

Good Thinking, Good Future

FASTUS

Long-Distance BGS Laser Sensor

TOF-L Series

* FASTUS is a product brand of OPTEX FA.



Ultra-Compact Long-Distance Detection Sensor

Detection
distance

*With white paper (90%)

4.5 m max.

The world's
smallest
TOF sensor

Stable detection
even over long
distances

OPTEX FA CO., LTD.



A compact and low-cost TOF sensor that changes the definition of long-distance detection.

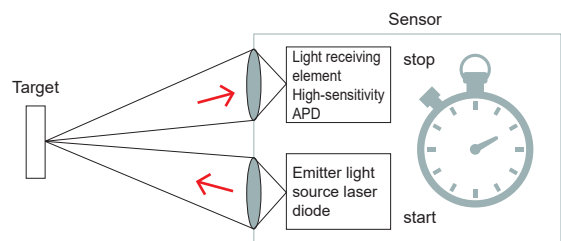
In general, long-distance detection sensors are large and heavy. The FASTUS TOF-L Series is a photoelectric sensor with a built-in amplifier that aims to change that characterization. In addition to being the world's smallest*¹ TOF sensor, the TOF-L Series also features a high-sensitivity APD in the light receiving element for high-speed responses of 0.5 ms and maximum detection distances of up to 4.5 m*².

*1 Among sensors that employ the TOF method. OPTEX FA examination performed September 2015.

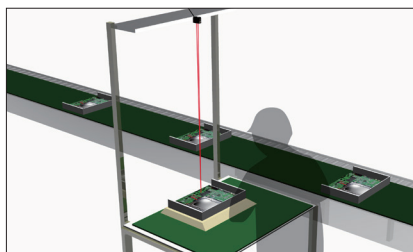
*2 With white paper (90%)

TOF (Time Of Flight) method

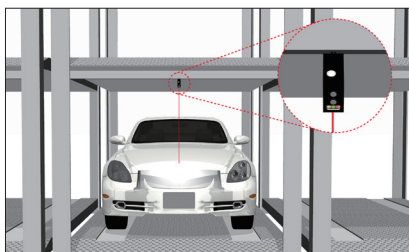
The TOF method measures the time it takes a pulse-emitted laser to hit a target and return, and the measurement is then converted into distance. With strong resistance to influences from the target's surface conditions, this method is capable of producing stable detection.



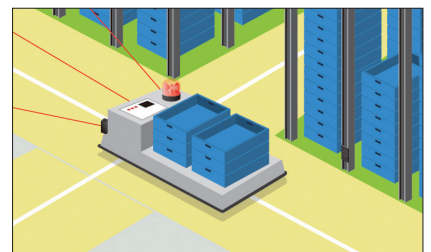
Applications



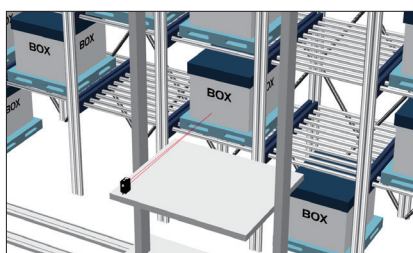
Workpiece seating verification in cell production systems



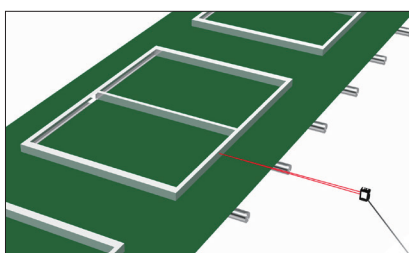
Vehicle detection in parking structures



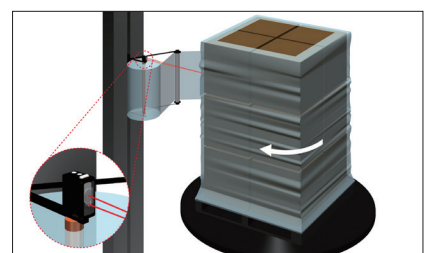
Position detection in unmanned transport vehicles



