

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 Panel.
It may give an electric shock.
- Do not connect terminals when it is power on.
It may give an electric shock.
- Do not disassemble and modify this unit, when it requires. If needs, please contact us.
It may give an electric shock and cause a fire.

Caution

- This unit shall not be used outdoors.
It might shorten the life cycle of the product or give an electric shock.
- When wire connection, AWG 20(0.50mm²) should be used and screw bolt on terminal block with 0.74N-m to 0.90N-m strength.
It may result in malfunction or fire due to contact failure.
- Please observe specification rating.
It might shorten the life cycle of the product and cause a fire.
- Do not use the load beyond 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 might cause an electric shock or fire that will result in damage to the product.
- 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 explosion.
- Do not inflow dust or wire dregs into inside of this unit.
It may cause a fire or mechanical trouble.

Ordering information

CT	6	M	-	2P	4	T	
							Communication
							Blank
							T
							RS485
							Power supply
							4
							100-240VAC 50/60Hz
							2
							24VAC 50/60Hz / 24-48VDC
							Output
							2P
							Dual preset
							1P
							Single preset
							I
							Indicator
							S
							DIN W48×H48mm
							Y
							DIN W72×H36mm
							M
							DIN W72×H72mm
							Size
							4
							9999(4 Digit)
							6
							999999(6 Digit)
							Digit type
							CT
							Counter/Timer
							Item

*4 Digits does not exist in the indicator type.

*Upgraded or added functions is seen in the shaded part of ordering information.

Specifications

Series		CTS		CTY		CTM		
Digit		4		6		6		
Model	Dual Preset	CT4S-2P□□		CT6S-2P□□		CT6Y-2P□□		CT6M-2P□□
	Single Preset	CT4S-1P□□		CT6S-1P□□		CT6Y-1P□□		CT6M-1P□□
	Indicator	—		CT6S-I□□		CT6Y-I□□		CT6M-I□□
Digit Size	Count value	11mm		10mm		10mm		13mm
	Preset value	8mm		7mm		7mm		9mm
Power Supply	AC Power	100-240VAC 50/60Hz						
	AC/DC Power	24VAC 50/60Hz / 24-48VDC						
Allowable voltage range		90-110% of rated voltage(AC Power type)						
Power consumption	AC Power	Max. 12VA						
	AC/DC Power	AC: Max. 10VA / DC: Max. 8W						
CPS of INA, INB		Selectable 1cps, 30cps, 1kcps, 5kcps, 10kcps						
Min. input signal width	Counter	Reset input: Selectable 1ms or 20ms						
	Timer	INA, INB, RESET: Selectable 1ms or 20ms		INA, INB, RESET, INHIBIT, BATCH RESET: Selectable 1ms or 20ms				
Input		Selectable voltage input or No-voltage input -Voltage input: input impedance is 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		Dual preset: SPST(1a) 1EA, SPDT(1c) 1EA Single preset: SPDT(1c) 1EA			
		Solid state output	Dual preset: 1NPN open collector Single preset: 1NPN open collector		Dual preset: 3NPN open collector Single preset: 2NPN open collector			
	Com.	Contact output	Dual preset: SPST(1a)2EA Single preset: SPDT(1c)1EA		Dual preset: SPST(1a), SPDT(1c) Single preset: SPDT(1c)			
		Solid state output	—		Dual preset: 1NPN open collector Single preset: 2NPN open collector			
Capacity	Contact output	250VAC 5A resistive load		250VAC 3A resistive load		250VAC 5A resistive load		
	Solid state output	30VDC Max. 100mA Max.						
External sensor power		12VDC $\pm 10\%$, 100mA Max.						
Memory retention		10years(When using non-volatile semiconductor memory type)						
Timer		Repeat error, Set error, voltage error, Temperature error -Power ON Start: Max. $\pm 0.01\% \pm 0.05\%$ -Signal Start: Max. $\pm 0.01\% \pm 0.03\%$ sec						
Insulation resistance		Min. 100MΩ (500VDC Megger)						
Dielectric strength		2,000VAC 50/60Hz for 1minute						
Noise strength(AC Power)		± 2 kV the square wave noise(pulse width:1μs) by the noise simulator						
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 1 hour						
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 10 minutes						
Shock	Mechanical	300m/s ² (Approx. 30G) 3 times at X, Y, Z direction						
	Malfunction	100m/s ² (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 ~ 55℃, Storage temperature: -25~65℃						
	Ambient humidity	35 ~ 85%RH, Storage humidity: 35 ~ 85%RH						
Approval		CE, 						
Weight		Approx. 159g		Approx. 149g		Approx. 253g		

*Environment resistance is rated at no freezing or condensation.

Communication specification

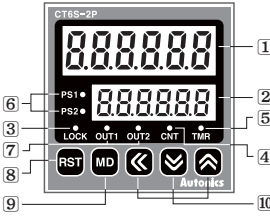
Protocol	Modbus RTU(16bit CRC)
Connection method	RS485
Application standard	Compliance with EIA RS485
Number of connections	31, it is available to set address 1~127
Communication method	Half Duplex
Synchronous method	Asynchronous
Communication distance	within max. 800meter
Communication speed	2,400/4,800/9,600/19,200/38,400bps(Factory default: 9,600bps)
Response waiting time	5~99ms(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

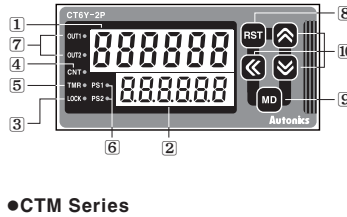
- Available to set the decimal point position of prescale value to 5 decimal place.
- Built-in Modbus communication function. (Communication model)
- Available to set the One-Shot output time per 10ms. (0.01sec to 99.99sec)
- Increase contact capacity to 5A(CTS, CTM series).
- Available to set Count Start Point.(Initial value)
- Improved visibility with high luminance LED.
- Improved to select 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 operation modes in the indicator.
- Added Timer INT2(NT2)/NFD(NFD)/NFD.1(NFD.1)/NTG(INTG) output modes.
- Added Timer range 999.999s / 9999m59s / 99999.9h.

Front panel identification

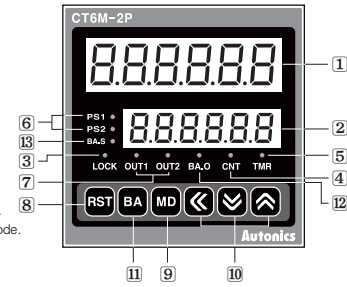
CTS Series



CTY Series



CTM Series



Count indicator(Red LED)

- Run mode: Count mode-Indicates count value.
Timer mode-Indicates time progressing.
- Function setting mode: Indicates function setting mode.

Preset value indicator (Yellow-Green LED)

- Run mode: Indicates preset value.
- Function setting mode: Indicates setting value1.

Key Lock:

- Lights when setting key lock.

