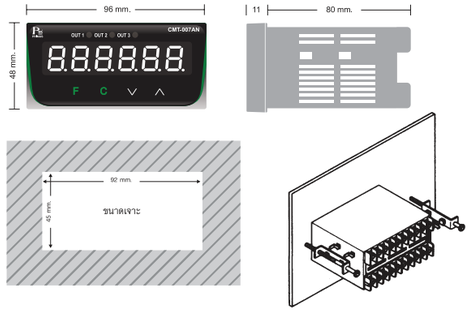
CMT-007AN DIGITAL COUNTER

Primus
User Manual

TECHNICAL SPECIFICATION

Power Supply		220 VAC ±15% 50/60 Hz
		24 VAC/VDC ±15%
Power Consumption		3VA
Display		7 Segment, 6 Digit, Size 0.56 Inch, 1 Raws
Input	Range Display and Setting	Measurement Range -199999 to 999999
	Input Frequency	0 to 10 kHz
	Input Type	Photoswitch, Proximity, Contact, Encoder , NPN , PNP
	DC Source for Sensor	24 VDC 100 mA
	Decimal Point Setting	0 to 0.00000
	Timer (Input Filter)	0.00 to 10.00 Sec
	Timer Accuracy	±10 ms
	Input Reset	Dry Contact
Output	Relay Output	3 Relay Output 5A/250VAC
Communication	Protocol	MODBUS RTU
	Baud Rate	4800, 9600, 19200, 38400, 57600 bps
	Parity	None, Even, Odd
	Stop Bits	1,2
	Data Bits	8 Bits
	Address	1 - 255
Ambient Operation	Temperature	-10°C to 60°C
	Humidity	85 % RH Non-Condensing
Ambient Storage	Temperature	-20°C to 80°C
	Humidity	85 % RH Non-Condensing
Protection Degree	Front Protection Rating	IP52
	Case Protection Rating	IP30
Installation		Panel Mounting
Material		ABS-V0
Size (mm.)		48 x 96 x 80
Weight		230 g.

DIMENSION CUTTING AND INSTALLATION

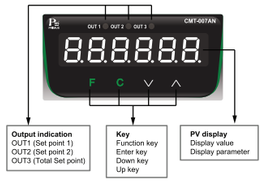


DESCRIPTION

- Digital Counter
- Display by 7-Segment
- Receive Input from sensor device such as Photo Switch, Proximity Switch Encoder, Contact, NPN, PNP
- Operation mode for 11 mode
- Easy to use by program from screen.
- Digital Input (Dry Contact) for Reset values.
- Can communicate with computer via port RS485 MODBUS RTU.

OPERATION

Digital display device for production work in industrial display by 7-Segment in Real Time to control production to be as target. Decrease error or check status of machine status count quantity of goods into stock. It can operate count up and count down. Receive input from sensor devices such as Proximity, Switch, Encoder Mechanical Contact, NPN, PNP can receive input at speed 10kHz. 11 mode operation. There is Shot cut by pressing F button at screen for setting Set Point, Press Down to show Total value, press Up for Reset count value and save counted value by FRAM. can link with Computer or PLC from RS485 and can Monitor, Logging, Edit value.



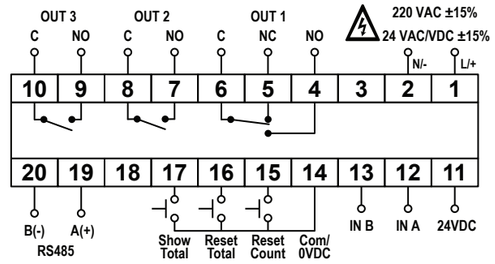
F **Function** : Pressed for approx 3 second to Enter/Exit Menu or pressed once to Exit sub Menu

Enter : Pressed the Enter key to access parameters

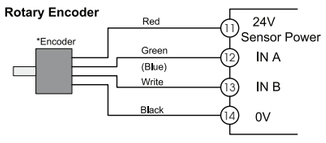
Down : Decrements parameter and function, Reset Count and Total

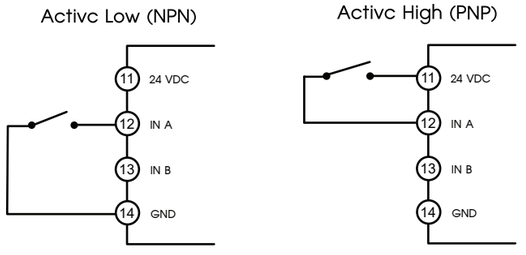
Up : Increments parameter and function, Show Total

WIRING DIAGRAM



INPUT WIRING EXAMPLES (CONTINUE)





WARNING

- Make sure the correct wiring connection before turning on electricity. Mis-wiring may cause malfunction of the unit and fire.
- Never modify the unit to prevent damage or incident such as malfunction and fire etc.

