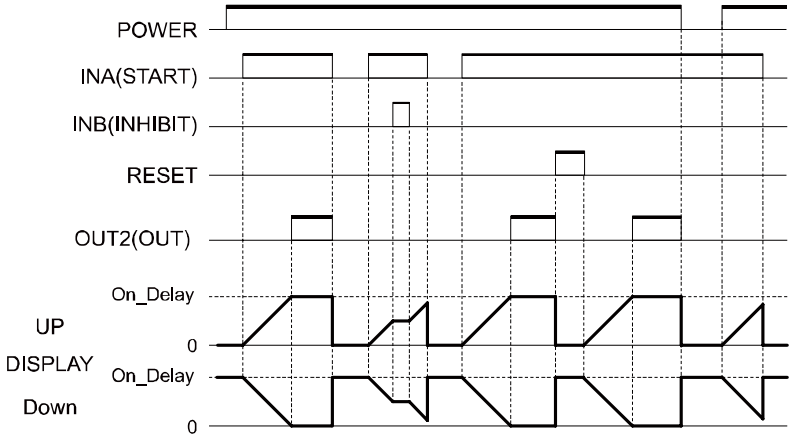
2) On_Delay setting time 1 is set as '0'.



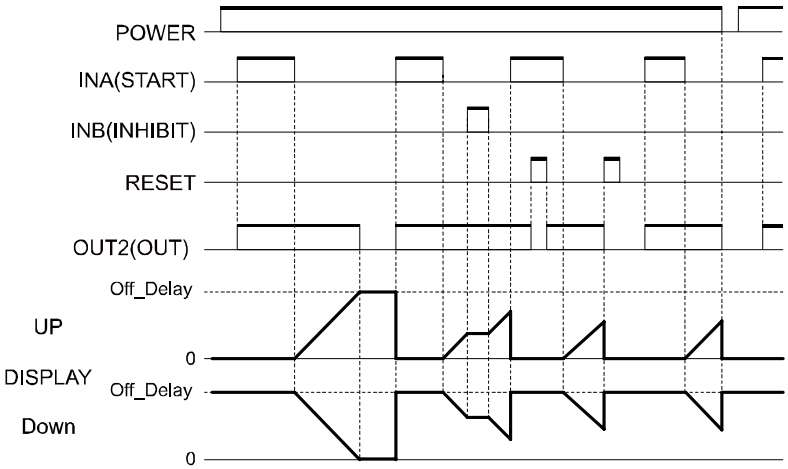


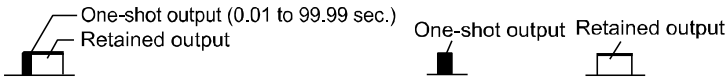
(5) OFD.1 (ON-OFF Delay 1) mode [nFd.1]

1) Off_Delay setting time 1 is set as '0'.



2) On_Delay setting time 1 is set as '0'.

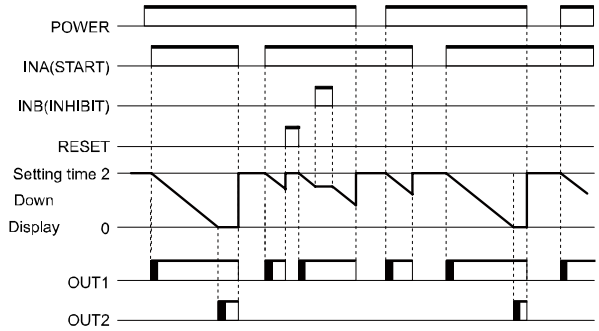




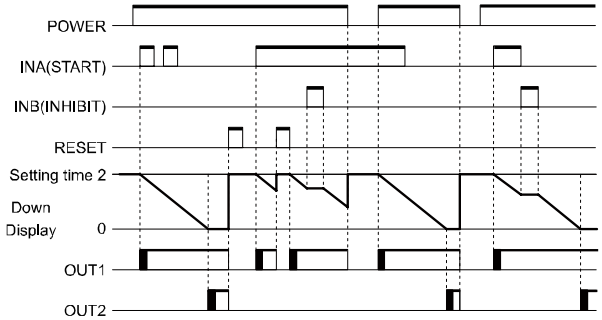
(6) When setting value 1(PRESET 1) is greater than setting value 2(PRESET 2), In case of OND[ond], OND.1[ond.1], OND.2[ond.2] output mode,

- UP mode: Timer setting value 1 (PRESET 1) is greater than setting value 2 (PRESET 2), OUT 1 output does not turn ON.
- DOWN mode: Timer setting value 1 (PRESET 1) is greater than setting value2 (PRESET 2), OUT1 output does not turn ON. The setting value 1(PRESET 1) is same as setting value 2 (PRESET 2), OUT1 output turns ON immediately when applied start signal.

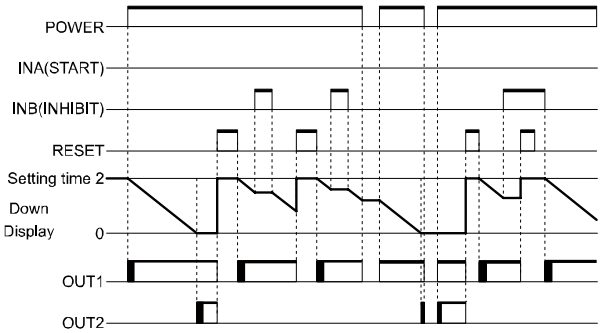
1) ond (Signal On Delay) output mode



2) ond.1 (Signal ON Delay 1) output mode



3) ond.2 (Signal On Delay 2) output mode



9 Factory Default

9.1 Common

Parameter	Factory default
LoCK	L.oFF
PRESET1	1000
PRESET2	5000

9.2 Counter

Parameter		Factory default
In		Ud-C
oUt.n		F
dSP.n		totAL
CPS		30
oUt2 [oUt.t]		HoLd (fixed)
oUt 1		00.10
dP		------
rSt		20
SIG		nPn
SC.dP	6-digit model	-.-----
	4-digit model	-.---
SCL	6-digit model	1.00000
	4-digit model	1.000
Strt		000000
dAtA		CLr

9.3 Timer

Parameter		Factory default
HoUr/Mi n/SEC	6-digit model	0.00 1s-999.999s
	4-digit model	0.00 1s-9.999s
U-d		UP
dSP.n		totAL
dAtA		CLr
oUt.n		ond
oUt2[oUt.t]		HoLd
oUt 1		00.10
SI G		nPn
I nt		20