

# Autonics COUNTER/TIMER CT SERIES

## M A N U A L

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

**Caution for your safety**

- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow:
  - Warning** Serious injury may result if instructions are not followed.
  - Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
  - caution: Injury or danger may occur under special conditions.

**Warning**

- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information required.  
It may result in fatal damage, fire or human injury
- This unit must be mounted on the Panel.  
It may cause electric shock.
- Do not connect terminals when it is power on.  
It may cause electric shock.
- Do not disassemble and modify this unit. Please contact us if it is required.  
It may cause electric shock and a fire.

**Caution**

- This unit shall not be used outdoors.  
It might shorten the life cycle of the product or cause electric shock.
- When wire connection, AWG 20(0.50mm<sup>2</sup>) should be used and screw bolt on terminal block with 0.74N-m to 0.90N-m strength.  
It may cause malfunction or a fire due to contact failure.
- Please observe the rated specifications.  
It might shorten the life cycle of the product and cause a fire.
- Do not use the load beyond the rated switching capacity of Relay contact.  
It may cause insulation failure, contact melt, contact failure, relay broken, fire etc.
- In cleaning the unit, do not use water or an organic solvents.  
It may cause electric shock or a fire.
- Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray of the sun, radiant heat, vibration, impact etc.  
It may cause a fire or explosion.
- Do not inflow dust or wire dregs into the unit.  
It may cause a fire or mechanical trouble.

**Ordering information**

CT 6 M - 2P 4 T

Item	Blank	None
Communication	T	RS485
Power supply	4	100-240VAC 50/60Hz
	2	24VAC 50/60Hz / 24-48VDC
Output	2P	Dual preset
	1P	Single preset
	I	Indicator
Size	S	DIN W48×H48mm
	Y	DIN W72×H36mm
	M	DIN W72×H72mm
Digit type	4	9999(4 Digit)
	6	999999(6 Digit)
	CT	Counter/Timer

\*4 Digit type does not exist in the indicator type.

\*Upgraded or added functions are seen in the shaded part.

**Specifications**

Series	CTS	CTY	CTM
Digit	4	6	6
Model	Dual Preset: CT4S-2P□□ Single Preset: CT4S-1P□□ Indicator: CT4S-I□□□	Dual Preset: CT6S-2P□□ Single Preset: CT6S-1P□□ Indicator: CT6S-I□□□	Dual Preset: CT6Y-2P□□ Single Preset: CT6Y-1P□□ Indicator: CT6Y-I□□□
Digit Size	Count value: 11mm Preset value: 8mm	Count value: 10mm Preset value: 7mm	Count value: 13mm Preset value: 9mm
Power supply	AC Power: 100-240VAC 50/60Hz AC/DC Power: 24VAC 50/60Hz / 24-48VDC	AC Power: Max. 12VA AC/DC Power: AC: Max. 10VA / DC: Max. 8W	AC Power: Max. 12VA AC/DC Power: AC: Max. 10VA / DC: Max. 8W
Allowable voltage range	90 to 110% of rated voltage(AC Power type)		
CPS of INA, INB	Selectable 1cps, 30cps, 1kcps, 5kcps, or 10kcps		
Min. input signal width	Counter: Reset signal: Selectable 1ms or 20ms	Timer: INA, INH, RESET: Selectable 1ms or 20ms	INA, RESET, INHIBIT, BATCH RESET: Selectable 1ms or 20ms
Input	Selectable voltage input or No-voltage input -Voltage input: input impedance: 5.4kΩ, 'H' level: 5-30VDC, 'L' level: 0-2VDC -No-voltage input: short-circuit impedance: Max. 1kΩ, Residual voltage: Max. 2VDC		
One-shot output	Selectable 0.01s to 99.99s		
Control output	Without com.: Contact output: Dual preset: SPST(1a) 2EA Single preset: SPDT(1c) 1EA Solid state output: Dual preset: 1NPN open collector Single preset: 1NPN open collector	Com.: Contact output: Dual preset: SPST(1a) 2EA Single preset: SPDT(1c) 1EA Solid state output: Dual preset: 2NPN open collector Single preset: 2NPN open collector	Capacity: Contact output: 250VAC 5A resistive load Solid state output: Max. 30VDC, Max. 100mA
External sensor power	12VDC ±10%, Max. 100mA		
Memory retention	10years(When using non-volatile semiconductor memory type)		
Timer	Repeat error, set error, voltage error, temperature error—Power ON Start: Max. ±0.01% ±0.05 sec —Signal Start: Max. ±0.01% ±0.03 sec		
Insulation resistance	Min. 100MΩ (at 500VDC megger)		
Dielectric strength	2,000VAC 50/60Hz for 1minute		
Noise resistance(AC Power)	±2kV the square wave noise(pulse width:1μs) by the noise simulator		
Vibration	Mechanical: 0.75mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z direction for 1 hour Malfunction: 0.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z direction for 10 minutes		
Shock	Mechanical: 300m/s <sup>2</sup> (Approx. 30G) 3 times at X, Y, Z direction Malfunction: 100m/s <sup>2</sup> (Approx. 10G) 3 times at X, Y, Z direction		
Relay Life cycle	Mechanical: Min. 10,000,000 times Electrical: Min. 100,000 times		
Protection	IP65(Front panel only)		
Environment	Ambient temperature: -10 to 55°C, Storage temperature: -25 to 65°C Ambient humidity: 35 to 85%RH, Storage humidity: 35 to 85%RH		
Approval	CE, RoHS		
Unit weight	Approx. 159g	Approx. 149g	Approx. 253g

\*Environment resistance is rated at no freezing or condensation.