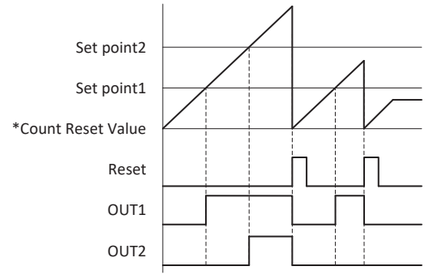
FUNCTION OUTPUT MODE

*Cout Reset Valuehas Countedstart after Reset

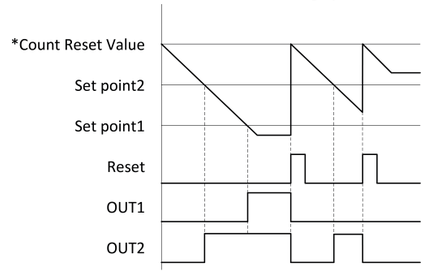
MODE 1

When count up or count down to Set Point 1 from setting. It will made OUT 1 ON until press Reset and when Count value count up or count down to Set Point 2 from setting until Reset pressing.

- OUT1 Retentive output / Count Continuation Relay ON all time even stay in condition.
- OUT2 Retentive output / Count Continuation Relay ON all time even stay in condition.



Mode 1 UP function graph

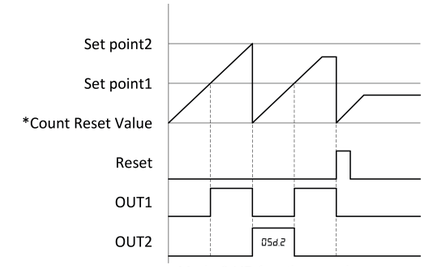


Mode 1 Down function graph

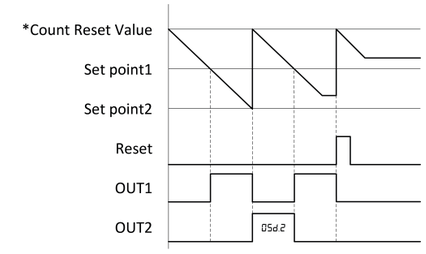
MODE 2

When Count up or down to Set Point 1 from setting will made OUT 1 ON until press Reset and Count up or count down to Set Point 2 from setting will Reset count and OUT 2 ON follow time of One shot duration 2

- OUT1 Retentive output / Count Continuation relay ON all time when stay in condition.
- OUT2 One-Shot output / Count Resetting relay ON follow time 05d.2



Mode 2 UP function graph

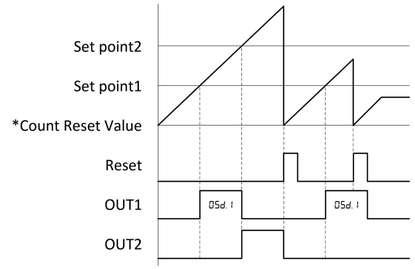


Mode 2 DOWN function graph

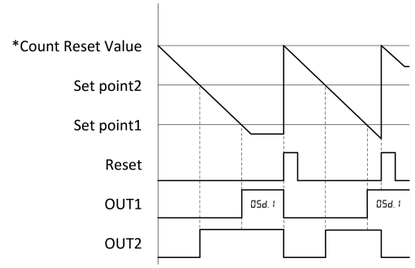
MODE 3

When count up or count down to Set Point 1 from setting. It will made OUT 1 ON follow time of One Shot duration 1(OSD.1) and when Count value count up or count down to Set Point 2 from setting. It will made OUT 2 ON until press Reset.

- OUT1 One-Shot output / Count Continuation Relay ON follow time 05d. 1
- OUT2 Retentive output / Count Continuation Relay ON on time when stay in condition.



