

378

TOF type

**TOF-3V** series



For amazing technical and application support for Time-of-Flight sensing - contact the experts at Ramco Innovations today!

## 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

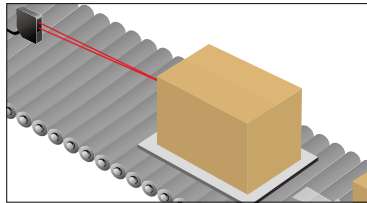


Display & Analog output

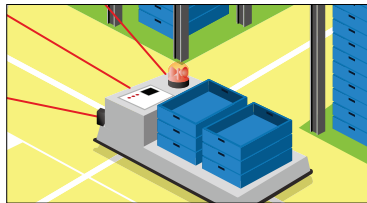
**TOF-DL**  
● P.370



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	<b>TOF-3V300N1</b> ( <b>TOF-3V300CN1</b> )	<b>TOF-3V300P1</b> ( <b>TOF-3V300CP1</b> )
			2CH	<b>TOF-3V300N</b> ( <b>TOF-3V300CN</b> )	<b>TOF-3V300P</b> ( <b>TOF-3V300CP</b> )
Retro-reflective		0 to 20 m	2CH	<b>TOF-3V2000N</b> ( <b>TOF-3V2000CN</b> )	<b>TOF-3V2000P</b> ( <b>TOF-3V2000CP</b> )

### Options/Accessories

Reflectors for TOF-3V2000□

Standard (included)



**V-61**  
Sensing distance: 0.01 to 20 m

Connector cable



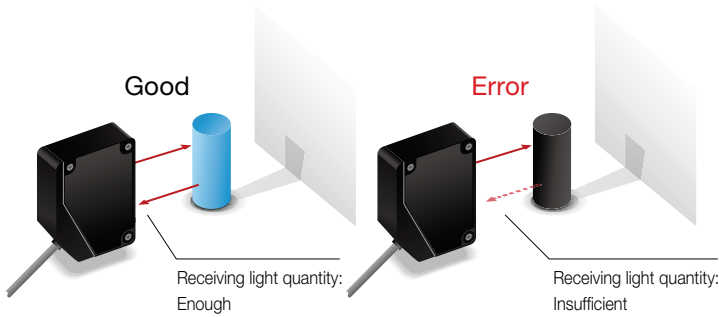
**DOL-1205-G02M**

Cable length: 2 m

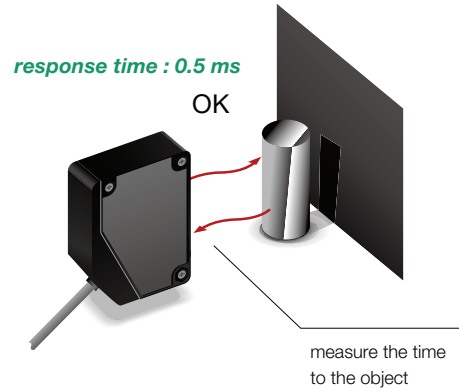
\*5 m and 10 m cables are separately available.  
\*Robot cables are also available.



Standard diffuse-reflective sensor

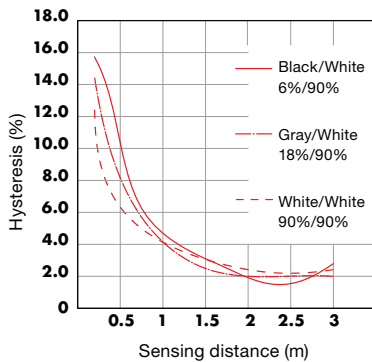


TOF (Diffuse-reflective)



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)



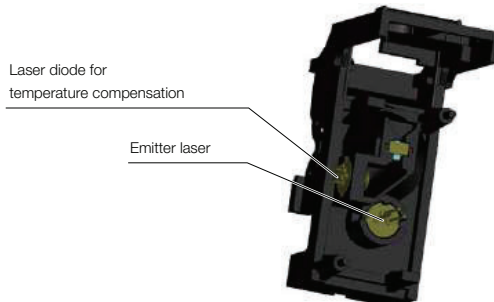
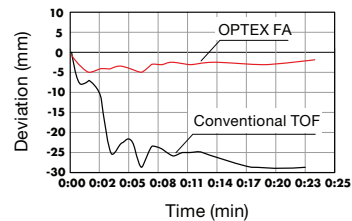
Crosstalk prevention-2pcs MAX.

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.



Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Long-range BGS Sensors

TOF-L

TOF-DL

TOF-3V

BGS-2V



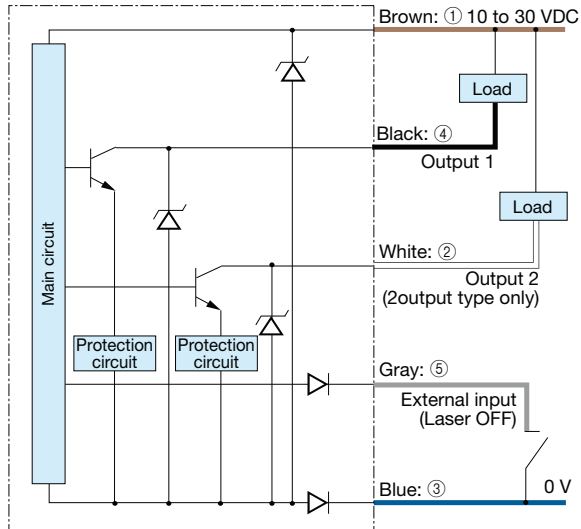
## TOF type TOF-3V series

## Specifications

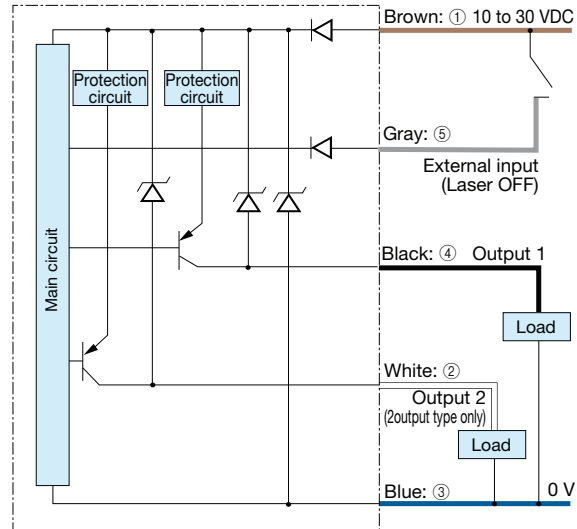
Type			Diffuse Reflective	Retro Reflective	
Model	Cable type	NPN	Output: 1CH	<b>TOF-3V300N1</b>	—
			Output: 2CH	<b>TOF-3V300N</b>	<b>TOF-3V2000N</b>
		PNP	Output: 1CH	<b>TOF-3V300P1</b>	—
			Output: 2CH	<b>TOF-3V300P</b>	<b>TOF-3V2000P</b>
	Connector type	NPN	Output: 1CH	<b>TOF-3V300CN1</b>	—
			Output: 2CH	<b>TOF-3V300CN</b>	<b>TOF-3V2000CN</b>
		PNP	Output: 1CH	<b>TOF-3V300CP1</b>	—
			Output: 2CH	<b>TOF-3V300CP</b>	<b>TOF-3V2000CP</b>
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: 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		
EMC			EN60497-5-2		
Initialization time			300 ms		
Internal short circuit			according to VDE 160		
Materials			ABS/PMMA		
Degree of protection			IP67		
Vibration resistance			10 to 55 Hz, Double amplitude 1.5 mm, X, Y, Z for 2 Hours		
Shock resistance			500m/s <sup>2</sup> (approx. 50G) X, Y, Z 3 times each		
UL			cUL		
CE			EMC directive		
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.		

## 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).

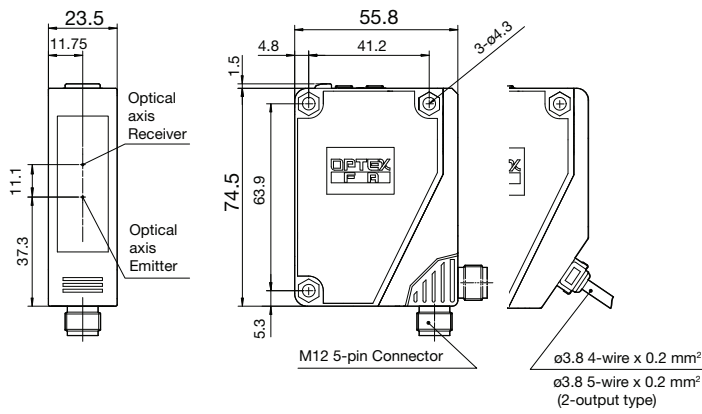
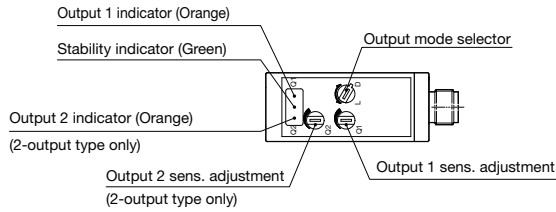
TOF type TOF-3V series

