Autonics

COUNTER/TIMER
FX/FXH/FXL 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

1. **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 serious damage, fire or human injury
2. **This unit must be mounted on Panel.**
   It may give an electric shock.
3. **Do not connect terminals when it is power on.**
   It may give an electric shock.
4. **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

1. **This unit shall not be used outdoors.**
   It might shorten the life cycle of the product or give an electric shock.
2. **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.
3. **Please observe specification rating.**
   It might shorten the life cycle of the product and cause a fire.
4. **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.
5. **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.
6. **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.
7. **Do not inflow dust or wire dregs into inside of this unit.**
   It may cause a fire or mechanical trouble.

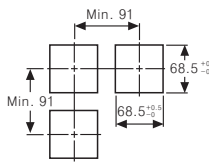
▣ Input logic selection

※Please be sure to turn power OFF before changing input logic.

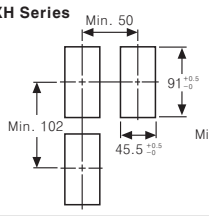
FX series	FXL series	FXH series
Input logic is changable by input logic selection switch located at the one-side of case.	Input logic is changable by input logic selection switch located at the terminal block.	Input logic is changable by input logic selection switch(SW3) located at the inside of the case.
• No-voltage intput(NPN) • Voltage intput (PNP) NPN PNP NPN PNP LED display direction	• No-voltage intput(NPN) F S • Voltage intput(PNP) F S	• No-voltage intput(NPN) • Voltage intput (PNP) NPN PNP NPN PNP LED Display direction LED Display direction

▣ Panel cut-out

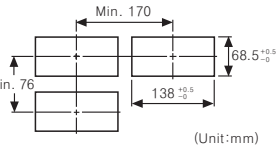
●FX Series



●FXH Series

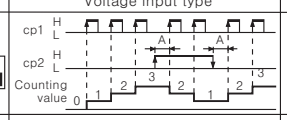
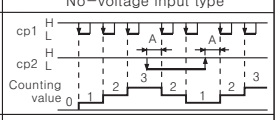
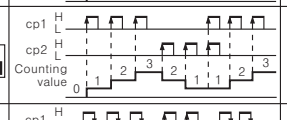
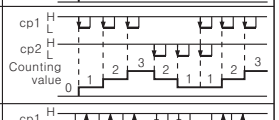
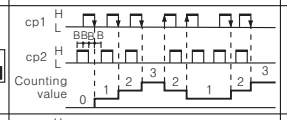
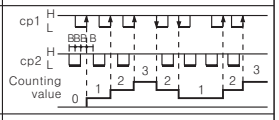
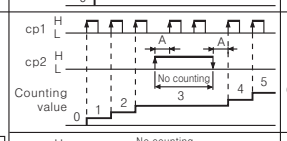
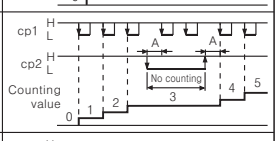
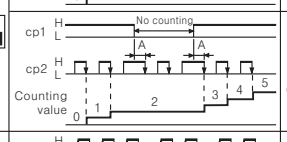
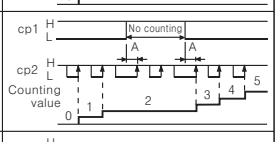
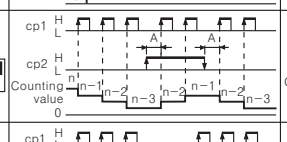
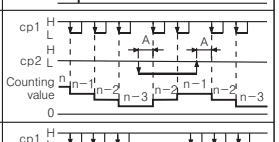
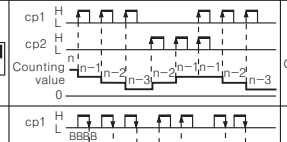
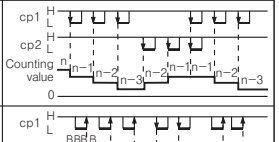
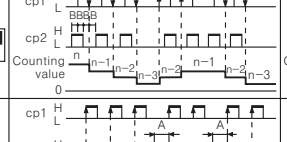
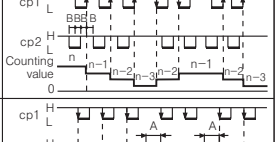
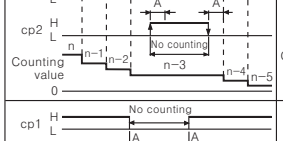
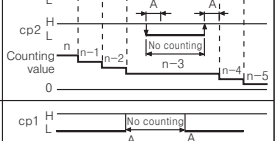
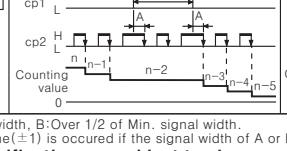
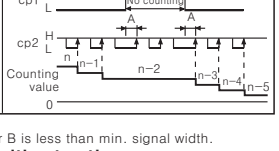


