

TOF type
TOF-3V series



Long Sensing Distance Sensor

- | TOF, Time Of Flight, method forms the technical basis for maximum reliability and high precision
- | Immune to object color and angle

Related products

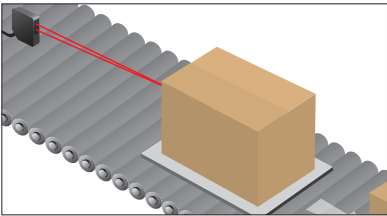
Compact type

TOF-L
● P.364

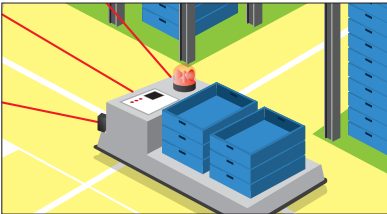
Display & Analog output

TOF-DL
● P.370

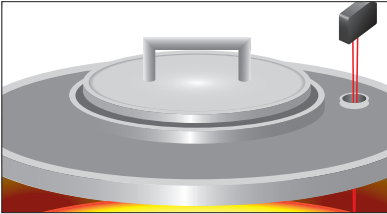
Position detection of items on moving palette.



Position detection of automated guided vehicle.



Level detection of melted aluminum liquid.



Selection table

Type	Shape	Sensing distance	Control output	Model (Models in parentheses are connector types)	
				NPN type	PNP type
Diffuse-reflective		0.3 to 3 m	1CH	TOF-3V300N1 (TOF-3V300CN1)	TOF-3V300P1 (TOF-3V300CP1)
			2CH	TOF-3V300N (TOF-3V300CN)	TOF-3V300P (TOF-3V300CP)
Retro-reflective		0 to 20 m	1CH	TOF-3V2000N (TOF-3V2000CN)	TOF-3V2000P (TOF-3V2000CP)

Options/Accessories

Reflectors for TOF-3V2000□

Standard (included)



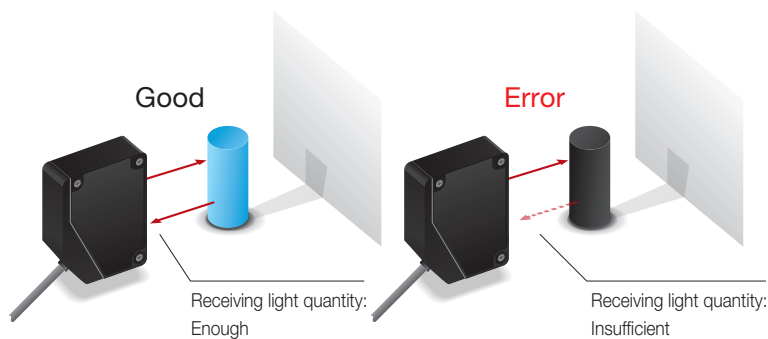
V-61
Sensing distance: 0.01 to 20 m

Connector cable

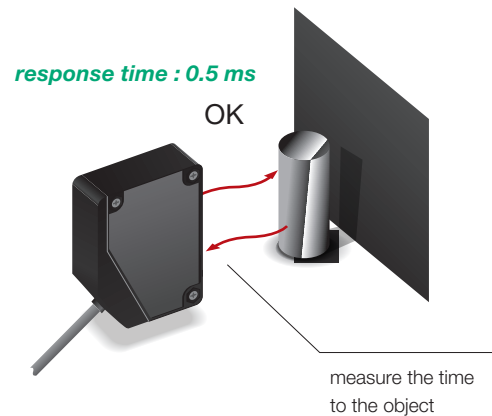


DOL-1205-G02M
Cable length: 2 m
*5 m and 10 m cables are separately available.
*Robot cables are also available.

Standard diffuse-reflective sensor

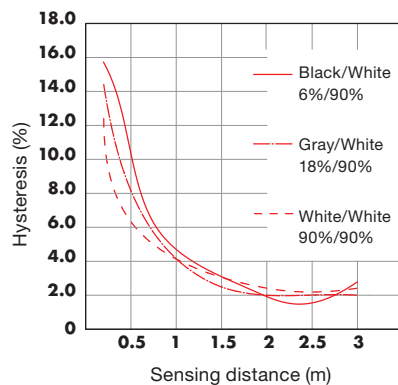


TOF (Diffuse-reflective)



Super tight hysteresis (Diffuse-reflective)

OPTEX FA's skill in TOF technology design provides super tight hysteresis between black and white objects (2% at 3 m distance)



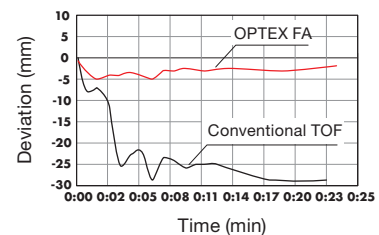
Crosstalk prevention-2pcs MAX.

