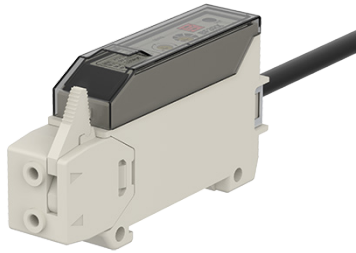


Volume Adjustment Fiber Optic Amplifiers



BF3 Series PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- Convenient DIN rail mounting type
- Response time: max. 1 ms
- Enables to adjust sensitivity with high accuracy by coarse and fine adjuster
- Selectable Light ON/Dark ON operation mode by control wire
- Reverse power protection and output short overcurrent protection circuit
- Adjustable length with free cut type fiber optic unit

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

- 01. 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 personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
Failure to follow this instruction may result in explosion or fire.
- 03. Install the unit on DIN rail or panel to use.**
Failure to follow this instruction may result in fire.
- 04. Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.
- 05. Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- 06. Check 'Connections' before wiring.**
Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

- 01. Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- When connecting an inductive load such as a DC relay, remove surge by using a diode or varistor.
- Use the product after 3 sec of the power input.
- The power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep it away from high voltage lines or power lines to prevent surge and inductive noise.
- When using switching mode power supply (SMPS), 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, an error of sensing distance can occur due to the deviation of each feature.
- Turn off the power of the fiber optic amplifier before installation or removal.
- When installing the fiber optic unit, check the bend radius of each unit written on the product manual. If the installed unit that has the bend radius under the rated range, causing optical loss so the sensing distance is shortened.
- Be sure not to scratch the surface of the fiber optic unit.
- Do not pull the cable of the fiber optic unit that is connected to the amplifier.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000 m
 - Pollution degree 2
 - Installation category III

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

BF3RX - ①

① Control output

No mark: NPN open collector output
P: PNP open collector output

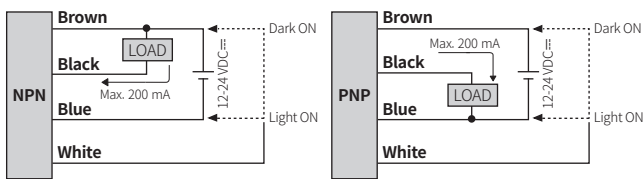
Product Components

- Product
- Instruction manual
- Bracket
- Bolt / Nut × 2
- Adjustment screwdriver

Sold Separately

- Fiber optic units (except GT-420-13H2 model)

Connections

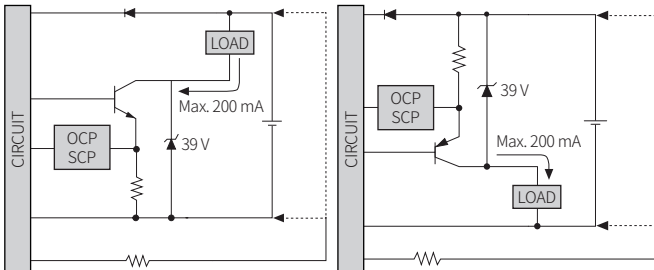


■ Selectable operation mode

| Operation mode | Connection |
|----------------|---|
| Light ON | (White) control wire connects with (Blue) 0 V |
| Dark ON | (White) control wire connects with (Brown) +V |

Circuit

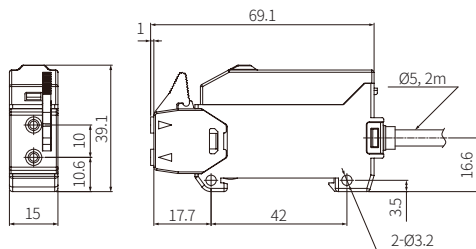
■ NPN open collector output ■ PNP open collector output



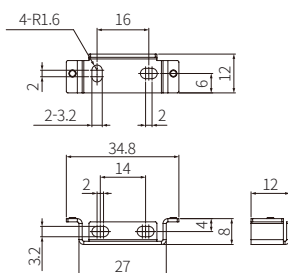
• OCP (over current protection), SCP (short circuit protection)

Dimensions

• Unit: mm, For the detailed drawings, follow the Autonics website.



