

PRECAUTIONS

- The LD-T20R(PN) uses a Class 2 semiconductor laser in accordance with JIS C 6802 "Laser Product Radiation Safety Standard". (Class 2 : Exposure to visible radiation from Class 2 laser is not harmful to operator, owing to the human body's protective reflex.)
- The LD-T20R-C1(PN) uses a Class 1 semiconductor laser in accordance with JIS C 6802 "Laser Product Radiation Safety Standard". (Class 1 : By technical design, it is essentially a safe thing.)
- Never expose operator's eyes to the laser beam, which is used in the form of parallel beam bundle. Never look into a laser radiation port on Transmitter connected to power source. Direct exposure to laser beam may be harmful to operator's eyes.
- This product is provided with a warning label and a caution label as shown in the right for persons who handle sensors to call their attention. After installing the product, affix these labels to the sensor unit so that they are easy to be seen and read.
- When a detection object is a person, laser light should not go into the eye by any means
- Please turn off power, when removing the sensor or carrying out repair.

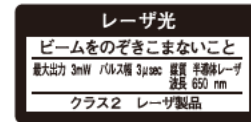
SPECIFICATIONS

Cable type	NPN	LD-T20R	LD-T20R-C1
	PNP	LD-T20RPN	LD-T20RPN-C1
Connector type	NPN	LD-T20R-J	LD-T20R-C1-J
	PNP	LD-T20RPN-J	LD-T20RPN-C1-J
Detection	Through beam		
Range	20m		
Detecting object	20mm dia. opaque		
Power supply	12 to 24VDC \pm 10%, Ripple 10% (Max.)		
Power consump.	NPN	Transmitter 20mA (Max.), Receiver 20mA (Max.)	
	PNP	Transmitter 20mA (Max.), Receiver 25mA (Max.)	
Output	Control output	NPN open collector, Rating : Sink current 100mA(30VDC)Max. PNP open collector, Rating : Source current 100mA(30VDC)Max.	
	Stability output	NPN open collector, Rating : Sink current 50mA(30VDC)Max. NPN open collector, Rating : Source current 50mA(30VDC)Max.	
Operating mode	Light ON/Dark ON selectable		
Response time	0.5ms Max.		
Operating angle	30° (Receiver side)		
Light source	Red semiconductor laser (650nm)		
		Class 2	Class 1
Indicators	Transmitter : Power (Green)		
	Receiver : Operation (Red), Stability (Green)		
Sensitivity	SENS : Potentiometer (Receiver)		
Operating mode	Light ON/Dark ON selectable		
Circuit protection	Short circuit protection built-in (only control output)		
Materials	Case : Poryalirate, Lens : Acrylic		
Connection	Cable type	Attached cable (ϕ 4.2mm) Tx : 0.3mm \times 2 cores 2m (gray) Rx : 0.2mm \times 4 cores 2m (black)	
	Connector type	M8 connector	
Weight	Cable type	Approx. 80g (transmitter/receiver)	
	Connector type	Approx. 25g (transmitter/receiver)	
Others	*1 M8 connector type is available. (-J)		

ENVIRONMENTAL CHARACTERISTICS

Ambient light	5,000 lx (Max.)
Ambient temperature	-10 to +55°C
Ambient humidity	35 to 85%RH
Protective structure	I P67
Vibration resistance	10 to 55Hz, 1.5 double amplitude, 2 hr. in X, Y and Z directions
Shock resistance	500m/s ² 3 times in X, Y and Z directions
Dielectric strength	1,000VAC for 1 minute
Insulation resistance	Min. 20M Ω (at 500VDC)

[Label for class 2]

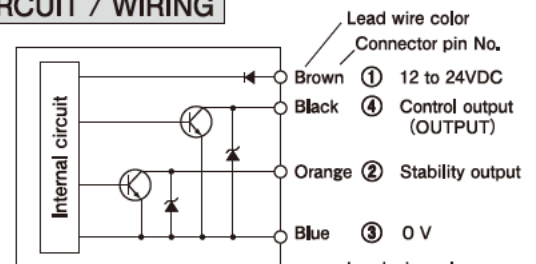


[Label for class 1]

