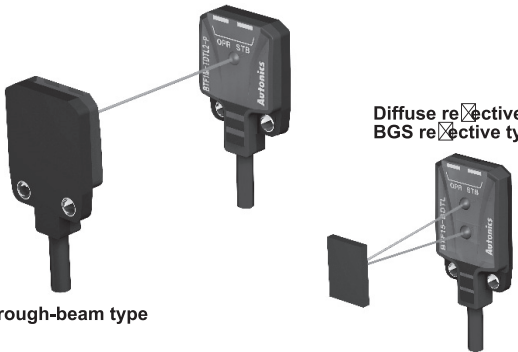


Autonics

ULTRA-THIN PHOTOELECTRIC SENSOR

BTF SERIES

M A N U A L



Thank you very much for selecting Autoics 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

- In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.
It may cause a fire, human injury or damage to property.
- Do not disassemble or modify this unit. Please contact us if it is required.
It may give an electric shock and cause a fire.

Caution

- This unit shall not be used outdoors.
It might shorten the life cycle of the product or give an electric shock.
Use this product inside only. Do not use the product outdoors or location subject to temperatures or humidity outside.(Ex: rain, dirty, frost, sunlight, condensation, etc.)
- Do not use this unit where there is flammable or explosive gas.
It may cause a fire or explosion.
- Please observe the rated specifications.
It may shorten the life cycle or damage to the product.
- Do not use this unit over rated voltage and do not supply AC power to DC power type.
It may cause a damage to product.
- Please check the polarity of power and wrong wiring.
It may cause a damage to product.
- Do not use this unit where there is vibration or impact.
It may cause a damage to product.
- In cleaning the unit, do not use water or an oil-based detergent.
It may cause a fire, give an electric shock or damage to product.

Ordering information

BT	F	1	M	-	T	D	T	L	-	P		
										Control output		NPN open collector output
											P	PNP open collector output
											1	Emitter
											2	Receiver
										Operation mode	L	Light ON
											D	Dark ON
										Output	T	Solid-state output(Transistor)
										Power supply	D	DC power
											T	Through-beam
											D	Diffuse reflective
											B	BGS reflective
										Sensing type		Unit: mm
											M	Unit: m
										Sensing distance unit	Number	Sensing distance
										Sensing distance	F	Flat type
										Shape		
										Item	BT	Photoelectric sensor series

※..... This information is intended for product management of through-beam type.
(No need to refer when selecting model)
※The above specifications are subject to change and some models may be discontinued without notice.