■ Bracket



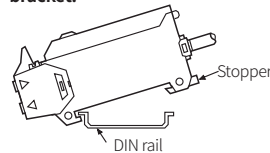
Specifications

| | |
|---------------------------------------|---|
| Model | BF3RX-□ |
| Light source | Red LED |
| Peak emission wavelength | 660 nm, modulated |
| Response time | ≤ 1 ms |
| Sensitivity setting | Manual sensitivity setting (adjuster) |
| Operation mode | Light ON / Dark ON selectable (control wire) |
| Indicator | Operation indicator (red) |
| Approval | ERC |
| Unit weight | ≈ 90 g |
| Power supply | 12-24 VDC± ±10% (ripple P-P: ≤ 10%) |
| Current consumption | ≤ 40 mA |
| Control output | NPN open collector output / PNP open collector output model |
| Load voltage | ≤ 30 VDC± |
| Load current | ≤ 200 mA |
| Residual voltage | NPN: ≤ 1 VDC±, PNP: ≤ 2.5 VDC± |
| Protection circuit | Reverse power protection circuit, output short overcurrent protection circuit |
| Insulation resistance | ≥ 20 MΩ (500 VDC± megger) |
| Noise immunity | ± 240 VDC± the square wave noise (pulse width: 1 μs) by the noise simulator |
| Dielectric strength | 1,000 VAC~ 50 / 60 Hz for 1 min |
| Vibration | 1 mm double amplitude at frequency of 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours |
| Shock | 500 m/s ² (≈ 50 G) in each X, Y, Z direction for 3 times |
| Ambient illuminance (receiver) | Sunlight: ≤ 11,000 lx, incandescent lamp: ≤ 3,000 lx |
| Ambient temperature | -10 to 50 °C, storage: -25 to 70 °C (no freezing or condensation) |
| Ambient humidity | 35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation) |
| Cable spec. | Ø 5 mm, 4-wire, 2 m |
| Wire spec. | AWG24 (0.08 mm, 40-core), insulator outer diameter: Ø 1 mm |
| Material | Case: ABS, cover: PC |

Mount and Removal of Amplifier

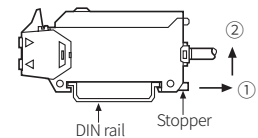
■ Mount

01. Hang up the holder on the front part of the amplifier to the DIN rail or bracket.
02. Press the stopper at the rear part of the amplifier on the DIN rail or bracket.



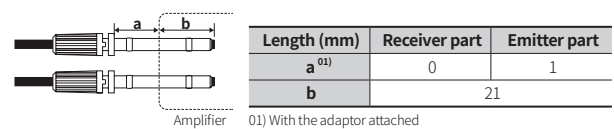
■ Removal

01. Pull the stopper at the rear part of the amplifier via a screwdriver toward direction ①.
02. Lift the rear part of the amplifier toward direction ②.

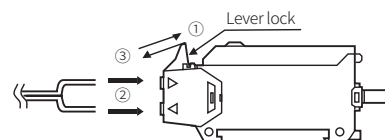


Insert Fiber Optic Unit

01. Lower down the lever lock.
02. Insert the cable of the fiber optic unit to the slot completely.
(▷ : receiver part, ◁ : emitter part)



03. Lift the lever lock to fix the fiber optic unit.



Operation timing chart

| Operation mode | Light ON | Dark ON |
|---------------------------|-------------------------|-------------------------|
| Received light | Received Interrupted | Received Interrupted |
| Operation indicator (red) | ON OFF | ON OFF |
| Transistor output | ON OFF | ON OFF |

Sensitivity Adjustment

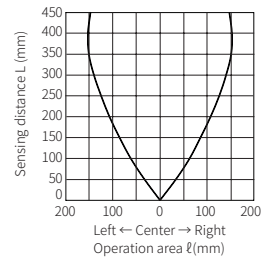
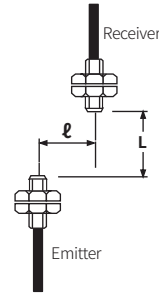
Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.

| STEP | Status | Adjuster | | Descriptions |
|------|-------------|----------|------|--|
| | | COARSE | FINE | |
| 01 | - | | | Fix the COARSE adjuster at MIN and fix the FINE adjuster at center (▼). |
| 02 | Received | | | Turn the COARSE adjuster to the right and fix it where the operation indicator lights up. |
| 03 | Received | | | Turn the FINE adjuster to (-) direction and check the position where the operation indicator turns OFF. Turn the FINE adjuster again to (+) direction and check the position (A) where the operation indicator lights up. |
| 04 | Interrupted | | | Turn the FINE adjuster to (+) direction and check the position where the operation indicator lights up. Turn the FINE adjuster again to (-) direction and check the position (B) where the operation indicator turns OFF. If the operation indicator does NOT light up: MAX = (B). |
| 05 | - | | | Set the adjuster at the mid position between (A) and (B) for optimal sensitivity. |
| 06 | Received | | | If you cannot adjust as above, set the FINE adjuster at MAX and follow the step again. |

Feature Data: Through-beam Type

Fiber optic unit model: FT-420-10

■ Sensing area



Feature Data: Reflective Type

Fiber optic unit model: FD-620-10

■ Sensing area