Up to 2pcs can be mounted side by side.



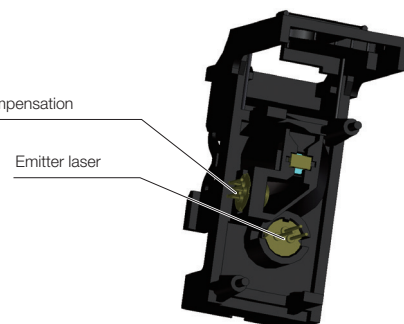
Dual laser system

The sensor uses two laser diodes in order to compensate for temperature drift of the laser pulse rise time. One laser diode is inside the case and emits directly to a receiver element. The other emits on the outside of the case. By compensating for the time difference between the two laser pulses, the time measurement remains consistent regardless of temperature changes.



Laser diode for
temperature compensation

Emitter laser



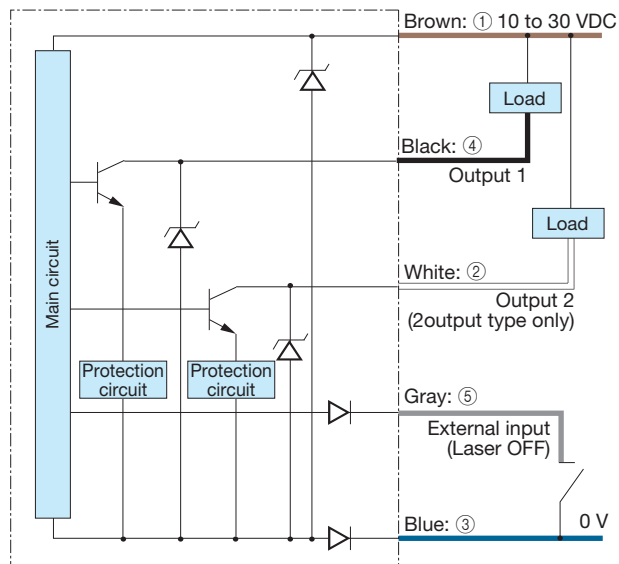
Specifications

Type				Diffuse Reflective	Retro Reflective
Model	Cable type	NPN	Output: 1CH	TOF-3V300N1	TOF-3V2000N
			Output: 2CH	TOF-3V300N	—
		PNP	Output: 1CH	TOF-3V300P1	TOF-3V2000P
			Output: 2CH	TOF-3V300P	—
	Connector type	NPN	Output: 1CH	TOF-3V300CN1	TOF-3V2000CN
			Output: 2CH	TOF-3V300CN	—
		PNP	Output: 1CH	TOF-3V300CP1	TOF-3V2000CP
			Output: 2CH	TOF-3V300CP	—
Detecting object/target				Opaque (Reflectance: 6 to 90%)	Reflector : V-61
Sensing distance				3000 mm (90% white)	20 m with Reflector V-61
Light source				Red laser diode, wavelength: 650 nm, Maximum output: 5 mW	
Laser class				FDA*1: Class I JIS/IEC: Class1	
Spot size				ø12 mm at 3 m distance	ø50 mm at 20 m distance
Optical angle deviation				0.5°(9 mrad) or less	
Hysteresis				15% Max : 300 to 1500 mm / 6% Max : 1500 to 3000 mm	10% Max : 1 to 4 m / 3% Max : 4 to 20 m
Repeat accuracy				2 mm	10 mm
Response time				0.5 ms	2 ms
Output mode				Light ON/ Dark ON selectable	
Environmental illuminance				Sunlight : 4,000 lx, Incandescent lamp : 3,000 lx (at 1 m)	
Indicator				Output indicator: Orange x 2 (2-output type), Stable indicator : Green	
Distance adjustment				4-turn Potentiometer	12-turn Potentiometer.
External input				Laser OFF	
Crosstalk prevention				Up to 2 pcs.	
Supply voltage				10 to 30 VDC ±10%, 70 mA max.	
Circuit protection				Reverse connection protection, Over current protection	
Control output				NPN/PNP Open collector, 30V/100mA, (Residual voltage 1.8 V max.)	
Connection (cable)				ø3.8 2 m cable 5 wires (2-output type) , 4 wires (1-output type)	
Connection (M12 connector)				M12, 5-pin connector	
Applicable standards				EN60497-5-2	
Initialization time				300 ms	
Internal short circuit				according to VDE 160	
Materials				ABS/PMMA	
Degree of protection				IP67 (IEC 60529)	
Vibration resistance				10 to 55 Hz, Double amplitude 1.5 mm, X, Y, Z for 2 Hours	
Shock resistance				500m/s ² (approx. 50G) X, Y, Z 3 times each	
UL				cUL	
Applicable regulations				EMC directive (2014/30/EU)/FDA regulations (21 CFR 1040.10 and 1040.11) (except for deviations pursuant to Laser Notice No.56)	
Operating temp. humidity				-10 to +50°C, 35 to 85% RH	
Storage temp. humidity				-40 to +70°C, 35 to 95% RH	
Temperature drift				±1% max.	