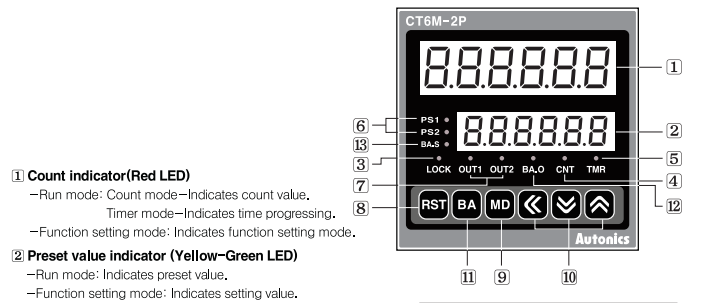
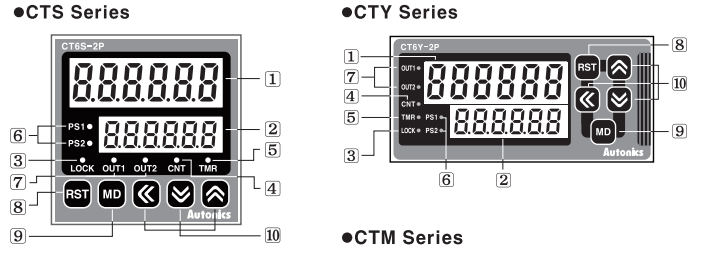
**Communication specification**

Protocol	Modbus RTU(16bit CRC)
Connection method	RS485
Application standard	Compliance with EIA RS485
Number of connections	31, it is available to set address 1 to 127
Communication method	Half Duplex
Synchronous method	Asynchronous
Communication distance	within max. 800m
Communication speed	2,400/4,800/9,600/19,200/38,400bps(Factory default: 9,600bps)
Response waiting time	5 to 99ms(Factory default: 20ms)
Start bit	1bit(Fixed)
Data bit	8bits(Fixed)
Parity bit	None, Even, Odd(Factory default: None)
Stop bit	1, 2bit(Factory default: 2bit)

**Upgraded functions**

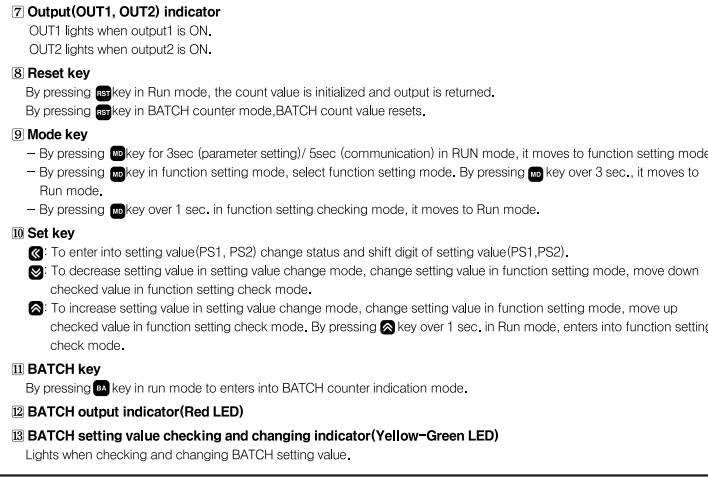
- Available to set the decimal point position of prescale value to 5 decimal place.
- Built-in Modbus communication function. (Communication model)
- Available to set the One-shot output time in 10ms, (0.01sec to 99.99sec)
- Increase contact capacity to 5A(CTS, CTM series).
- Available to set Count Start Point.(Initial value)
- Improved visibility with high luminance LED.
- Selectable memory protection function in the indicator.
- Added BATCH counter function(CTM series)
- Added Counter UP-1(Up-1)/UP-2(Up-2)/dn-1(Down-1)/dn-2(Down-2) input modes.
- Added Counter Total(TOTAL)/Hold(HOLD) operation modes in the indicator.
- Added Timer Total(TOTAL)/Hold(HOLD)/On Time Display(On Time Display) operation modes in the indicator.
- Added Timer Int.2(INT2)/NFD(NFD)/NFd.1(NFD.1)/NFd.2(NFD.2) output modes.
- Added Timer range 999,999s / 9999m59s / 99999.9h.