●FXL Series



(Unit:mm)

▣ Input operation mode(Counter)

Input mode	SW1	Counting chart	
		Voltage input type	No-voltage input type
Up/ Down-A (Command input)	2 3 4 ON OFF		
Up/ Down-B (Individual input)	2 3 4 ON OFF		
Up/ Down-C (Phase difference input)	2 3 4 ON OFF		
Up (Up input)	2 3 4 ON OFF		
			
Up/ Down-D (Command input)	2 3 4 ON OFF		
Up/ Down-E (Individual input)	2 3 4 ON OFF		
Up/ Down-F (Phase difference input)	2 3 4 ON OFF		
Down (Down input)	2 3 4 ON OFF		
			

※A:Over Min. signal width, B:Over 1/2 of Min. signal width.
Counting miss by one(±1) is occured if the signal width of A or B is less than min. signal width.

※The above specification are subject to change without notice.

▣ Specifications

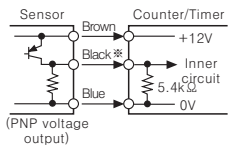
Series		FX		FXH	FXL	
Digit		4	6	4	4	6
Model	Single preset	FX4	FX6	FX4H	——	——
	Dual preset	FX4-2P	FX6-2P	FX4H-2P	FX4L-2P	FX6L-2P
	Indication	FX4-I	FX6-I	FX4H-I	FX4L-I	FX6L-I
Power supply	AC power	100-240VAC 50/60Hz				
	AC/DC power	12-24VAC 50/60Hz, 12-24VDC				
Allowable voltage range		90 to 110% of rated voltage				
Power consumption	AC power	Indiction:Approx. 6VA, Single preset:Approx. 7VA, Dual preset:Approx. 8VA(240VAC 50/60Hz)				
	AC/DC power	Indiction:Approx. 5.8VA, Single preset:Approx. 6.8VA, Dual preset:Approx. 7.6VA(24VAC 50/60Hz) Indiction:Approx. 2.7W, Single preset:Approx. 3.3W, Dual preset:Approx. 3.8W(24VDC)				
Max. counting speed for CP1, CP2		Selectable 1cps/30cps/2kcps/5kcps by inner DIP switch				
Min. input signal width		RESET input, INHIBIT input : Approx. 20ms				
Input method	CP1, CP2 (INHIBIT)	Input logic is selectable [Voltage input] Input impedance:5.4kΩ, "H" level:5-30VDC, "L" level:0-2VDC [No-voltage input] Short-circuit impedance:Max. 1kΩ, Residual voltage:Max. 2VDC, Open-circuit impedance:Min. 100kΩ				
	RESET input					
One-shot output time		1st output : 0.5sec., 2nd output : 0.05 to 5sec.				
Control output	Con-tact Type	Single preset type:SPDT(1c) Dual preset type:1st output SPDT(1c), 2nd output:SPDT(1c)				
	Con-tact Capacity	250VAC 3A resistive load				
	Solid-state Type	Single preset type:NPN open collector Dual preset type:1st output NPN open collector, 2nd output NPN open collector				
	Solid-state Rating	30VDC Max. 100mA Max.				
Memory retention		10 years(EEPROM)				
External power supply		12VDC ±10% 50mA Max.				
Environment	Ambient temperature	-10 ~ 55℃, Storage temperature: -25 ~ 65℃				
	Ambient humidity	35 ~ 85%RH, , Storage humidity: 35 ~ 85%RH				
Approval		cULus				

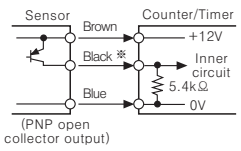
※Environment resistance is rated at no freezing or condensation.

