Autonics

SENSOR CONTROLLER PA10 SERIES



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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 is required to install fail-safe device.
- may result in serious damage, fire or human injury.
- 2. This unit must be mounted on panel or rail.
- 3. Do not repair or checkup when power on.
- It may give an electric shock.

 4. Do not disassemble and modify this unit. If needs, please contact us.

It may give an electric shock and cause a fire

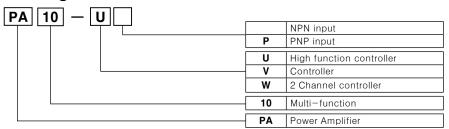
△ Caution

- 1. This unit shall not be used outdoors.
- It might shorten the life cycle of the product or give an electric shock.

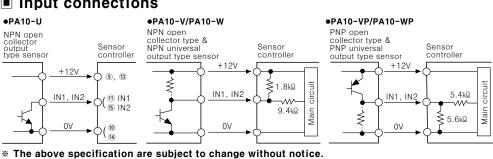
 2. When wire connection, 20 AWG(0.50mm²) should be used and screw bolt on terminal block with
- 0.74N · m to 0.90N · m strength.
- 3. Please observe the rated specifications. might shorten the life cycle of the product and cause a fire
- 4. Do not use the load beyond rated switching capacity of Relay contact.
- ay 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.
- 7. Do not inflow dust or wire dregs into inside of this unit.