### Front panel identification



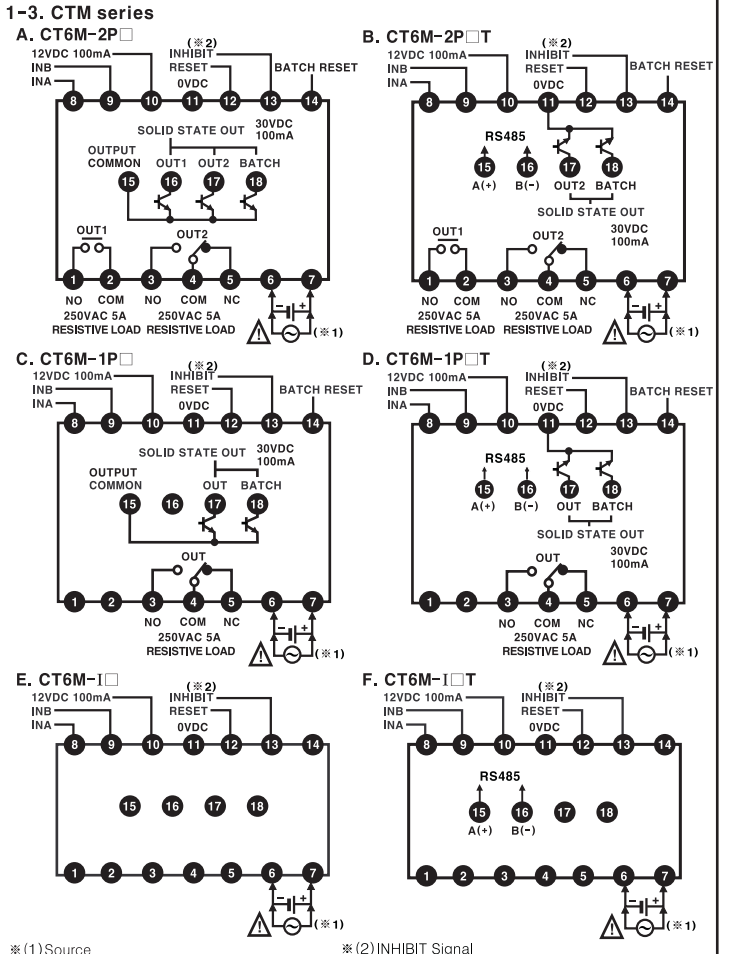
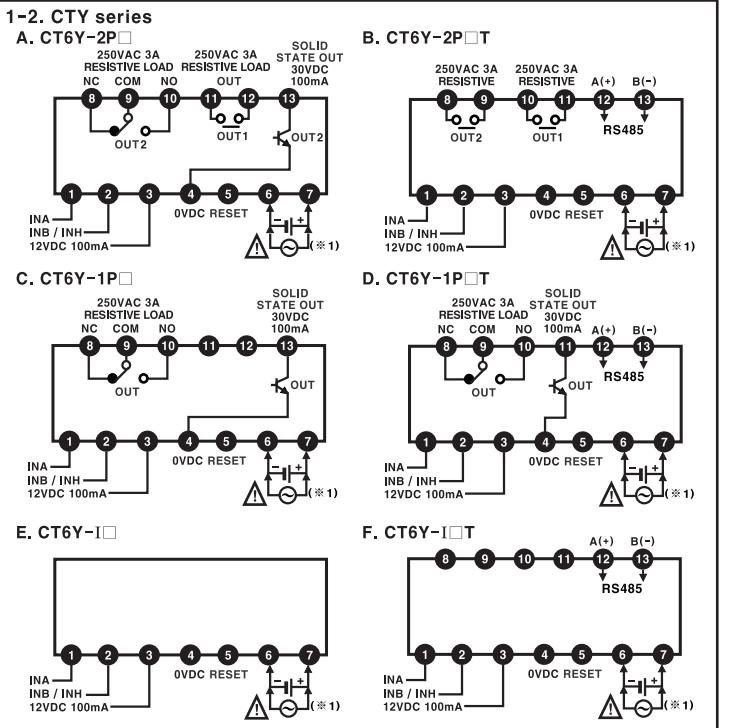
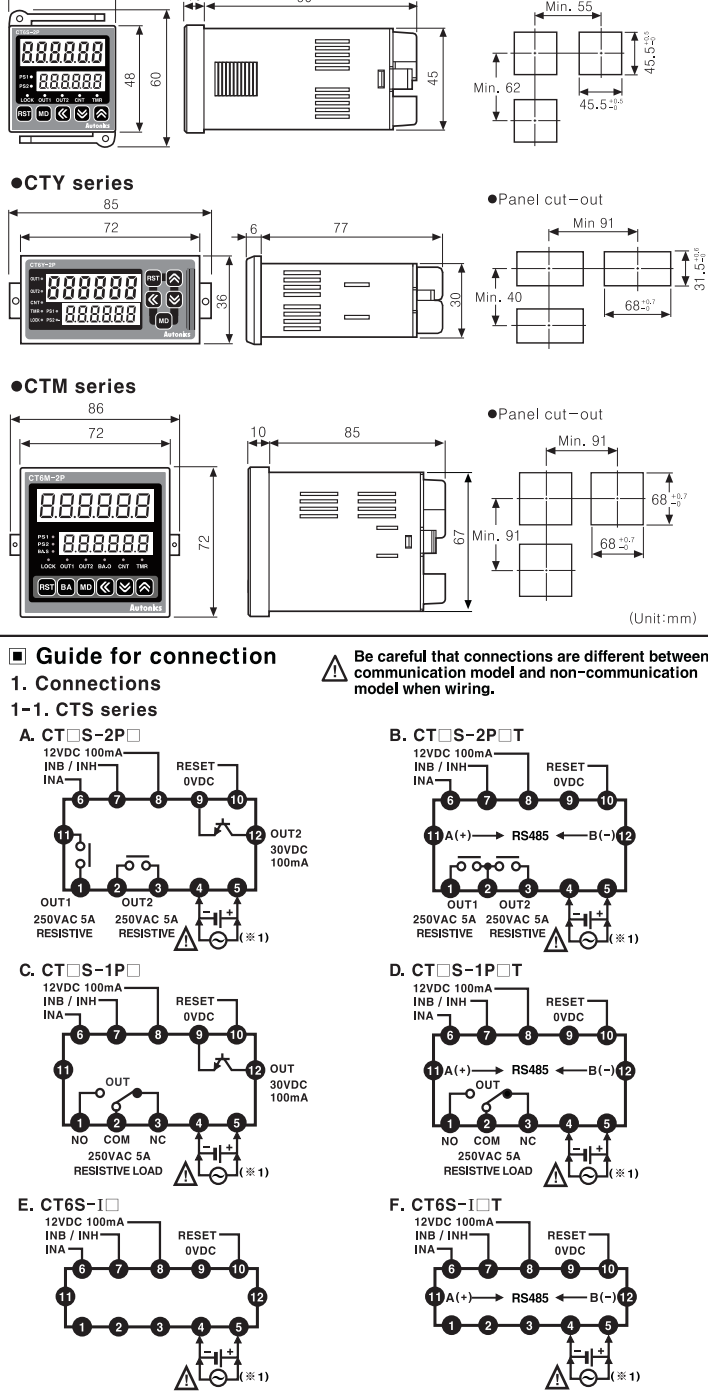
Model	Changed	Notice
CT6Y-1P	PS2→PS	There are no PS1, OUT1 LEDs.
CT6S-1P	PS2→PS	
CT4S-1P	OUT2→OUT	
CT6M-1P	OUT2→OUT	
CT6Y-1	PS2→PS	There are no PS1, OUT1 LEDs.
CT6S-1	PS2→PS	
CT6M-1	PS2→PS	

\*The indicator type does not exist in CT4S model.



### Guide for connection

Be careful that connections are different between communication model and non-communication model when wiring.