Mode 3 UP graph function

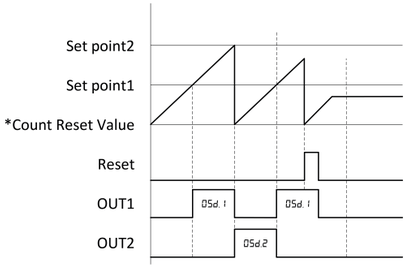


Mode 3 Down graph function

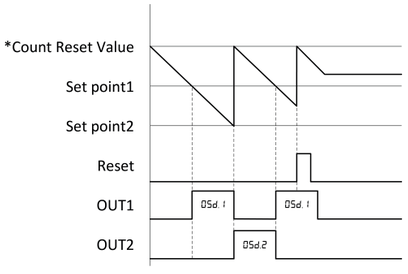
MODE 4

When count up or count down to Set Point 1 from setting. It will made OUT 1 ON follow time of One Shot duration 1 and when Count value count up or count down to Set Point 2 from setting will Reset count and OUT2 ON follow time of One shot duration 2.

- OUT1 One-Shot output / Count Continuation Relay ON follow time 05d. 1
- OUT2 One-Shot output / Count Resetting Relay ON follow time 05d.2



Mode 4 UP function graph



Mode 4 DOWN function graph

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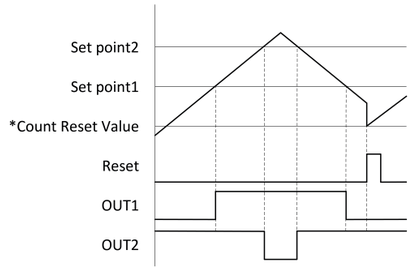
MODE 5

When Count value more or equal to Set Point 1 from settingwill made OUT 1 ON until Count value less than Set Point 1 will made OUT 1 OFF and when Count value more than Set Point 2 will made OUT2 OFF until Count value less or equal to Set Point 2 will made OUT2 ON

- OUT1 Count Value ⩾ Set point 1
- OUT2 Count Value ⩽ Set point 2

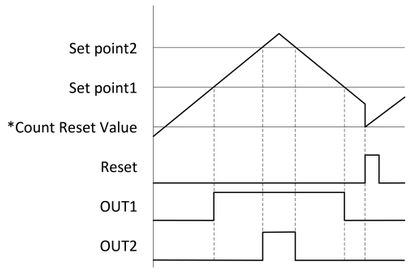


Mode 5 function graph

MODE 6

When Count more or equal to Set Point 1 from setting. It will made OUT 1 ON until Count less Set Point 1 will made OUT 1 OFF and when Count more or equal to Set Point2 ON until Count less than Set Point 2 will made OUT 2 OFF.

- OUT1 Count Value ⩾ Set point 1
- OUT2 Count Value ⩾ Set point 2

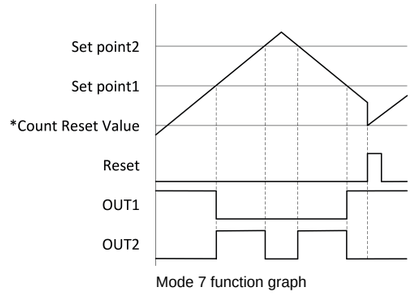


Mode 6 function graph

MODE 7

When Count less than Set Point 1 from setting. It will made OUT 1 ON until Count more or equal to Set Point 1 will made OUT 1 OFF and OUT 2 ON when Count more than Set Point 2 will made OUT 2 OFF.

- OUT1 Count Value < Set point 1
- OUT2 Count Value ⩾ Set point 1 และ Count Value ⩽ Set point 2



Mode 7 function graph

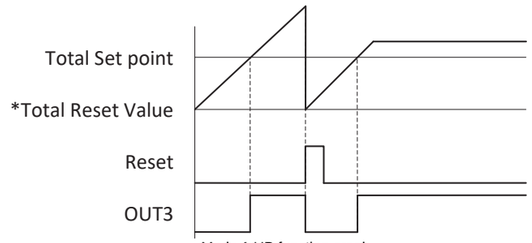
FUNCTION TOTAL MODE

*Total Reset Value is Total start after Reset.

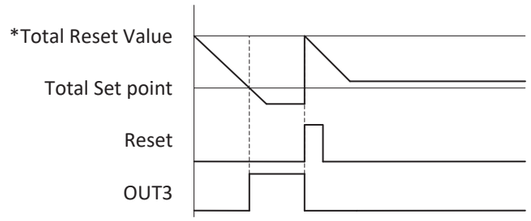
MODE 1

When Total count up or count down to Total Set Point from setting. It will made OUT 3 ON until press Reset.

- OUT 3 Retentive output / Count Continuation Relay ON all time when stay in condition.



