CONOTEC®
Digital Counter & Timer
www.conotec.co.kr

ISO 9001:2008

USER MANUAL

Thanks for your purchase of CONOTEC product.

<FOX-CTM4> <FOX-CTM7> <FOX-CTM5>

1 Cautions for Safety

Read carefully this instruction manual before use and use

* The specifications, appearance and dimension may be changed for improvement of performance without a prior notice

⚠ WARNING

1. This product is not made as a safety device, so when it is used for a control of devices feared to cause casualties, damages to the peripheral devices or huge property loss, the double safety devices should be arranged before use.
2. Avoid connecting lines, checking and repairing the products while power is supplied.
3. Connect power after making sure the terminal number.
4. Never disassemble modify, improve or repair the product.

⚠ CAUTIONS

● Be well–informed of how to use, safety regulations, warnings, etc before installation of this device and apply it to the extent of the defined specifications and relevant capacity without fail.
● Avoid wiring or installation to a motor or solenoid with a large inductive load.
● Use a shiled cable for extention of the sensor and ensure not to make it longer than the necessity.
● Ensure not to use the parts generating arc when switching at the same power source or near to it.
● Keep the power cable away from a high–tention power line and ensure not to install it at a place with serious oil and dirt.
● Avoid strong magnetic field or serious noise, vibration or impact.
● Keep away from the place where strong alkaline or acid material is directly released and use an independent pipe line.
● When it is installed at kitchen, ensure not to pour water directly over the product for cleaning.
● Keep the sensor cable away from signal line, power source, power line or loaded line and use an independent pipe line.
● Note that the mark of ⚠ in terminal connection diagram is the safety expression for warnings or cautions.
● Avoid using the product close to the device generating noises(high frequency welder, high frequency sewing machine, high frequency radio, large capacity SCR Controller, etc).
● The use in any way other than what is instructed by the manufacturer may cause injury or property loss.
● It is not a toy and keep it out of reach of children's hand.
● The installation of the device should be performed by an expert or a qualified personnel without fail.
● We shall not take any responsibility for the damage caused by non–compliance with the above–mentioned warnings or cautions or by any consumer's mistake.

⚠ DANGER

■ Attention, Danger related to electric shock

· Electric shock –Do not touch AC terminal during application of electric current. It may cause electric shock.
· Cut the power supply without fail during checking the input power.

2 Models

Model	Dimensions
FOX-CTM4	(W)48 × (H)48 × (D)109.5 mm
FOX-CTM5	(W)96 × (H)48 × (D)111 mm
FOX-CTM7	(W)72 × (H)72 × (D)111.2 mm

3 Specification

Series		FOX-CTM4	FOX-CTM5	FOX-CTM7
AC Power		100~240VAC(50/60Hz) ±10%		
Power consumption		7VA		
Allowable voltage range		±10% of rated voltage		
Input		CP1(START), CP2(INHIBIT), RESET, BATCH RESET		
Input type		Selectable voltage, No-voltage input		
CPS		1 / 30 / 1K / 10Kcps		
one shot output		0 ~ 99.99s		
Control output	Contact output	Relay : SPST(1a), SPDT(1a1b) Capacity : 250VAC 2A resistive load		
	Non-contact output	Open collector : OUT1, OUT2, BAT.B OUT Capacity : 30VDC Max, 100mA Max		
External supply voltage		12VDC ±10%, 200mA Max		
Memory retention		10 years(when using non-volatile semiconductor memory type)		
Relay life	Electrical	Min. 100,000 times(250VAC 2A resistive load)		
	Mechanical	Min. 10,000,000 times		
Ambient temperature		-10~55℃(but, at no freezing)		
Preservation temperature		-25~65℃(but, at no freezing)		
Ambient humidity		35~85% RH		
Weight		221g	244g	236g