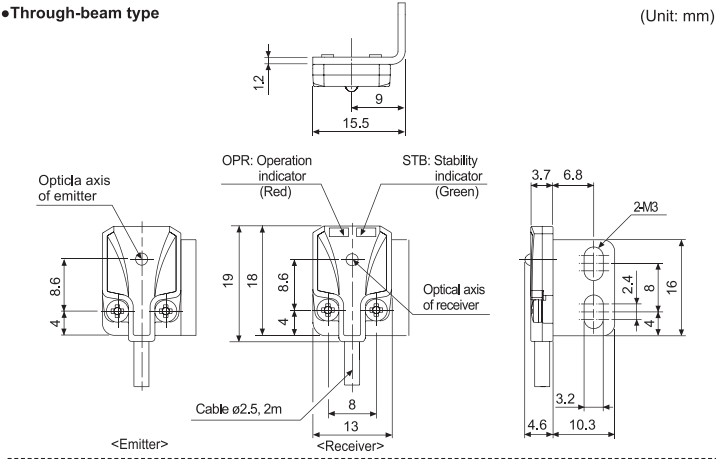
Specifications

Type		Through-beam		Diffuse reflective		BGS reflective	
Model	NPN open collector output	BTF1M-TDTL	BTF1M-TDTD	BTF30-DDTL	BTF30-DDTD	BTF15-BDTL	BTF15-BDTD
	PNP open collector output	BTF1M-TDTL-P	BTF1M-TDTD-P	BTF30-DDTL-P	BTF30-DDTD-P	BTF15-BDTL-P	BTF15-BDTD-P
Sensing distance		1m		5 to 30mm(Non-glossy white paper 50×50mm)		1 to 15mm(Non-glossy white paper 50×50mm)	
Sensing target		Opaque materials of max. ø2mm		Opaque materials, Translucent materials			
Min.Sensing target		Opaque materials of ø2mm		ø0.2mm (Sensing distance 10mm)		ø0.2mm non-illuminated objects (Sensing distance 10mm)	
Hysteresis		-		Max. 20% at rated sensing distance		Max. 5% at rated sensing distance	
Reflectivity Characteristics (black/white error)		-		-		Max 15% of maximum sensing distance	
Response time		Max. 1ms					
Power supply		12-24VDC ±10%(Ripple P-P: Max. 10%)					
Current consumption		Max. 20mA(This is for each emitter and receiver of through-beam type)					
Light source/Wavelength		Red LED(650nm)					
Operation mode		Light ON	Dark ON	Light ON	Dark ON	Light ON	Dark ON
Control output		< NPN or PNP open collector output > ·Load voltage: Max. 26.4VDC ·Load current: Max. 50mA ·Residual voltage: Max.1V(NPN), Max.2V(PNP)					
Protection circuit		Reverse polarity protection, output short-circuit protection					
Indicator		Operation indicator: Red, Stability indicator: Green					
Connection		Outgoing cable					
Insulation resistance		Min. 20MQ(at 500VDC megger)					
Noise strength		±240V the square wave noise(pulse width:1μs) by the noise simulator					
Dielectric strength		1,000VAC 50/60Hz for 1 minute					
Vibration resistance		1.5mm or 300m/s ² amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours					
Shock resistance		500m/s ² (50G) in X, Y, Z directions for 3 times					
Environment	Ambient illumination	Sunlight: Max.10,000tx, Incandescent lamp: Max.3,000tx(Receiver illumination)					
	Ambient temperature	-25 to 55°C, Storage: -40 to 70°C					
	Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH					
Protection		IP67(IEC standards)					
Material		Case: PBT, Sensing part : PMMA					
Cable		ø2.5mm, 3P, Length: 2m(Emitter of through-beam type: ø2.5mm, 2P, Length: 2m) (AWG 28, Core wire diameter: 0.08mm, No. of core wire: 19, Insulator out diameter: 0.9mm)					
Accessory		Fixing bracket(SUS304), Bolt(SWCH10A)					
Approval		CE					
Unit weight		Approx. 40g		Approx. 25g		Approx. 25g	

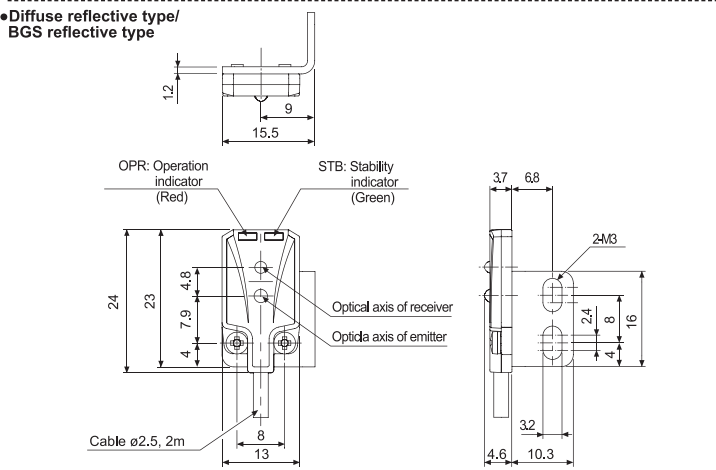
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

