

Button Adjustment Fiber Optic Amplifiers

BF4 Series
INSTRUCTION MANUAL

TCD210067AB

Autonics

Thank you for choosing our Autonics product.
Read and understand the instruction manual and manual thoroughly before using the product.
For your safety, read and follow the below safety considerations before using.
For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
Keep this instruction manual in a place where you can find easily.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.
Follow Autonics website for the latest information.

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.

- 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.
- 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.
- Install the unit on DIN rail or panel to use.**
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.
- 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.

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

- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- 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.

BF4 ① ② - ③

① Light source

R: Red LED
G: Green LED

② Control output

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

③ Features

No mark: Standard type
E: External synchronization input type
R: Remote sensitivity setting type

Product Components

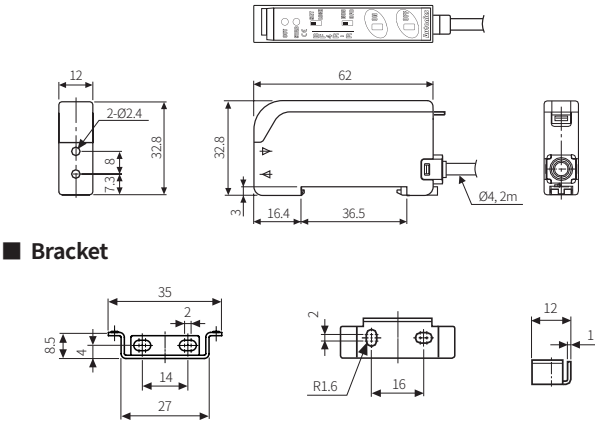
- Product
- Instruction manual
- Bracket
- Bolt / Nut × 2

Sold Separately

- Fiber optic units

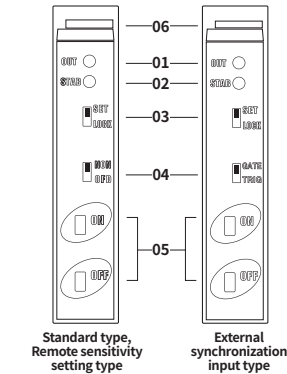
Dimensions

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



■ Bracket

Unit Descriptions



- 01. Operation indicator (red)**
- 02. Stability indicator (green)**
- 03. Setting switch for the mode**
 - SET: function setting
 - LOCK: lock mode
- 04. Setting switch for the timer / external synchronization**
 - NON: not used,
 - OFD: OFF Delay mode
 - GATE: gate synchronization,
 - TRIG: trigger synchronization
- 05. Sensitivity setting button**
- 06. Lever lock**
It is used to fix the fiber optic unit.

Supporting Functions of Each Model

- For more detailed information on functions and settings, refer to the manual.

	Standard type	External synchronization input type	Remote sensitivity setting type
Sensitivity setting by the button	○	○	○
Remote sensitivity setting	-	-	○
Sensitivity setting output (Answer back)	-	-	○
Operation mode of the timer (OFF Delay 40 ms fixed)	○	-	○
Mutual interference prevention	○	○	○
Self-diagnosis output	○	○	○
External synchronization input	-	○	-
Emitter OFF function	-	○	-

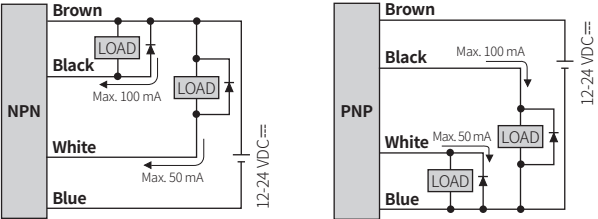
Connections

- Connect the diode at the external terminal for inductive load.
- For wiring, refer to the table below.

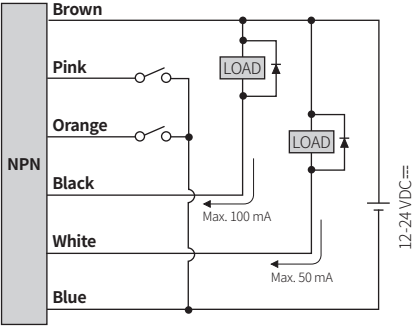
Color	Function		
	Standard type	External synchronization input type ⁰¹⁾	Remote sensitivity setting type ⁰¹⁾
Brown	+V		
Black	Control output		
White	Self-diagnosis output		
Blue	0 V		
Pink	-	External synchronization input	Remote sensitivity setting ON
Orange	-	Emitter OFF input	Remote sensitivity setting OFF