▣ Input connection

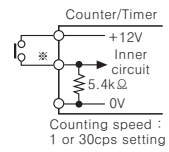
◎Input logic : Voltage input(PNP)

●No-voltage input(Standard input sensor:PNP output type sensor)





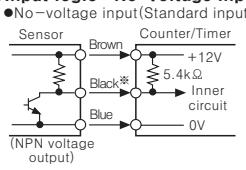
●Contact input

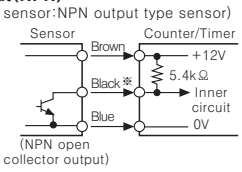


Counting speed : 1 or 30cps setting

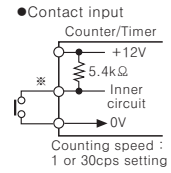
◎Input logic : No-voltage input(NPN)

●No-voltage input(Standard input sensor:NPN output type sensor)





●Contact input

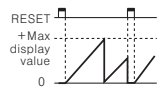


Counting speed : 1 or 30cps setting

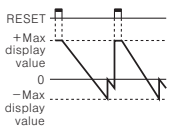
※CP1, CP2(INHIBIT), RESET input part

▣ Counting operation of indication model

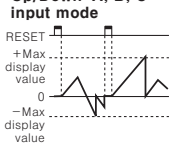
●Up input mode



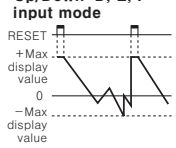
●Down input mode



●Up/Down-A, B, C input mode



●Up/Down-D, E, F input mode



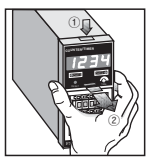
▣ Case & DIP switch detachment

Please turn off the power before detaching the case.

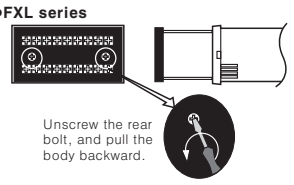
●FXH series

①Push down the front guide.
②Pull out the front guide.

※Separate the case by hands.

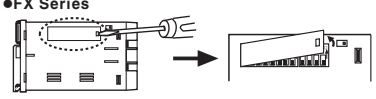


●FXL series



Unscrew the rear bolt, and pull the body backward.

●FX Series

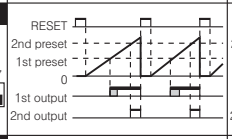
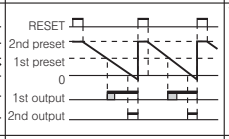
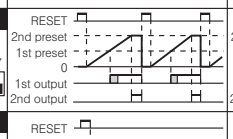
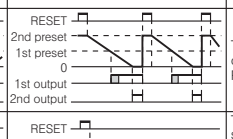
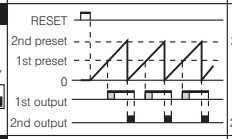
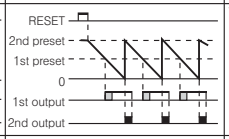
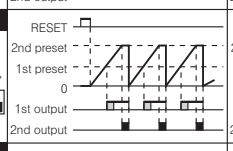
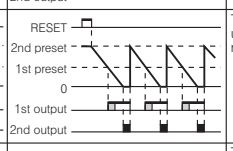
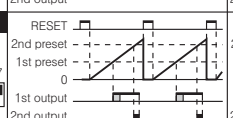
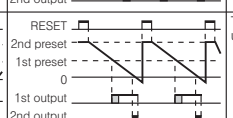
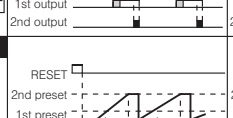
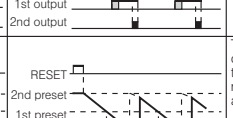
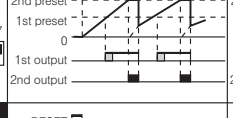
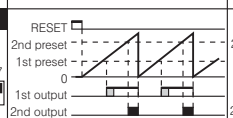
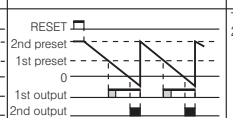
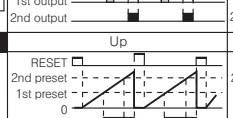
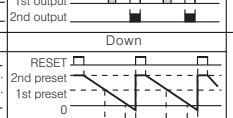
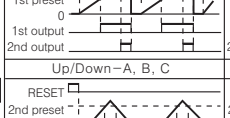
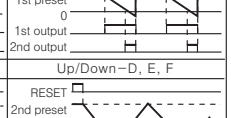


Push a lock part to front direction and widen it simultaneously.
※Be careful in order not to be wounded.

