

Compact Time-Of-Flight Laser Sensor

TOF-DL Series

Object Detection in Long Distance

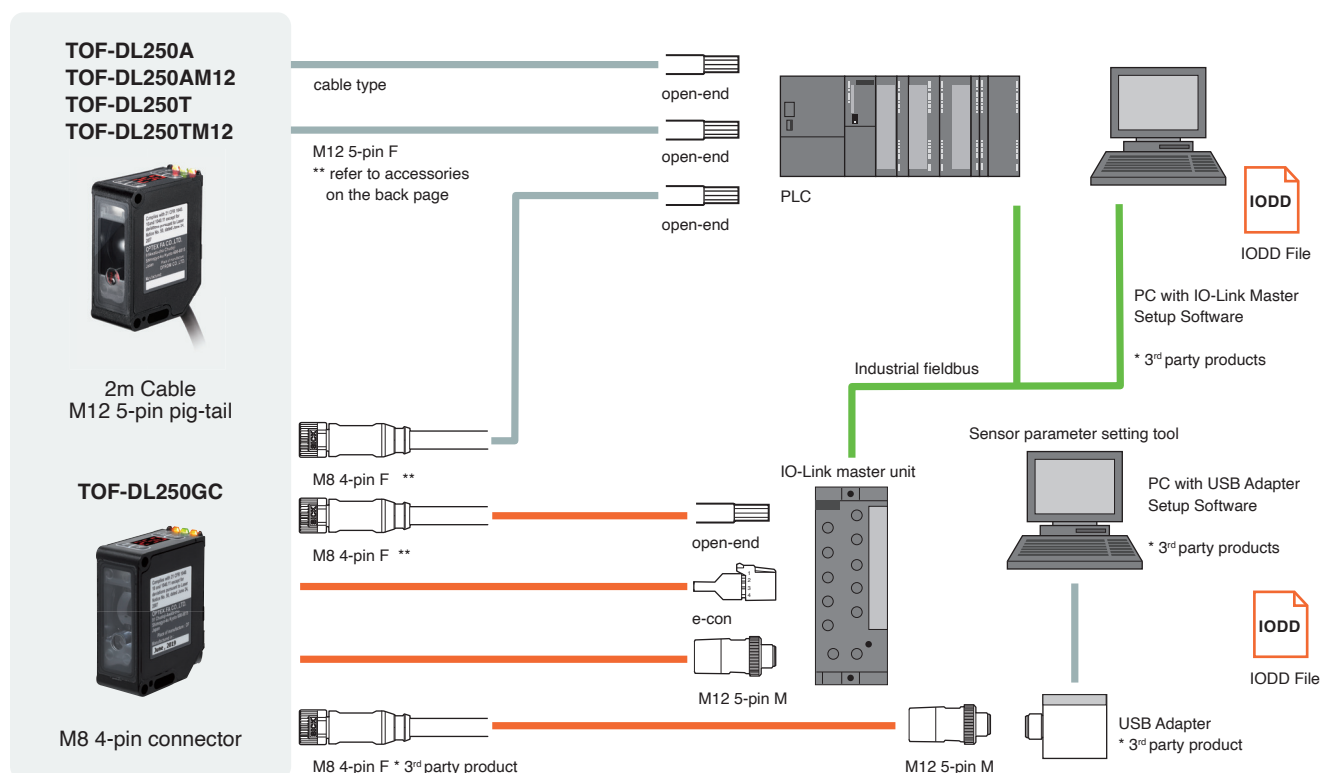
- IO-Link connection supported
- Measurement range: 0.25 to 2.5m
- The smallest TOF sensor in class
- Built-in digital display for simple setup



Photo: Cable type

Type	Measurement range	Laser class (IEC/FDA)	IO-Link	I/O	Connection type	Model
TOF		Class 1	✓	Control output x2 (External input)	M8 connector	TOF-DL250GC
			—	Analog output Control output External input	Cable	TOF-DL250A
					M12 pig-tail	TOF-DL250AM12
			—	Control output x3 (External input)	Cable	TOF-DL250T
					M12 pig-tail	TOF-DL250TM12