The operation of counter indicator

- The operation of timer indicator

- Check preset value and display change of it

- Output(OUT1, OUT2) indicator

- Reset key

- Mode key

- Set key

- BATCH key

- BATCH output indicator(Red LED)

- BATCH setting value checking and changing indicator(Yellow-Green LED)

- Dimensions

- CTS series

- CTY series

- CTM series

- Guide for connection

- Connections

- 1-1. CTS series

- A. CT□S-2P□

- B. CT□S-2P□T

- C. CT□S-1P□

- D. CT□S-1P□T

- E. CT6S-I□

- F. CT6S-I□T

- Model

- Changed

- Notice

- CT6Y-1P

- CT6S-1P

- CT4S-1P

- CT6M-1P

- CT6Y-1

- CT6S-1

- CT6M-1

- PS2-PS

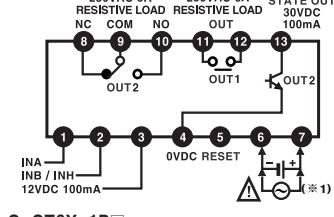
- There are no PS1, OUT1 LEDs.

- There are no PS1, OUT1 OUT2 LEDs.

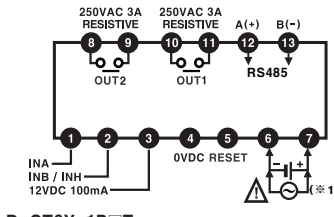
- *The indicator type does not exist in CT4S model.

1-2. CTY series

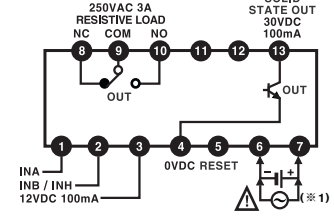
A. CT6Y-2P□



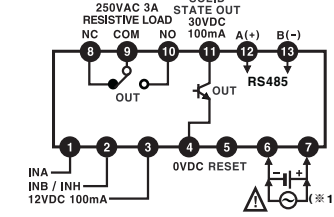
B. CT6Y-2P□T



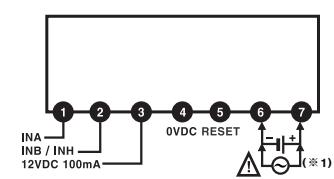
C. CT6Y-1P□



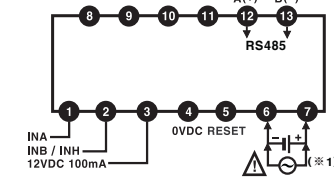
D. CT6Y-1P□T



E. CT6Y-I□

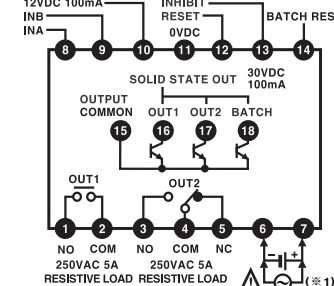


F. CT6Y-I□T

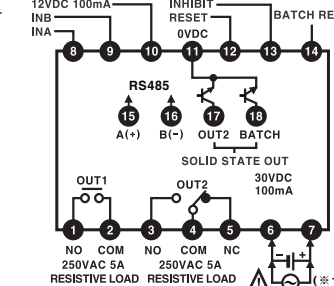


1-3. CTM series

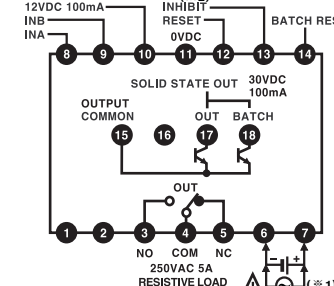
A. CT6M-2P□



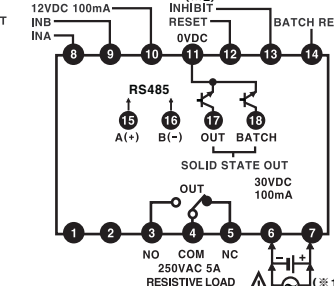
B. CT6M-2P□T



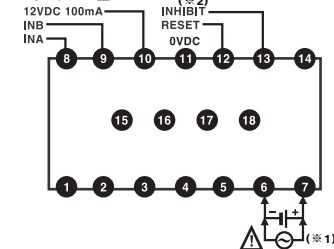
C. CT6M-1P□



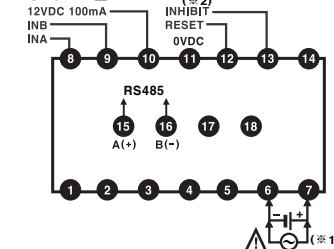
D. CT6M-1P□T



E. CT6M-I□



F. CT6M-I□T



* (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)]

- The power must be cut off.
- Squeeze toward ① and pull toward ② as shown in picture. (CTS/CTY Series)

CTS Series



CTY



CTM



3. Select input logic by using input logic switch(SW1) inside Counter/Timer.

4. Please assembly opposite way of the case detachment.

5. Then apply the power to Counter/Timer.

2-2. Input connection

A. No-voltage input(NPN)

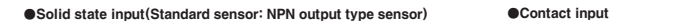
- Solid state input(Standard sensor: NPN output type sensor)



* INA, INB/INH, RESET, INHIBIT, BATCH RESET input part

B. Voltage input(PNP)

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



* INA, INB/INH, RESET, INHIBIT, BATCH RESET input part

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



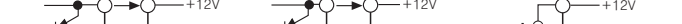
* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



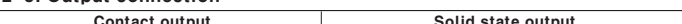
* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

- Contact input



* Counting speed: 1 or 30cps setting(Counter)

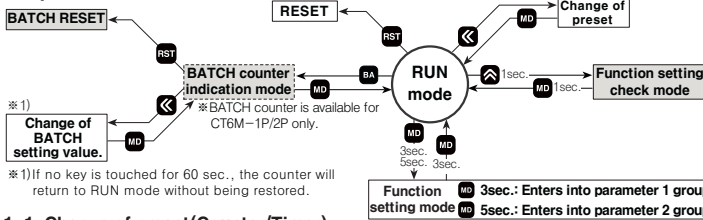
- Contact input



* Counting speed: 1 or 30cps setting(Counter)

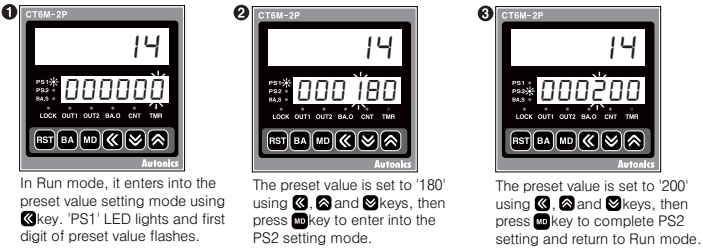
■ Basic operations and constitution(Counter/Timer/Communication)

1. Operations and functions



1-1. Change of preset(Counter/Timer)

Even if changing the preset value, input operation and output control will continue. In addition, the preset value could be set to 0 and 0 preset value turns ON. According to output mode, preset value could not be set to 0. (When setting to 0, preset value "0" will flash 3 times.)



