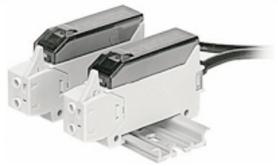
Autonics

FIBER OPTIC SENSOR

BF3 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 machinery(Ex: nuclear power control, medical equpment, 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.
2. **Do not disassemble and modify this unit,**
   It may cause electric shock or a fire.

⚠Caution

1. **This unit shall not be used outdoors.**
   It might shorten the life cycle of the product or cause 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.)
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 supply AC power.**
   It may cause damage to this unit.
4. **Please check the polarity of power and wrong wiring.**
   It may cause damage to this unit.
5. **Do not use this unit in place where there is vibration or impact.**
   It may cause damage to this unit.
6. **In cleaning the unit, do not use water or an oil-based detergent.**
   It may cause electric shock or fire.

■ Ordering information

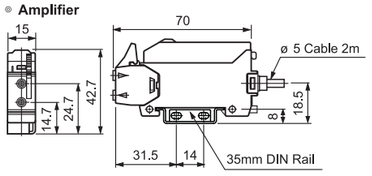
BF3 **RX** – □

Control output	**No mark**	NPN open collector output
	P	PNP open collector output
Light source	**RX**	Red LED
Item	**BF3**	Fiber optic sensor

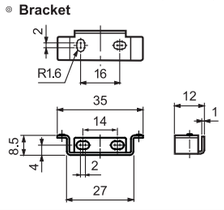
■ Dimension

(Unit:mm)

◦ **Amplifier**



◦ **Bracket**



■ Operation mode & Time chart

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

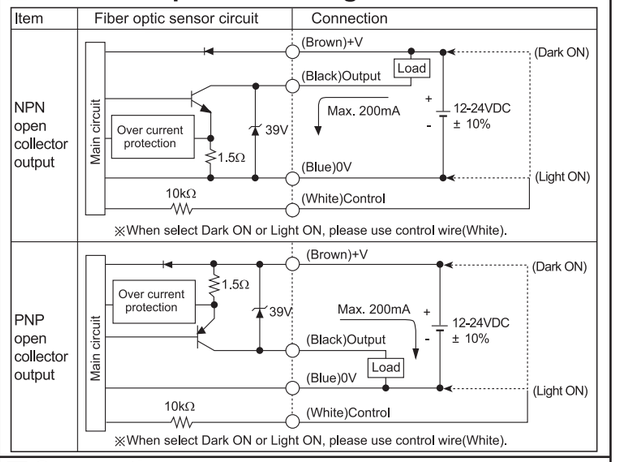
※**The above specifications are subject to change and some models may be discontinued without notice.**

■ Specification

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	Adjustable VR(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 •Load current: Max. 200mA, •Residual voltage - NPN: Max. 1V, PNP: Max. 2.5V	
Protection circuit	Reverse polarity protection, Output short-circuit protection	
Indication	Operation indicator: Red LED	
Insulation resistance	Min. 20MΩ (at 500VDC megger)	
Noise strength	± 240V the square wave noise(pulse width:1μs) by the noise simulator	
Dielectric strength	1,000VAC 50/60Hz for 1minute	
Vibration resistance	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Shock resistance	500m/s² (50G) in X, Y, Z directions for 3 times	
Envir-onment: Ambient illumination	Sunlight: Max. 11,000ℓx, Incandescent lamp: Max. 3,000ℓx (Receiver illumination)	
Envir-onment: Ambient temperature	-10 to 50℃, Storage: -25 to 70℃	
Envir-onment: Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH	
Material	Case: ABS, Cover: PC	
Cable	ø 5mm, 4-wire, Length: 2m (AWG24, Core diameter: 0.08mm, Number of cores: 40, Insulator diameter: ø 1mm)	
Accessory	VR adjustment driver, Mounting bracket, Bolts/nuts	
Unit Weight	Approx. 90g	

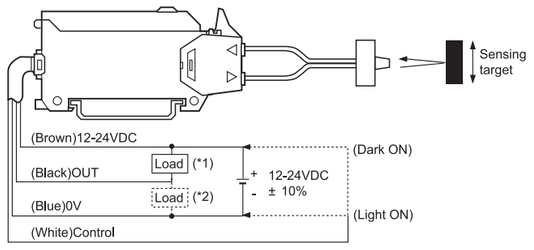
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

