

Autonics

PHOTOELECTRIC SENSOR BA2M 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.

⚠: 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 on type required.
It may result in serious damage, fire or human injury.

2. 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. Do not use this unit in place where there is flammable or explosive gas.

It may cause a fire or explosion.

3. Please observe voltage rating and do not apply AC power.

It may result in damage to this unit.

4. Please check the polarity of power and wrong wiring.

It may result in damage to this unit.

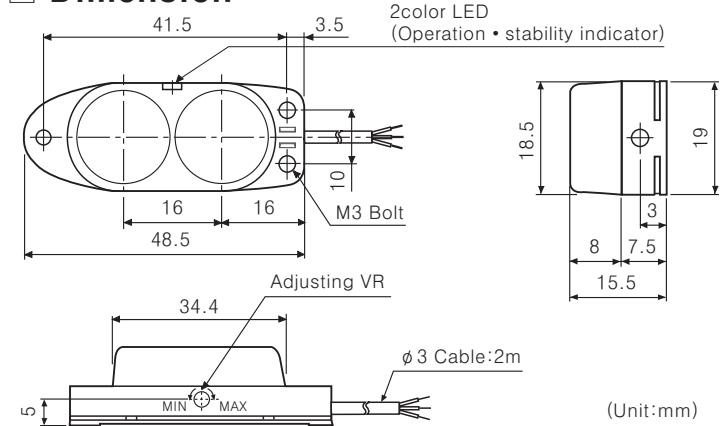
5. Do not use this unit in place where there is vibration or impact.

It may result in damage to this unit.

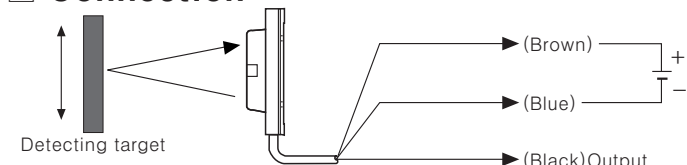
6. In cleaning the unit, do not use water or an oil-based detergent

It might cause an electric shock or fire that will result in damage to this product.

Dimension



Connection



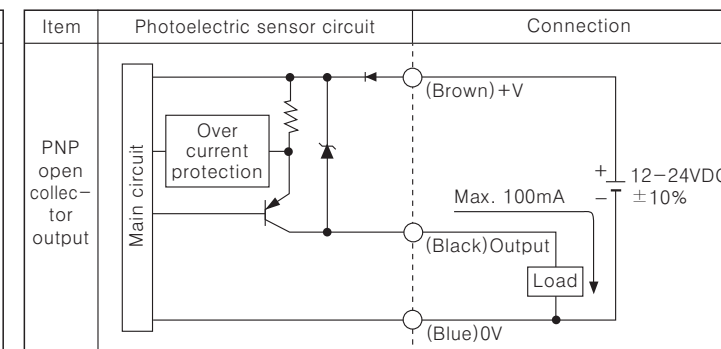
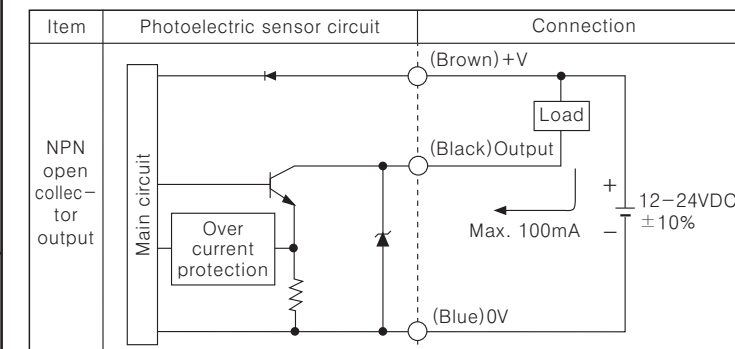
*The above specifications are changeable at anytime without notice.