1-2. Function setting check mode

Setting value of function setting mode can be confirmed using the MD and BA keys.

1-3. Switching display function in preset indicator

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

1-4. Reset

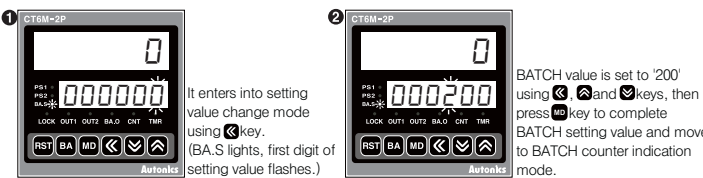
In Run mode or function setting mode, if pressing the RST key or applying the signal to the RESET terminal on the back side, present value will be initialized and output will maintain off status.

2. BATCH Counter(For CT6M-1P□□/CT6M-2P□□ model only)

In BATCH counter indication mode, 'BATCH counter value' is displayed in count indicator and 'BATCH counter setting value' is displayed in preset indicator.

2-1. Change of BATCH setting value

If pressing the MD key in Run mode, it will enter into BATCH counter indication mode.



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 of CT6M-1P□□ or reaching dual setting value of CT6M-2P□□
- BATCH counting operation in Timer: Counts the number of reaching setting time. (In case of "FLK" output mode, count the number of reaching T.off setting time and T.on setting time.)

2-3. BATCH output

- If input signal is applied while changing BATCH setting value, counting operation and output control will be performed.
- If BATCH counter 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.

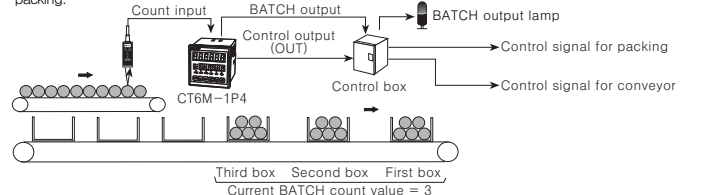
2-4. BATCH reset

- If pressing reset button or applying the signal to BATCH RESET terminal on the back side panel, BATCH counting value could be reset.
- When BATCH reset is applied, BATCH counting value maintains at 0 and BATCH output maintains in the OFF status.

2-5. Application of BATCH Counter function

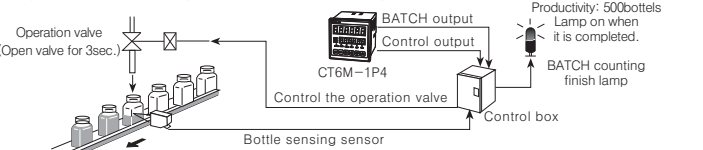
A. Counter

- In case, put 5 products in a box then pack the boxes when they reaches to 200.
- Counter preset setting value="5", BATCH setting value="200"
- When the count value of counter reaches to the preset 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 counter value reaches to "200", BATCH output will be ON. Then the control box stops conveyor and provides a control signal for packing.