4 Terminal connection diagram
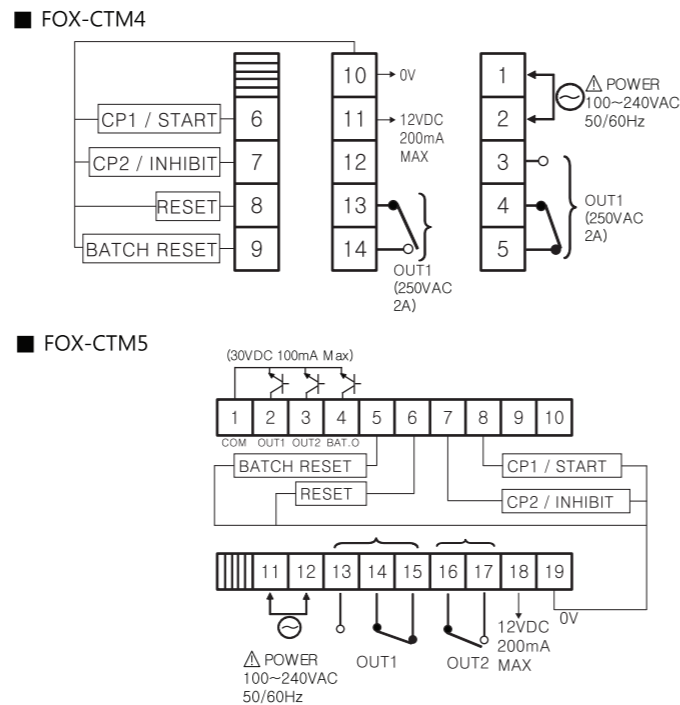
■ FOX-CTM4
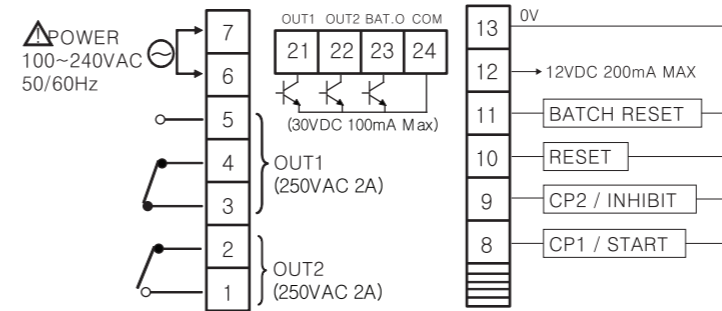
■ FOX-CTM5

■ FOX-CTM7

5 External dimension and processed panel

■ FOX-CTM4

단위 : mm

■ FOX-CTM5

unit : mm

■ FOX-CTM7

unit : mm
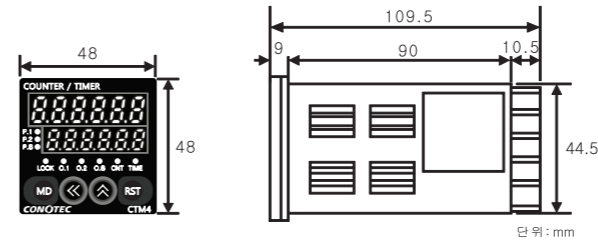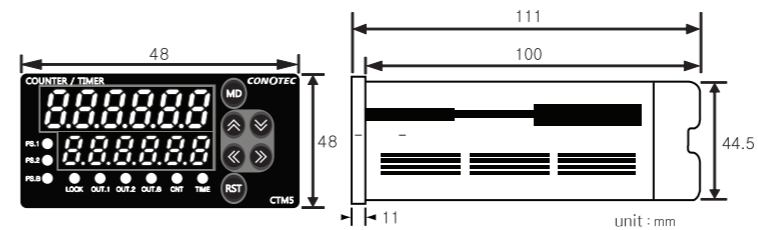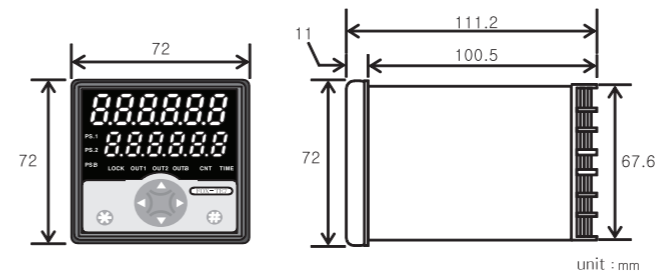
■ Dimensions