01) Signal condition
High: 4.5-30 VDC≐ or Open, Low: 0-1 VDC≐

■ Standard type



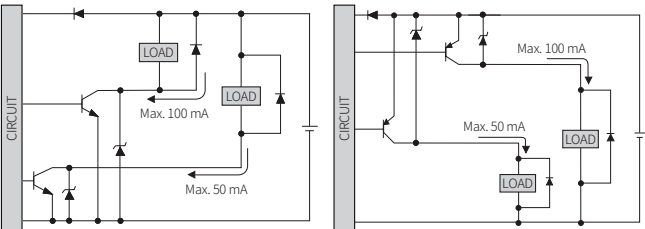
■ External synchronization input type / Remote sensitivity setting type



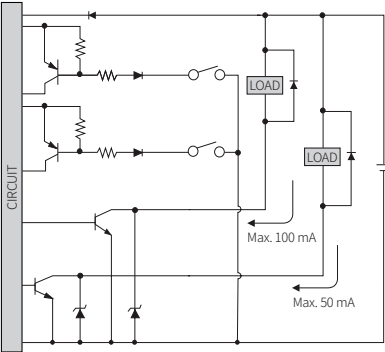
Circuit

■ Standard type

- NPN open collector output
- PNP open collector output



■ External synchronization input type / Remote sensitivity setting type



Specifications

Model	BF4R□□-□	BF4G□□-□
Light source	Red LED	Green LED
Peak emission wavelength	660 nm, modulated	525 nm, modulated
Response time	Built-in 2 differential frequencies (frequency 1: ≤ 0.5 ms, frequency 2: ≤ 0.7 ms)	
Sensitivity setting	Button / Remote sensitivity setting	
Operation mode	Light ON / Dark ON selectable	
Self-diagnosis output	YES	
Load voltage	≤ 30 VDC≐	
Load current	≤ 50 mA	
Residual voltage	NPN: ≤ 1 VDC≐ (load current: 50 mA), ≤ 0.4 VDC≐ (load current: 16 mA) PNP: ≤ 2.5 VDC≐	
Indicator	Operation indicator (red), stability indicator (green)	
Approval	CE 2014/535/EU	CE 2014/535/EU
Unit weight (packaged)	≈ 65 g (≈ 120 g)	≈ 65 g (≈ 120 g)

Power supply	12-24 VDC≐ ± 10% (ripple P-P: ≤ 10%)
Current consumption	≤ 45 mA
Control output	NPN open collector output / PNP open collector output model
Load voltage	≤ 30 VDC≐
Load current	≤ 100 mA
Residual voltage	NPN: ≤ 1 VDC≐ (load current: 100 mA), ≤ 0.4 VDC≐ (load current: 16 mA) 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	Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min
Vibration	1 mm double amplitude at frequency 10 to 55 Hz in each X, Y, Z direction for 2 hours
Shock	500 m/s ² (≈ 50 G) in each X, Y, Z directions for 3 times
Ambient illuminance (receiver)	Sunlight: ≤ 11,000 lx, incandescent lamp: ≤ 3,000 lx
Ambient temperature	-10 to 50 °C, storage: -20 to 70 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Cable spec.	Standard type: Ø 4 mm, 4-wire, 2 m External synchronization input, remote sensitivity setting type: Ø 4 mm, 6-wire, 2 m
Wire spec.	Standard type: AWG22 (0.08 mm, 60-core), insulator outer diameter: Ø 1.25 mm External synchronization input, remote sensitivity setting type: AWG24 (0.08 mm, 40-core), insulator outer diameter: Ø 1 mm
Material	Case: heat-resistance ABS, cover: PC

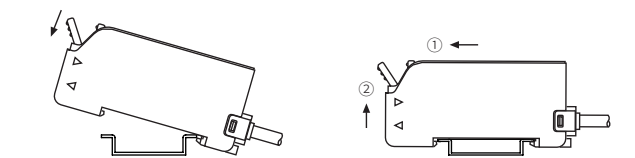
DIN Rail Mount and Removal

■ Mount

- Hang up the holder on the backside of the amplifier to the DIN rail (35 mm).
- Press the front side of the amplifier toward the DIN rail.

■ Removal

- Slide the amplifier to direction ①.
- Lift the front side of the amplifier to direction ②.



Insert Fiber Optic Unit

- Lift the protective cover and lower down the lever lock.
- Insert the cable of the fiber optic unit to the slot completely.
(▷ : receiver part, ◁ : emitter part)

	Length (mm)	Receiver part	Emitter part
a ⁰¹⁾		11	
b			10

Amplifier 01) With the adaptor attached

- Lift the lever lock to fix the fiber optic unit and close the protective cover.