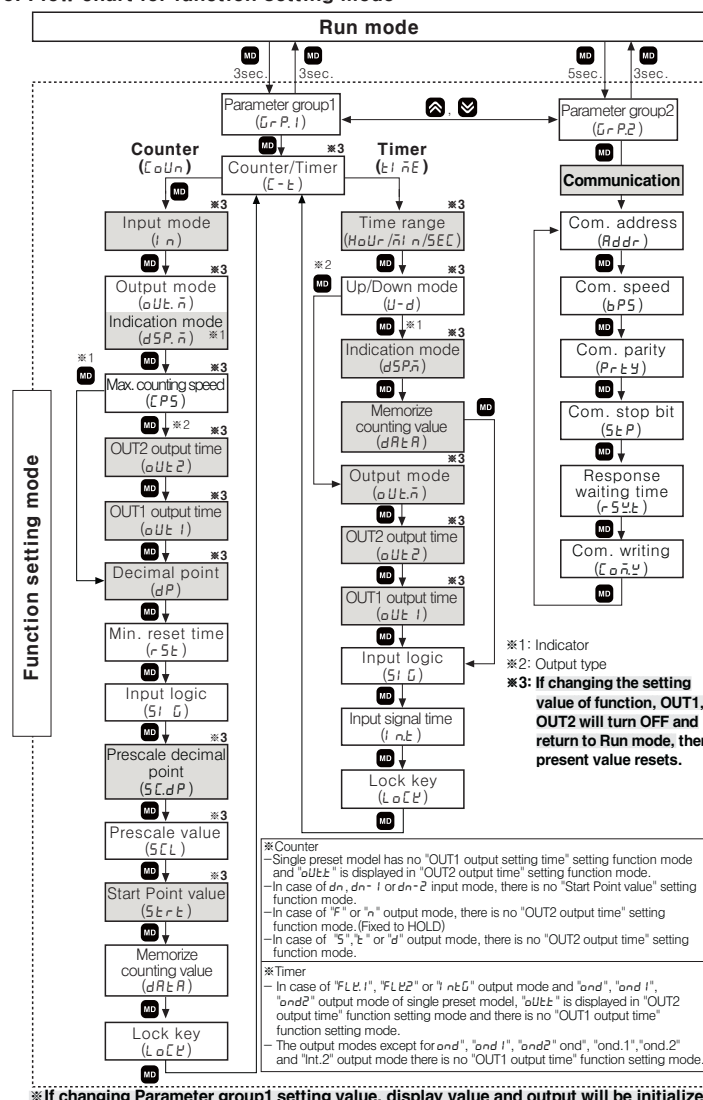


B. Timer

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



3. Flow chart for function setting mode



■ Counter mode

1. Parameter setting

Setting mode	How to set
Counter/Timer (C-T)	* CoUn: COUNTER * ti nE: TIMER
Input mode (i n)	* "UP", "UP-1", "UP-2" or "dn", "dn-1", "dn-2" input mode F ↔ n ↔ C ↔ r ↔ E ↔ P ↔ Q ↔ R * In case that output mode is "F", "n", there is no "OUT2 output time" setting mode. (Fixed to HOLD) * "Ud-R", "Ud-b", "Ud-C" input mode F ↔ n ↔ C ↔ r ↔ E ↔ P ↔ Q ↔ R ↔ S ↔ t ↔ d * If output mode is set to "d" when max. counting speed is set to 5Kcps, 10Kcps, max. counting speed is automatically set to 30cps. (Factory default setting) * In case of the indicator * In case of the indicator, indicate mode selection (d5P n) is displayed. HoLd ↔ t o t R L * It is added that the function which can set the preset value when selecting HOLD. (Refer to 4. Counter operation of the indicator.)
Output mode (o Ut n)	* Counting speed is that of one by one(1:1) duty ratio of INA or INB input signal, and it is applied in INA and INB at the same time. * In case of setting "d" in output mode, you can choose from 1 cps, 30 cps or 1k cps.
Indication mode (d5P n)	
Max. counting speed (CP5)	
OUT2 output time (o Ut 2)	* To shift flashing digit position of OUT2 output time value. * Set OUT2 one-shot output time. * Setting range: 0.01 to 99.99 sec. * It does not appear if F or n output mode is selected.
OUT1 output time (o Ut 1)	* To shift flashing digit position of OUT1 output time value. * Set OUT1 one-shot setting time * Time range: 0.01 to 99.99 sec., Hold * HoLd is displayed by pressing the key 4 times.
Decimal point (dP)	* 6Digit type * 4Digit type * Setting the decimal point is applied same to counting value and setting value.
Min. reset time (r5t)	* 1 ↔ 20 Unit: ms * Set the min. external RESET signal width.
Input logic (SiG)	* nPn: No-Voltage input * PnP: Voltage input * Check input logic value(PNP, NPN).
Prescale decimal point (5CdP)	* 6Digit type * 4Digit type * Prescale decimal point position is not set below the decimal point setting digits(dP).
Prescale value (5CL)	* To shift the flashing digit. * To change the prescale value. * Setting range of prescale value 6Digit type: 0.00001~99999.9 4Digit type: 0.001~999.9 * Refer to 5. Prescale function.
Start Point Value (StPt)	* To shift the flashing digit. * To change the Start Point value. * Setting range of Start Point value (Connected with decimal point setting) 6Digit type: 0.00000~99999 4Digit type: 0.000~9999 * Refer to 6. Start Point function.
Memory protection (dRtR)	* CLr ↔ rEC * CLr: Initializes count value when power is off. * rEC: Memorizes count value at the moment of power off.
Lock key (LoLk)	* LoFF ↔ LoC.1 * LoC.1: Locks the key. * LoC.2: Locks the keys. * LoC.3: Locks the keys.

- *1: Explanation of decimal point and prescale decimal point setting
-Decimal point setting: Set decimal point of the display value on front indicator.
-Prescale decimal point setting: Set prescale decimal point of counting regardless of decimal point of display value on front indicator.

2. Input operation mode

Input mode	Count chart	Operation
UP (Up)		* If INA is counting input, INB is inhibition input. If INB is counting input, INA is inhibition input.
UP-1 (Up-1)		* Counts when INA input signal is up. (↑) * INA: Counting input * INB: Inhibition input
UP-2 (Up-2)		* Counts when INA input signal is down. (↓) * INA: Counting input * INB: Inhibition input
dn (Down)		* If INA is counting input, INB is inhibition input. If INB is counting input, INA is inhibition input.
dn-1 (Down-1)		* Count when INA input signal is up. (↑) * INA: Counting input * INB: Inhibition input
dn-2 (Down-2)		* Counts when INA input signal is down. (↓) * INA: Counting input * INB: Inhibition input
Ud-R (Up/Down-A)		* INA: Counting input INB: Counting command input
Ud-b (Up/Down-B)		* INA: Up counting input INB: Down counting input * When both INA and INB are applied to L→H, it will remain previous counting value.
Ud-C (Up/Down-C)		* When use A,B phase of encoder with connecting to INA, INB, please set counter input mode (i n) as phase different input (Ud-C).

* @signal width should be over min. signal width and @ signal width should be over a half min. signal width. If not, ±1 counting error could be occurred.

Input type	Voltage input	No-Voltage input
H	5~30VDC	Short circuit
L	0~2VDC	Open

Counting speed	Min. signal width
1cps	500ms
30cps	16.7ms
1kcps	0.5ms

Counting speed	Min. signal width
5kcps	0.1ms
10kcps	0.05ms

1cps=1Hz

3. Output operation mode

Output mode	Up, Up-1, 2	Down, Down-1, 2	Up/Down-A, B, C	Operation
F (F)				After count-up, counting display value increases or decreases until reset signal is applied and hold output is maintained.
n (N)				After count-up, counting display value and hold output are maintained until reset signal is applied.
C (C)				When count-up, counting display value will be reset and count simultaneously. OUT1 hold output will be off after OUT2 one-shot time. The one-shot output time is operated regardless of OUT2 output.
r (R)				After OUT2 one-shot time, counting display value will be reset and count simultaneously. OUT1 hold output will be off after OUT2 one-shot time. OUT1 one-shot output time is operated regardless of OUT2 output.
t (K)				After count-up, Counting display value increases or decreases until RESET input is applied. OUT1 hold output is off after OUT2 one-shot time. OUT1 one-shot output time is operated regardless of OUT2 output.
P (P)				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 hold output is off after OUT2 one-shot time. OUT1 one-shot output time is operated regardless of OUT2 output.
Q (Q)				After count-up, counting display value increases or decreases during OUT2 one-shot time. OUT1 hold output is off after OUT2 one-shot time. OUT1 one-shot output time is operated regardless of OUT2 output.
A (A)				After count-up, counting display value and OUT1 hold output are maintained until RESET input is applied. OUT1 one-shot output time is operated regardless of OUT2 output.
S (S)				OUT1 and OUT2 keeps ON status in following condition: Counting display value ≥ PRESET1 Counting display value ≥ PRESET2
t (T)				OUT1 output is off: Counting display value ≥ PRESET1 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.

* The single preset type output(OUT) is operated as OUT2 of dual preset type.
* The dual preset model OUT1 output is operated as one-shot or hold output. (except 5(S), t(T), or d(D) output mode)
* OUT1 output could be set to 0 in all modes and 0 value output turns ON.
* OUT2 output could not set to 0 in C(E), R(-), P(P) or Q(Q) output mode.

4. Counter operation of the indicator

Indicate mode (d5P n)	In case of input mode is Up (Up, Up-1, Up-2)	In case of input mode is Down (Down, Down-1, Down-2)	Operation
t o t R L (TOTAL)			Count value increases or decreases until RESET input is applied. When reaching max. count value or min. count value, it will be reset and count simultaneously.
HoLd (HOLD)			Count value increases or decreases until RESET input is applied, count value indicator flashes when reaching preset value(Up count) or 0(Down count).

* In case of the input mode is Command input (Ud-R), Individual input (Ud-b), Phase difference input (Ud-C).

* In case of UP/DOWN (Ud-R, Ud-b, Ud-C) mode among input modes, indication mode (d5P n) of the configuration is not displayed.

5. Prescale function

This function is to set and indicate calculated unit for actual length, liquid measure, position etc. It is called "Prescale value" for measured length, measured liquid, measured position, etc per 1 pulse.
For example, P is the number of pulses per 1 revolution of a rotary encoder and L is the desired length to be measured. Prescale value is [the desired length (L)]/[the number of pulses (P) per 1 revolution of the rotary encoder]. It is the length per 1 pulse of a rotary encoder.
©Control length by the counter and the rotary encoder

* Prescale value = $\pi \times \text{Diameter of the pulley(D)}$
The number of pulses per 1 revolution of the encoder
= $\frac{3.1416 \times 22}{1000}$
= 0.069mm/pulse

In decimal point position setting (dP) of function setting mode, select below 1 decimal place (-----). Select "-----" in prescale decimal point position setting (5CdP) of function setting mode, and set prescale setting value(5CL) to "0.069". It could be available to control conveyor position per 0.1mm.