Specification

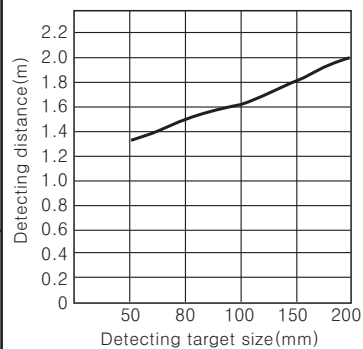
Type	Diffuse reflective(Long detecting distance & miniature type)	
Model	BA2M-DDT	BA2M-DDT-P
Detecting distance	2m(Non-glossy white paper 200×200mm)	
Detecting target	Transparent, Translucent, Opaque material	
Hysteresis	Max. 20% at rated setting distance	
Response time	Approx. 1ms	
Power supply	12-24VDC ±10%(Ripple P-P:Max. 10%)	
Current consumption	Max. 15mA(max. 30mA when the output is ON)	
Receiver	Photo diode(Built-in IC)	
Light source	Infrared LED(850nm modulated)	
Sensitivity adjustment	Adjustable VR	
Operation mode	Light ON	
Control output	NPN or PNP Open collector type • Load voltage:Max.26.4VDC • Load current:Max.100mA • Residual voltage: NPN:Max.1V, PNP:Min. -2.5V of power supply	
Protection circuit	Reverse polarity protection, output short-circuit protection	
Indication	2 color LED(Operation:Red, stability:Yellow(red+green))	
Connection	Outgoing cable	
Insulation resistance	Min. 20MΩ(500VDC)	
Noise strength	±240V the square wave noise(pulse width:1μs) by the noise simulator	
Dielectric strength	1,000VAC 50/60Hz for 1minute	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock	100m/s ² (10G) in X, Y, Z directions for 3 times	
Ambient illumination	Sunlight : Max. 10,000lx, Incandescent lamp : Max.3,000lx	
Ambient temperature	-20 to +55℃(non-freezing condition), Storage : -25 to +70℃	
Ambient humidity	35 to 85%RH	
Protection	IP50(IEC specification)	
Material	Case:PBT, Indicator:PC, Lens:Acryl	
Cable	3P, φ3mm, Length:2m	
Accessory	Driver	
Weight	Approx. 50g	
Approval	CE	

* (Note1) Dark ON operation mode is option.

Control output circuit diagram

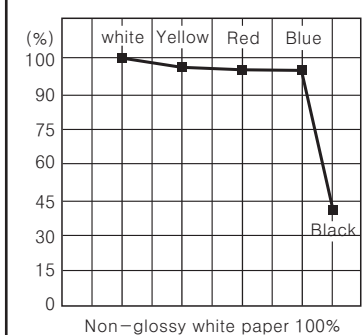


Detecting distance against the target size



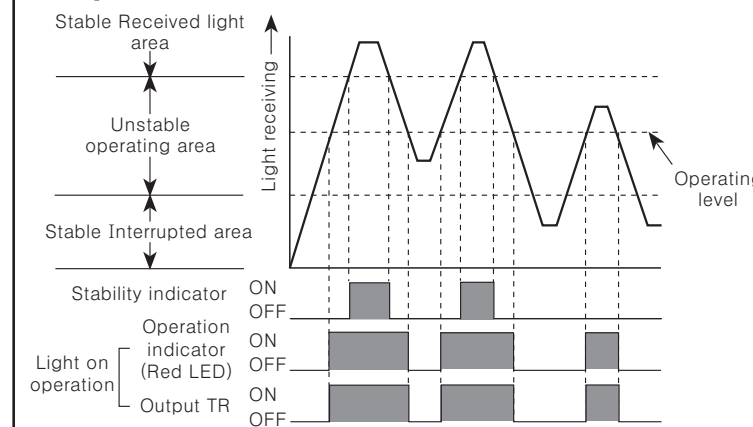
*It shows the change of detecting distance by size of targets.
Standard targets : □200×200mm non-glossy white paper.

Detecting distance against the target color



*It shows the rate of detecting distance by color of targets.