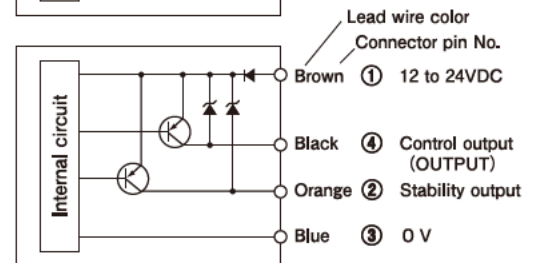


OUTPUT CIRCUIT / WIRING

[NPN type]

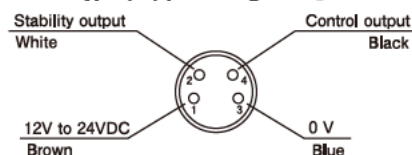


[PNP type]



- Control output transistor will be turned off when load is short-circuited or overloaded. Supply power again after checking the load status.
- Stability output is not equipped with short-circuit protection function.

[M8 connector type (-J) pin arrangement]



- The above lead colors show for an optional M8 connector.
- For Transmitter, 1 (Brown) and 3 (Blue) only and the others are not connected.

OPERATION MODE CHANGEOVER

An operation mode selectable switch is equipped on Receiver unit.

- * Turn to L side for Light ON operation.

Light-On operation Dark-On operation

- * Turn to D side for Dark ON operation.



OPTICAL AXIS ALIGNMENT

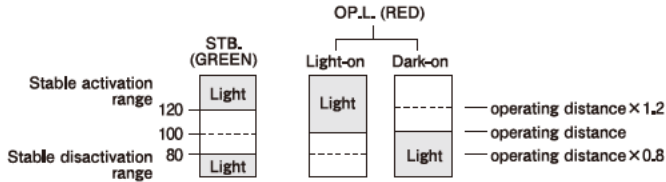
- Rotate Transmitter unit horizontally and vertically, and place the unit in a position where Receiver lens surface lights red to the maximum when viewing behind Transmitter unit.
- Next, rotate Receiver unit horizontally and vertically, and place the unit at the center of the range where the sensor operates in the each direction. Red LED (OP.L) is the Operation indicator. It lights up when receiving the light in the L.ON mode (Light ON). It lights up when interrupting the light in the D.ON mode (Dark ON).

SHORT CIRCUIT PROTECTION

- Even if the output and the power supply are short-circuited, the protection circuit works, and the output transistor is protected.
- To reset the short-circuit protection, restore the short-circuit, then turn off and on the power, or block and unblock the light beam.
- Since an over-current sometimes flows in excessive when the load capacitor and the coil are connected, please take care.

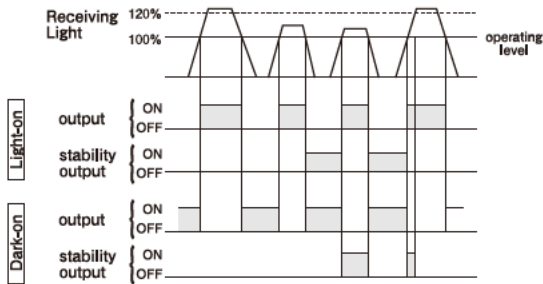
INDICATORS

- Operation indicator (red LED) and Stability indicator (green LED) show the below levels.
- Repeatedly make light received or interrupted with a detecting object whenever optical axis alignment or sensitivity adjustment has been carried, and verify that the light level is in a stable range of activation/disactivation.
- Setting within the stable range, the reliability will be enhanced against severe environments after set-up.



STABILITY OUTPUT

- The stability output can be used to check for reduction of the light intensity level along with any change in the operating environment or to perform initial check of the operation. When two consecutive detections have occurred with the intensity of light detected exceeding the operation level but not reaching 120% of the level (range allowing stable operation), the stability signal is output when the control output is deactivated.



※ When the stability output (orange cable) is not used, insulate the cable so as not to contact with other lines.

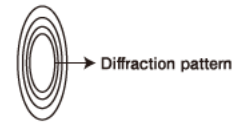
FAMILY PRODUCTS

- The other specifications are the same as LD-T20R except the range and detection object shown below.