6. Start Point function

This function is that setting Start Point value in counter operation mode.
-In case of "dn", "dn-1" or "dn-2" in timer input mode, it is not available.
-When reset is applied, the present value is initialized to Start Point.
-After count up in "C", "n", "P" or "Q" output mode, preset value starts at Start Point value.

■ Timer mode

1. Parameter setting

(key: To select setting mode, or key: To change setting value)

Setting mode	How to set
Counter/Timer ($\bar{C}-t$)	$\bar{C}oUn \longleftrightarrow tI \bar{n}E$ * $\bar{C}oUn$: COUNTER $tI \bar{n}E$: TIMER
Timer range ($HoUr/\bar{n}i n/SEC$)	●6Digit type 0.001s~999.999s, 0.01s~9999.99s, 0.1s~99999.9s, 1s~999999s, 0.01s~99m59.99s, 0.1h~99999.9h, 0.1s~999m59.9s
	●4Digit type 0.001s~9.999s, 0.01s~99.99s, 0.1s~999.9s, 1s~9999s, 1s~99m59s, 1h~9999h, 99h59m, 9999m, 999.9m
	UP/DOWN mode ($\bar{U}-d$) $\bar{U}P \longleftrightarrow d\bar{n}$ * $\bar{U}P$: Time proceeds from 0 to the setting value. $d\bar{n}$: Time proceeds from the setting value to 0.
	Indication mode ($dSP\bar{n}$) $t\bar{o}t\bar{A}L \longleftrightarrow HoLd \longleftrightarrow \bar{o}n\bar{t}.d$ *Used for the indicator only. *It is added that the feature which set the setting time when selecting $HoLd$ or $\bar{o}n\bar{t}.d$ (Refer to 3. Timer operation for the indicator).
Memory protection ($dRtR$)	$\bar{C}Lr \longleftrightarrow r\bar{E}C$ *Used for the indicator only. * $\bar{C}Lr$: Initializes time value when power is off. $r\bar{E}C$: Memorizes time value at the moment of power off.
Output mode ($\bar{o}U\bar{t}.\bar{n}$)	$\bar{o}n\bar{d} \longleftrightarrow \bar{o}n\bar{d}.1 \longleftrightarrow \bar{o}n\bar{d}.2 \longleftrightarrow FLK \longleftrightarrow FLK.1 \longleftrightarrow FLK.2 \longleftrightarrow i\bar{n}\bar{t} \longleftrightarrow i\bar{n}\bar{t}.1 \longleftrightarrow n\bar{F}d.1 \longleftrightarrow n\bar{F}d \longleftrightarrow \bar{o}F\bar{d} \longleftrightarrow i\bar{n}\bar{t}.2 \longleftrightarrow i\bar{n}\bar{t}.1$
OUT2 output time ($\bar{o}U\bar{t}.2$)	key: To shift flashing digit position of OUT2 output time value. key: To change OUT2 output time value. *Set OUT2 one-shot output time. *Setting range: 0.01~99.99sec. * $HoLd$ is displayed by pressing key 4 times.
OUT1 output time ($\bar{o}U\bar{t}.1$)	key: To shift flashing digit position of OUT1 output time value. key: To change OUT1 output time value. *Set OUT1 one-shot output time. *Setting range: 0.01~99.99sec., Hold * $HoLd$ is displayed by pressing key 4 times.
Input logic ($S\bar{I}\bar{G}$)	$n\bar{P}n$: No-Voltage input *Check input logic value(PNP, NPN). $Pn\bar{P}$: Voltage input
Input signal time ($i\bar{n}\bar{t}.t$)	$i \longleftrightarrow 20$ *CTS/CTY: Set min. external INA, INH, RESET signal width. *CTM: Set min. external INA, RESET, INHIBIT, BATCH RESET signal width. [Unit: ms]
Lock key ($L\bar{o}Ck$)	$L\bar{o}FF \longleftrightarrow L\bar{o}C.1$ * $L\bar{o}FF$: Cancellation of the lock mode $\bar{L}o\bar{C}.3 \longleftrightarrow L\bar{o}C.2$ $L\bar{o}C.1$: Locks key. $L\bar{o}C.2$: Locks keys. $L\bar{o}C.3$: Locks keys.

2. Output operation mode

One-shot output Hold output One-shot output Hold output

Output mode	Time chart	Operation
$\bar{o}n\bar{d}$ (OND)	Signal ON Delay(Power Reset) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	1)Time starts when INA signal turns on. When INA signal turns off, time resets. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold or one-shot output.
	Signal ON Delay 1(Power Reset) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	1)Time starts when INA signal turns on, if INA signal is applied repeatedly, only initial signal is recognized. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold or one-shot output.
$\bar{o}n\bar{d}.1$ (OND.1)	Signal ON Delay 1(Power Reset) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	1)Time starts when INA signal turns on, if INA signal is applied repeatedly, only initial signal is recognized. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold or one-shot output.
	Power ON Delay(Power Hold) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	1)Time starts when power turns on. (There is no INA function.) 2)Time resets when reset turns on. Time starts when reset turns off. 3)Control output operates as hold or one-shot output. 4)It memorizes display value at the moment of power off.
$\bar{o}n\bar{d}.2$ (OND.2)	Power ON Delay(Power Reset) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	1)Time starts when power turns on. (There is no INA function.) 2)Time resets when reset turns on. Time starts when reset turns off. 3)Control output operates as hold or one-shot output. 4)It memorizes display value at the moment of power off.
	Flicker(Power Reset) Up: T.off setting time, T.on setting time, 0 Down: T.off setting time, T.on setting time, 0	1)Time starts when INA signal turns on. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold output, output turns off for the T.off time and turns off 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.
FLK (FLK)	Flicker(Power Reset) Up: T.off setting time, T.on setting time, 0 Down: T.off setting time, T.on setting time, 0	1)Time starts when INA signal turns on. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold output, output turns off for the T.off time and turns off 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.
	Flicker(Power Reset) Up: T.off setting time, T.on setting time, 0 Down: T.off setting time, T.on setting time, 0	1)Time starts when INA signal turns on. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold output, output turns off for the T.off time and turns off 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.