▣ Output operation mode

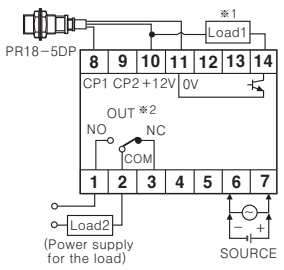
One-shot output (0.05 to 5sec) of 2nd output ← Hold output → One-shot output (0.5sec) of 1st output ← Hold output

※The output of single preset type is operated at the status of the second output mode

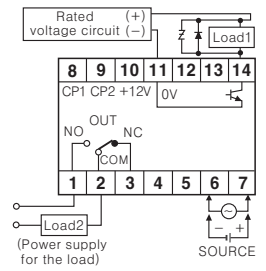
Output mode	Input mode: Up, Up/Down-A, B, C mode	Input mode: Down, Up/Down-D, E, F mode	Operation after Count up
F			The display value continues until Reset signal applied and the output will be held. • 1st hold output and 2nd output will be held until Reset signal applied. • When use 1st output as one-shot output, it will return after operating for 0.5sec.
N			The display value and output will be held until Reset signal.
C			The display returns to initial status and 2nd output will be reset after one-shot time. • 1st hold output will be OFF after one-shot output time of 2nd output. • 1st one-shot output will be reset after operating 0.5sec. not related to 2nd output.
R			The display value will be held until 2nd output is OFF then reset. • 1st hold output will be OFF after one-shot time of 2nd output. • 1st one-shot output will be reset after operating 0.5sec. not related to 2nd output.
K			The display value continues until Reset signal applied. • 1st hold output will be OFF after one-shot time of 2nd output. • 1st one-shot output will be reset after operating 0.5sec. not related to 2nd output.
P			The display value is held during 2nd output one-shot time, counting process is returned to reset start status as soon as 2nd output ON. • 1st hold output will be OFF after one-shot time of 2nd output. • 1st one-shot output will be reset after operating 0.5sec. not related to 2nd output.
Q			The display continues until 2nd output is OFF. • 1st hold output will be OFF after one-shot time of 2nd output. • 1st one-shot output will be reset after operating 0.5sec. not related to 2nd output.
S Counter	Up 	Down 	• Up, Up/Down-A, B, C input mode -OUT1 is ON when(Display value) ≥ (1st preset value) -OUT2 is ON when(Display value) ≥ (Double preset value)
	Up/Down-A, B, C 	Up/Down-D, E, F 	• Down, Up/Down-D, E, F input mode -OUT1 is ON when(Display value) ≤ (1st preset value) -OUT2 is ON when(Display value) ≤ (Zero)
S Timer	Up 	Down 	When it is used as Timer, 1st output and 2nd output are flickering repeatedly.

▣ Input • output connection

◎In case of operating the load by power supply of the sensor



◎In case of operating the load by external power supply

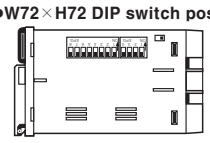


※1: Please select proper capacity of Load 1, because total current consumption should not exceed current capacity(50mA max.).
※2: Contact capacity: 250VAC 3A Max. RESISTIVE LOAD

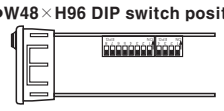
- The capacity of Load 1 must not be exceed max. 30VDC, max. 100mA of the switching capacity of the transistor.
- Please do not supply the reverse polarity voltage.
- Please connect the surge absorber(Diode, Varistor, etc.) at both terminals of Load1, in case of using the inductive load.

▣ Selection by DIP switches

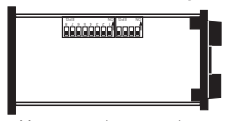
●W72×H72 DIP switch position

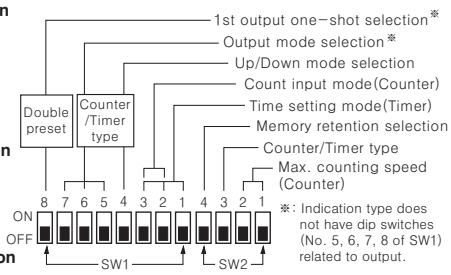


●W48×H96 DIP switch position



●W144×H72 DIP switch position





※: Indication type does not have dip switches (No. 5, 6, 7, 8 of SW1) related to output.

●Max. counting speed

SW2	CP1, CP2
1 2 ON OFF	1cps
1 2 ON OFF	30cps
1 2 ON OFF	2kcps
1 2 ON OFF	5kcps

●Up/Down mode selection

	SW1	Function
4	ON OFF	Down mode
	ON OFF	Up mode

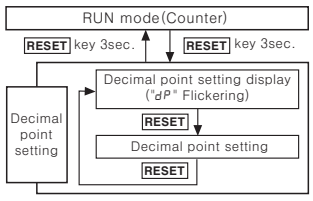
●Counter/Timer

	SW2	Function
3	ON OFF	Counter
	ON OFF	Timer

●Memory retention

	SW2	Function
4	ON OFF	Power reset (Non memory)
	ON OFF	Memory

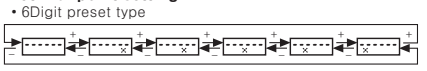
▣ Decimal point setting(Counter)



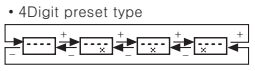
※It returns to decimal point setting status if pressing RESET button for over 3sec. in RUN mode.
※It returns to RUN mode if pressing RESET button for over 3sec. in decimal point setting status. It returns to RUN mode if no RESET button or digital switch(2nd preset type:2nd preset digital switch) is applied for 60sec. in decimal point setting status.
※The decimal point setting is not existed in indication type.