Dimensions

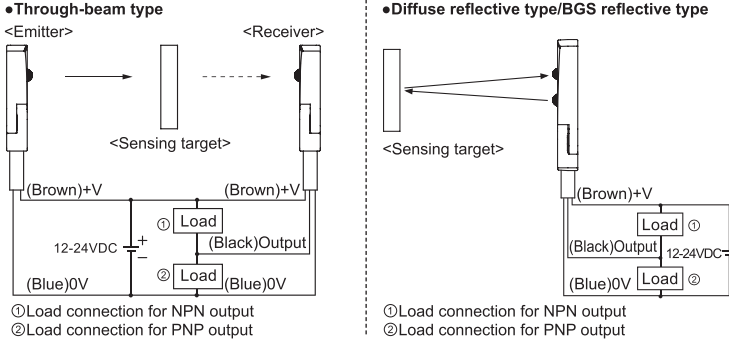
Through-beam type



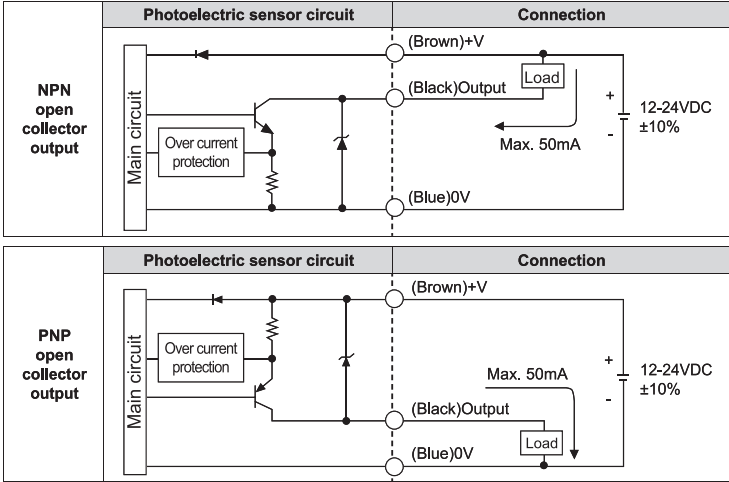
Diffuse reflective type/BGS reflective type



Connections



Control output circuit diagram

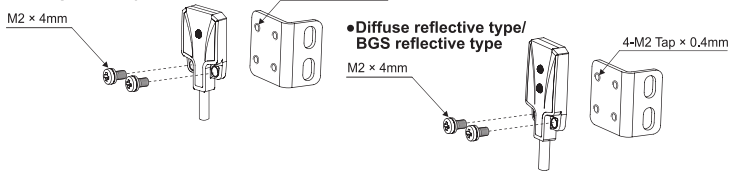


Mounting & Adjustment

Installation

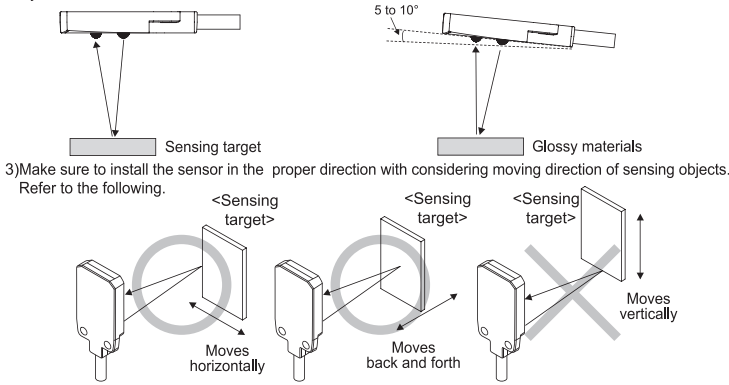
- Please use bolt M2 for mounting of sensor, set the tightening torque under 0.3N·m.
- Do not impact on the unit with hard object and do not bend outgoing cable part too much. It may cause damage to waterproof function.

Through-beam type



Notice for BGS reflective type

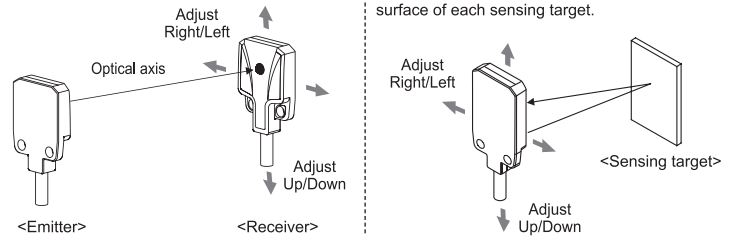
- Make sure that the sensing side of sensor is parallel with the surface of each sensing object.
- If the sensing object has glossary surface or high-reflection, the sensor tilts to 5 to 10° as shown in the figure. Make sure whether the sensor is influenced by any background objects.