System structure



Specifications

Type		Analog output type		Three-output type		IO-Link type	
Model	Cable type		TOF-DL250A		TOF-DL250T		-
	M12 Pig-tail type		TOF-DL250AM12		TOF-DL250TM12		-
	M8 connector type		-		-		TOF-DL250GC
Measurement range * ¹			0.25 to 2.5 m				
Light source	Medium/Wavelength		Red semiconductor laser, 650 nm				
	Average output		390 μW or less				
Laser class			Class 1 (IEC/JIS/FDA * ²)				
Spot size * ³			φ10 mm (At a distance of 2.5 m)				
Sampling period / Response time			0.2 ms / 0.5 ms or less (When performing moving average once)				
Hysteresis			3% or less (Moving average: 64 times/256 times, Distance: 1 to 2.5 m)				
Sensitivity adjustment			Teaching + Manual adjustment				
Indicators			Output, Stability/Laser OFF		Output 1 to 3, Stability/Laser OFF		Detection 1 and 2 Power/IO-Link
Digital display			7-segment, 3-digit LED display (Display unit: cm)				
External input			Selectable by setting				
Control output	No. of outputs		1		3		2
	Type		NPN/PNP open collector				NPN/PNP, Push/Pull
	Max. current, Residual volt.		Max. 100 mA/30 VDC, 1.8 V Max.				
	Stability output		Output 1 switchable to stability output				-
	Output mode		Light ON / Dark ON selectable				Invertable
Analog output,IO-Link			4 to 20 mA (<300 Ω) or 0 to 10 V (<100 Ω), selectable		-		Ver. 1.1, COM 3 (230.4 kbps), P-data length: 4 byte, Min. cycle time: 1.0 ms
Supply voltage (Including 10% ripple (p-p))			12 to 30 VDC * ⁴		10 to 30 VDC		IO-Link: 18 to 30 VDC SIO: 10 to 30 VDC
Current consumption			60 mA or less * ⁵				
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* ⁶)				
Applicable standards			EN 60947-5-2 / IEC 60825-1				
NRTL certifications			UL Recognized Components Proximity Switch Certified for US and Canada			UL Listed Proximity Switch Certified for US and Canada	
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				
Protection category			IP67 (IEC 60529)				
Material			Housing: PC, Front cover: PMMA				
Weight			Cable: 88 g, Pig-tail: 48 g				30 g
Included accessories			Mounting bracket: BEF-WK-190, Mounting screws (M3 x 20 mm)				

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

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

*3. 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.

*4. Use a power supply voltage of 12.0 VDC or higher to obtain normal output.

*5. Not including control output load current.

*6. Excluding differences per Laser Notice No. 56.

Wiring & pin assignments

M12 pig-tail type

Analog output type

Pin	Wire	Connection
①	Brown	12 to 30 VDC
②	White	Analog output
③	Blue	0 V
④	Black	Output
⑤	Gray	External input

Three-output type

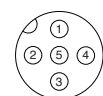
Pin	Wire	Connection
①	Brown	10 to 30 VDC
②	White	Output 2
③	Blue	0 V
④	Black	Output 1
⑤	Gray	External input/output 3

M8 connector type pin

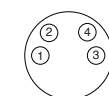
IO-Link type

Pin	Wire	Connection
①	Brown	10 to 30 VDC
②	White	Output 2/External input
③	Blue	0 V
④	Black	Output 1/IO-Link

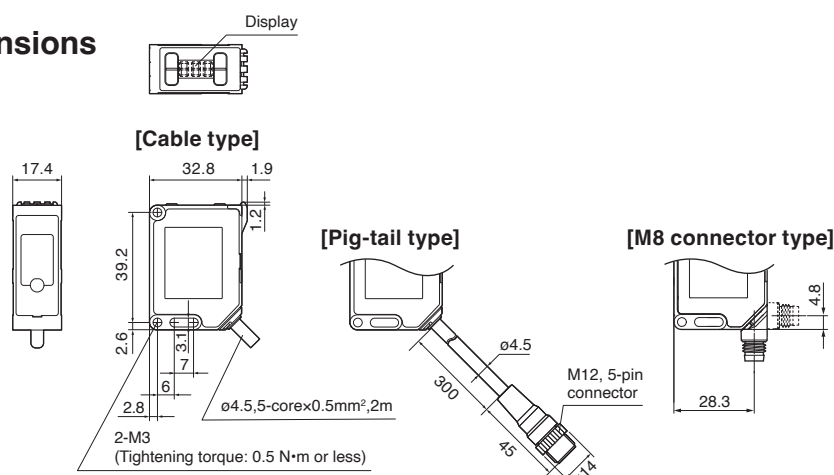
M12 pig-tail pin No.



M8 connector pin No.



Dimensions



Never use these products as sensing devices for personnel protection.

Doing so could lead to serious injury or death.

Before use please read an instruction manual.

• Specifications are subject to change without prior notice.



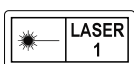
Notes for sensor usage

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-DL250□□



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