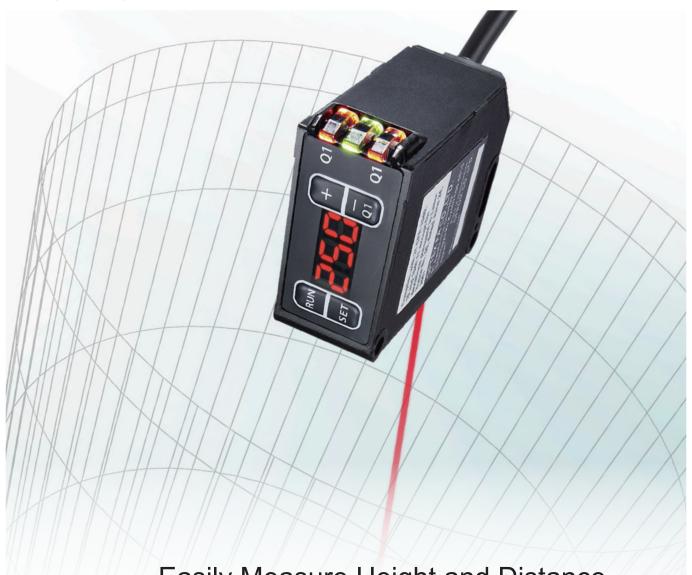


**Ultra-Compact Laser Distance Sensor** 

# **TOF-DL Series**

\*FASTUS is a product brand of Optex FA.



Easily Measure Height and Distance World's Smallest TOF Sensor

Built-in digital display for simple setup

# Measure from up to 2.5 m away.

"Visualize" distances with the TOF-DL compact sensor.



## Lineup

Туре	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)

## 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 Threshold (+) adjustment / Output 2 (Q2) selection button RUN button Threshold (-) adjustment / Output 1 (Q1) selection button SET / Output 3 (Q3) Selection button SET / Output 3 (Q3) Selection button Output 1 (Q1) selection button

## 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.



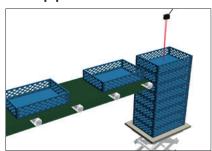
Indicators visible from any direction

# Class 1 Laser Light Source

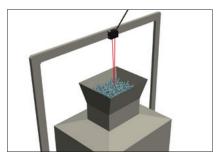
The Class 1 laser used in the TOF-DL Series opens the door to long-distance measuring at up to 2.5 m without sacrificing eye safety. In addition, the spot is clearly visible, making light axis alignments easy.



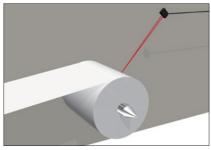
## Applications



Lifting platform lift amount measurement



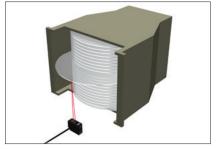
Measurement of material amount remaining in tank



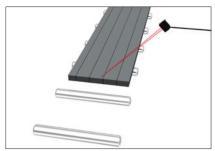
Measurement of remaining non-woven fabric amount



Sheet material loop control



Wafer protrusion detection in cassettes



Long-distance detection of building material

#### Specifications

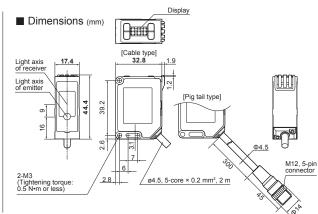
Туре		Analog output type	Three-output type		
Model*1	Cable type	TOF-DL250A	TOF-DL250T		
	Pig tail type	TOF-DL250AM12	TOF-DL250TM12		
Measurement range*2		0.25 to 2.5 m			
Light Medium/Wavelength		Red laser Diode (Wavelength:650nm)			
source Average output		390 μW or less			
Laser class		Class 1 (IEC/JIS/FDA*3)			
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	No. of outputs	1	3 (Output 3 available by switching external input)		
	Stability output	Output 1 switchable to stability output (Selectable by setting)			
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			
rtating	Current consumption	60 mA or less*6			
Applicable	EMC	EMC directive (2014/30/EU)			
regulations	RoHS	RoHS directive (2011/65/EU), China RoHS (Directive 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/s² (Approx. 50 G), 3 times in each of the XY and Z directions			
	Protection category	IEC standard, IP67			
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).
- $^{\star}2$  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. 50, the laser is classified as Class 1 per the IEC 60825-1:2007 and 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 Excluding differences per Laser Notice No. 50.



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

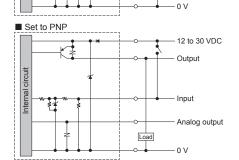
\*5 m and 10 m cables are available



#### ■ I/O Circuit Diagrams

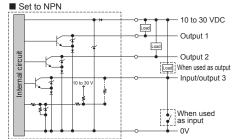
# Analog output type ■ Set to NPN 12 to 30 VDC

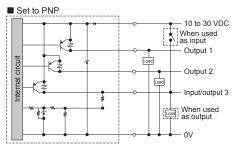
Analog output

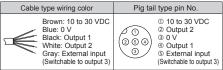


Cable type wiring color	Pig tail type pin No.	
Brown: 12 to 30 VD0 Blue: 0 V Black: Output White: Analog outpu Gray: External input	② ① ② Analog output ② ③ ④ ③ 0 V	

#### Three-output type







#### 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.

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91 Chudoji-Awata-cho Shimogyo-ku Kyoto 600-8815 JAPAN FAX. +81-75-325-2936 TEL. +81-75-325-1314 http://www.optex-fa.com