$FLK.1$ (FLK.1)	Flicker 1(Power Reset) Up: Setting time, 0 Down: Setting time, 0	1)Time starts when INA signal turns on. 2)When INA signal is on: Power ON Time Start is operated Power OFF Time Start is operated 3)Control output operates as hold output. 4)In case of using the contact output, min. setting time must be set over 100ms.
	One-Shot output Up: Setting time, 0 Down: Setting time, 0	1)Time starts when INA signal turns on. 2)When INA signal is on: Power ON Time Start is operated Power 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.
$FLK.2$ (FLK.2)	Flicker 2(Power Hold) Up: Setting time, 0 Down: Setting time, 0	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 Power OFF Time Start is operated 3)Control output operates as hold 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 Up: Setting time, 0 Down: Setting time, 0	1)Time starts when INA signal turns ON and the display value the moment when power is off is memorized. 2)When INA signal is on: Power ON Time Start is operated Power 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.
$i\bar{n}\bar{t}$ (INT)	Interval (Power Reset) Up: Setting time, 0 Down: Setting time, 0	1)Control output turns ON and time starts when INA signal turns ON. 2)When INA signal is on: Power ON Time Start is operated Power 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.
	Interval 1(Power Reset) Up: Setting time, 0 Down: Setting time, 0	1)Control output turns ON and time starts when INA signal turns ON. 2)When INA signal is on: Power ON Time Start is operated Power 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.
$i\bar{n}\bar{t}.1$ (INT.1)	Interval 1(Power Reset) Up: Setting time, 0 Down: Setting time, 0	1)Control output turns ON and time starts when INA signal turns ON. 2)When INA signal is on: Power ON Time Start is operated Power 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.
	Interval 2(Power Reset) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	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.
$\bar{o}F\bar{d}$ (OFD)	Signal Off Delay1(Power Reset) Up: Setting time, 0 Down: Setting time, 0	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. 3)When it reaches setting time, indication value and control output are reset automatically.
	On-Off Delay(Power Reset) Up: On_Delay, Off_Delay, 0 Down: On_Delay, Off_Delay, 0	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.
$n\bar{F}d$ (NFD)	On-Off Delay1(Power Reset) Up: On_Delay, Off_Delay, 0 Down: On_Delay, Off_Delay, 0	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 step2 operate. 4)If INA input turns ON within Off_Delay time, output will turn OFF and step1 operate.
	Integration Time(Power Reset) Up: Setting time, 0 Down: Setting time, 0	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.
$i\bar{n}\bar{t}.2$ (INT.2)	Signal ON Delay 1(Power Reset) Up: Setting time 2, Setting time 1, 0 Down: Setting time 1, 0	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.
	Signal Off Delay1(Power Reset) Up: Setting time, 0 Down: Setting time, 0	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. 3)When it reaches setting time, indication value and control output are reset automatically.
$\bar{o}F\bar{d}.1$ (NFD.1)	On-Off Delay1(Power Reset) Up: On_Delay, Off_Delay, 0 Down: On_Delay, Off_Delay, 0	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 step2 operate. 4)If INA input turns ON within Off_Delay time, output will turn OFF and step1 operate.
	Integration Time(Power Reset) Up: Setting time, 0 Down: Setting time, 0	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.

*Power Reset: There is no memory protection. (Initializes 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.)

3. Timer operation for the indicator

$t\bar{o}t\bar{A}L$ (TOTAL)	When memory protection setting is OFF Up: Max. time range, 0 Down: Max. time range, 0	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.
	When memory protection setting is ON Up: Max. time range, 0 Down: Max. time range, 0	1)Time starts when INA input is ON. 2)Setting value is initialized when Reset input is ON. 3)Time progress stops while INHIBIT input is ON. 4)Display value at the moment of power OFF is memorized.
$HoLd$ (HOLD)	When memory protection setting is OFF Up: Setting time, 0 Down: Setting time, 0	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 Up: Setting time, 0 Down: Setting time, 0	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.
$\bar{o}n\bar{t}.d$ (On Time Display)	When memory protection setting is OFF Up: Setting time, 0 Down: Setting time, 0	*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 Up: Setting time, 0 Down: Setting time, 0	*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.

4. Timer '0' time setting

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

$\bar{o}n\bar{d}$, $\bar{o}n\bar{d}.1$, $\bar{o}n\bar{d}.2$, $n\bar{F}d$, $n\bar{F}d.1$

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

A. OND(Signal ON Delay) mode($\bar{o}n\bar{d}$)

● Setting time1 is set to 0	● Setting time2 is set to 0

B. OND.1(Signal ON Delay 1) mode($\bar{o}n\bar{d}.1$)

● Setting time1 is set to 0	● Setting time2 is set to 0

C. OND.2(Signal ON Delay2) mode($\bar{o}n\bar{d}.2$)

● Setting time1 is set to 0	● Setting time2 is set to 0

D. NFD(ON-OFF Delay) mode($n\bar{F}d$)

● Off_Delay setting time is set to 0	● ON_Delay setting time is set to 0

E. NFD.1(ON-OFF Delay1) mode($n\bar{F}d.1$)

● 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($\bar{o}n\bar{d}$), OND.1($\bar{o}n\bar{d}.1$) or OND.2($\bar{o}n\bar{d}.2$) output mode
—UP mode: If setting value1 of timer is greater than setting value2, OUT1 will not turn ON.
—DOWN mode: If setting value 1 of timer is greater than setting value2, OUT1 will turn ON immediately when start signal is applied.

1. Parameter setting (MD key: To select setting mode, or key: To change setting value)

[illegible]

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



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

[illegible][illegible]

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

1) Query(Master)

```

sequenceDiagram
    participant M as Master
    participant S as Slave
    Note over S: Slave Address  
1Byte
    Note over S: Function  
1Byte
    Note over S: High  
1Byte
    Note over S: Low  
1Byte
    Note over S: Error Check(CRC 16)  
Low 1Byte  
High 1Byte
    M->>S: 
    
```

[illegible][illegible]

CRC16

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

1) Query(Master)

Slave Address	Function	Starting Address		No. of Register		Byte Count	Data		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	1Byte	

CRC16							
2) Response(Slave)							
Slave Address	Function	Starting Address		No. of Register		Error Check (CRC 16)	
		High	Low	High	Low	Low	High

4-6. Application

Read Coil Status(Func 01 H)

Master:reads QUT3 0002(0001H) ~ 0003(0002H). QUT1 output status(ON:1 OFF:0) from the Slave(Address 01 H)

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

—Read Input Register (Func 04 H)
Master reads preset value 21004(03EBH)~21005(03ECH) of counter/timer, Slave (Address 15).