Ordering information



Input connections

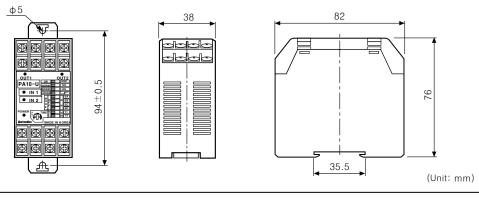


Specifications

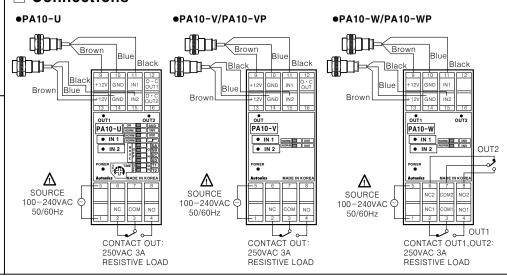
Model			PA10-U	PA10-V	PA10-VP	PA10-W	PA10-WP	
Power supply			100-240VAC 50/60Hz					
Allowable voltage range		e range	90 to 110% of rated voltage					
Power consumption		otion	100VAC 50/60Hz: Approx. 7VA(Condition:12VDC/200mA), 240VAC 50/60Hz: Approx. 10VA					
Power for external sensor		nal	12VDC ±10% approx. 200mA					
Input(IN1, IN2)			Selectable NORM/INV. Selectable OR/AND operation for IN1, IN2 input. Selection function for IN2 derivative action.			Selectable NORM/INV. Selection function for IN1, IN2 individual operation.		
			NPN input type	NPN input type	PNP input type	NPN input type	PNP input type	
Input method			PA10-U [No-voltage input] Impedance at short-circuit: Max. 680Ω, Residual voltage at short-circuit: Max. 0.8V, Impedance at open: Min. 100kΩ PA10-V/PA10-W [No-voltage input]] Impedance at short-circuit: Max. 300Ω, Residual voltage at short-circuit: Max. 2V, Impedance at open: Min. 100kΩ PA10-VP/PA10-WP [Voltage input]] Input impedance: 5.6kΩ, "H" level voltage: 5-30VDC, "L" level voltage: 0-2VDC					
	Contact output							
	Comadi	output	OUT[250VAC 3A(Resisti	ive load)]		OUT1, OUT2 [250VA	C 3A(Resistive load)]	
Out-	Solid-s		OUT[250VAC 3A(Resisti	o · C OUT		OUT1, OUT2 [250VA	C 3A(Resistive load)]	
Out- put				O · C OUT	Max. 100mA	OUT1, OUT2 [250VA	C 3A(Resistive load)]	
put	Solid-s		O • C OUT1, O • C OUT2	O · C OUT		_	C 3A(Resistive load)]	
Respo Time s function each n *Only	Solid-s output nse time etting on by node y for		O • C OUT1, O • C OUT2 NPN open collector out	O · C OUT put Max. 30VDC ns, Transistor out ODE MODE	oFF-DE FLICKEF LOW-SI	ns ELAY MODE		
Respo Time s function	Solid-s output nse time etting on by node y for	tate	O · C OUT1, O · C OUT2 NPN open collector out; Relay output : Max. 10n ON-DELAY MODE ONE-SHOT DELAY M FLICKER ONE-SHOT	O · C OUT put Max. 30VDC ns, Transistor out ODE MODE	tput: Max. 0.05r OFF-DE FLICKEF LOW-SR ON/OFF	ns ELAY MODE R MODE PEED DETECTION	N MODE	
Respo Time s functic each n **Only PA10	Solid-s output nse time etting on by node y for	tate Have Non	O • C OUT1, O • C OUT2 NPN open collector out; Relay output : Max. 10n • ON-DELAY MODE • ONE-SHOT DELAY M • FLICKER ONE-SHOT • HIGH-SPEED DETEC	D · C OUT put Max. 30VDC ns, Transistor out ODE MODE TION MODE	tput: Max. 0.05r OFF-DE FLICKEF LOW-SR ON/OFF	ns ELAY MODE R MODE PEED DETECTION DELAY MODE	N MODE	
Respo Time s functic each n **Only PA10 Relay	Solid—s output nse time setting on by node y for D-U	tate Have Non ical	O • C OUT1, O • C OUT2 NPN open collector out; Relay output : Max. 10n • ON-DELAY MODE • ONE-SHOT DELAY M • FLICKER ONE-SHOT • HIGH-SPEED DETEC • NORMAL MODE	O · C OUT put Max. 30VDC ns, Transistor out ODE MODE TION MODE • FLIP-FLO	tput: Max. 0.05r OFF-DE FLICKEF LOW-SI ON/OFF	ns ELAY MODE R MODE PEED DETECTION DELAY MODE	N MODE	
Respo Time s functic each n **Only PA10 Relay life cycle	Solid—s output nse time setting on by node y for D-U	Have Non ical	O · C OUT1, O · C OUT2 NPN open collector out; Relay output : Max. 10n ON-DELAY MODE ONE-SHOT DELAY M FLICKER ONE-SHOT HIGH-SPEED DETEC NORMAL MODE Min.10,000,000 times	O • C OUT put Max. 30VDC ns, Transistor out ODE MODE TION MODE • FLIP-FLO	tput: Max. 0.05r OFF-DE FLICKEF LOW-SI ON/OFF	ns ELAY MODE R MODE PEED DETECTION DELAY MODE	N MODE	
Respo Time s functic each n **Only PA10 Relay life cycle Dielect	Solid—s output nse time letting on by node y for O-U Mechan Electricatric streng tion resist	Have Non ical al gth tance	O • C OUT1, O • C OUT2 NPN open collector out; Relay output : Max. 10n • ON – DELAY MODE • ONE – SHOT DELAY M • FLICKER ONE – SHOT • NORMAL MODE Min.10,000,000 times Min.100,000 times (250)	O • C OUT put Max. 30VDC ns, Transistor out ODE MODE TION MODE • FLIP-FLO /AC 3A resistive I minute	tput: Max. 0.05r OFF-DE FLICKEF LOW-SI ON/OFF	ns ELAY MODE R MODE PEED DETECTION DELAY MODE	N MODE	
Respo Time s functic each n **Only PA10 Relay life cycle Dielect Insulat Envi-	Solid—s output nse time setting on by node y for O-U Mechan Electricatric strengen	Have Non ical al gth tance	O • C OUT1, O • C OUT2 NPN open collector out; Relay output : Max. 10n • ON – DELAY MODE • ONE – SHOT DELAY M • FLICKER ONE – SHOT • NORMAL MODE Min.10,000,000 times Min.100,000 times (250) 2000VAC 50/60Hz for 1	O · C OUT put Max. 30VDC ns, Transistor out ODE MODE TION MODE FLIP-FLOI /AC 3A resistive I minute C megger)	tput: Max. 0.05r OFF-DE FLICKEF LOW-SI ON/OFF	ns ELAY MODE R MODE PEED DETECTION DELAY MODE	N MODE	
Respo Time s functic each n **Only PA10 Relay life cycle Dielect Insulat	Solid—s output nse time setting on by node y for D-U Mechan Electricatric strengtion resist Ambien	Have Non ical al gth tance tt	O • C OUT1, O • C OUT2 NPN open collector out Relay output : Max. 10n • ON-DELAY MODE • ONE-SHOT DELAY M • FLICKER ONE-SHOT • HIGH-SPEED DETEC • NORMAL MODE Min.10,000,000 times Min.100,000 times (250) 2000VAC 50/60Hz for 1 Min. 100MΩ (at 500VDC)	O · C OUT put Max. 30VDC ns, Transistor out ODE MODE TION MODE • FLIP-FLOI VAC 3A resistive I minute C megger) -25 to 60°C]	tput: Max. 0.05r OFF-DE FLICKEF LOW-SI ON/OFF	ns ELAY MODE R MODE PEED DETECTION DELAY MODE		