Mode 1 UP function graph

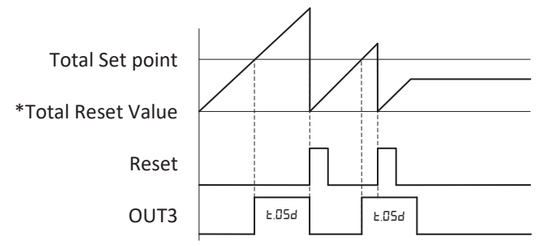


Mode 1 DOWN function graph

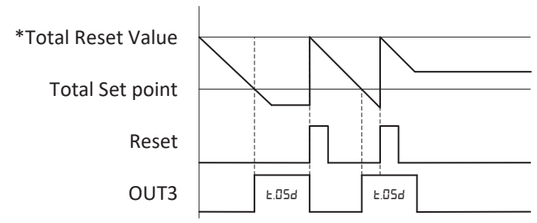
MODE 2

When Total count up or count down to Total Set Point from setting. It will made OUT 3 ON follow time of Total One shot duration.

- OUT 3 One-Shot output / Count Continuation Relay ON follow time t.05d



Mode 2 UP function graph

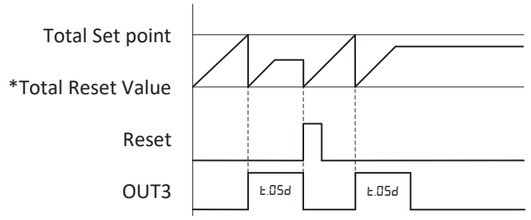


Mode 2 DOWN function graph.

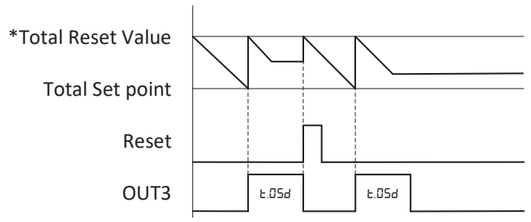
MODE 3

When count up or count down to Total Set Point from setting will Reset Total and OUT 3 ON follow time of Total One shot duration.

- OUT 3 One-Shot output / Count Resetting Relay ON follow time t.05d



Mode 3 UP function graph

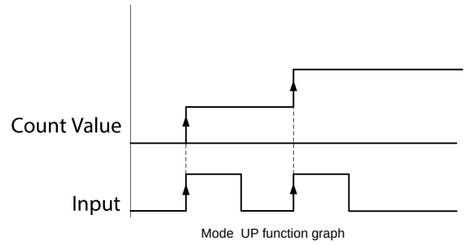


Mode 3 DOWN function graph.

DIRECTION INPUT MODE

MODE UP

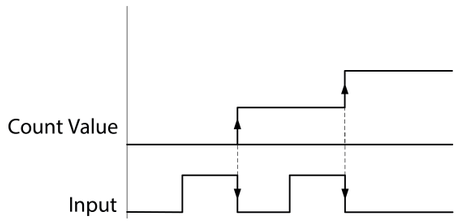
Count the rising edge will count Count Value value immediately when Input come.



Mode UP function graph

MODE DOWN

Count the down edge will count Count Value value immediately when Input come and go.



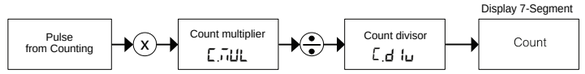
Mode Down function graph

PRESCALING

We can scale pulse value that come by setting count multiplier such as request count up to pulse and 0.7 so scale in form divisor.

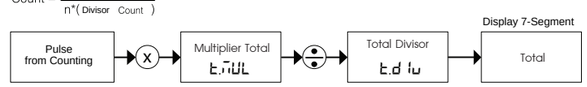
scale = multiplier/divisor, scale = 0.7 = 7/10.

:: so multiplier = 7, divisor = 10



Calculation When Input come in at n Pulse

$$Count = \frac{n*(\text{multiplier Count})}{n*(\text{Divisor Count})}$$



Calculation When Input come in at n Pulse

$$Total = \frac{n*(\text{Multiplier Total})}{n*(\text{Divisor Total})}$$

EXAMPLE

1.Encoder wheel type 100 pulse/round when run complete 1 round will have 0.45 metre. User needs to show in metre unit decimal 2 position.

Calculation

Display value = Pulse from actual counted * Scale

0.45 = 100 * Scale = multiplier/Divisor

Multiplier(C.mUL) = 45, Divisor(C.diu) = 10000, 45/10000

make multiplier, divisor to be simplest form 45/10000 = 9/2000

Setting

Multiplier (C.mUL) = 9, divisor(C.diu) = 2000

Decimal(d.P) = 0.00

Input(InPut.m) = EnCdr

2.Production line install Sensor NPN type count product to pack in the boxes. 12 pcs. per box by display quantity of boxes.