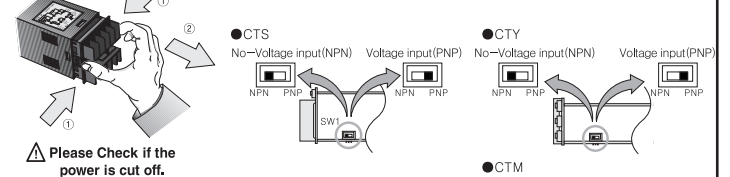


\* (1) Source  
-AC Power: 100-240VAC 50/60Hz  
-AC/DC Power: 24-48VDC, 24VAC 50/60Hz

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

### 2. Input and output connections

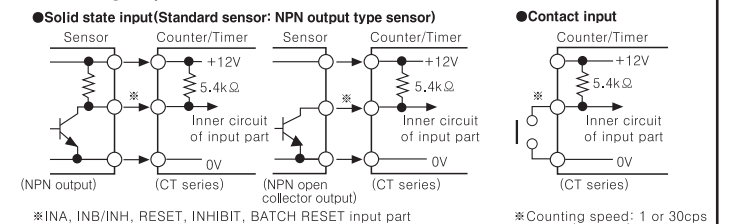
#### 2-1. Input logic Selection[No-voltage input(NPN)/Voltage input(PNP)]



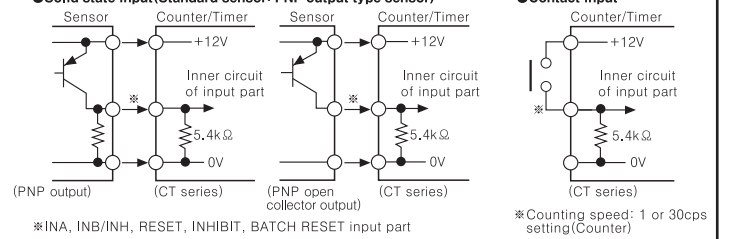
3. Select input logic by using input logic switch(SW1) inside Counter/Timer.  
4. Push a case in the opposite direction of 2-2.  
5. Then supply the power to Counter/Timer.

#### 2-2. Input connection

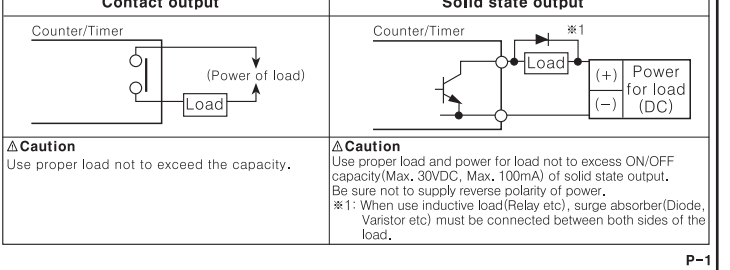
##### A. No-voltage input(NPN)



##### B. Voltage input(PNP)



#### 2-3. Output connection





# Timer mode

## 1. Parameter setting

Setting mode	How to set
Counter/Timer (C-T)	CoUn ← ti nE * CoUn: COUNTER ti nE: TIMER
Timer range (HoUr / n / s / EC)	<p><b>6Digit type</b></p> <p>999999 → 999999 → 999999 → 999999 → 999999 → 999999</p> <p>0.001s to 999.999s, 0.01s to 9999.99s, 0.1s to 99999.9s, 1s to 999999s, 0.01s to 99m59.99s</p> <p>HoUr → 999999 → 999999 → 999999 → 999999 → 999999</p> <p>0.1h to 99999.9h, 0.1s to 999m59.9s</p> <p>H n → 999999 → 999999 → 999999 → 999999 → 999999</p> <p>1m to 9999h59m, 1s to 99h59m59s, 1m to 999999m, 0.1m to 99999.9m, 1s to 9999m59s</p> <p><b>4Digit type</b></p> <p>9999 → 9999 → 9999 → 9999 → 9999 → 9999</p> <p>0.001s to 9.999s, 0.01s to 99.99s, 0.1s to 999.9s, 1s to 9999s, 1s to 99m59s</p> <p>HoUr → 9999 → 9999 → 9999 → 9999 → 9999</p> <p>1h to 9999h, 1m to 99h59m, 9999m, 0.1m to 999.9m</p>
UP/DOWN mode (U-d)	UP ↔ dn * UP: Time proceeds from 0 to the setting value. * dn: Time proceeds from the setting value to 0.
Indication mode (dSPn)	to tRL ↔ HoLd ↔ ont.d * Used for the indicator only. * It is added that the feature which set the setting time when selecting HoLd or ont.d (Refer to 3. Timer operation for the indicator).
Memory protection (dRtR)	CLr ↔ rEC * Used for the indicator only. * CLr: Initializes time value when power is off. * rEC: Memorizes time value at the moment of power off.
Output mode (oUt.n)	ond ↔ ond.1 ↔ ond.2 ↔ FLK.1 ↔ FLK.2 ↔ i n t.1 i n t.1 ↔ nFd.1 ↔ nFd.2 ↔ oFd.1 ↔ i n t.2 ↔ i n t.1
OUT2 output time (oUt.2)	<p>☑ key: To shift flashing digit position of OUT2 output time value.</p> <p>☑ key: To change OUT2 output time value.</p> <p>* Set OUT2 one-shot output time.</p> <p>* Setting range: 0.01 to 99.99sec.</p> <p>* HoLd is displayed by pressing ☑ key 4 times.</p>
OUT1 output time (oUt.1)	<p>☑ key: To shift flashing digit position of OUT1 output time value.</p> <p>☑ key: To change OUT1 output time value.</p> <p>* Set OUT1 one-shot output time.</p> <p>* Setting range: 0.01 to 99.99sec., Hold</p> <p>* HoLd is displayed by pressing ☑ key 4 times.</p>
Input logic (SiG)	nPn: No-Voltage input * Check input logic value (PNP, NPN). PnP: Voltage input
Input signal time (I n t)	<p>1 ↔ 20 [Unit: ms]</p> <p>* CTS/CTY: Set min. external INA, INH, RESET signal width.</p> <p>* CTM: Set min. external INA, RESET, INHIBIT, BATCH RESET signal width.</p>
Lock key (LoLk)	<p>LoFF ↔ LoL1 LoL1: Locks ☑ key. (Front Lock LED ON)</p> <p>LoL2 ↔ LoL3 LoL2: Locks ☑, ☑, ☑ keys. (Front Lock LED ON)</p> <p>LoL3: Locks ☑, ☑, ☑, ☑ keys. (Front Lock LED ON)</p>

