

## Button Adjustment Fiber Optic Amplifiers

# BF4 Series

## INSTRUCTION MANUAL

TCD210067AA

**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.

**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.

**07. Do not touch the fiber optic unit.** Failure to follow this instruction may result in fire.

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### 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

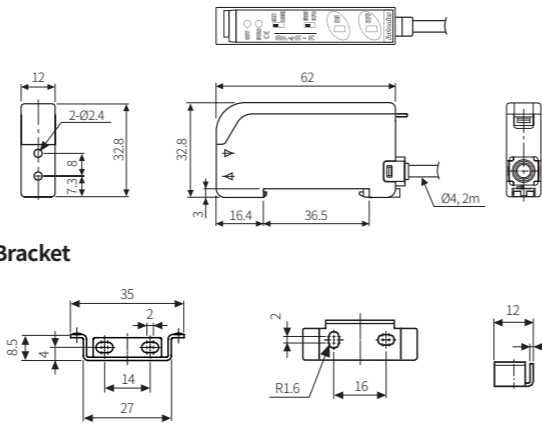
- Product
- Instruction manual
- Bracket
- Bolt / Nut × 2

### Sold Separately

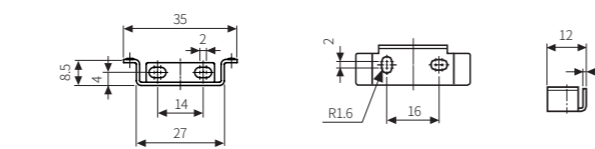
- Fiber optic units

### Dimensions

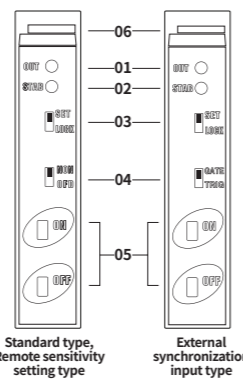
- Unit: mm, For the detailed drawings, follow the Autonics website.



#### ■ 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	-	○	-

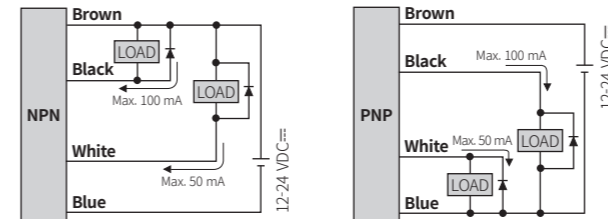
### Connections

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

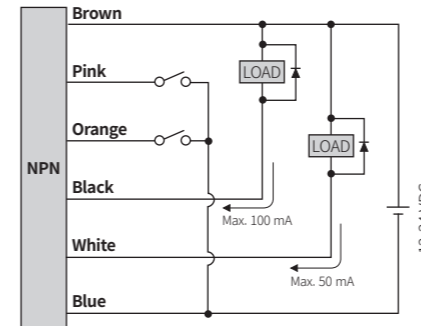
Color	Function		
	Standard type	External synchronization input type <sup>01)</sup>	Remote sensitivity setting type <sup>01)</sup>
Brown	+V		
Black	Control output		
White	Self-diagnosis output		
Blue	0V		
Pink	-	External synchronization input	Remote sensitivity setting ON
Orange	-	Emitter OFF input	Remote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

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

#### ■ Standard type



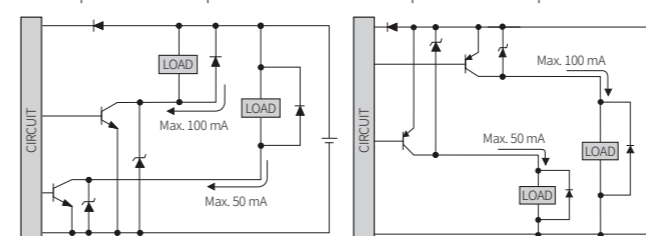
#### ■ External synchronization input type / Remote sensitivity setting type



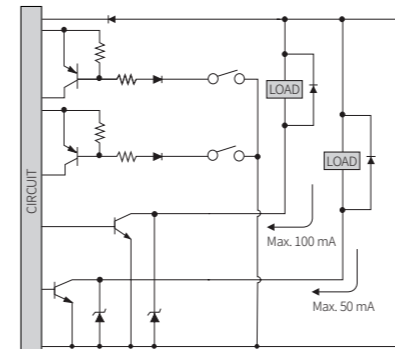
### Circuit

#### ■ Standard type

- NPN open collector output
- PNP open collector output



#### ■ External synchronization input type / Remote sensitivity setting type



### Specifications

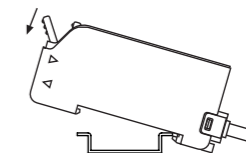
Model	BF4R□□-□	BF4G□□-□
Light source	Red LED	Green LED
Peak emission wavelength	660 nm, modulated	525 nm, modulated
Response time	Built-in 2 differential frequencies (frequency 1: ≤ 0.5 ms, frequency 2: ≤ 0.7 ms)	
Sensitivity setting	Button / Remote sensitivity setting	
Operation mode	Light ON / Dark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

Power supply	12-24VDC≐ ±10% (ripple P-P: ≤ 10%)
Current consumption	≤ 45 mA
Control output	NPN open collector output / PNP open collector output model
Load voltage	≤ 30VDC≐
Load current	≤ 100 mA
Residual voltage	NPN: ≤ 1VDC≐ (load current: 100 mA), ≤ 0.4VDC≐ (load current: 16 mA) PNP: ≤ 2.5VDC≐
Protection circuit	Reverse power protection circuit, output short overcurrent protection circuit
Insulation resistance	≥ 20 MΩ (500VDC≐ megger)
Noise immunity	±240VDC≐ the square wave noise (pulse width: 1 μs) by the noise simulator
Dielectric strength	1,000VAC~ 50 / 60 Hz for 1 min
Vibration	1 mm double amplitude at frequency 10 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours
Shock	500 m/s <sup>2</sup> (≈ 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

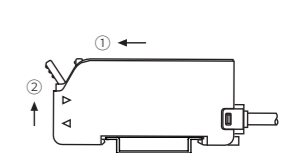
#### ■ Mount

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



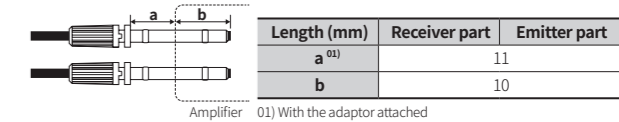
#### ■ Removal

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



### Insert Fiber Optic Unit

01. Lift the protective cover and 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 and close the protective cover.