Calculation

Display = Pulse from actual counted * Scale.

1 = 12 * Scale = multiplier/divisor

Multiplier(C.mUL) = 1, divisor(C.diu) = 12, 1/12

Setting

Multiplier(C.mUL) = 1, divisor(C.diu) = 12

Decimal(d.P) = 0

Input(InPut.m)= H.SPd

ORDERING CODE

CMT-007AN - □ - □ - □

OUTPUT	
A	1 Relay Output (SP1)
AB	2 Relay Output (SP2)
ABC	3 Relay Output (TOTAL)

Option	
NONE	NONE
M	RS485

POWER SUPPLY	
220	220 VAC ±15%
24	24 VAC/VDC ±15%

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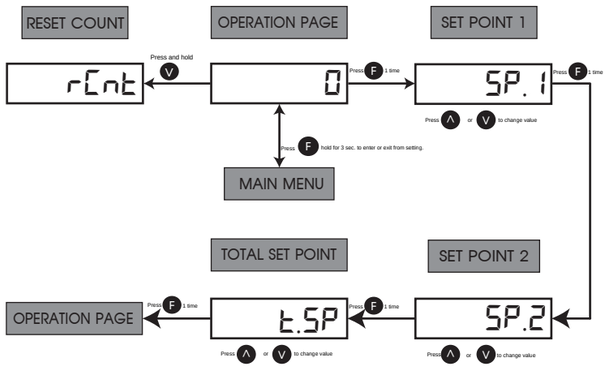
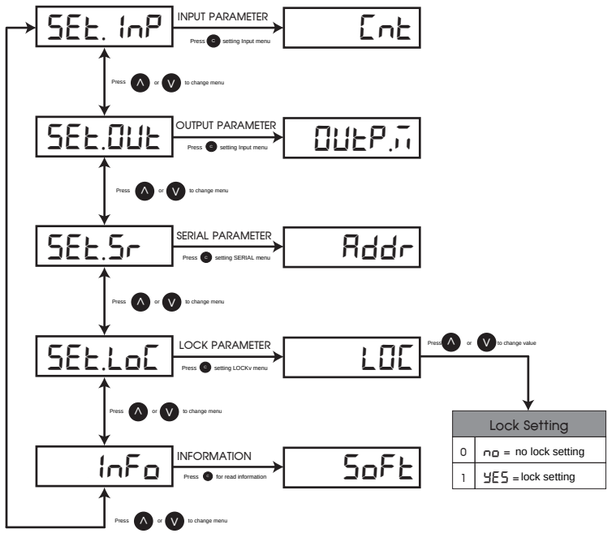
CMT-007AN PARAMETER SETTING