	CTM4	CTM5	CTM7
A	Min.60	Min.130	Min.82
B	Min.60	Min.60	Min.82
C	$45.0^{+0.6}_{0}$	$45.0^{+0.5}_{0}$	$68.0^{+0.7}_{0}$
D	$45.0^{+0.6}_{0}$	$92.0^{+0.5}_{0}$	$68.0^{+0.7}_{0}$

6 Name of parts

■ FOX-CTM4
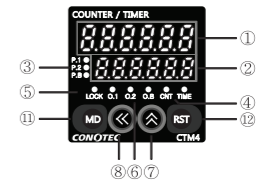
■ FOX-CTM5
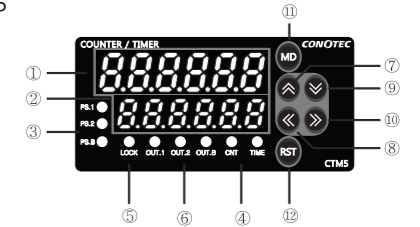
■ FOX-CTM7

① When the run mode : Counting value
When the setting mode : Menu name
When changing the setting value: Set menu name
② When the operating mode : Setting value
When the menu setting mode : Detailed menu
When the setting value changing mode : Setting value
③ PS.1 : Lights when indicates PRESET 1
PS.2 : Lights when indicates PRESET 2
PS.B : Lights when indicates BATCH COUNTER
④ CNT : Lights when the current mode is at counter
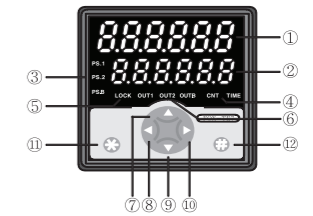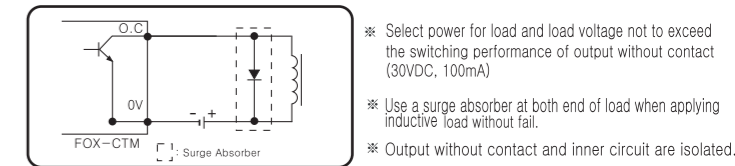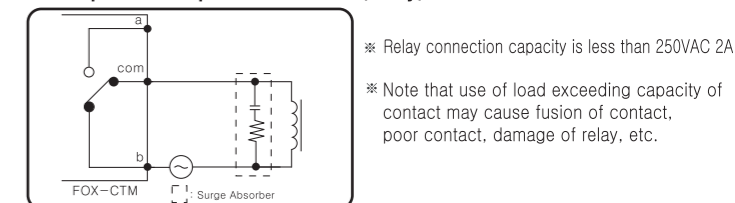TIME : Lights when the current mode is at timer
⑤ LOCK : Lights when the settig key lock
⑥ OUT.1 : Lights when OUT1 is outputting
OUT.2 : Lights when OUT2 is outputting
OUT.B : Lights when BATCH COUNTER is outputting
⑦ UP key, to increase setting value
⑧ LEFT key, checkable the PRESET value in the operation display
⑨ DOWN key, to decrease the setting value
⑩ RIGHT key,checkable the PRESET value in the operation display
⑪ MODE key, switchable to the operation display and menu setting mode
⑫ RESET key, initialized the timer or counter, returning in the menu setting mode.

7 Relay connection

■ Example for output with non-contact(Transistor)

※ Select power for load and load voltage not to exceed the switching performance of output without contact (30VDC, 100mA)

※ Use a surge absorber at both end of load when applying inductive load without fail.

※ Output without contact and inner circuit are isolated.

■ Example for out put with Contact(relay)

※ Relay connection capacity is less than 250VAC 2A.

※ Note that use of load exceeding capacity of contact may cause fusion of contact, poor contact, damage of relay, etc.