Dimensions

Sensor

(Unit: mm)

■ Connector type/cable type



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TOF-L

TOF-DL

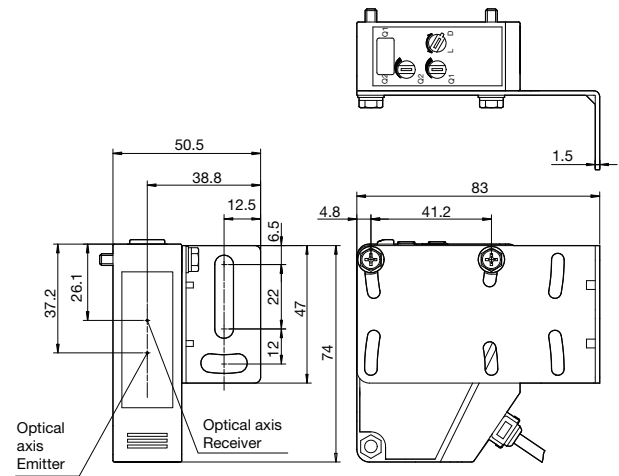
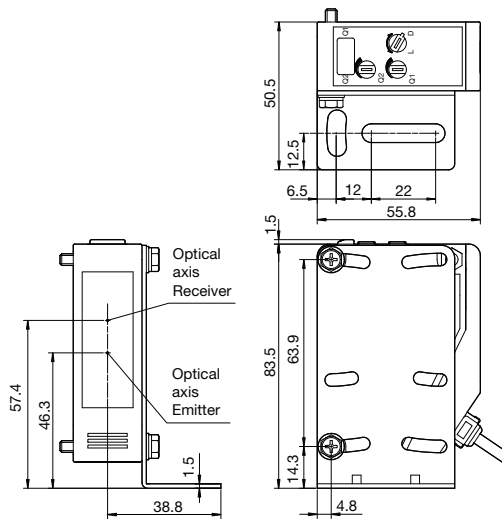
TOF-3V

BGS-2V

Mounting bracket

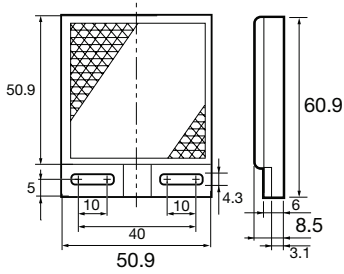
■ Floor-mounted

■ Wall-mounted



Reflectors for TOF-3V2000

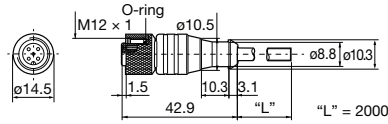
V-61: Standard type reflector



Connector cable

Cable for M12 connector type

DOL-1205-G02M



Cable section material: PVC  
Conductor cross-section: 5-wire x 0.5 mm<sup>2</sup>

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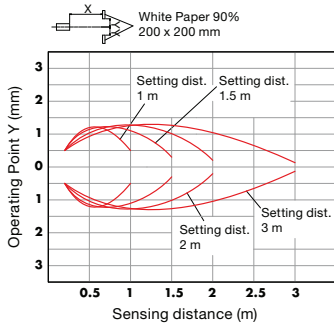
TOF-3V

BGS-2V

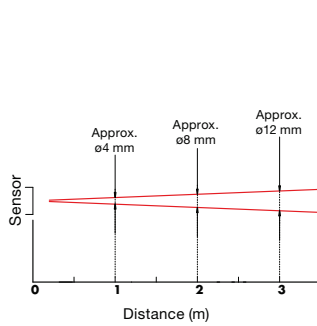
Typical characteristic data

TOF-3V300

Sensing Area

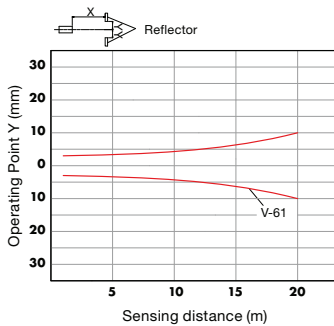


Spot Size



TOF-3V2000

Sensing Area



Spot Size

