



Good Thinking, Good Future

Ultra-Compact Laser Distance Sensor

TOF-DL Series

*FASTUS is a product brand of OPTEX FA.



Easily Measure Height and Distance World's Smallest TOF Sensor

Measurement range	0.25 to 2.5 m	The world's smallest TOF sensor	Built-in digital display for simple setup
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OPTEX FA CO., LTD.

Measure from up to 2.5 m away.

“Visualize” distances with the TOF-DL compact sensor.



The FASTUS TOF-DL Series is the world’s smallest TOF sensor*1. This ultra-compact laser distance sensor is capable of measuring at distances of up to 2.5 m.

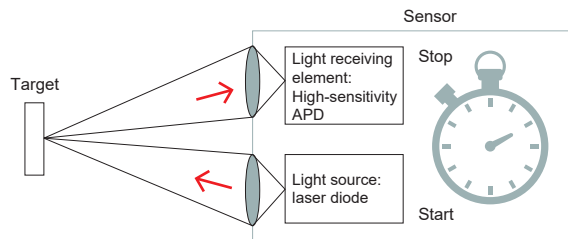
With a built-in digital display, configuring settings is simple. Notably, the TOF-DL Series is most useful with applications requiring height and target distance control, such as level and position measurements and loop control at a manufacturing site.

World’s smallest*1 Size: 17 × 32.8 × 44.4 (W × D × H) mm

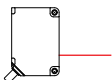
*1 OTEX FA examination performed October 2016.

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.



Lineup

Type	Measurement range	Laser class (JIS/IEC/FDA*)	Interface	Model Pig tail types are shown in parentheses
 TOF	0.25 to 2.5 m	Class 1	Analog output Control output External input	TOF-DL250A (TOF-DL250AM12)
			Control output × 3 External input	TOF-DL250T (TOF-DL250TM12)

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

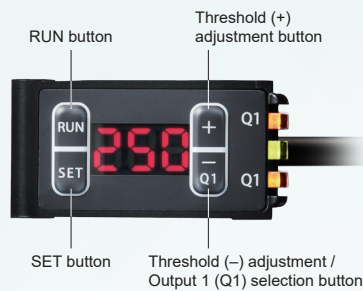
Easy-to-See Digital Display

With its ultra-compact size, the TOF-DL Series is equipped with a three-digit, easy-to-see digital display.

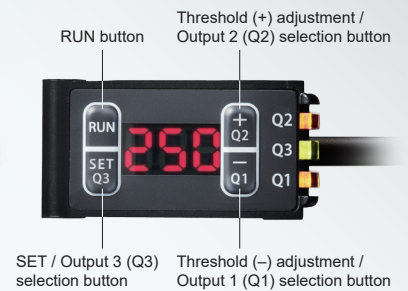
The display allows users to check the distance showing numerical values.

This digital display also makes teaching adjustments easy.

■ Analog output type



■ Three-output type



Easy-to-See Indicators and Stability Output

The indicators used on the TOF-DL Series allow for easy visibility from any angle.

In addition, users are able to switch output 1 to Stability Output.

Stability Output turns ON (Central indicator = Green) when measuring is stable and turns OFF (Central indicator = Red) when measurement is not possible.



Indicators visible from any direction

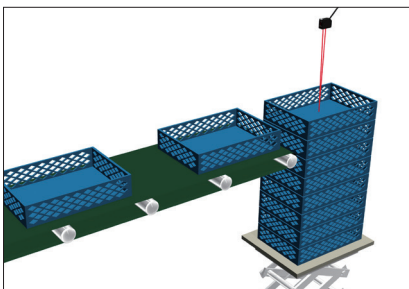
Class 1 Laser Light Source

The Class 1 laser used in the TOF-DL Series opens the door to long-distance measuring at up to 2.5 m without sacrificing eye safety.

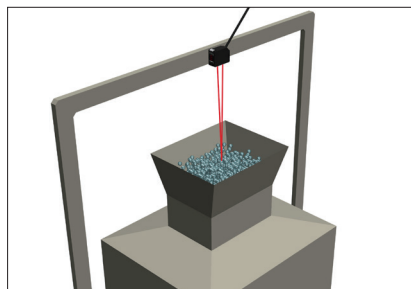
In addition, the spot is clearly visible, making light axis alignments easy.