■ Example for Non-contact input

Sensor spec	<Voltage output>	<Open collector output>
Sensor type : NPN Product setting: NPN	sensor FOX-CTM Input +12V 9.4KΩ 0V	sensor FOX-CTM Input +12V 9.4KΩ 0V
Sensor type : PNP Product setting: PNP	sensor FOX-CTM Input +12V 4.7KΩ 0V	sensor FOX-CTM Input +12V 4.7KΩ 0V
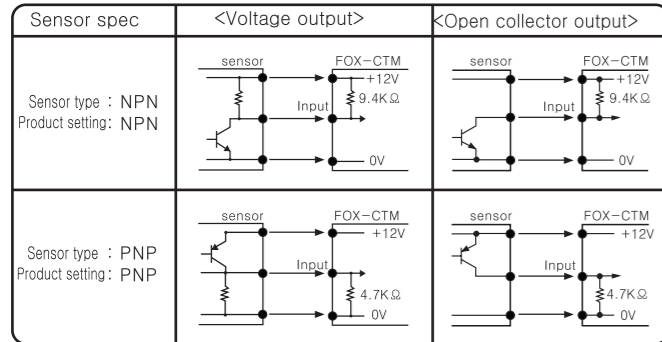
■ Example for Contact input

<When select INPUT logic NPN>	<When select INPUT logic PNP>
FOX-CTM +12V 9.4KΩ Input 0V	FOX-CTM +12V Input 4.7KΩ 0V

Operation display

Press for 3 seconds

MODE ↓

C-t   Timer / Counter mode selection

MODE ↕ RESET

InPUt   Input mode selection

MODE ↕ RESET

oUt   Output mode selection

MODE ↕ RESET

oUt.t-1   OUT1 Output time setting

MODE ↕ RESET

oUt.t-2   OUT2 Output time setting

MODE ↕ RESET

PrES   Prescale value setting

MODE ↕ RESET

PrE.P   Prescale decimal point

MODE ↕ RESET

dot.P   Displayed value decimal point

MODE ↕ RESET

CPS   Max.counting speed setting

MODE ↕ RESET

bAtCH   Batchcounter output selection

MODE ↕ RESET

SIGnAL   NPN / PNP input selection

MODE ↕ RESET

bACk   Memory for power failure

MODE ↕ RESET

LoCk   Key lock

MODE ↓

Operation display

※ In case of no input for 60 sec. at the setting value changing mode, automatically return to the operation display.

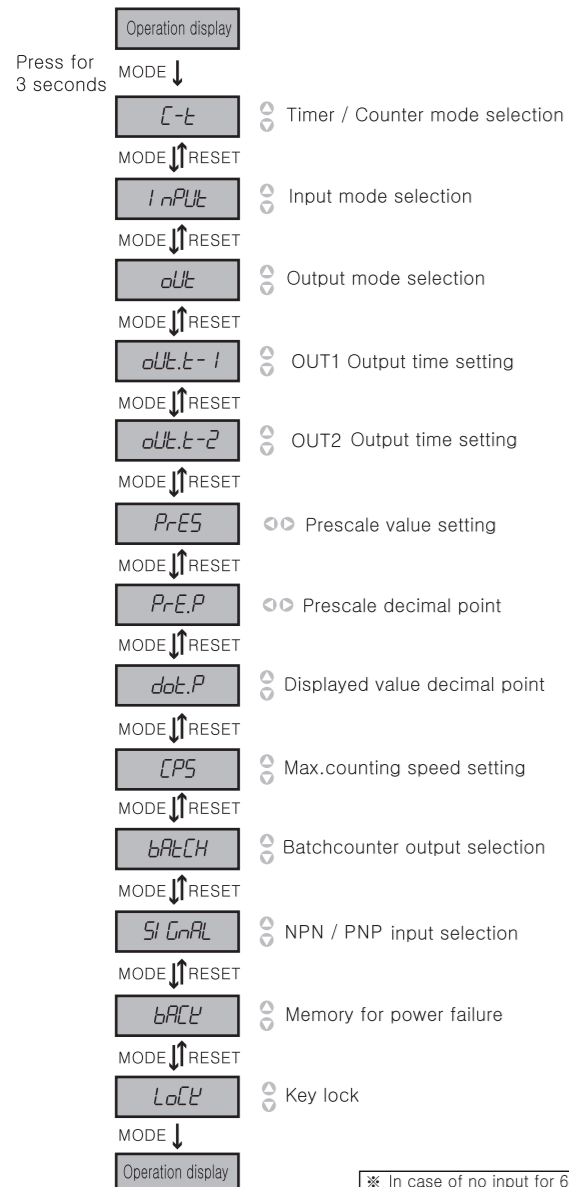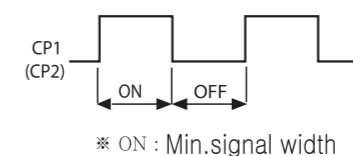| Set menu		Initial value
InPUt	UP-A ↔ dy-A ↔ UP-b ↔ dy-b ↔ UP-Ab ↔ dy-Ab ↔ Ud-A ↔ Ud-b ↔ Ud-C ↔ Ud-d ↔ Ud-E ↔ Ud-F	UP-A
o-PUt	n ↔ F ↔ C ↔ r ↔ t ↔ P ↔ q ↔ A	n
oUt.t-1	00.00 ~ 99.99	1 SEC
oUt.t-2	00.00 ~ 99.99	1 SEC
PrES	000001 ~ 999999	1
PrE-P	000001 ~ 999999 ※ Possible set to 3-digit decimal.	0000
dot-P	0.000 ~ 0000 ※ Possible set to 3-digit decimal.	0000
CPS	1 ↔ 30 ↔ 1k ↔ 10k ※When using the contact,use 1 or 30cps	1
bAtCH	CTM5 CTM7 rY-1 ↔ tr ↔ ALL ↔ oFF ※ If relay, ALL, out1 is operated to the batch output CTM4 rY-1 ↔ oFF	rY-1
SIGnAL	nPn ↔ PnP ※nPn or PnP input logic selection	nPn
PoYEr	SAYE ↔ nonE ※Memory when power failure, select to use or not	SAYE
LoCk	L.oFF ↔ L.rSt ↔ L.SEt ↔ L.ALL ※L.rSt : reset key L.SEt: mode key	oFF

