

**Autonics**

**FIBER OPTIC SENSOR  
BF3 SERIES**

**INSTRUCTION MANUAL**



Thank you for choosing our Autonics product.  
Please read the following safety considerations before use.

**■ Safety Considerations**

※Please observe all safety considerations for safe and proper product operation to avoid hazards.  
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

- ⚠ Warning** Failure to follow these instructions may result in serious injury or death.
- ⚠ Caution** Failure to follow these instructions may result in personal injury or product damage.

**⚠ Warning**

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)  
Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Install the unit on device panel or DIN rail to use.**  
Failure to follow this instruction may result in fire.
- Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in fire.
- Check 'Connections' before wiring.**  
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.**  
Failure to follow this instruction may result in fire.

**⚠ Caution**

- Use the unit within the rated specifications.**  
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.**  
Failure to follow this instruction may result in fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**  
Failure to follow this instruction may result in fire or explosion.

**■ Ordering Information**

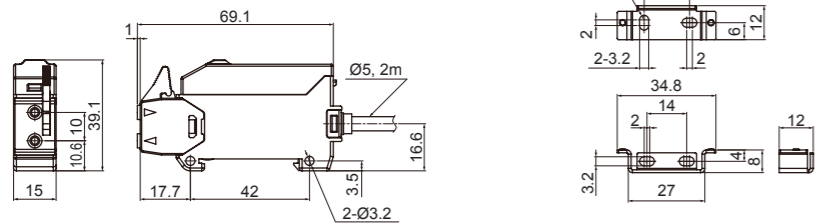
<b>BF3</b>	<b>RX</b>	Control output	<b>No mark</b>	NPN open collector output
		Light source	<b>P</b>	PNP open collector output
			<b>RX</b>	Red LED
			<b>BF3</b>	Fiber optic sensor

**■ Dimensions**

○ Amplifier

(unit: mm)

○ Bracket



**■ Operation Mode**

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

Note)1. The Transistor output will be held OFF for 0.5 sec after supplied power in order to prevent malfunction of this fiber optic sensor.  
2. If the control output terminal is short-circuited or flow beyond rated current, the control signal will not be output normally due to protection circuit.

※The above specifications are subject to change and some models may be discontinued without notice.  
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

**■ Specifications**

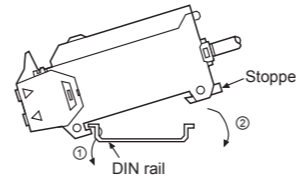
Model	BF3RX	BF3RX-P
Response time	Max. 1ms	
Power supply	12-24VDC±10%(Ripple P-P: Max. 10%)	
Current consumption	Max. 40mA	
Light source	Red LED(modulated)	
Sensitivity adjustment	Sensitivity adjuster(Double adjustment: Coarse adjustment, Fine adjustment)	
Operation mode	Selectable Light ON/Dark ON by control wire	
Control output	NPN or PNP open collector output • Load voltage: Max. 30VDC± • Residual voltage - NPN: Max. 1V, PNP: Max. 2.5V	
Protection circuit	Power reverse polarity protection circuit, output short over current protection circuit	
Indication	Operation indicator: Red LED	
Insulation resistance	Over 20MΩ(at 500VDC megger)	
Noise immunity	±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 X, Y, Z direction for 2 hours	
Shock	500m/s <sup>2</sup> (approx. 50G) in each X, Y, Z direction for 3 times	
Environment	Ambient illumination	Sunlight: Max. 11,000lx, Incandescent lamp: Max. 3,000lx (Receiver illumination)
	Ambient temperature	-10 to 50°C, Storage: -25 to 70°C
	Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH
Material	Case: ABS, Cover: PC	
Cable	Ø5mm, 4-wire, 2m (AWG24, Core diameter: 0.08mm, Number of cores: 40, Insulator diameter: Ø1mm)	
Accessory	Adjustment screwdriver, Mounting bracket, Bolts/nuts	
Unit Weight	Approx. 90g	

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

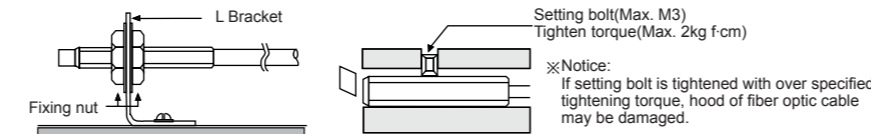
**■ Installations**

**1. Mounting amplifier unit**

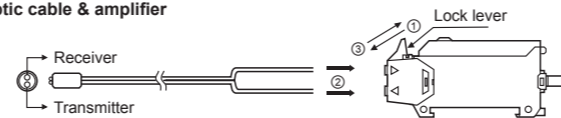
- When mounting the amplifier
  - Hook the front part of the amplifier on DIN rail(or Bracket)
  - Press the rear part of the amplifier on DIN rail(or Bracket)
- When releasing the amplifier
  - Use screwdriver to move the stopper on rear of the amplifier backward.



**2. Mounting fiber optic cable**



**3. Connection of fiber optic cable & amplifier**



- Open the Lock lever to (↺) direction(Unlock).
- Insert the fiber optic cable slowly into the amplifier. (Depth: 21mm)
- Close the Lock lever to (↻) direction(Lock).