Optical axis adjustment

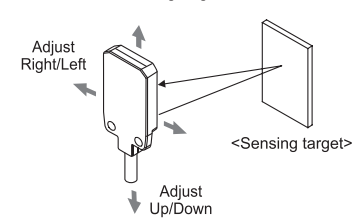
Through-beam type

Set emitter and receiver facing each other and adjust these up-down, right-left after to check the point operating operation indicator. Fix emitter and receiver at the center of the point.



Diffuse reflective type/BGS reflective type

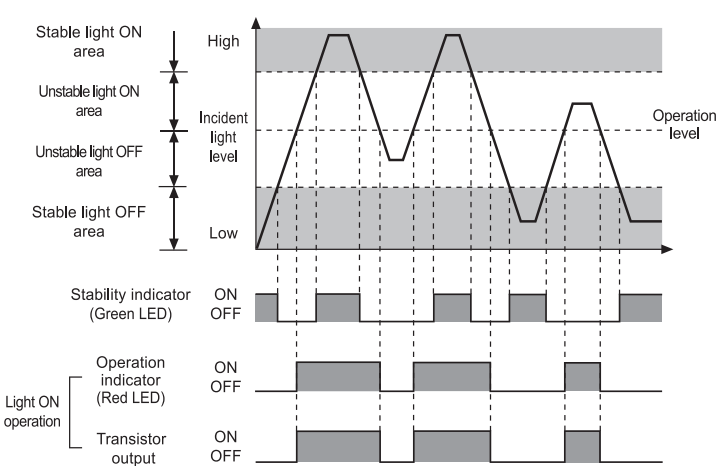
After place a sensing target, fix it in the middle of position where the indicator is operated adjusting the sensor to up-down, right-left. Make sure that the sensing side of sensor is parallel with the surface of each sensing target.



Operation mode

Operation mode	Light ON mode	Dark ON mode
Receiver operation	Received light Interrupted light	Received light Interrupted light
Operation indicator (Red LED)	ON OFF	ON OFF
Transistor output	ON OFF	ON OFF

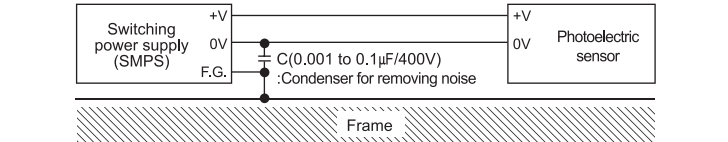
Operating timing diagram



※The waveforms of "Operation indicator" and "Transistor output" are for Light ON mode. They are opposite operation for Dark ON mode.

Caution for using

- The sensor will be in a detectable status within 100ms after supply the power. If the power line of the load and the sensor is different, supply power voltage to the sensor first.
- Shade a strong source of light as like sunlight, spotlight not to be let in the inclination angle range of photoelectric sensor directly.
- The photoelectric sensor may cause malfunction under the fluorescent lamp light, be sure to use the cover or the shutter to shade the light.
- If photoelectric sensor is installed at flat part, it may cause malfunction by reflection light from flat part. Be sure to put space between photoelectric sensor and ground.
- When wiring the photoelectric sensor with high voltage line, power line in a same conduit, it may cause malfunction or mechanical problem, please do wire separately or use different conduit.
- Avoid installing the unit in place with corrosive gas, oil or dust, strong flux, noise, sunlight, strong alkali and acid.
- In case of connecting relay as inductive load to output, please remove surge by using diode or varistor.
- Photoelectric sensor cable shall be used as short as possible, because it may cause malfunction by noise through the cable.
- When it is stained by dirt at lens, please clean the lens with dry cloth, do not use an organic materials such as alkali, acid and chromic acid.
- When use switching power supply as the source of supplying power, F.G. terminal shall be grounded and a condenser for removing noise shall be installed between 0V and F.G. terminal.



Installation environment

- It shall be used indoor
- Altitude Max. 2,000m
- Pollution Degree 3
- Installation Category II

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

Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO₂, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

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