Inventory verification in automated warehouses



Long-distance aluminum frame detection

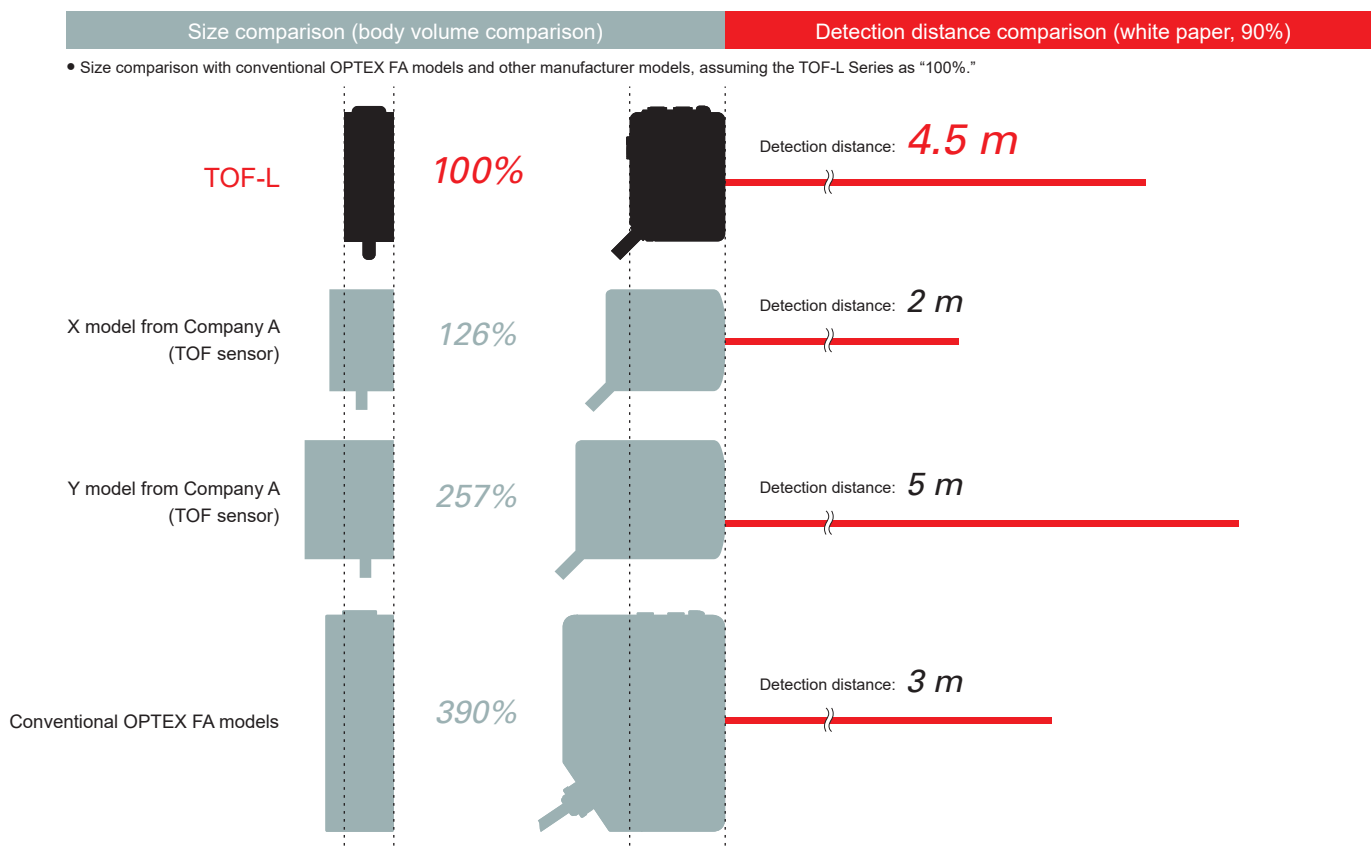


Height detection in wrapping machines

The World's Smallest TOF Sensor

At just 17 × 32.8 × 44.4 (W × D × H) mm, the TOF-L Series photoelectric sensor is the world's smallest*1 TOF sensor. In addition to measuring only about one-fourth the volume of conventional sensors for significantly more compactness, the TOF-L is capable of long-distance detection at distances up to 4.5 m.

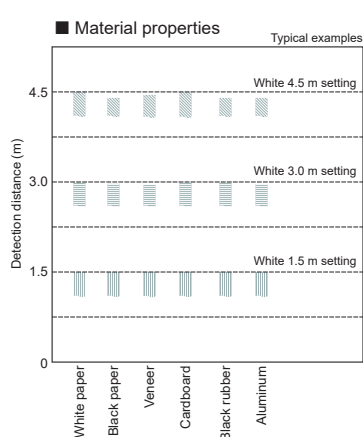
*1 Among sensors that employ the TOF method. OPTEX FA examination performed September 2015.