Operation mode



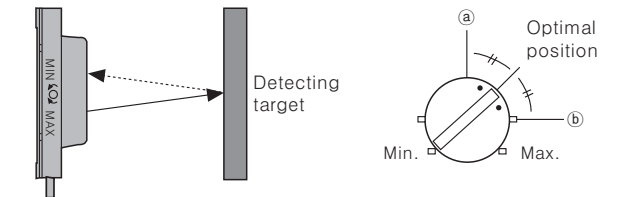
1. Wave form of operation indicator and output TR is for the Light ON mode. When it is Dark ON mode, the operation will be apposite. (Dark ON mode : Option)

2. If the control output terminal is short-circuit or over current than the rated current flows the unit, the sensor does not operate normally by protection circuit.

Mounting & Adjustment

Please check wiring after setting the target and supply the power to this sensor.

Optical axis adjustment



Mount this unit at center position where operation LED turns on as moving the unit toward right or left, up or down

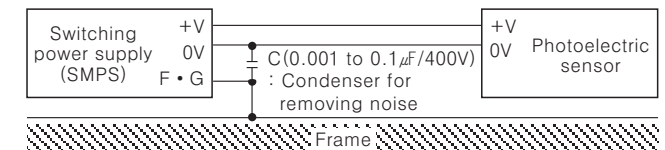
Adjustment

1. Set the sensitivity at position where Red & Green LED turn on as above <Operation mode> when sensor detects the target.
2. Even if this sensor is set at max. sensitive position, the sensitivity of the sensor must be adjusted according to the existence of the reflective material in background.
3. Turn the sensitivity to min. position after setting the target, and then turn it slowly clockwise till position ①.
4. Remove the target and then adjust the sensitivity till position ②. (If Yellow LED do not turn on, position ② is max. position)
5. The optimum sensitivity position is center position between position ① and position ②.

*Detecting distance indicated in this manual is that of the target size 200×200mm of non-glossy white paper, and detecting distance may change according to the target size or reflectance, its surface status.

Caution for using

1. Intercept a strong source of light as like sunlight, spotlight within inclination angle range of photoelectric sensor.
2. The photoelectric sensor may cause malfunction under the fluorescent lamp light, so be sure to use cut-off light with panel.
3. When more than two sensors are installed adjacently, it can be occurred malfunction by light beam from the other target. So it must be installed at an enough interval.
4. If photoelectric sensor is installed at flat part, it might cause malfunction by reflection light from flat part.
Be sure to put space between photoelectric sensor and ground.
5. When wire the photoelectric sensor with high voltage line, power line in the same conduit, it may cause malfunction or mechanical trouble. Therefore please wire separately or use different conduit.
6. Avoid installing the unit as following place.
Corrosive gas, oil or dust, strong flux, noise, sunlight, strong alkali, acid.
7. In case of connect DC relay as inductive load to output, please remove surges by using diode or varistor.
8. The photoelectric sensor cable shall be used as short as possible, because it may cause malfunction by noise through the cable.
9. When it is stained by dirt at lens, please clean the lens with dry cloth, but don't use an organic materials such as alkali, acid, chromic acid.
10. When use switching power supply as the source of supplying power, F.G terminal shall be good earth ground and condenser for removing noise shall be installed between 0V and F.G terminal.



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

Major products

- PROXIMITY SENSOR
- AREA SENSOR
- DOOR/DOOR SIDE SENSOR
- ROTARY ENCODER
- COUNTER
- TEMPERATURE CONTROLLER
- TEMPERATURE/HUMIDITY TRANSDUCER
- POWER CONTROLLER
- PANEL METER
- TACHO/LINE SPEED/PULSE METER
- DISPLAY UNIT
- SENSOR CONTROLLER
- SWITCHING POWER SUPPLY
- GRAPHIC PANEL
- STEPPING MOTOR & DRIVER & CONTROLLER
- LASER MARKING SYSTEM(CO₂, Nd:YAG)

Autonics Corporation
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Satisfiable Partner For Factory Automation

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