※ A should be over the width of minimum signal.
※ B should be over 1/2 of the width of minimum signal

Input mode		Input mode	
UP-A	UP-A Inhibit input	dy-A	DOWN-A Inhibit input
UP-b	UP-B Inhibit input	dy-b	DOWN-B Inhibit input
UP-Ab	UP-AB Individual input	dy-Ab	DOWN-AB Individual input
Ud-A	UP/DOWN-A Command input	Ud-d	UP/DOWN-D Command input
Ud-b	UP/DOWN-B Individual input	Ud-E	UP/DOWN-E Individual input
Ud-C	UP/DOWN-C Phase difference input	Ud-F	UP/DOWN-F Phase difference input

One shot time delay   Self-maintenance output   One shot output (Out1)   One shot output (Out2)

Output mode	Input mode			
	UP	DOWN	UP/DOWN/A,B,C	
n	Reset 999999 Set2 Set1 0 Out1 Out2			When the Set2 value count-up, Out2 will be output after delay setting time, and display counting value to be maintained. Out1 and Out 2 turned OFF when reset inputs, and counting value to be initialized.
F				When the Set2 value count-up, Out2 will be output after delay setting time, and display counting value to be continuously. Out1 and Out 2 turned OFF when reset inputs, and counting value to be initialized.
C				Will be reset when the Set1 value count-up, Out2 to be one-shot output. When Out2 is turned OFF, self-maintenance output of Out1 also to be turned OFF.
r				Out2 is to be the one-shot output when the Set2 value count-up, the counting value is maintained. After one-shot time, to be reset.
t				Out2 is to be one-shot output when the Set2 value count-up, the counting value is to be proceeding. After Out2 one-shot time, Out1 and Out2 is turned OFF.
P				When the Set2 value count-up, displaying the counting value is maintained and Out 2 is one-shot output. After one-shot time, the proceeded counting value is displayed.
q				When the Set2 value count-up, Out2 is one-shot output, and the counting value is being proceeded. After one-shot output time, the counting value is re-set.
A				Out1 and Out 2 are divided, in case of the value for Out1 is same as the value of Set1, it leads to one-shot output or self-maintenance. And Out2 is one-shot output. In case of Reset input, Out1 and Out2 are turned OFF, the counting value is to be initialized.

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

CP1 (CP2) ← ON → ← OFF →

※ ON : Min.signal width

※ Minimum signal width is the time for counting input signal as one to one in duty ratio.