## 2. Output operation mode

Output mode	Time chart	Operation
ond (OND)		<p>1) Time starts when INA signal turns on.</p> <p>When INA signal turns off, time resets.</p> <p>2) When INA signal is on:</p> <p>Power ON Time Start is operated</p> <p>Power OFF Time Start is operated</p> <p>3) Control output operates as retained or one-shot output.</p>
ond.1 (OND.1)		<p>1) Time starts when INA signal turns on, if INA signal is applied repeatedly, only initial signal is recognized.</p> <p>2) When INA signal is on:</p> <p>Power ON Time Start is operated</p> <p>Power OFF Time Start is operated</p> <p>3) Control output operates as retained or one-shot output.</p>
ond.2 (OND.2)		<p>1) Time starts when power turns on. (There is no INA function.)</p> <p>2) Time resets when reset turns on. Time starts when reset turns off.</p> <p>3) Control output operates as retained or one-shot output.</p> <p>4) It memorizes display value at the moment of power off.</p>
FLK (FLK)		<p>1) Time starts when INA signal turns on.</p> <p>2) When INA signal is on:</p> <p>Power ON Time Start is operated</p> <p>Power OFF Time Start is operated</p> <p>3) Control output operates as retained output, output turns off for the T.off time and turns on for the T.on time repeatedly.</p> <p>Ta + Tb = T.off setting time</p> <p>4) The T.on time and T.off time must be set individually.</p> <p>5) In case of using the contact output, min. setting time must be set over 100ms.</p>

FLK.1 (FLK.1)		<p>1) Time starts when INA signal turns on.</p> <p>2) When INA signal is on:</p> <p>Power ON Time Start is operated</p> <p>Power OFF Time Start is operated</p> <p>3) Control output operates as retained output.</p> <p>4) In case of using the contact output, min. setting time must be set over 100ms.</p>
FLK.2 (FLK.2)		<p>1) Time starts when INA signal turns ON and the display value at the moment when power is off is memorized.</p> <p>2) When INA signal is on:</p> <p>Power ON Time Start is operated</p> <p>Power OFF Time Start is operated</p> <p>3) Control output operates as retained output.</p> <p>4) Control output will be reversed when it reaches setting time. (At the initial start, OUT2 control output is OFF.)</p> <p>5) In case of using the contact output, min. setting time must be set over 100ms.</p>
INT.1 (INT.1)		<p>1) Control output turns ON and time starts when INA signal turns ON.</p> <p>2) When INA signal is on:</p> <p>Power ON Time Start is operated</p> <p>Power OFF Time Start is operated</p> <p>3) When it reaches setting time, indication value and control output are reset automatically.</p> <p>4) Control output is ON when time is progressing.</p> <p>5) INA input is ignored while time is progressing.</p>
INT.2 (INT.2)		<p>1) Time starts when INA input is ON and resets when INA input is OFF.</p> <p>2) INA input is ON, OUT1 output is ON during T1 (HOLD) or t1.</p> <p>3) When it reaches setting time1, display value resets and OUT2 output is ON during T2 (HOLD) or t2 output time.</p> <p>* Output turns OFF when reaching the setting time even if one-shot time is longer than setting time.</p>
oFd (OFD)		<p>1) If INA is ON, control output remains ON. (except when power is off and reset is on)</p> <p>2) When INA signal is OFF, time processes.</p> <p>3) When it reaches setting time, indication value and control output are reset automatically.</p>
nFd (NFD)		<p>1) When INA input is ON, output is ON and time is progressing, then output is OFF after On_Delay time.</p> <p>2) When INA input is OFF, output is ON and time is progressing, then output is OFF after Off_Delay time.</p> <p>3) If INA input is OFF within On_Delay time, step 2 starts again.</p> <p>4) If INA input is ON within Off_Delay time, step 1 starts again.</p>
nFd.1 (NFD.1)		<p>1) When INA input turns ON, time progresses and output turns ON after On_Delay time.</p> <p>2) When INA input turns OFF, time progresses and output turns OFF after Off_Delay time.</p> <p>3) If INA input turns OFF within On_Delay time, output will turn ON and step 2 operate.</p> <p>4) If INA input turns ON within Off_Delay time, output will turn OFF and step 1 operate.</p>
INTG (INTG)		<p>1) Time is progressing while INA input is ON.</p> <p>2) Time progress stops while INA input is OFF.</p> <p>3) When it reaches the setting time, output is ON.</p>

## 3. Timer operation for the indicator

to tRL (TOTAL)		<p>1) Time starts when INA input is ON.</p> <p>2) Setting value is initialized when Reset input is ON.</p> <p>3) Time progress stops when INHIBIT input is ON.</p> <p>4) Resets when power is OFF.</p>
HoLd (HOLD)		<p>1) Time starts when INA input is ON.</p> <p>2) Time progress stops while INHIBIT input is ON.</p> <p>3) Time progress stops while INHIBIT input is ON.</p> <p>4) Display value at the moment of power OFF is memorized.</p>
ont.d (On Time Display)		<p>* ON time indicate mode of INA input</p> <p>1) Time reset start operates when INA input turns ON.</p> <p>2) Time progress stops while INA input is OFF.</p> <p>3) When time reaches setting time, display value will stop and flash.</p> <p>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.</p>
		<p>* ON time indicate mode of INA input</p> <p>1) Time reset start operates when INA input turns ON.</p> <p>2) Time progress stops while INA input is OFF.</p> <p>3) When time progress stops and power is off, the display value is memorized.</p> <p>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.</p>

## 4. Timer '0' time setting

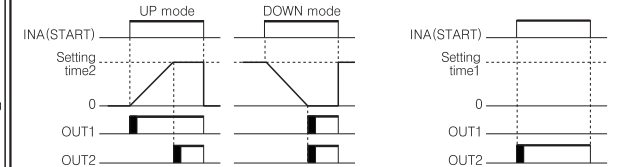
### 4-1. Available output operation mode to set '0' time setting

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

### 4-2. Operation according to output mode (at 0 time setting)

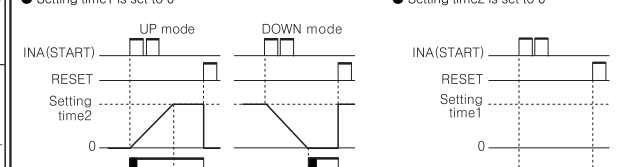
#### A. OND (Signal ON Delay) mode (ond)