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

5-1. Reset/Output

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

No(Address)	Func	Explanation	Factory specification	Notice
30001~30100	04	Reserved	—	Model ID
30101(0064)	04	Product number H	—	
30102(0065)	04	Product number L	—	
30103(0066)	04	Product number M	—	

30103(006E)	04	Hardware version	—	
30104(0067)	04	Software version	—	
30105(0068)	04	Model no. 1	"CT"	
30106(0069)	04	Model no. 2	"6M"	
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	—	

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
		BA.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) 31003(03EA)	04	Present value of BATCH counter	0~999999	For BATCH output model
31004(03EB)	04	Present value of counter/timer	Counter 6Digit type:- 99999~999999 4Digit type:- 999~9999 Timer: Within time setting range	Use counter and timer in common
31005(03EC)				
31006(03ED)	04	Display unit	Counter: decimal point of display value Timer: Time range	Counter: 40058 Data Timer: 40102 Data
31007(03EE) 31008(03EF)	04	PS(2) setting value	Counter 6Digit type:- 99999~999999 4Digit type:- 999~9999 Timer: Within time setting range	Use counter and timer in common
31009(03F0) 31010(03F1)	04	PS1 setting value	Counter 6Digit type:- 99999~999999 4Digit type:- 999~9999 Timer: Within time setting range	Use counter and timer in common
31011(03F2) 31012(03F3)	04	Setting value of BATCH counter	0~999999	Use counter and timer in common
31013(03F4)	04	Checking the input logic	0: NPN, 1:PNP	

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

No(Address)	Func	Explanation	Setting range	Notice
40051(0032)	03/06/16	Counter/Timer(C←t)	0: C0~n 1: C1~AE	Use counter and timer in common
40052(0033)	03/06/16	Input mode(I←n)	0: U0~P 1: U0~P-1 2: U0~P-2 3: dn 4: dn-1	5: dn-2 6: U0~A 7: U0~B 8: U0~C
40053(0034)	03/06/16	Indication mode(I←5A)	0: t0~RL 1: RoL d	For the indicator
40054(0035)	03/06/16	Output mode(O←tA)	0: F 1: n 2: C 3: r	4: t 5: P 6: 9 7: A 8: 5 9: t 10: d
40055(0036)	03/06/16	Maximum counting speed (CPS)	0: 1 1: 30	2: 10 3: 50 4: 100
40056(0037)	03/06/16	OUT2(OUT) output time	0001~9999	Unit: ×10ms
40057(0038)	03/06/16	OUT1 output time	0001~9999	Unit: ×10ms
40058(0039)	03/06/16	Decimal point (dP)	0: ----- 1: ----- 2: ----- 3: -----	2: ----- 3: ----- 4: ----- 5: ----- 4Digit type 0: ----- 1: ----- 2: ----- 3: -----
40059(003A)	03/06/16	Min. reset time(rSt)	0: 1 1: 1~20	Unit: ms
40060(003B)	03/06/16	Prescale decimal point position (SLd)	1: ----- 2: ----- 3: ----- 4: ----- 5: -----	4Digit type 1: ----- 2: ----- 3: -----
40061(003C)	03/06/16	Prescale value(SL)	6Digit type: 0.00001~999999 4Digit type: 0.001~9999	Connected with prescale decimal point position
40062(003D)	03/06/16	Start value(St←t)	6Digit type: 0.00000~999999 4Digit type: 0.000~9999	Connected with decimal point position of display value
40063(003E)	03/06/16	Memory protection(dRb)	0: CLr 1: rEC	Use counter and timer in common
40064(003F)	03/06/16	Lock key(L←Ct)	0: LoFF 1: LoC1	
40065(0040)	03/06/16		2: LoC2 3: LoC3	

No(Address)	Func	Explanation	Setting range	Notice
40101(0064)	03/06/16	Count/Timer ($\overline{C} \sim \overline{t}$)	0: $C \sim 0$ n 1: $t \sim \overline{t}$ E	Use counter and timer in common
40102(0065)	03/06/16	Time range ($H \sim 0.1 \sim 1 \sim 5 \sim E$)	4Digit type 0: 0.001s~9.999s 5: 0.1m~999.9m 1: 0.01s~99.99s 6: 1m~9999m 2: 0.1s~999.9s 7: 1m~99h59m 3: 1s~9999s 8: 1h~9999h 4: 1s~99m59s	
			6Digit type 0: 0.001s~999.999s 6: 1s~9999m59s 1: 0.01s~9999.99s 7: 0.1m~99999.9m 2: 0.1s~99999.9s 8: 1m~999999m 3: 1s~999999s 9: 1s~99h59m59s 4: 0.01s~99m59.99s 10: 1m~9999h59m 5: 0.1s~99959.9s 11: 0.1h~99999.9h	
40103(0066)	03/06/16	Up/Down mode ($\overline{U} \sim d$)	0: $\overline{U}P$ 1: d n	
40104(0067)	03/06/16	Output mode ($\overline{oU} \sim \overline{n}$)	0: $\overline{o}nd$ 5: $\overline{F}LE\overline{2}$ 9: $\overline{o}Fd$ 1: $\overline{o}nd1$ 6: $\overline{n}t$ 10: $\overline{n}Fd$ 2: $\overline{o}nd2$ 7: $\overline{n}t1$ 11: $\overline{n}Fd1$ 3: $\overline{F}LE$ 8: $\overline{n}t2$ 12: $\overline{n}tE$ 4: $\overline{F}LE1$	Use counter and timer in common
40105(0068)	03/06/16	OUT2(OUT) output time ($\overline{oU}t \sim t$)	000 1~9999, 0: HOLD	Unit: $\times 10$ ms
40106(0069)	03/06/16	OUT1 output time ($\overline{oU}t \sim t$)	000 1~9999, 0: HOLD	Unit: $\times 10$ ms
40107(006A)	03/06/16	Input signal time($\overline{n}t$)	0: 1 1: $2\overline{D}$	Unit: ms
40108(006B)	03/06/16	Memory protection ($\overline{d}R\overline{A}$)	0: $\overline{C}LR$ 1: $r\overline{E}C$	Use counter and timer in common
40109(006C)	03/06/16	Lock key($\overline{L} \sim \overline{C}t$)	0: $\overline{L}oFF$ 1: $\overline{L}oC1$ 2: $\overline{L}oC2$ 3: $\overline{L}oC3$	Use counter and timer in common
40110(006D)	03/06/16	Indication mode ($\overline{d}SP\overline{n}$)	0: $\overline{b}atRL$ 1: $\overline{N}oLd$ 2: $\overline{o}ntd$	For the indicator

No(Address)	Func	Explanation	Setting range	Notice
40151(0096)	03/06/16	Com. address(<i>Addr</i>)	1~127	
40152(0097)	03/06/16	Com. speed(<i>BPS</i>)	0: 24 1: 48 2: 96 3: 192 4: 384	Unit: ×100bps
40153(0098)	03/06/16	Com. parity(<i>P</i> = <i>±</i>)	0: none 1: $\bar{E} \cup E$ 2: odd	
40154(0099)	03/06/16	Stop bit (<i>St</i> = <i>F</i>)	0: 1 1: 2	
40155(009A)	03/06/16	Response waiting time(<i>F</i> = 5 位)	05~99	Unit: ms
40156(009B)	03/06/16	Com. writing(<i>C</i> = 5 位)	0: $\bar{E} \cup A$ 1: di $\bar{S}A$	

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

- Illegal Function(Exception Code: 01H): Not supporting command
- Illegal Data Address(Exception Code: 02H): Mismatch between start address of asked data and transmittable address in device
- Illegal Data Value(Exception Code: 03H): Mismatch between asked the number of data and transmittable the number of data in device
- Slave Device Failure(Exception Code: 04H): Command is processed incorrectly.