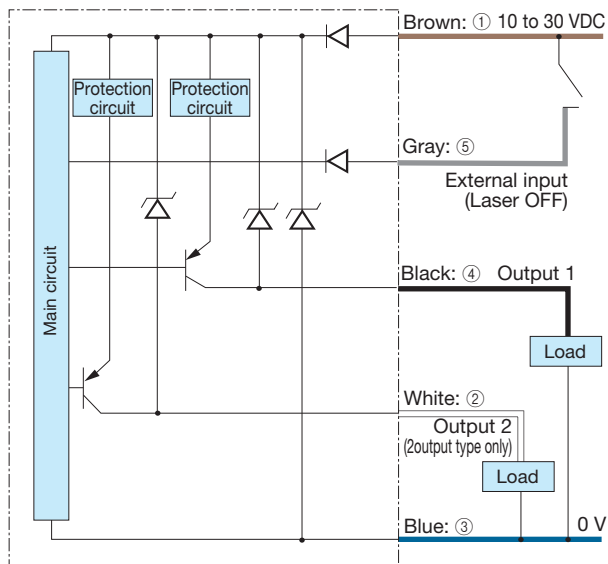
*1. In accordance with the FDA provisions of Laser Notice No. 56, the laser is classified as Class 1 per the IEC 608251:2014 standard.

I/O circuit diagram

■ NPN output type



■ PNP output type



■ Connector type

(Pin configuration) Sensor side Connector cable side



- ① 10 to 30 VDC
- ② Output 2 (2 Output type only)
- ③ 0 V
- ④ Output 1
- ⑤ External input (Laser OFF)

Connecting

- When not used for control output 2 or external input, cut the lead wire and wrap it individually with insulating tape, and do not connect it to any other terminal.
- ① to ⑤ correspond to connector pin No.

Notes

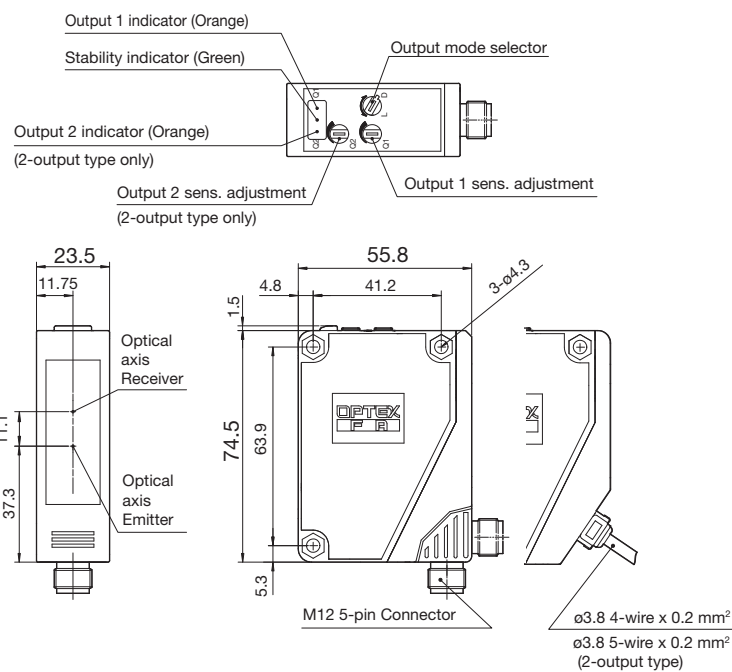
- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 300 ms).