*Environment resistance is rated at no freezing or condensation.

Dimensions

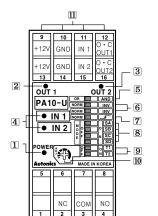


Connections



■ Front panel indentification

●PA10-U



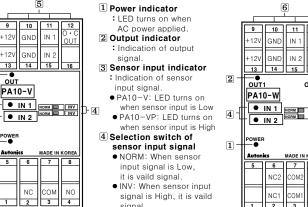
- 1 Power indicator: LED turns on when AC power applied
- 2 Output indicator 1: Indication of output 1 operation status 3 Output indicator 2: Indication of output 2 operation status
- 4 Sensor input indicator: Indication of sensor input signal
- (LED turns on when sensor input is Low) 5 AND/OR selection switch: Select "AND" or "OR" for IN1, IN2 Input 6 Selection switch of sensor input signal
- NORM INV (Input signal reverse turn function)
- NORM: When input signal is low, it is valid signal. ()
- INV: When input signal is high, it is valid signal. (_____
- 7 Derivative action selection of IN2 input signal (AND/OR selection switch: AND)
- NORM (When input signal is high(_____), it is effective signal)
- NORM: IN2 input signal is operating as reverse turn function
- Fig. Derivative action of IN2 input signal.

 *See *• Derivation action applications 8 Selection switch for operation mode: See " Operation mode" in next page 9 Selection switch of time range and max, input frequency: It is the switch
- to select time range(1 to 7 mode) or allowable input frequency(9 to 11 mode) • Time range: Approx. 0.01 to 0.1sec, Max. input frequency: 100kHz
- Time range: Approx. 0.1 to 1sec, Max. input frequency: 10kHz
- Time range: Approx. 0.1 to 10sec, Max. input frequency: 1kHz
- Time range: Approx. 10 to 100sec, Max. input frequency: 100Hz
- 10 Timer volume: Adjust time as same as the range of NO.9 function.

11 Terminal block

●PA10-V/PA10-VP

●PA10-W/PA10-WP



*When IN1, IN2 input signal is AND, OUT will work

9 10 11 12 2 Output 1 indicator 3 Output 2 indicator ● IN 1 NORM INV

5 Terminal block

operation status 4 Sensor input indicator input signal.

• PA10-W: LED turns on when sensor input is Low

• PA10-WP: LED turns or

1 Power indicator

: LED turns on when AC

Indication of output 2

operation status.

when sensor input is High 5 Selection switch of sensor input signal

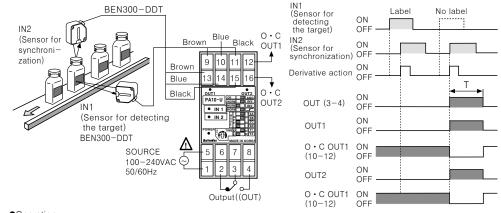
- NORM: When senso input signal is Low it is vaild signal.
- INV: When sensor input signal is High, it is vaild

6 Terminal block

%IN1_IN2 operates individually

Derivative action applications

O Detect label of glass bottle

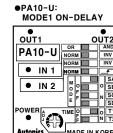


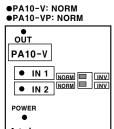
Operation

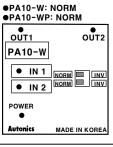
When IN1 is ON and IN2 is ON, OUT will not work.

But when there is no label on bottle, OUT will work when IN2 is ON. OUT will be returned after setting time. Note) Condition of detecting label on glass bottle is to install with IN1 operating first.