●Decimal point setting

• 6Digit preset type



• 4Digit preset type



※Existing decimal point setting is displayed when entering into decimal point setting mode.
※If pressing one of digital switch(2nd preset type:2nd preset digital switch) Up(+) buttons in decimal point setting mode, decimal point will be moved to Up(+) direction. If pressing one of digital switch(2nd preset type:2nd preset digital switch) Down(-) buttons, decimal point will be moved to Down(-) direction.

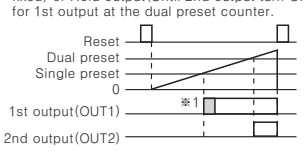
▣ Time setting mode(Timer)

	SW1	4Digit	6Digit
A	ON OFF 1 2 3	99.99sec	99999.9sec
B	ON OFF 1 2 3	999.9sec	999999sec
C	ON OFF 1 2 3	9999sec	99min 59.99sec
D	ON OFF 1 2 3	99min 59sec	999min 59.9sec
E	ON OFF 1 2 3	999.9min	99999.9min
F	ON OFF 1 2 3	99hour 59min	99hour 59min 59sec
G	ON OFF 1 2 3	999.9hour	9999hour 59min
H	ON OFF 1 2 3	9999hour	99999.9hour

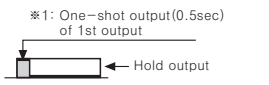
●Selection of one-shot output or hold output for 1st output.

	SW1	Function
8	ON	1st output:One-shot output
	ON	1st output:Hold output

※This mode selects a one-shot output(0.5sec. fixed) or Hold output(Until 2nd output turn OFF) for 1st output at the dual preset counter.



※1: One-shot output(0.5sec) of 1st output



▣ Caution for using

1. DIP switch setting
Please be sure to turn power OFF before changing Counter/Timer DIP switches setting.
If DIP switches setting is changed in power OFF, Counter/Timer must be reset by manual reset or external reset after power ON.

2. Error

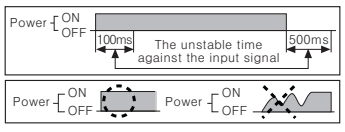
Error display	Error contents	Return method
Err0	Zero setting value status	Change setting value which is not zero

※Output is OFF when error is displayed.
※If 1st preset value is chaged to zero("0"), 1st output keeps OFF status.
※ If 2nd preset value is lower than 1st preset value, 2nd preset value operates only. (1st preset value is not vaild)
※No Error display is appeared in indication type.

3. Unit sticker
The unit sticker is found at the inner box of FX/FXL series.
According to the usage, the unit sticker can be used.

COUNTER	mm	inch	mm	inch
TIMER	m	hour	m	hour
COUNTER	sec	cm	sec	cm
TIMER	min	yd	min	yd

4. Power
①The inner circuit voltage starts to rise up for the first 100ms after power on, the input may not work at this time. And also the inner circuit voltage drops down for the last 500ms after power off, the input may not work at this time.
②Please use the power within rating power and apply or cut the power at once to prevent from chattering.



5. Input signal line
①Shorten the cable distance between the sensor and this product.
②Please shielded wire for input signal needed to be long.
③Please wire input signal line separated from power line.

6. When test dielectric voltage and insulation resistance of the control panel with this unit installed.
①Please isolate this unit from the circuit of control panel.
②Please make all terminals of this unit short-circuited.

7. Do not use this unit at below places.
①Place where there are severe vibration or impact.
②Place where strong alkalis or acids are used.
③Place where there are direct ray of the sun.
④Place where strong magnetic field or electric noise are generated.

8. Installation environment
①It shall be used indoor ②Altitude Max. 2000m ③Pollution Degree 2 ④Installation Category Ⅱ.

※It may cause malfunction if above instructions are not followed.

▣ Main products

■ 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(CO_2, Nd:YAG)
■ Laser welding/soldering system
■ Photoelectric sensors
■ Fiber optic sensors
■ Pressure sensors
■ Timers
■ Display units
■ Sensor controllers

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