Model	Range	Detecting object
LD-T20R-P2	15 m	φ2 Min. opaque object
LD-T20R-P1	7 m	φ1 Min. opaque object
LD-T20R-P05	3 m	φ0.5 Min. opaque object
LD-T20R-P03	0.7 m	φ0.3 Min. opaque object
LD-T20R-C1-P2	10 m	φ2 Min. opaque object
LD-T20R-C1-P1	5 m	φ1 Min. opaque object

NOTES

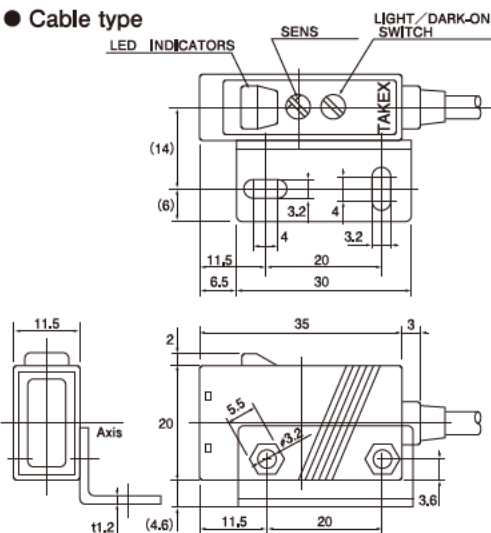
- Avoid to turn on and off the power consecutively.
- Clean the lens by a soft and dry cloth periodically. A stain or dirt stuck on the lens deteriorates the performance. Do not use organic solvent including alcohol and thinner.
- When expanding the wiring, use cables with 0.3mm² or more.
- When using a DC power unit with an insulated transformer or a switching regulator, be sure to ground the frame ground (FG) terminal.
- High frequency fluorescent lamps or inverters may emit light or noise of similar modulated frequency that photo sensors generate. Do not install the sensor in the vicinity of high-frequency equipment.
- Be sure to route the sensor wires separate from any power transmission or high voltage line. Use a same conduit or duct with high-voltage or power lines will cause malfunction or damage by induction.
- The radiated laser beam is elliptic due to the characteristics of semiconductor laser. In addition, diffraction pattern is generated due to optical diffraction phenomenon.



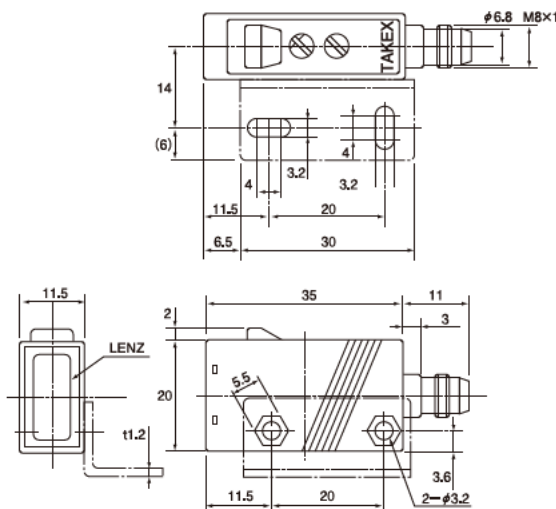
- Be notified that this product uses semiconductor laser and is prone to deterioration due to surge current or static electricity.
- The laser diode is equipped with a circuit that maintains the same light intensity level by increasing the current if it becomes dark. For this reason, allow sufficient margin in the capacity of the power supply.
- Though this sensor has IP67 rated housing, do not use the sensor where water is splashing constantly or under the water.
- Fix the attached bracket on the sensor. Use attached volts and tighten it with a torque of 0.6N·m or less.
- Limit the current of the power supply (2A) in accordance with the size of the sensor cable.

DIMENSIONS (unit : mm)

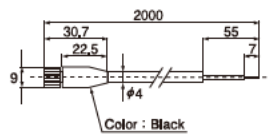
● Cable type



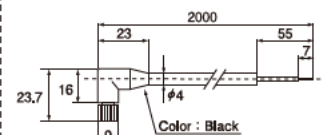
● M8 Connector type (-J type)



FBC-4R2S



FBC-4R2L



- The guarantee period of this product is one year after the delivery.
- If any defect is found during the guarantee period, Takenaka will repair or replace the defective product.
- This product is an industrial sensor which issues an output upon detecting an object. It does not have any function to prevent accidents, death or injuries.
- Takenaka will not held responsible for any damage or loss incurred due to accidents, faulty installation, abuse, misuse, improper maintenance or acts of God including lightning surge.