- Setting time1 is set to 0
- Setting time2 is set to 0



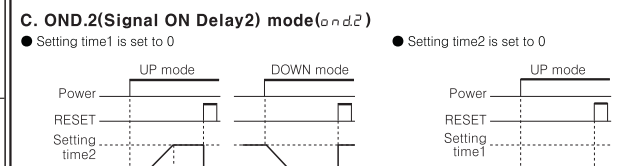
#### B. OND.1 (Signal ON Delay 1) mode (ond.1)

- Setting time1 is set to 0
- Setting time2 is set to 0



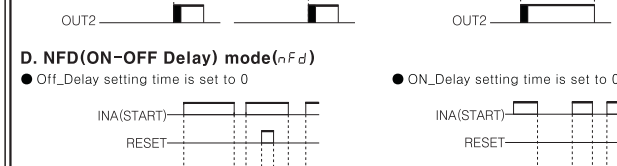
#### C. OND.2 (Signal ON Delay 2) mode (ond.2)

- Setting time1 is set to 0
- Setting time2 is set to 0



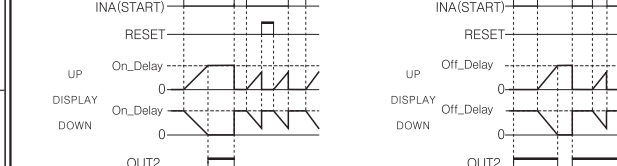
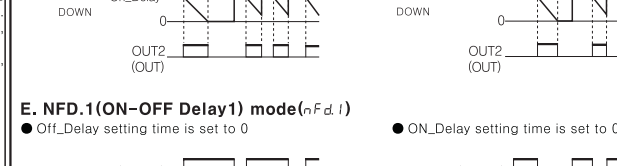
#### D. NFD (ON-OFF Delay) mode (nFd)

- Off\_Delay setting time is set to 0
- ON\_Delay setting time is set to 0



#### E. NFD.1 (ON-OFF Delay 1) mode (nFd.1)

- Off\_Delay setting time is set to 0
- ON\_Delay setting time is set to 0



## 5. Setting value1 (PS1) is greater than Setting value2 (PS2)

In OND (ond), OND.1 (ond.1) or OND.2 (ond.2) output mode

-UP mode: When the timer setting value1 is greater than the setting value 2, OUT1 output does not turn ON.

-DOWN mode: When the timer setting value 1 is greater than the setting value 2, OUT1 output does not turn ON.

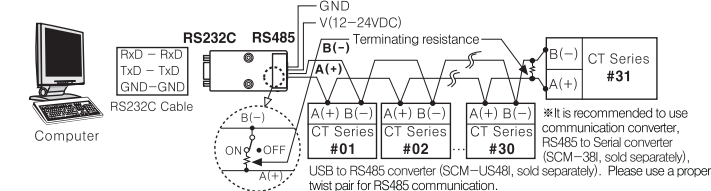
If the setting value 1 is same as the setting value 2 and START signal is applied, OUT1 output turns ON immediately.

## Communication mode

### 1. Parameter setting

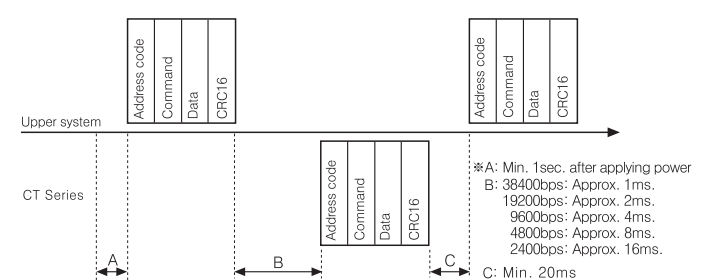
Setting mode	How to set
Com. address (Addr)	Ⓜ: To shift flashing digits of Com. address. *Setting range of com. address: 1 to 127 Ⓜ: To change the flashing digits. *If the same address is applied during multi-com., it will not work correctly.
Com. speed (bPS)	24 ← 48 ← 96 ← 192 ← 384 *2400/4800/9600/19200/38400bps
Com. parity (Prty)	nonE → EUE → odd *nonE: None EUE: Even number odd: Odd number
Com. stop bit (StP)	1 → 2
Response waiting time (rStt)	Ⓜ: To shift flashing digits position of com. response waiting time. Ⓜ: To change the flashing digits position value.
Com. write (CnW)	E n A → d i 5 R *E n A: Permits com. write(Enable) d i 5 R: Prohibits com. write(Disable)

### 2. Application of system organization



### 3. Communication control ordering

- The communication method is Modbus RTU(PI-MBUS-300-REV.J).
- After 1sec. of power supply into the high order system, it starts to communicate.
- Initial communication will be started by the high order system. When a command comes out from the high order system, CT series will respond.



### 4. Communication command and block

The format of query and response

#### 4-1. Read Coil Status(Func 01 H), Read Input Status(Func 02 H)

##### 1) Query(Master)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

##### 2) Response(Slave)

Slave Address	Function	Byte Count	Data			Error Check(CRC 16)	
			High	Low	High	Low	Low
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

#### 4-2. Read Holding Registers(Func 03 H), Read Input Registers(Func 04 H)

##### 1) Query(Master)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

##### 2) Response(Slave)

Slave Address	Function	Byte Count	Data			Error Check(CRC 16)	
			High	Low	High	Low	Low
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

#### 4-3. Force Single Coil(Func 05 H)

##### 1) Query(Master)

Slave Address	Function	Coil Address		Force Data		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

##### 2) Response(Slave)

Slave Address	Function	Coil Address		Force Data		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

#### 4-4. Preset Single Register(Func 06 H)

##### 1) Query(Master)

Slave Address	Function	Register Address		Preset Data		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

##### 2) Response(Slave)

Slave Address	Function	Register Address		Preset Data		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

#### 4-5. Preset Multiple Registers(Func 10 H)

##### 1) Query(Master)

Slave Address	Function	Starting Address		No. of Register		Byte Count		Data		Error Check(CRC 16)	
		High	Low	High	Low	High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

##### 2) Response(Slave)

Slave Address	Function	Starting Address		No. of Register		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

#### 4-6. Application

Read Coil Status(Func 01 H)  
Master reads OUT2 00002(0002H) to 00003(0002H), OUT1 output status(ON:1, OFF:0) from the Slave(Address 01).