Master reads output status (ON:1, OFF:0) of non existing coil 01001 (03E8 H) from Slave (Address17).

A. Query(Master)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	01 H	03 H	E8 H	00 H	01 H	## H	## H

■ Read and write of parameter value using communication

1. Read of the parameter area
00002(OUT2), 00003(OUT1), 00004(BA, 0), 10001~10005(Terminal input), 30101~30125(Product information), 31001~31013(Monitoring data)

2. Read and write of the parameter area
00001 (Reset starts), 00005(BATCH Reset starts), 40001~40006(Setting value saving group)
40051~40066(Counter setting group), 40101~40110(Timer setting group)
40151~40156(Communication setting group)

3. Read of communication

4. Communication write

Change parameter value using communication. (Function: 05H, 06H, 10H)

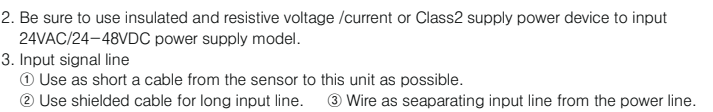
- 1) When change the parameter setting value of 5~6. Function setting mode Counter group or 5~7. Function setting mode Timer group using communication, reset indication will flash in 3 seconds and display value will be reset. (It does not save that counting display value or progress time of before changing parameter setting value.)
- 2) When change the parameter setting value of 5~5. Preset value setting group or 5~8. Function setting mode Communication group using communication, counting display value or progress time will not be reset.
- 3) In prohibit communication write setting (C0.5.1: 5B), do not perform a write command.
- 4) If set value beyond the setting range, that setting value is substituted for the value within the setting range and memorized.

DAQMaster. Download the DAQMaster program by visiting our web site. (www.autonics.com)

	Parameter	Factory default setting
C O N F I G U R E	Input mode (I_n)	Up/Down—C ($Ud-C$)
	Output mode (OUT_n)	F (F)
	CPS (CP5)	30cps (30)
	Indication mode (indicator type) ($d5PA$)	TOTAL ($totRL$)
	OUT2 (OUT_2)	100ms (100)
	OUT1 (OUT_1)	Hold ($Hold$)
	Decimal point (dP)	-----
	Min. reset time ($r5t$)	20ms (20)
	Input logic (S_iG)	NPN (nPN)
	Prescale decimal point ($5CdP$)	6Digit type: -----, 4Digit type: ----
	Prescale value ($5CL$)	6Digit type: :00000, 4Digit type: :000
	Start Point setting ($5trt$)	000000
	Counting memory ($dRtR$)	Clear (CLR)
	Lock key (L_oLK)	Lock off (L_oFF)
T I M E R	Preset value 1 (PS1)	1000 (1000)
	Preset value 2 (PS2)	5000 (5000)
	Time range ($Wdr/R/n5EC$)	6Digit type: 0.001s–999.999s, 4Digit type: 0.001s–9.999s
	Up/Down mode ($U-d$)	Up (Up)
	Indication mode (Indicator type) ($d5PA$)	TOTAL ($totRL$)
	Memory protection (Indicator type) ($dRtR$)	CLEAR (CLR)
	Output mode (OUT_n)	OND (ond)
	OUT2 output time (OUT_2)	Hold ($Hold$)
	OUT1 output time (OUT_1)	100ms (100)
	Input logic (S_iG)	NPN (nPN)
C O M M U N I C A T I O N	Input signal time (t_nL)	20ms (20)
	Lock key (L_oLK)	Lock off (L_oFF)
	Preset value 1 (PS1)	1000 (1000)
	Preset value 2 (PS2)	5000 (5000)
	Communication address ($Addr$)	01 (001)
	Communication speed ($bP5$)	9600bps (96)
	Communication parity ($P-rty$)	NONE ($nonE$)
	Communication stop bit ($5tP$)	2 (2)
	Response waiting time ($r5wt$)	20ms (20)
	Communication writing ($CLoW$)	Enable (EnR)

1. The power ON/OFF
Power voltage rises for 100ms after power on and falls for 500ms after power off. Therefore be sure to apply input signal after 100ms and power turns on again after 500ms when power turns off.

The diagram shows a power signal (ON/OFF) with a 100ms rise time and a 500ms fall time. The unstable time against the input signal is indicated.



- Be sure that supply power is off when selecting input logic, then select logic input according to input logic changing method.
5. Contact count input (When it is used as Counter)
If apply contact input at high speed mode (1k, 5k, 10k), it may miscount by chattering.
Therefore set low speed mode (1cps or 30cps) at contact input.
6. When test dielectric voltage and insulation resistance of the control panel with this unit installed.
 - ① Please isolate this unit from the circuit of control panel.
 - ② Please make all terminals of this unit short-circuited.
7. Do not use below places.
 - ① Place where there are severe vibration or impact.
 - ② Place where strong alkalis or acids are used.
 - ③ Place where there are direct ray of the sun.
 - ④ Place where strong magnetic field or electric noise are generated.
8. Installation environment
 - ① It shall be used indoor.
 - ② Altitude Max. 2000m
 - ③ Pollution Degree 2
 - ④ Installation Category II

※Please keep the above precautions to avoid malfunction and damages.
 ※The above specifications are subject to change without notice.

■ Proximity sensors ■ Area sensors ■ Door/Door side sensors ■ Counters ■ Rotary encoders ■ Power controllers ■ Panel meters ■ Graphic/Logic panels ■ Temperature controllers ■ Tachometer/Pulse(Rate) meters ■ Temperature/Humidity transducers ■ Stepping motors/drivers/motion controllers ■ Laser marking system(CO₂, Nd:YAG) ■ Laser welding/soldering system	■ Photoelectric sensors ■ Fiber optic sensors ■ Pressure sensors ■ Timers ■ Display units ■ Sensor controllers
---	---

Autonics Corporation
<http://www.autonics.com>

Satisfiable Partner For Factory Automation	
■ HEAD QUARTERS : 41-5, Yongsang-dong, Yangsan-si, Gyeongnam, 626-847, Korea ■ OVERSEAS SALES : Bldg. 402 3rd Fl., Bucheon Techno Park, 193, Yakdae-dong, Wornim-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea TEL 82-32-610-2730 / FAX 82-32-329-0728 ■ E-mail : sales@autonics.com	The proposal of a product improvement and development : product@autonics.com EP-E-01-036A



Autonics Corporation

<http://www.autonics.com>

Satisfiable Partner For Factory Automation

■ **HEAD QUARTERS :**
 45, Yongdang-dong, Yangsan-si, Gyeongnam, 626-847, Korea

■ **OVERSEAS SALES :**
 Bldg. 402 3rd Fl., Bucheon Techno Park, 193, Yakdae-dong, Wonnig-ku, Bucheon-si, Gyeonggi-do, 420-734, Korea
 TEL 82-32-610-2730 / FAX 82-32-329-0728

■ **E-mail :** sales@autonics.com

**The proposal of a product improvement
 and development : product@autonics.com**