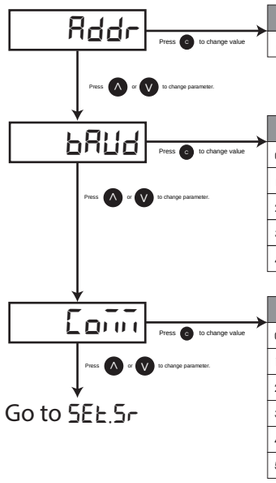


MAIN MENU



Lock Setting	
0	no = no lock setting
1	YES = lock setting

SERIAL PARAMETER

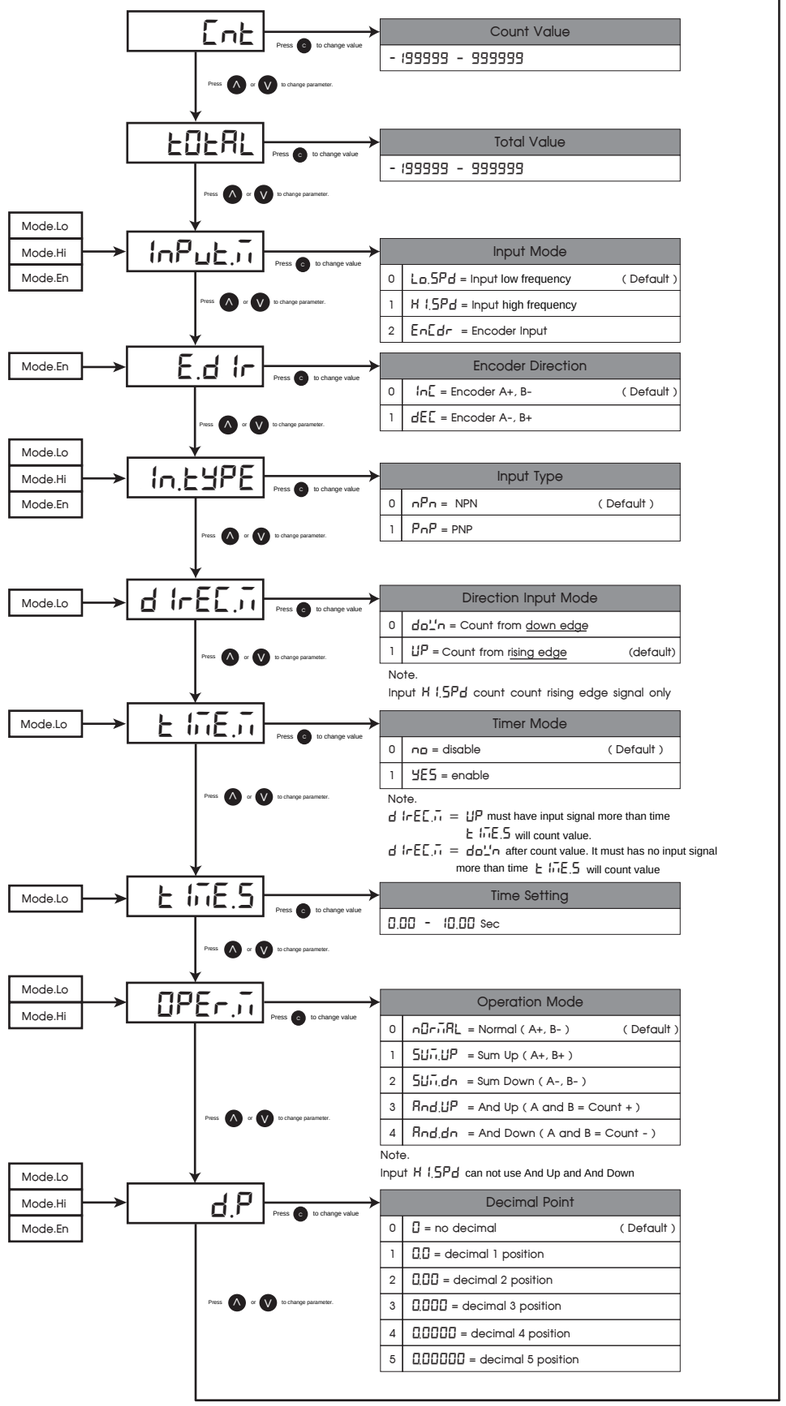


Slave Address
1 - 255

Baud Rate		
0	4.8 = 4800 Bps	
1	9.6 = 9600 Bps	(Default)
2	19.2 = 19200 Bps	
3	38.4 = 38400 Bps	
4	57.6 = 57600 Bps	

Communication	
0	b8n1 = Data 8 bits, NONE, 1 Stop Bit (Default)
1	b8n2 = Data 8 bits, NONE, 2 Stop Bits
2	b8o1 = Data 8 bits, ODD, 1 Stop Bit
3	b8o2 = Data 8 bits, ODD, 2 Stop Bits
4	b8E1 = Data 8 bits, EVEN, 1 Stop Bit
5	b8E2 = Data 8 bits, EVEN, 2 Stop Bits

INPUT PARAMETER



Input Mode		
0	Lo.SPd = Input low frequency	(Default)
1	HI.SPd = Input high frequency	
2	EnCdr = Encoder Input	

Encoder Direction		
0	InC = Encoder A+, B-	(Default)
1	dEC = Encoder A-, B+	

Input Type		
0	nPn = NPN	(Default)
1	PnP = PNP	

Direction Input Mode		
0	do'Wn = Count from down edge	
1	UP = Count from rising edge	(default)