Factory default for S/W



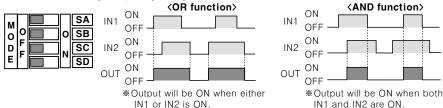




Operation mode

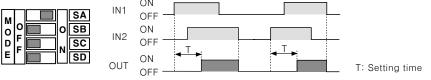
●MODE 0 NORMAL MODE

: OUT will work according to input signal regardless Timer



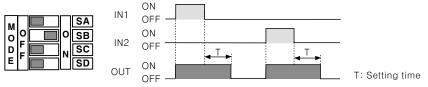
•MODE 1 ON-DELAY MODE

: OUT will be ON after setting time when one of IN1 and IN2 is ON. When IN1 and IN2 are OFF, OUT will be OFF. (This is when input logic is OR)



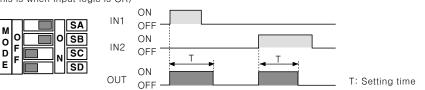
●MODE 2 OFF-DELAY MODE

OUT will be ON at the same time when IN1 or IN2 is ON then OUT will be OFF after setting time when IN1 or IN2 is OFF. (This is when input logic is OR)



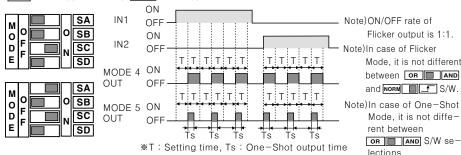
●MODE 3 ONE-SHOT DELAY MODE

OUT will be ON at the same time when IN1 or IN2 is ON then OUT will be OFF after setting time. (This is when input logic is OR)



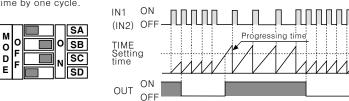
●MODE 4.5 FLICKER MODE / FLICKER ONE-SHOT MODE

OUT will be ON after setting time for IN1 input then it is flickering and OUT will be flickering after setting (Ts= Approx. 10ms, NORM: Ts= Approx. 100ms)



●MODE 6 LOW-SPEED DETECTION MODE

: OUT will be ON when input signal (IN1) is longer than setting time by comparing it to to the setting time by one cycle

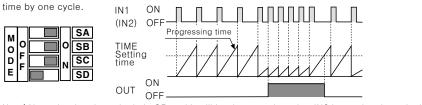


Note) Above is when input logic is OR and it will be the same by using IN2 input signal terminal instead

Note) When use MODE 6 as above, be sure that OUT will be work at the same time with power supply.

●MODE 7 HIGH-SPEED DETECTION MODE

OUT will be ON when input signal (IN1) is shorter than setting time by comparing it to to the setting



Note) Above is when input logic is OR and it will be the same by using IN2 input signal terminal instead of IN1.

○TIME S/W function(MODE 1 to MODE 7)

: Set the setting time by TIME S/W(T1, T2) and front TIME VOLUME(ADJ).

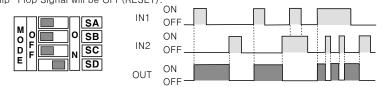
	MODE MODE 1 to MODE 7, MODE 1		MODE 6 to MODE 7		
TIME S/W		Setting time range	Input frequency	rpm	
	O	0.01 to 0.1sec	100 to 10Hz	6,000 to 600rpm	
	O	0.1 to 1sec	10 to 1Hz	600 to 60rpm	
	0	1 to 10sec	1 to 0.1Hz	60 to 6rpm	
	0	10 to 100sec	0.1 to 0.01Hz	6 to 0.6rpm	

*Range of operating rpm is 1 pulse per 1 revolution

*When the pulse is increasing per 1 revolution, range of operating rpm is decreasing.

◆MODE 8 Flip-Flop MODE [OUT LATCH operation]

: When IN1 signal is input then the Flip-Flop output will be ON(SET). When the IN2 signal is input, Flip-Flop Signal will be OFF (RESET)



Note)IN2 will be the first of input signal

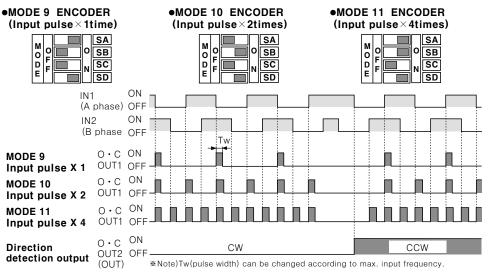
Note) It is not different between OR AND and NORM S/W.