14 How to set-up timer mode

Operation display

Press for 3 seconds MODE ↓

Display	Description
C-t	Timer / counter mode selection
MODE ↕ RESET	
oUt	Timer output mode selection
MODE ↕ RESET	
oUtt-1	OUT1 output time setting ◐◑ Shifting digit
MODE ↕ RESET	
oUtt-2	OUT2 output time setting ◐◑ Shifting digit
MODE ↕ RESET	
U-d	Timer counting UP/DOWN mode selection
MODE ↕ RESET	
UnIt	Time unit selection
MODE ↕ RESET	
SEC	Time range setting
MODE ↕ RESET	
bAtCH	Batch counter output selection
MODE ↕ RESET	
StArt	START input mode selection
MODE ↕ RESET	
SIGnAL	NPN / PNP input selection
MODE ↕ RESET	
bAtʏ	Memory protect function selection
MODE ↕ RESET	
LoCʏ	Key lock
MODE ↓	

Operation display

※ In case of no input for 60 seconds in the mode for changing value, automatically return to the operation display

15 Function setting detailed menu

Set menu	Description	Initial value
oUt	oUt.1 ↔ oUt.2 ↔ oUt.3 ↔ oUt.4 oUt.5 ↔ oUt.6 ↔ oUt.7 ↔ oUt.8	oUt.1
oUt.t-1	00.00 ~ 99.99	01.00
oUt.t-2	00.00 ~ 99.99	01.00
U-d	UP ↔ doʏn	UP
UnIt	10 ↔ 60	10
SEC	※ Refer to the time range for setting	9999.99
bAtCH	CTM5 CTM7 rʏ-1 ↔ tr ↔ ALL ↔ oFF ※ If relay, ALL, out1 is operated to the batch output CTM4 rʏ-1 ↔ oFF	rʏ-1
StArt	SHot ↔ ʏEEP ↔ P-on	SHot
SIGnAL	nPn ↔ PnP	nPn
PoʏEr	SAʏE ↔ nonE	SAʏE
LoCʏ	L.oFF ↔ L.rSt ↔ L.SEt ↔ L.ALL ※L.rSt:reset key L.SEt:mode key	oFF

16 Setting the time range

10digit(UnIt=10)			60digit(UnIt=60)		
Indication		Range	Indication		Range
SEC	9999.99	9999.99sec	SEC	59.59.99	59min59.99sec
SEC	99999.9	99999.9sec	SEC	9.59.99.9	9hrs 59min59.9sec
SEC	999999	999999sec	SEC	99.59.59	99 hrs 59min59sec
ᄉ in	999999	999999min	ᄉ in	9999.59	9999 hrs 59min

17 Output operation

START input operation	P.ON(P.on)	SHOT(SHot)	KEEP(ʏEEP)
	When the power ON a timer turns ON, and maintains ON till the power OFF. START input signal is ignored.	If the power ON, and START inputs a timer turns ON. During a timer ON, START input is ignored.	If the Power ON, a timer ON only during START input is maintained. If START input is OFF, a timer to be re-set.

t ▮ One shot   ▭ Self-maintenance

Output mode	START=P.ON(P.on)	START=SHOT(SHot)	START=KEEP(ʏEEP)	Description
oUt.1				1. When the Set value reaches at 1 –> OUT1 ON 2. When the Set value reaches at 2 –> OUT2 ON 3. Maintains the displayed value