Stable Detection even over Long Distances

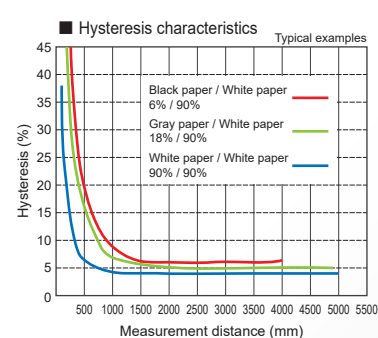
Stable detection even with glossy or low-reflectance workpieces

By relying on distance to a workpiece rather than differences in the amount of received light for turning ON/OFF, the TOF-L Series makes it possible to achieve stable long-distance detection with a variety of workpieces, including low-reflectivity targets such as black rubber and glossy targets such as metal workpieces.



Stable detection even when determining level differences

The TOF-L Series is capable of low hysteresis for white objects of less than or equal to 5% (typical). The sensor also delivers level-difference detection such as when inspecting for the presence of parts from remote locations. In addition, adoption of the TOF method helps reduce black/white errors without sacrificing detection accuracy even over long distances.



Class 1 Laser in Emitter Light Source

The TOF-L Series sensor achieves long-distance detections at distances up to 4.5 m while using a Class 1 laser.

This class of laser is also safe on the eyes, so there's no need for workers to wear eye protection.

In addition, the spot beam is clearly visible, making light axis adjustments easy.



		Cable type	M12 pig tail type	M8 connector type
Model	NPN	TOF-L450DN	TOF-L450DM12N	TOF-L450DCN
	PNP	TOF-L450DP	TOF-L450DM12P	TOF-L450DCP
Detection distance*1		0 to 4.5 m		
Emitter light source		Red laser, wavelength: 650 nm		
Laser class		Class 1 (IEC/JIS/FDA*2)		
Spot size*3		Approx. ø17 mm (at a distance of 4.5 m)		
Response time		0.5 ms or less		
Hysteresis distance		15% or less		
Gain adjustment		4-turn potentiometer		
Indicators		Output Ch. 1 and 2 indicator (orange); Stability indicator (green); Instability indicator (red)		
External input		Laser emission stop input		—
Control output	Type	NPN/PNP open collector output, max. 100 mA / 30 VDC, residual voltage 1.8 V max.		
	No. of outputs	2 channels		
Output mode		Light ON / Dark ON selectable (same output mode for Ch. 1 and Ch. 2)		
Connection mode		ø4.5 mm, 2 m cable	Cable with M12, 5-pin connector 300 mm	M8, 4-pin connector
Protection circuit		Reverse connection protection, Overcurrent protection		
Rating	Power supply voltage	10 to 30 VDC, including 10% ripple (p-p)		
	Current consumption	85 mA or less*4		
Applicable regulations		EMC directive (2014/30/EU) / FDA regulations (21 CFR 1040.10 and 1040.11*5)		
Applicable standards		EN 60947-5-2 / IEC 60825-1		
Company standards		Noise resistance: Feilen Level 4 cleared		
Environmental resistance	Operating temperature/humidity	-10 to +50°C (no freezing) / 35 to 85% (no condensation)		
	Operating illuminance	Sunlight: 4,000 lx or less (at 1 m), fluorescent lamp: 3,000 lx or less (at 1 m)		
	Vibration resistance	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
	Shock resistance	500 m/s ² (approx. 50 G), 3 times in each of the X, Y, and Z directions		
	Degree of protection	IP67 (IEC 60529)		
Material		Case: ABS, Front cover: PMMA		
Weight (excl. cable)		Approx. 25 g		
Accessories		Mounting bracket: BEF-WK-190, mounting screws (M3 × 20 mm)		

*4 Not including control output load current. *5 Except for deviations pursuant to Laser Notice No.56.

Output indicator, output 2 (orange)

Indicator (Stability: green / Instability: red)

Laser OFF (not lit)

Q1 gain adjustment potentiometer (output 1)

Q2 gain adjustment potentiometer (output 2)

[Cable type]

Light axis of receiver

Light axis of emitter

**2-M3
(Tightening torque:
0.5 N·m or less)**

32.8

1.25

17

2.1

44.4

9

16

39.2

2.6

3.1

7

6

2.8

ø4.5, 5-core 2 m cable

[M12 pig tail type]

ø4.5

300

45

ø14

[M8 connector type]

28.25

M12, 5-pin connector

4.8

M8, 4-pin connector (movable)

Light ON / Dark ON selection switch



OPTEX
FA

78014-01-006-2411