Note.
Input HI.SPd count count rising edge signal only

Timer Mode		
0	no = disable	(Default)
1	YES = enable	

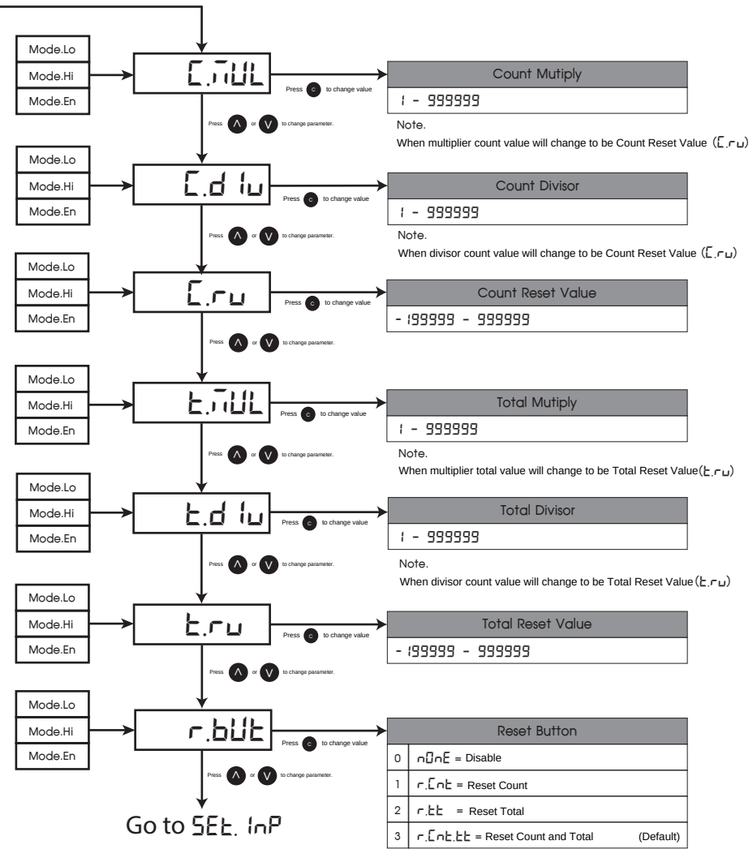
Note.
dIrEC.n = UP must have input signal more than time tIME.S will count value.
dIrEC.n = do'Wn after count value. It must has no input signal more than time tIME.S will count value

Time Setting
0.00 - 10.00 Sec

Operation Mode		
0	nOrMAL = Normal (A+, B-)	(Default)
1	SUM.UP = Sum Up (A+, B+)	
2	SUM.dn = Sum Down (A-, B-)	
3	And.UP = And Up (A and B = Count +)	
4	And.dn = And Down (A and B = Count -)	

Note.
Input HI.SPd can not use And Up and And Down

Decimal Point		
0	0 = no decimal	(Default)
1	0.0 = decimal 1 position	
2	0.00 = decimal 2 position	
3	0.000 = decimal 3 position	
4	0.0000 = decimal 4 position	
5	0.00000 = decimal 5 position	



Count Mutiply
1 - 999999

Note.
When multiplier count value will change to be Count Reset Value (C.ru)

Count Divisor
1 - 999999

Note.
When divisor count value will change to be Count Reset Value (C.ru)

Count Reset Value
-199999 - 999999

Total Mutiply
1 - 999999

Note.
When multiplier total value will change to be Total Reset Value(t.ru)

Total Divisor
1 - 999999

Note.
When divisor count value will change to be Total Reset Value(t.ru)

Total Reset Value
-199999 - 999999

Reset Button		
0	nOnE = Disable	
1	r.Cnt = Reset Count	
2	r.tt = Reset Total	
3	r.Cnt.tt = Reset Count and Total	(Default)

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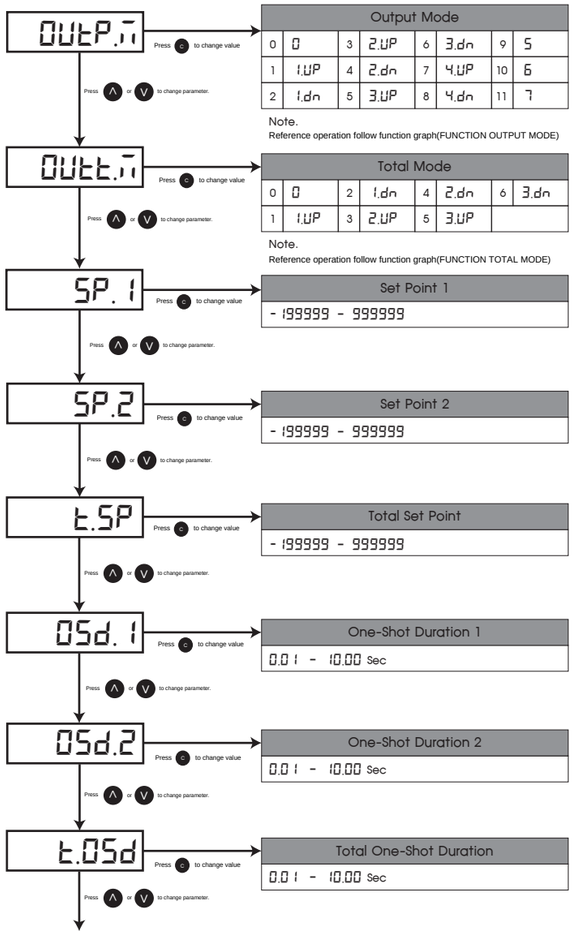
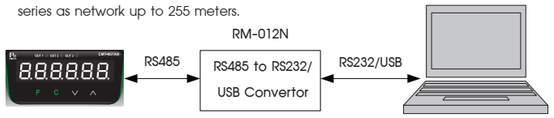
OUTPUT PARAMETER