■ Control output circuit diagram

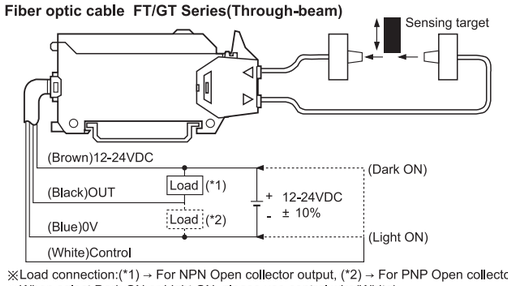


■ Connection

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

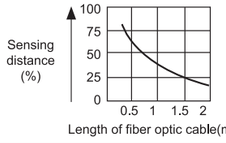


◦ **Fiber optic cable FT/GT Series(Through-beam)**



※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).

■ Characteristic of sensing distance by length of fiber optic cable

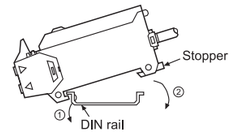


※The sensing distance of reflective type is based on non-glossy white paper(50X50mm) size. Sensing distance can be decreased to Max. 20% upon the treatment of the fiber optic cable's cut.
※Sensing distance is variable according to length of fiber optic cable as shown in the chart.

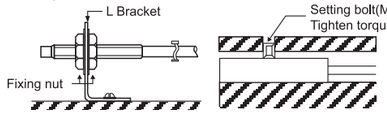
■ Installations

1. Mounting amplifier unit

1)When mounting the amplifier
①Hook the front part of the amplifier on DIN rail(or Bracket)
②Press the rear part of the amplifier on DIN rail(or Bracket)
2)When releasing the amplifier
Use screwdriver to move the stopper on rear of the amplifier backward.

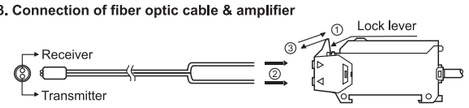


2. Mounting fiber optic cable



※Notice:
If setting bolt is tightened with over specified tightening torque, hood of fiber optic cable may be damaged.

3. Connection of fiber optic cable & amplifier



①Open the Lock lever to(↙) direction(Unlock).
②Insert the fiber optic cable slowly into the amplifier. (Depth: 21mm)
③Close the Lock lever to(↗) direction(Lock).

4. Sensitivity

①Adjust as the optimum sensitivity according to the order as shown below.
②Please observe below chart because operation lamp will be changed by sensing method.

Order	Sensing type: Diffuse reflective	Sensing type: Through-beam	Adjustment	VR: COARSE	VR: FINE
1	Initial setting		VR(COARSE) should be fixed at min. and VR(FINE) should be fixed at center(▾).	Min.	(-) (+)
2	Light ON	Light ON	Fix VR(COARSE) at ON position by turning clockwise slowly in light on status.	ON / Min.	(-) (+)
3	Light ON	Light ON	Turn VR(FINE) until it is OFF toward(-), and turning until it is ON toward (+) again, then confirm that this will be A position.	Coarse VR is not required to adjust after-wards	A ON OFF (-)(+)
4	Dark ON	Dark ON	Turn VR(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.)		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 VR(FINE) at max. position toward(+), then execute again.	Min.	(-)(+) Max.

■ Accessories

(Unit:mm)

Model	Demension	Features
FTH-310	M3X0.5, ø 4.6, ø 3, ø 6, ø 6, 12, 8, 1000	Fiber optic cable protection pipe (Shock, Vibration, Cable cut)
FTH-410	M4X0.7, ø 5.8, ø 4, ø 7, ø 7, 12, 8, 1000	
FDH-610	M6X0.75, ø 7, ø 5.5, ø 9, ø 9, 11, 8, 1000	

