

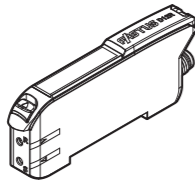
**FASTUS**

Good Thinking, Good Future

Fiber Optic Sensors

# D12R Series

Download the D12R Series User's manual from the OPTEX FA website.  
<https://www.optex-fa.com>

**OPTEX FA CO., LTD.**

Thank you for purchasing this Fiber optic sensor "D12R".

Before using this product, read this manual carefully to ensure proper use.

Read this manual thoroughly, and then keep this manual at hand so that it can be used whenever necessary.

Refer to the D12R Series User's Manual for detailed information on how to set up the D12R Series and the details of each function.

## Safety Precautions

Safety precautions for ensuring safe operation of this product are displayed as follows with the following symbols.

Precautions listed here describe important information about safety. Make sure to follow them accordingly.

### Safety Symbols

	<b>WARNING</b>	Indicates that any improper operation or handling may result in moderate or minor injury, and in rare cases, serious injury or death. Also indicates a risk of serious property damage.
	<b>CAUTION</b>	Indicates that any improper operation or handling may result in minor injury or property damage.

<b>WARNING</b>	
	This product cannot be used in applications that directly or indirectly detect human bodies for the purpose of ensuring safety. Do not use this product as a detection device for protecting the human body.
	This product does not have a function that stops the emission of light from the laser during disassembly. Do not disassemble the product.
	This product is not explosion-proof and should not be used around flammable or explosive gases or liquids. Doing so may cause ignition resulting in an explosion or fire.
	Do not use air dusters or any spray that uses flammable gas around the product or on the inside of the product. Doing so may cause ignition resulting in a fire.
	Do not install this product or its cables in any of the following locations. Doing so may cause a fire, damage, or a malfunction. 1. Locations where dust, salt, iron powders, or vapor (steam) is present. 2. Locations subjected to corrosive gases or flammable gases. 3. Locations where water, oil, or chemical splashes may occur. 4. Locations where heavy vibrations or impacts may occur. 5. Locations where the ambient temperature exceeds the rated range. 6. Locations subject to rapid temperature changes (or where condensation occurs). 7. Locations with strong electric or magnetic fields. 8. Outdoor locations or locations subject to direct sun light.
	Do not use this product in a non-industrial environment. Doing so may cause induction or radiation interference.
	This product is not intended for use with nuclear power, railways, aviation, vehicles, medical equipment, food-handling equipment, or any application where particular safety measures are required. Absolutely do not use this product for any of these fields.
	In the event of a malfunction such as smoke comes out from the product. If you detect any malfunction including emission of smoke, abnormal smells or sounds, or the housing becoming very hot, immediately stop operating the product and turn off the power to the controller. Doing so may cause a fire. Repairing the product is dangerous and should in no way be performed by the customer. Contact the OPTEX FA sales office.
	In case water enters the product If water or any other liquid enters the product or the cable, immediately stop operating the product and turn off the power to the controller. Using the product in this condition may cause a fire.

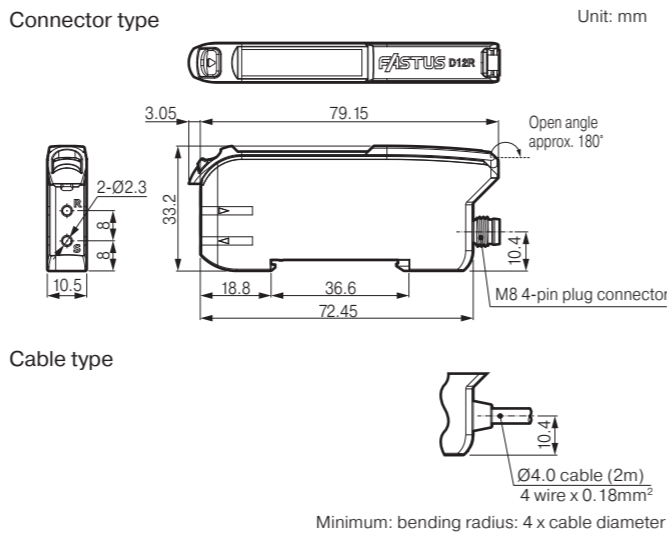
<b>CAUTION</b>	
	Follow the instructions in this manual or the specified instruction manual when wiring the product or the dedicated controller for the correct wiring method. Incorrect wiring can damage the product or the controller or cause a malfunction.
	Do not bend the cable when below the freezing point. Doing so may cause the cable to break.
	Do not excessively twist or apply stress to the cable. Doing so may damage the cable or the connector.
	When connecting the cable, make sure to hold it by the connector portion, and do not apply excessive force to the cable.