Note) There is no Timer function in Flip-Flop Mode, therefore use this unit with Time S/W(T1, T2) as OFF

○ENCODER MODE(MODE 9 ~ MODE 11)

- 1) There should be 90° phase difference between IN1 and IN2 for input terminal.
- 2) Please connect A phase output of encoder to IN1 and B phase output of encoder to IN2, when use NPN open collector or Totempole output type of encoder with controller.
- In this case, turnded to CW direction detection signal (O.C OUT2, OUT) output of controller will be OFF. 3) There are output function of pulse(O.C OUT1) which has been multiplied(×1, ×2, ×4 times) against input signal and direction detection output(O.C OUT2, OUT) function which detects direction of encoder rotation in Encoder mode
- 4) Be sure to Input speed(cps) of connected equipment because pulse width of O.C OUT1 is short.

5) OR AND NORM NORM INV Selection S/W can be set at any position.



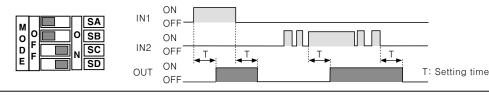
OTIME S/W function in Encoder mode

: TIME S/W is to convert output pulse width(Tw)

	TIME S/W	Max. input frequency	Output pulse width(Tw)	Input speed of connected equipment(cps)
	0 O T1 F N T2	100kHz	Approx. 0.5μs	Min. 2000kHz(2,000kcps)
	O	10kHz	Approx. 5μs	Min. 200kHz(200kcps)
	0 O T1 F N T2	1kHz	Approx. 50μs	Min. 20kHz(20kcps)
	O O T1 F N T2	100Hz	Approx. 500μs	Min. 2kHz(2kcps)

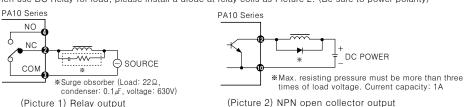
●MODE 12 ON/OFF-DELAY MODE

- OUT will be ON after setting time when IN1 (or IN2) is ON. When IN1 (or IN2) is OFF, OUT will be OFF after setting time. (This is when input logic is OR)
- *If IN1 (or IN2) ON/OFF time is shorter than setting time, OUT does not turn.

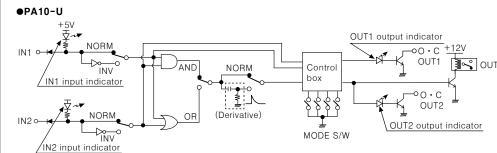


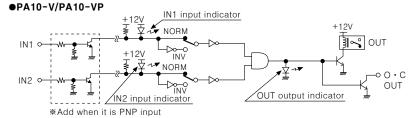
Output

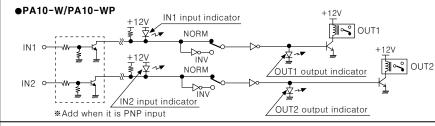
It is able to reduce noise generating if install surge obsorber between inductive loads (Motor, Solenoid, etc) as Picture 1 When use DC Relay for load, please install a diode at relay coils as Picture 2. (Be sure to power polarity)



Function diagram







Caution for using

1. Power

- 1) The 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.
- 2 Please use the power within the rated power and apply or cut the power at once to prevent from chattering.
- The unstable time against the input signal

- 2. Input signal line
- (1) Shorten the cable distance between the sensor and this product
- (2) Please shielded wire for input signal needed to be long
- 3 Please wire input signal line separated from power line.
- 3. When test dielectric voltage and insulation resistance of the control panel with this unit installed.

Counters

■ Display units

■ Panel meters

■ Pressure sensors

■ Rotary encoders

■ Power controllers

Timers

- 1) Please isolate this unit from the circuit of control panel. 2 Please make all terminals of this unit short-circuited.
- 4. Do not use this unit at 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.
- 5. Installation environment
- 1) It shall be used indoor ② Altitude Max. 2000m ③ Pollution Degree 2 (4) Installation Category II.
- It may cause malfunction if above instructions are not followed.

Major products

- Proximity sensors
- Area sensors
- Photoelectric sensors
- Fiber optic sensors
- Door/Door side sensors
- Sensor controllers
- Graphic/Logic panels
- Temperature controllers
- Temperature/Humidity transducers
- Stepping motors/drivers/motion controllers
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system



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■ Tachometer/Pulse(Rate) meters

■ Switching power supplies

■ Field network devices

FP-F-10-026D