Dimensions

Sensor

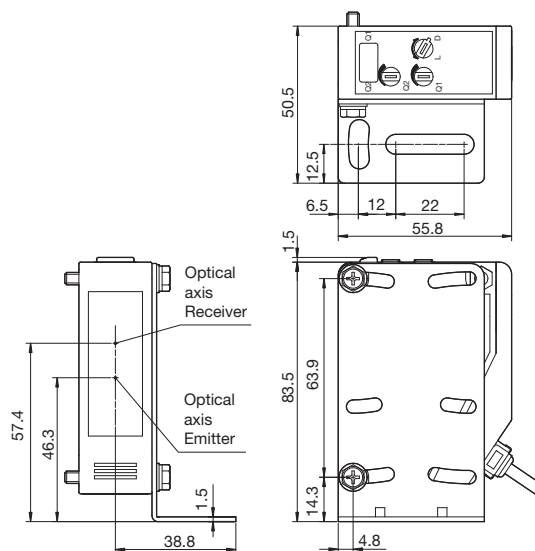
(Unit: mm)

■ Connector type/cable type

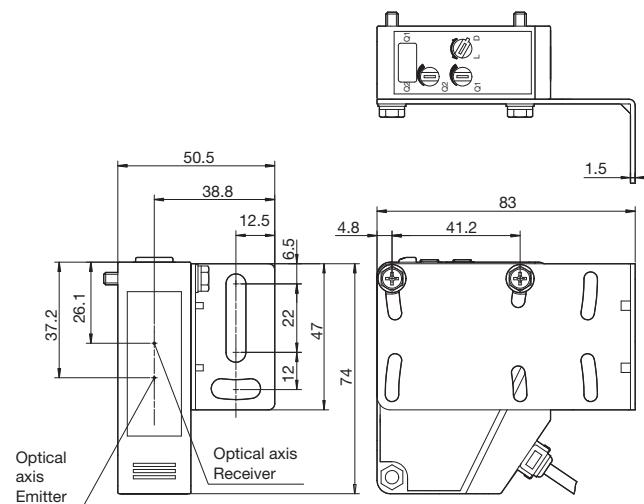


Mounting bracket

■ Floor-mounted



■ Wall-mounted

Photoelectric
SensorsSpecialized
Photoelectric
SensorsLaser
Displacement
SensorsLong-range
BGS Sensors

TOF-L

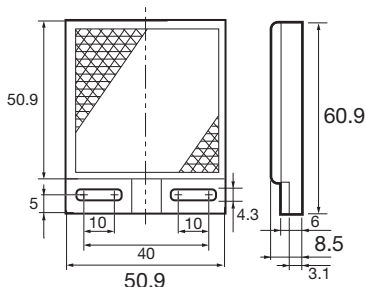
TOF-DL

TOF-3V

BGS-2V

Reflectors for TOF-3V2000□

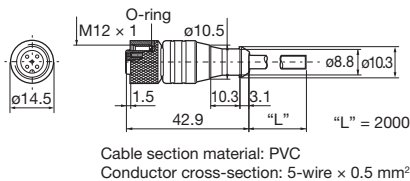
■ V-61: Standard type reflector



Connector cable

■ Cable for M12 connector type

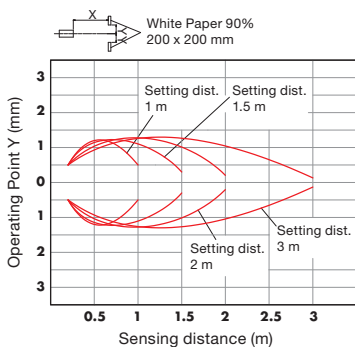
DOL-1205-G02M



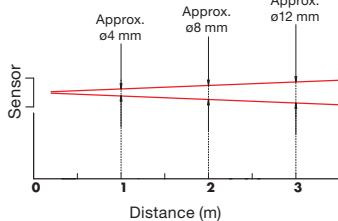
Typical characteristic data

TOF-3V300□

Sensing Area

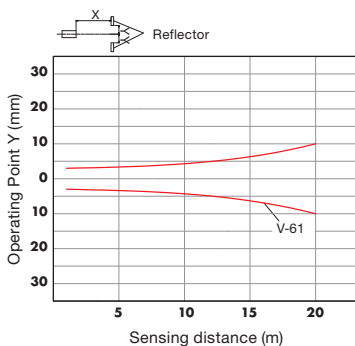


Spot Size

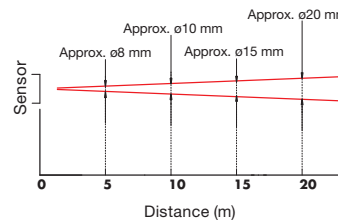


TOF-3V2000□

Sensing Area



Spot Size



Notes for sensor usage

This product emits a Class 1 (I) visible laser beam that is compliant with JIS C 6802/IEC 60825- 1/FDA laser safety standards. Warning and explanation labels are affixed to the sides of the sensor.



Warning

Do not look directly at the laser or intentionally shine the laser beam in another person's eyes. Doing so may cause damage to the eyes or health.

TOF-3V□□