SERIAL COMMUNICATION

The CMT series are equipped whit a RS485 serial communications interface to allow connection to computer or PLC. MODBUS protocal is provided as standard communication. The user can connect CMT series as network up to 255 meters.



MODBUS PROTOCAL
This MODBUS Protocal has been implement in accordance with MODBUS.ORG MODBUS Application Protocal Specification V1.1 With the following conditions applying

The following conditions apply
Baudrate must be set for 4800, 9600, 19200, 38400, 57600 bps
The format is MODBUS RTU
UART data 8 bites, 1 stop bit and no parity
Data is considered to be half duplex using 2 wire.

Exception Responses
The following exception codes will be supported only.

01 Illegal function
02 Illegal data address
03 Illegal value

MODBUS DATA REGISTER

Register	Register Name	Access	Format	Min	Max
0	Count	R/W	Long AB CD	-199999	999999
1					
2	Total	R/W	Long AB CD	-199999	999999
3					
4	Input Mode	R/W	Integer	0	2
5	Encoder Direc	R/W	Integer	0	1
6	Sensor Type	R/W	Integer	0	1
7	Direction Mode	R/W	Integer	0	1
8	Timer Mode	R/W	Integer	0	1
9	Time Setting	R/W	Integer	0	1000
10	Operate Mode	R/W	Integer	0	4
11	Decimal Point	R/W	Integer	0	5
12	Count Multiplier	R/W	Long AB CD	1	999999
13					
14	Count Divisor	R/W	Long AB CD	1	999999
15					
16	Count Reset	R/W	Long AB CD	-199999	999999
17					
18	Total Multiplier	R/W	Long AB CD	1	999999
19					
20	Total Divisor	R/W	Long AB CD	1	999999
21					
22	Total Reset	R/W	Long AB CD	-199999	999999
23					
24	Front Button Reset	R/W	Integer	0	3
25	Output Mode	R/W	Integer	0	11
26	Output Total Mode	R/W	Integer	0	6
27	Setpoint 1	R/W	Long AB CD	-199999	999999
28					
29	Setpoint 2	R/W	Long AB CD	-199999	999999
30					
31	Total Setpoint	R/W	Long AB CD	-199999	999999
32					
33	One Shot Duration 1	R/W	Integer	1	1000
34	One Shot Duration 2	R/W	Integer	1	1000
35	Total One Shot Duration	R/W	Integer	1	1000
36	Relay Status*	R	Integer	0	7
37	Slave Address	R/W	Integer	1	255
38	Baudrate	R/W	Integer	0	4
39	Communication	R/W	Integer	0	5
40	Lock	R/W	Integer	0	1

How to calculate Register

$$\text{Count} = \frac{\text{Count}_{\text{REG}}}{10^{\text{Decimal Point}_{\text{REG}}}} = \frac{1000}{10^{1}} = 100.0$$

$$\text{Total} = \frac{\text{Total}_{\text{REG}}}{10^{\text{Decimal Point}_{\text{REG}}}} = \frac{32000}{10^{3}} = 32.000$$

Ex.1 If needs set Time Setting at 5 seconds

$$\text{Time Setting} = \frac{5 \text{ seconds} \times 1000 \text{ ms}}{10}$$

$\therefore$ Set Time Setting $_{REG}$ = 500

Ex.2 If needs set OSD at 10 seconds

$$\text{One Shot Duration} = \frac{10 \text{ วินาที} \times 1000 \text{ ms}}{10}$$

$\therefore$ Set OSD $_{REG}$ = 1000

Ex.3 If needs to calculate OSD time from setting

One Shot Duration = OSD $_{REG}$ x 10
= 20 x 10
= 200 ms

*Relay Status

Out 1 = 1

Out 2 = 2

Out 3 = 4

Ex. Out 1 ON, Out 2 ON = 1+2 = 3

CMT-007AN

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