##### 1) Query(Master)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
01 H	01 H	00 H	01 H	00 H	02 H	0B H	0B H

On slave side OUT2 00003(0002H): OFF, OUT1 00002(0001H): ON

##### 2) Response(Slave)

Slave Address	Function	Byte Count	Data (00003 to 00001)		Error Check(CRC 16)		
			High	Low	High	Low	Low
01 H	01 H	01 H	00 H	02 H	D0 H	49 H	49 H

##### Read Input Register (Func 04 H)

Master reads preset value 21004(03EBH) to 21005(03ECH) of counter/timer, Slave (Address 15).

##### 1) Query(Master)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC 16)	
		High	Low	High	Low	Low	High
0F H	04 H	03 H	EB H	00 H	02 H	00 H	95 H

In case that the present value is 123456(0001 E240 H) in slave side, 31004(03EBH): E240 H, 31005(03ECH): 001H

##### 2) Response(Slave)

Slave Address	Function	Byte Count	Data			Error Check(CRC 16)			
			High	Low	High	Low	High	Low	
0F H	04 H	04 H	E2 H	40 H	00 H	01 H	E2 H	28 H	28 H

## 5. Modbus Mapping Table

### 5-1. Reset/Output

No.(Address)	Func	Explanation	Setting range	Notice
00001(0000)	01/05	Reset	0:OFF 1:ON	
00002(0001)	01	OUT2 output	0:OFF 1:ON	
00003(0002)	01	OUT1 output	0:OFF 1:ON	
00004(0003)	01	BATCH output	0:OFF 1:ON	For BATCH output model
00005(0004)	01/05	BATCH resets	0:OFF 1:ON	For BATCH output model

### 5-2. Terminal input status

No.(Address)	Func	Explanation	Setting range	Notice
10001(0000)	02	INA input status	0:OFF 1:ON	Terminal input status
10002(0001)	02	INB input status	0:OFF 1:ON	Terminal input status
10003(0002)	02	INHIBIT input status	0:OFF 1:ON	Terminal input status
10004(0003)	02	RESET input status	0:OFF 1:ON	Terminal input status
10005(0004)	02	BATCH RESET input status	0:OFF 1:ON	Terminal input status

### 5-3. Product Information

No.(Address)	Func	Explanation	Setting range	Notice
30001 to 30100	04	Reserved		
30101(0064)	04	Product number L		
30102(0065)	04	Product number H		
30103(0066)	04	Hardware version		
30104(0067)	04	Software version		
30105(0068)	04	Model no. 1		"CT"
30106(0069)	04	Model no. 2		"GM"
30107(006A)	04	Model no. 3		"-2"
30108(006B)	04	Model no. 4		"PT"
30109(006C)	04	Reserved		
30110(006D)	04	Reserved		
30111(006E)	04	Reserved		
30112(006F)	04	Reserved		
30113(0070)	04	Reserved		
30114(0071)	04	Reserved		
30115(0072)	04	Reserved		
30116(0073)	04	Reserved		
30117(0074)	04	Reserved		
30118(0075)	04	Coil Status Start Address	0000	
30119(0076)	04	Coil Status Quantity		
30120(0077)	04	Input Status Start Address	0000	
30121(0078)	04	Input Status Quantity		
30122(0079)	04	Holding Register Start Address	0000	
30123(007A)	04	Holding Register Quantity		
30124(007B)	04	Input Register Start Address	0064	
30125(007C)	04	Input Register Quantity		

### 5-4. Monitoring data

No.(Address)	Func	Explanation	Setting range	Notice
31001(03E8)	04	BA.O LED display status	0:OFF 1:ON	Bit 5
		OUT2 LED display status	0:OFF 1:ON	Bit 6
		OUT1 LED display status	0:OFF 1:ON	Bit 7
		B.A.S LED display status	0:OFF 1:ON	Bit 10
		LOCK LED display status	0:OFF 1:ON	Bit 11
		PS2 LED display status	0:OFF 1:ON	Bit 12
		PS1 LED display status	0:OFF 1:ON	Bit 13
		TMR LED display status	0:OFF 1:ON	Bit 14
		CNT LED display status	0:OFF 1:ON	Bit 15
31002(03E9)	04	Present value of BATCH counter	0 to 999999	For BATCH output model
31004(03EB)	04	Counter	6Digit type: -99999 to 999999 4Digit type: -999 to 9999 Timer: Within time setting range	Use counter and timer in common
31005(03EC)	04	Present value of counter/timer	Counter: decimal point of display value Timer: Time range	Counter: 40058 Data Timer: 40102 Data
31006(03ED)	04	Display unit	Counter: decimal point of display value Timer: Time range	Counter: 40058 Data Timer: 40102 Data
31007(03EE)	04	PS(2) setting value	Counter: 6Digit type: -99999 to 999999 4Digit type: -999 to 9999 Timer: Within time setting range	Use counter and timer in common
31008(03EF)	04	PS1 setting value	Counter: 6Digit type: -99999 to 999999 4Digit type: -999 to 9999 Timer: Within time setting range	Use counter and timer in common
31009(03F0)	04	PS1 setting value	Counter: 6Digit type: -99999 to 999999 4Digit type: -999 to 9999 Timer: Within time setting range	Use counter and timer in common
31010(03F1)	04	Setting value of BATCH counter	0 to 999999	Use counter and timer in common
31011(03F2)	04	Setting value of BATCH counter	0 to 999999	Use counter and timer in common
31012(03F3)	04	Checking the input logic	0: NPN, 1: PNP	
31013(03F4)	04	Checking the input logic	0: NPN, 1: PNP	