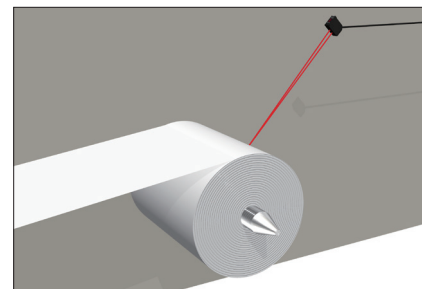
Applications



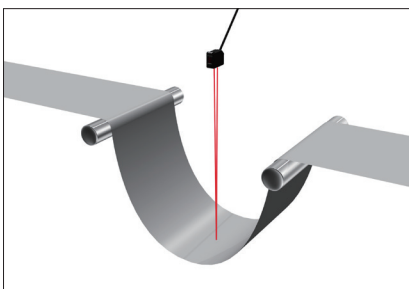
Lifting platform lift amount measurement



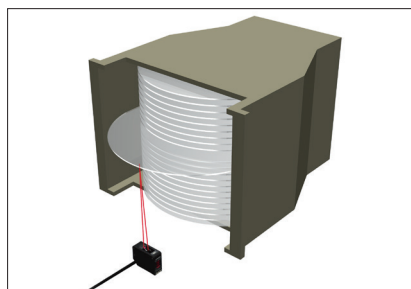
Measurement of material amount remaining in tank



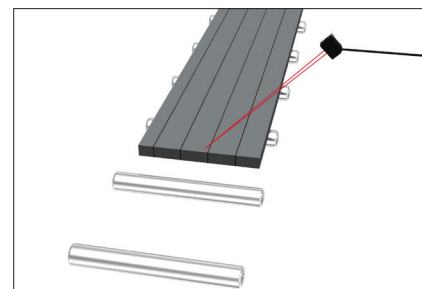
Measurement of remaining non-woven fabric amount



Sheet material loop control



Wafer protrusion detection in cassettes



Long-distance detection of building material

Specifications

Type		Analog output type	Three-output type
Model*1	Cable type	TOF-DL250A	TOF-DL250T
	Pig tail type	TOF-DL250AM12	TOF-DL250TM12
Measurement range*2		0.25 to 2.5 m	
Light source	Medium/Wavelength	Red laser Diode (Wavelength:650nm)	
	Average output	390 μW or less	
Laser class		Class 1 (IEC/JIS/FDA*3)	
Spot size*4		ø10 mm (At a distance of 2.5 m)	
Sampling period / Response time		200 μs / 0.5 ms or less (When performing moving average once)	
Hysteresis		15% or less	
Sensitivity adjustment		Teaching (Manual adjustment possible after teaching)	
Indicators		Output indicator (Orange), Stability indicator / laser off indicator: (Green) / (Red) / (Off)	Output 1 indicator (Orange), Output 2 indicator (Orange), Output 3 indicator / Stability indicator / Laser off indicator: (Orange) / (Green) / (Red) / (Off)
Digital display		7-segment, 3-digit LED display (Display unit: cm)	
External input		Laser OFF input / Teaching input (Selectable by setting)	
Control output	No. of outputs	1	3 (Output 3 available by switching external input)
	Stability output	Output 1 switchable to stability output (Selectable by setting)	
Analog output	Type	Open collector (NPN/PNP selectable by setting), Max. 100 mA / 30 VDC, residual voltage 1.8 V Max.	
	Output mode	Light ON / Dark ON selectable (Output 1 through 3 will be set to same output mode for three-output type)	
Analog output	Current output	4 to 20 mA, Load impedance: 300 Ω or less	Not equipped
	Voltage output	0 to 10 V, Output impedance: 100 Ω or less	
Connection type		Cable type: ø4.5 mm, 2 m cable, Pig tail type: Cable with M12, 5-pin connector 300 mm	
Protection circuit		Reverse connection protection, Overcurrent protection	
Rating	Power supply voltage	12 to 30 VDC, including 10% ripple (p-p)*5	10 to 30 VDC, including 10% ripple (p-p)
	Current consumption	60 mA or less*6	
Applicable regulations	EMC	EMC directive (2014/30/EU)	
	Environment	RoHS directive (2011/65/EU), China RoHS (MIIT Order No. 32)	
	Safety	FDA regulations (21 CFR 1040.10 and 1040.11*7)	
Applicable standards		EN 60947-5-7 / IEC 60825-1	EN 60947-5-2 / IEC 60825-1
Environmental resistance	Ambient temperature/humidity	-10 to +50°C (No freezing) / 35 to 85% RH (No condensation)	
	Ambient illuminance	Sunlight: 4,000 lx or less, Fluorescent lamp: 3,000 lx or less	
	Vibration resistance	10 to 55 Hz, double amplitude 1.5 mm, 2 hours in each of the XY and Z directions	
	Shock resistance	500 m/s ² (Approx. 50 G), 3 times in each of the XY and Z directions	
Degree of protection		IP67 (IEC 60529)	
Material		Housing: PC, Front cover: PMMA	
Weight (Incl. cable)		Cable type: 88 g, Pig tail type: 48 g	
Included accessories		Mounting bracket: BEF-WK-190, Mounting screws (M3 × 20 mm)	

*1 Connector type (M8, 4-pin) also available (Built to order).