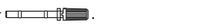
■ Fiber optic cable model

◦ **Fiber optic cable model name(All models)**

●FD-310-05	●FDCS-320-05	●FD-420-06B	●FTS2-320-05	●FT-420-10R
●FD-320-05	●FDS-420-05	●FD-620-10R	●FTS-420-10	●FT-420-13B
●FD-320-10	●FDS2-420-05	●FD-620-13B	●FTS2-420-10	●FTC-1520-05
●FD-620-10	●FD-320-F	●FDC-320-06B	●FT-420-10C	●FTC-1520-06B
●FD-610M-10	●FD-320-F1	●FT-310-05	●FTC-220-05	●FTC-220-05R
●FDS-310-05	●FD-320-F2	●FT-320-05	●FTC-320-10	●GT-420-13H2
●FDS-320-05	●FD-620-10H	●FT-420-10	●FTCS-220-05	●GD-420-20H2
●FDS2-320-05	●FD-620-15H1	●FT-430M-10	●FTS1-320-05	●GD-620-20H2
●FDS-620-10	●FDC-320-F	●FTP-320-10	●FT-420-10H	●GD-620-20H2S
●FDS2-620-10	●FD-320-05R	●FTS-310-05	●FT-420-15H1	●GD-420-20H2S
●FD-420-05	●FD-320-06B	●FTS2-310-05	●FT-320-05R	
●FDC-320-05	●FD-420-05R	●FTS-320-05	●FT-320-06B	

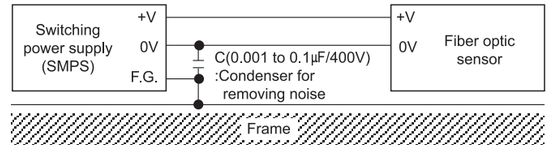
◦ **Specification(Example)**

Sensing type	Model	Allowable band radius	Min. sensing object	Sensing distance (mm)	Dimension
Through-beam type	FT-320-05	15R	ø 0.5	70	Adapter, 12, 2000, ø 0.5, M3X0.5, ø 1
Through-beam type	FT-420-10	30R	ø 1	200	20, 2000, 3, 12, 2.6, ø 1, M4X0.7, ø 2.2
Diffuse reflective type	FD-320-05	15R	ø 0.03	20	Adapter, 12, 2000, M3X0.5, 2-ø 0.5, 2-ø 1
Diffuse reflective type	FD-620-10	30R	ø 0.03	50	18, 2000, 3, 15, ø 4, 2-ø 1, M6X0.75, 2-ø 2.2

※Specification of other models is indicated in total catalogue.
※Adapter marked fiber optic cable should be used with adapter  .

■ Caution for using

1. Do not scratch the section of fiber optic cable.
2. Intercept a strong source of light as like sunlight, spotlight within inclination angle range of photoelectric sensor.
3. Do not apply a strong tensile force to fiber optic cable.
4. In case of installing the fiber optic cable, be sure not to curve the fiber optic cable over tolerance that mentioned in total catalog.
5. When wire the fiber optic sensor with high voltage line, power line in the same conduit, it may cause malfunction or mechanical trouble. Therefore please wire seperately or use different conduit.
6. Avoid installing the unit where there is severe corrosive gas, or dust, etc.
7. In case of connecting inductive load such as DC relay at load, use shielded cable, diode and varistor in order to remove noise.
8. The amplifier cable shall be used shortly, because it may cause malfunction by surge through the long cable.
9. When it is stained by dirt at a detecting part of the fiber optic cable, please clean the sensing part with dry cloth softly.
   But do not use an organic materials such as alkali, acid, chromic acid.
10. When the unit is supplied by switching power supply unit as a power source, please earth Frame ground(F.G.) terminal, and connect condenser between 0V and F.G. terminals to remove noise.



11. Installation environment
①It shall be used indoor ②Altitude Max. 2,000m
③Pollution Degree 2 ④Installation Category III

※**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, CO_2, 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

Autonics Corporation
http://www.autonics.com
Satisfiable Partner For Factory Automation

HEAD QUARTERS:
18, Bansong-ro 513beon-gil, Haeundae-gu, Busan, Korea
OVERSEAS SALES:
#402-404, Bucheon Techno Park, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon, Gyeonggi-do, Korea
TEL: 82-32-610-2730 / FAX: 82-32-329-0728
E-mail: sales@autonics.com

EP-KE-08-0080H