### 5-5. Preset value setting group

No.(Address)	Func	Explanation	Setting range	Notice
40001(0000)	03/06/16	PS2 setting value	Counter: 6Digit type: 0 to 999999 4Digit type: 0 to 9999 Timer: within time setting range	Use counter and timer in common
40002(0001)	03/06/16	PS setting value	Counter: 6Digit type: 0 to 999999 4Digit type: 0 to 9999 Timer: within time setting range	Use counter and timer in common
40003(0002)	03/06/16	PS1 setting value	Counter: 6Digit type: 0 to 999999 4Digit type: 0 to 9999 Timer: within time setting range	Use counter and timer in common
40004(0003)	03/06/16	BATCH counter setting value	0 to 999999	Use counter and timer in common
40005(0004)	03/06/16	BATCH counter setting value	0 to 999999	Use counter and timer in common
40006(0005)	03/06/16	BATCH counter setting value	0 to 999999	Use counter and timer in common

### 5-6. Function setting mode\_Counter group

No.(Address)	Func	Explanation	Setting range	Notice
40051(0032)	03/06/16	Counter/Timer(-t)	0: CoUn 1: t AE	Use counter and timer in common
40052(0033)	03/06/16	Input mode(i n)	0: UP 1: UP-1 2: UP-2 3: d 4: dn-1 5: dn-2 6: dn-3 7: dn-4 8: dn-5 9: dn-6 10: dn-7 11: dn-8 12: dn-9 13: dn-10	
40053(0034)	03/06/16	Indication mode(i n)	0: t o t RL 1: HoL d	For the indicator
40054(0035)	03/06/16	Output mode(o ut)	0: F 1: n 2: P 3: r 4: v 5: P 6: r 7: n 8: d 9: t 10: d	
40055(0036)	03/06/16	Maximum counting speed (CPS)	0: 1 2: 1E 3: 1D 4: 10E 5: 1D 6: 3E 7: 3E 8: 3E 9: 3E 10: 3E 11: 3E 12: 3E 13: 3E 14: 3E 15: 3E	
40056(0037)	03/06/16	OUT2(OUT) output time	000 i to 9999 Unit: ×10ms	
40057(0038)	03/06/16	OUT1 output time	000 i to 9999 Unit: ×10ms	
40058(0039)	03/06/16	Decimal point (dP)	0: - - - - - 2: - - - - - 4: - - - - - 5: - - - - - 6: - - - - - 7: - - - - - 8: - - - - - 9: - - - - -	4Digit type: 0: - - - - - 1: - - - - - 2: - - - - - 3: - - - - -
40059(003A)	03/06/16	Min. reset time(-St)	0: 1 2: 1D Unit: ms	
40060(003B)	03/06/16	Prescale decimal point position (SCL)	1: - - - - - 2: - - - - - 3: - - - - - 4: - - - - - 5: - - - - - 6: - - - - - 7: - - - - - 8: - - - - - 9: - - - - -	4Digit type: 1: - - - - - 2: - - - - - 3: - - - - -
40061(003C)	03/06/16	Prescale value(SCL)	6Digit type: 0.0000 1 to 999999 4Digit type: 0.00 1 to 9999	Connected with prescale decimal point position
40062(003D)	03/06/16	Start value(St-rt)	6Digit type: 000000 to 999999 4Digit type: 0000 to 9999	Connected with decimal point position of display value
40063(003E)	03/06/16	Memory protection(dRtR)	0: CLr 1: rEC	
40065(0040)	03/06/16	Memory protection(dRtR)	0: CLr 1: rEC	
40066(0041)	03/06/16	Lock key(L o c k)	0: LoFF 1: LoC 2: LoC 3: LoC 3	Use counter and timer in common

### 5-7. Function setting mode\_Timer group

No.(Address)	Func	Explanation	Setting range	Notice
40101(0064)	03/06/16	Count/Timer(-t)	0: CoUn 1: t AE	Use counter and timer in common
40102(0065)	03/06/16	Time range (HoUr / n i n S E C)	4Digit type: 0: 0.001s to 9.999s 5: 0.1m to 999.9m 1: 0.01s to 99.99s 6: 1m to 9999m 2: 0.1s to 999.9s 7: 1m to 99959m 3: 1s to 9999s 8: 1h to 9999h 4: 1s to 99m59s 9: 1s to 99m59s 5: 0.1s to 99m59.9s 10: 1m to 9999m59s 11: 0.1h to 9999.9h	
40103(0066)	03/06/16	Up/Down mode (i-d)	0: ond 5: FLt 6: 9: oFd 1: ond 1 6: i nt 10: nFd 2: ond2 7: i nt 11: nFd 1 3: FLt 8: i nt 12: i ntG 4: FLt 1	Use counter and timer in common
40104(0067)	03/06/16	Output mode (o ut)	0: F 1: n 2: P 3: r 4: v 5: P 6: r 7: n 8: d 9: t 10: d	
40105(0068)	03/06/16	OUT2(OUT) output time	000 i to 9999, 0: HOLD Unit: ×10ms	
40106(0069)	03/06/16	OUT1 output time	000 i to 9999, 0: HOLD Unit: ×10ms	
40107(006A)	03/06/16	Input signal time (i nt)	0: i 1: 1D Unit: ms	
40108(006B)	03/06/16	Memory protection (dRtR)	0: CLr 1: rEC	Use counter and timer in common
40109(006C)	03/06/16	Lock key (L o c k)	0: LoFF 1: LoC 2: LoC 3: LoC 3	Use counter and timer in common
40110(006D)	03/06/16	Indication mode (i n)	0: t o t RL 1: HoL d 2: o n t d	For the indicator

### 5-8. Function setting mode\_Communication group

No.(Address)	Func	Explanation	Setting range	Notice
40151(0096)	03/06/16	Com. address (Addr)	1 to 127	
40152(0097)	03/06/16	Com. speed (bPS)	0: 24 1: 48 2: 96 3: 192 4: 384 Unit: ×100bps	
40153(0098)	03/06/16	Com. parity (Prty)	0: nonE 1: EUE 2: odd	
40154(0099)	03/06/16	Stop bit (StP)	0: 1 1: 2	
40155(009A)	03/06/16	Response waiting time (-Stt)	05 to 99 Unit: ms	
40156(009B)	03/06/16	Com. writing (CnW)	0: E n A 1: d i 5 R	

## 6. Exception processing

### 6-1. When communication error occurs, the highest bit of received function is set to 1, then sends response command and transmits Exception code.

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