| Output mode	START=P.ON(P.on)	START=SHOT(SHot)	START=KEEP(ʏEEP)	Description
oUt.2				1. When reaching the set value 1 –>OUT1 one-shot output 2. When reaching the set value 2 –> OUT2 one-shot output 3. Maintains the displayed value
oUt.3				1. When reaching the set value 1 –> OUT1 OFF 2. When reaching the set value 2 –> OUT2 OFF 3. Maintains the displayed value
oUt.4				1. When reaching the set value 1 –> OUT1 OFF as long as the output time 1 2. When reaching the set value 2 –> OUT2 OFF as long as the output time 2 3. Output ON after OFF as long as each output time 4. Maintains the displayed value
oUt.5				1. OUT1 output ON while the set value 1 2. When reaching the set value 1 –>Reset the displayed value, OUT1 output OFF 3. OUT2 output ON while the set value 2 4. When reaching the set value 2 –>Reset the displayed value, OUT2 output OFF 5. Repeat the operation
oUt.6				1. OUT1 one-shot ouputs at start of the set value1 2. When reaching the set value 1 –> Reset the displayed value 3. OUT2 one-shot ouputs at start of the set value 2 4. When reaching the set value 2 –> Reset the displayed value 5. Repeat the operation
oUt.7				1. OUT2 output ON while the set value 1 2. When reaching the set value 1 –> Reset the displayed value, OUT2 output OFF 3. OUT1 output ON while the set value 2 4. When reaching the set value 2 –> Reset the displayed value, OUT1 output OFF 5. Repeat the operation
oUt.8				1. OUT2 one-shot ouputs at start of the set value 1 2. When reaching the set value 1 –> Reset the displayed value 3.OUT1 one-shot ouputs at start of the set value 2 4.When reaching the set value 2 –> Reset the displayed value 5. Repeat the operation

1. In the operation mode, using with ⊙⊙ keys, moves to the display for batch setting.
2. After moving the position with ⊙⊙ keys, set to the desired value with ⊙⊙ keys. (Initialized=1)
3. Setting completed by pressing the MODE key.
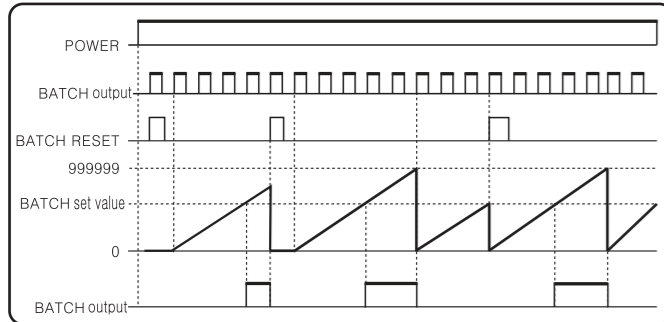
·· Batch counting is increased whenever the displayed value reaches at the set value.
·· If the counting value is exceeded 999999, initialized to 0, and countring from 0 again, to repeat the operation.
·· Batch ouput is selectable of OUT2, TR, OUT2+TR, OFF.
·· How to reset the batch counter
  · In display of a batch counter, press reset button on the front panel of a product.
    (Reset method with reset button on the display, is available only on the batch counter display)
  · To input the batch counter reset by outside available at any display.

■ Example for using a batch counter

When setting a batch counter in the mode setting, it can be operated available with a relay or TR ouput.
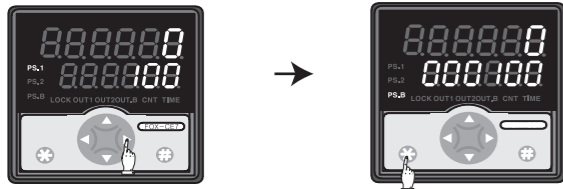
1. In the operation mode, moving Right or Left by pressing key to the display of a batch counter.

1. FND is flickered to be batch setting by once pressing the Mode key.
2. Position movement is by pressing Right or Left key and setting the batch value by Up or Down key.
3. Save the set value by once pressing Mode key after setting the batch value.

※ Caution for using a batch counter
 – When setting the batch ouput by a relay, be noticed that Out1 is operated as a batch output.

■ In case of display EEPRM ERROR when power ON
 – It caused by changed the value not identified value memorized occured an error by noise of outside or surge through the memory from system inside.
   In this case, all set values are initialized by pressing RESET key.

※Caution – Make sure of re-set the value due to be initialized.
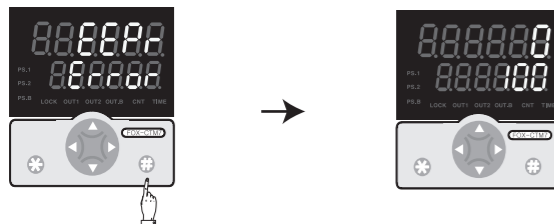
When EEPROM error displays, press ⊕ key.

Returns to the RUN mode

MEMO