<b>CAUTION</b>	
	When disconnecting the connector, be careful not to touch the terminals inside the connector, and do not allow foreign objects to enter the connector.
	Route wiring separately from high-voltage circuits and power circuits. If the wires are routed together, induction may occur, which can cause a malfunction or damage the product. If this is unavoidable, use a conductive object such as a properly grounded conduit as a shield.
	Install this product as far away from high-voltage equipment, power equipment, equipment that generates large switching surges, welders, inverter motors, or any equipment that can be a source of noise.
	Use this product within the rated ranges.
	Install this product and the dedicated controller securely. Failure to ensure secure installation can result in the products falling and becoming damaged.
	Make sure to turn the power off before wiring the cable or connecting/disconnecting the connector. Performing work while the product is energized may damage it or cause electric shock.

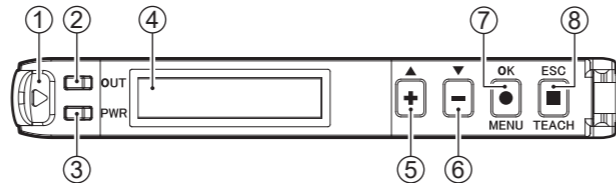
### NOTICE

- After carefully considering the intended use, required specifications, and usage conditions, install and use the product within the specified ranges.
- All specifications may be changed without notice.
- When using this product, it is the responsibility of the customer to ensure necessary safety designs in hardware, software, and systems in order to prevent any threat to life, physical health, and property due to product malfunction or failure.
- Do not use this product for the development of weapons of mass destruction, for military use, or for any other military application. Moreover, if this product is to be exported, comply with all applicable export laws and regulations, including the "Foreign Exchange and Foreign Trade Act" and the "Export Administration Regulations," and carry out the necessary procedures pursuant to the provisions therein.
- If installing this product in your own equipment, ensure that the product is properly handled according to the laws and regulations of the relevant country or region.
- Before using this product, fully examine the applicable environmental laws and regulations, and operate the product in conformity to such laws and regulations. OPTEX FA does not assume any responsibility for damages or losses occurring as a result of noncompliance with applicable laws and regulations.
- Detection characteristics values and digits value may vary depending on the state of the target object and variations among individual products.

## 1. Dimensions



## 2. Part Names

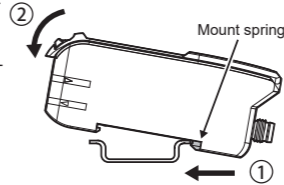


No.	Name	Description
①	Lock lever	Locks and releases the fiber unit.
②	Output indicator	Illuminates in orange when output is ON.
③	Power indicator	Illuminates in green when the power is turned on.
④	Display	Display the present receiving light level and threshold, and the parameters during set menu.
⑤	Selection keys (+ key)	Manually adjusts the threshold. In the settings menu select the item, and during item input, increase the value.
⑥	Selection keys (- key)	Manually adjusts the threshold. In the settings menu select the item, and during item input, decrease the value.
⑦	Menu key (OK)	Selects and sets the parameters.
⑧	Teach key (ESC)	Performs teaching, and exit menu during setting.

## 3. Installation

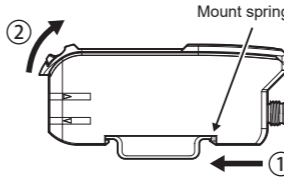
### Installing the fiber optic sensor

- Align the mount spring at the bottom of the amplifier with the DIN rail. Push the amplifier in the direction of ① and compress the mount spring.
- Push down in the direction of ② until the amplifier's hooks lock into place.



### Removing the fiber optic sensor

- Align the mount spring at the bottom of the amplifier with the DIN rail. Push the amplifier in the direction of ① and compress the mount spring.
- Pull the amplifier up in the direction of ②.



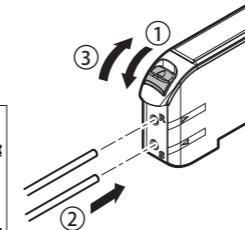
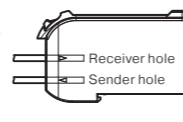
### Mounting the fiber unit

- Slide the lock lever down.
- Insert the fiber wires in the holes to the end.
- Raise the lock lever to the stop position.

How to use the fiber adapter

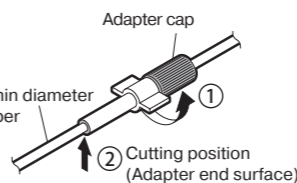
#### CAUTION

When using a coaxial reflective fiber unit, insert a single-core fiber or fiber sheath with a white line on the emitter hole, and multi-core fiber on the receiver hole.