*2 For black paper (6% reflectance), gray paper (18% reflectance), and white paper (90% reflectance).

*3 In accordance with the FDA provisions of Laser Notice No. 56, the laser is classified as Class 1 per the IEC 60825:2014 standards.

*4 Defined with 1/e² (13.5%) of the center strength at the maximum detection distance. The sensor may be affected by light leakage at spot sizes other than the default and when there is a highly reflective object close to the detection area.

*5 For analog output types, use a power supply voltage of 12.0 VDC or higher to obtain normal output.

*6 Not including control output load current. *7 Except for deviations pursuant to Laser Notice No.56.

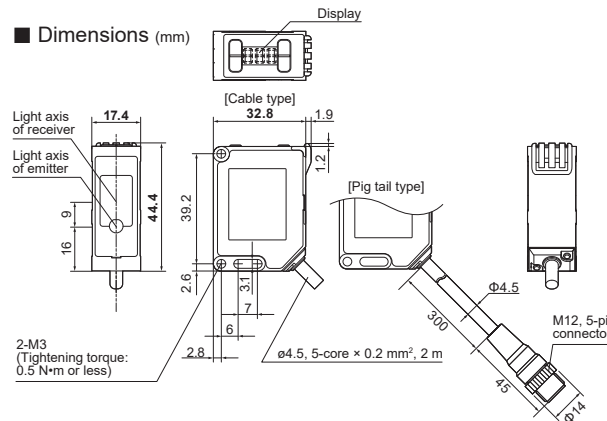
Options (Required for pig tail types)



Connector cable
DOL-1205-G02M
Cable length: 2 m

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

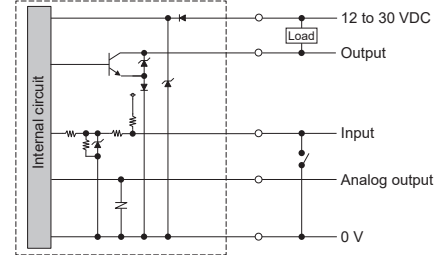
Dimensions (mm)



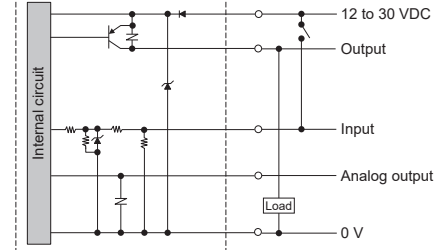
I/O Circuit Diagrams

Analog output type

Set to NPN



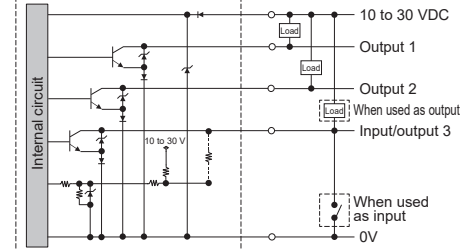
Set to PNP



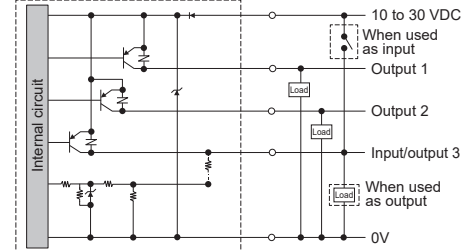
Cable type wiring color	Pig tail type pin No.
Brown: 12 to 30 VDC	① 12 to 30 VDC
Blue: 0 V	② Analog output
Black: Output	③ 0 V
White: Analog output	④ Output
Gray: External input	⑤ External input

Three-output type

Set to NPN



Set to PNP



Cable type wiring color	Pig tail type pin No.
Brown: 10 to 30 VDC	① 10 to 30 VDC
Blue: 0 V	② Output 2
Black: Output 1	③ 0 V
White: Output 2	④ Output 1
Gray: External input (Switchable to output 3)	⑤ External input (Switchable to output 3)

Attention: Not to be Used for Personnel Protection.

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do not include the self-checking redundant circuitry necessary to allow their use in personnel safety applications.

A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Please consult our distributors about safety products which meet OSHA, ANSI and IEC standards for personnel protection.

- Specifications are subject to change without prior notice.
- Specifications and technical information not mentioned here are written in Instruction Manual. Or visit our website for details.
- All the warnings and cautions to know prior to use are given in Instruction Manual.



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.

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.

Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 2, as described in Laser Notice No. 56, dated May 8, 2016.

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