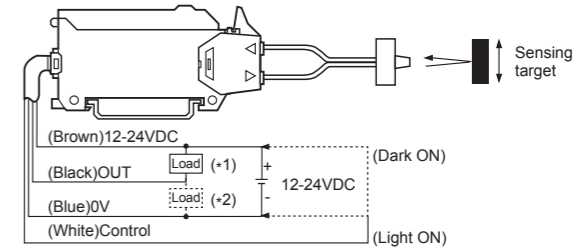
**4. Sensitivity**

- Adjust as the optimum sensitivity according to the order as shown below.
- Please observe below chart because operation lamp will be changed by sensing method.

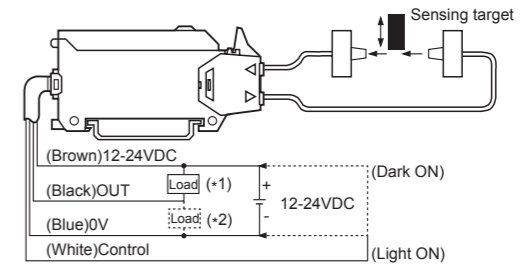
Order	Sensing type		Adjustment	Adjuster	
	Diffuse reflective	Through-beam		COARSE	FINE
1	Initial setting		The adjuster(COARSE) should be fixed at min. and the adjuster (FINE) should be fixed at center(▼).	Min. (↻)	(-) (+)
2	Light ON	Light ON	Fix the adjuster(COARSE) at ON position by turning clockwise slowly in light on status.	ON (↻)	(-) (+)
3	Light ON	Light ON	Turn the adjuster(FINE) until it is OFF toward(-), and turning until it is ON toward (+) again, then confirm that this will be A position.	Min.	A ON OFF (-)(+)
4	Dark ON	Dark ON	Turn the adjuster(FINE) until it is ON toward(+), and turning until it is OFF toward(-) again in dark on status. Then confirm that this position will be B position. (When it will not be ON, max. position will be B.)	The adjuster is not required to set afterwards	OFF B (-)(+) ON
5	—	—	Fix it at middle of A and B position. This will be the best position to set.		A B (-) (+)
6	Light ON	Light ON	If it cannot adjust as above method, set the adjuster(FINE) at max. position toward(+), then execute again.	Min. (↻)	(-) (+) Max.

**■ Connections**

**●Fiber optic cable FD Series(Diffuse reflective)**

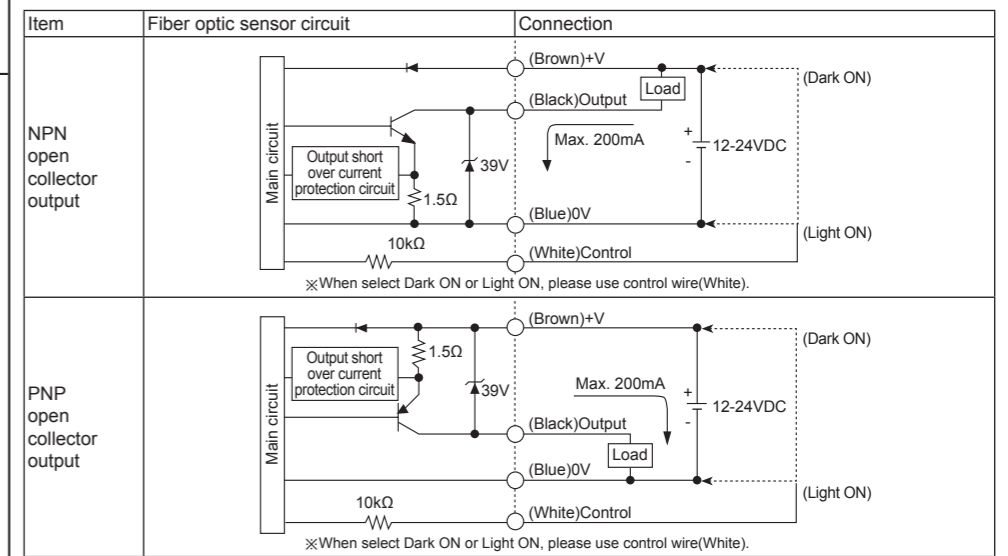


**●Fiber optic cable FT/GT Series(Through-beam)**



※Load connection:(+1)→For NPN Open collector output, (+2)→For PNP Open collector output.  
※When select Dark ON or Light ON, please use control wire(White).

**■ Control Output Circuit Diagram**



**■ Cautions during Use**

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- When connecting DC relay or other inductive load to the output, remove surge by using diode or varistor.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent surge and inductive noise.
- Use the product, after 3 sec of supplying power.
- When using switching mode power supply to supply power, ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
- Since external disturbance light (sunlight, fluorescent lighting, etc.) can cause product malfunction, use the product with a light shield or slit.
- When sensing an object with the maximum sensitivity, sensing distance error can occur due to deviation of each feature.
- When installing the fiber optic cable, refer to the radius of allowable stress for bending written in the catalogue. If installing the fiber optic cable under the rated radius of allowable stress for bending, light extinction occurs and sensing distance is shortened.
- Be cautious that a cross section of the fiber optic cable not be scratched.
- Do not pull the cable, when the fiber optic cable is connected to an amplifier unit.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000m
  - Pollution degree 2
  - Installation category III

**■ 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, CO<sub>2</sub>, Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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