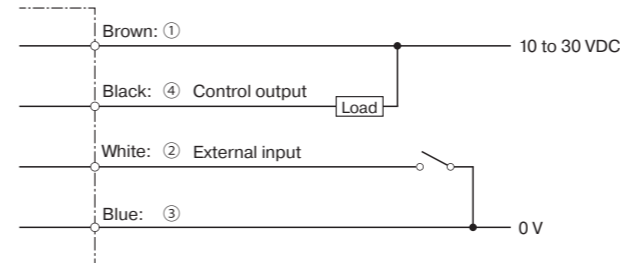
### (Included with the thin fiber units)

- Turn the adapter cap fully counterclockwise to unlock, and then align the ends of adapter pipe and fiber. Turn the cap fully clockwise to lock the adapter.
- Cut the fiber at a desired length, using the fiber cutter included in a free-cut fiber unit.

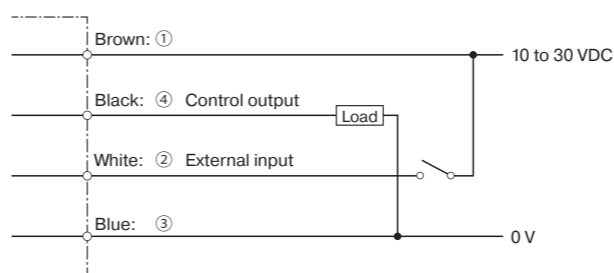


## 4. Wiring Diagram

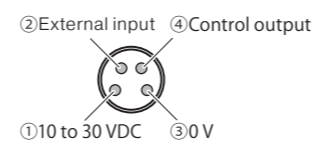
### NPN type



### PNP type



### M8 connector pin assignments



## 5. Specifications

Type		Cable type	Connector type
Model	NPN	D12R-TN	D12R-TNC4
	PNP	D12R-TP	D12R-TPC4
Light source		4-element Red LED (Wavelength: 660nm)	
Response time		50μs/250μs/1ms/4ms	
Timer function		On delay, Off delay, Pulse output, On/Off delay, On delay pulse	
Control output		NPN/PNP, open collector Max. 100mA/30 VDC residual voltage 1.8V or less	
Output mode		Light ON/Dark ON, selectable by setting	
External input		Teach input, Emitter off, Zero reset, trigger	
Protection circuit		Reverse polarity protection, Output overcurrent protection, Output Short Circuit protection	
Interference Prevention Quantity		Up to 4 units (frequency-selective)	
Supply voltage		10 ... 30 VDC ±10 % including 10 % ripple (p-p)	
Current consumption	Eco mode OFF	42 mA or less at 10 VDC, 19 mA or less at 30 VDC	
	Eco mode ON	30 mA or less at 10 VDC, 15 mA or less at 30 VDC	
Warm-up time		300 ms	
Applicable regulations	EMC	EU EMC directive (2014/30/EU) UK directive EMC (The Electromagnetic Compatibility Regulations 2016) FCC Part 15 subpart B	
	Environment	EU RoHS directive (2011/65/EU) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012) China RoHS (MIIT Order No. 32)	
Applicable standards		EN/IEC 60947-5-2	
NRTL certification	Cable type	UL Recognized Component certification for the US and Canada	
	Connector type	UL Listed certification for the US and Canada	
Environmental resistance	Ambient illuminance	Sunlight: 67,000 lx or less, Incandescent light: 99,000 lx or less LED lighting (DC light): 16,000 lx or less	
	Ambient temperature/humidity	-25 ... 55 °C/ 35 ... 85 % RH (no freezing or condensation)	
	Storage temperature/humidity	-40 ... 70 °C/ 35 ... 85 % RH (no freezing or condensation)	
	Vibration resistance	10 to 55 Hz Double amplitude 1.5 mm 2 hours in each X, Y, Z directions	
	Shock resistance	500 m/s² 3 times in each X, Y, Z directions	
	Degree of protection	IP50 (IEC 60529)	
	Material	Housing, cover: PC	
Weight		Approx. 72 g	Approx. 25 g

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

\* This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- Support for the China RoHS directive

For details on the support for the China RoHS (the Administrative Measure on the Control of Pollution Caused by Electronic Information Products), see the following website.  
[https://www.optex-fa.com/rohs\\_cn/](https://www.optex-fa.com/rohs_cn/)

- Specifications are subject to change without notice.
- For more information, questions and comments regarding product, please contact us at the information below.

## OPTEX FA CO., LTD.

[Headquarters]

91 Chudoji-Awata-cho, Shimogyo-ku, Kyoto 600-8815 JAPAN

TEL +81-75-325-1314 FAX +81-75-325-2936

<https://www.optex-fa.com>