



Displacement Sensor
CD33-L SERIES
Specular Laser type

CD33-L30□□
CD33-L50□□

INSTRUCTION MANUAL

- Confirm if the item meets your needs.
- Before the use, you should first thoroughly read this manual and operate correctly as mentioned.
- You should keep this manual at hand for proper use.

Carefully read and understand the safety precautions before operation. The important information is provided to protect your health and property. Do not apply any other installing or operating procedure other than that

Meanings of Safety Symbol

WARNING Indicates a possible hazard that may result in death, serious injury, WARNINGS or serious property damage if the product is used without observing the stated instructions.

WARNING Mandatory Requirements

- The light source of this product applies the visible light semiconductor laser. Do not allow the laser beam to enter an eye, either directly or reflected from reflective object. If the laser beam enters an eye, it may cause blindness.
- Do not disassemble or modify the product since it is not designed to automatically stop the laser emission when open. Disassembling or modifying at customer's end it may cause personal injury, fire or electric shock.
- This product is not an explosion proof construction. Do not use the product under flammable, explosive gas or liquid environment.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WARNING Safety Precautions

- It is dangerous to wire or attach/remove the connector with the power on. Make sure to turn off the power before operation.
- Installing in the following places may result in malfunction:
 1. A dusty or steamy place
 2. A place generating corrosive gas
 3. A place directly receiving scattering water or oil.
 4. A place suffered from heavy vibration or impact.
- The product is not designed for outdoor use.
- Do not use the sensor in a transient state at power on (Approx. 15min. Warm up period)
- Do not wire with the high voltage cable or the power lines. Failure to do this will cause malfunction by induction or damage.
- Do not use the product in water.
- Operate within the rated range.
- Wipe off dirt on the emitting/receiving parts to maintain correct detection. Also, avoid direct impact on the product.

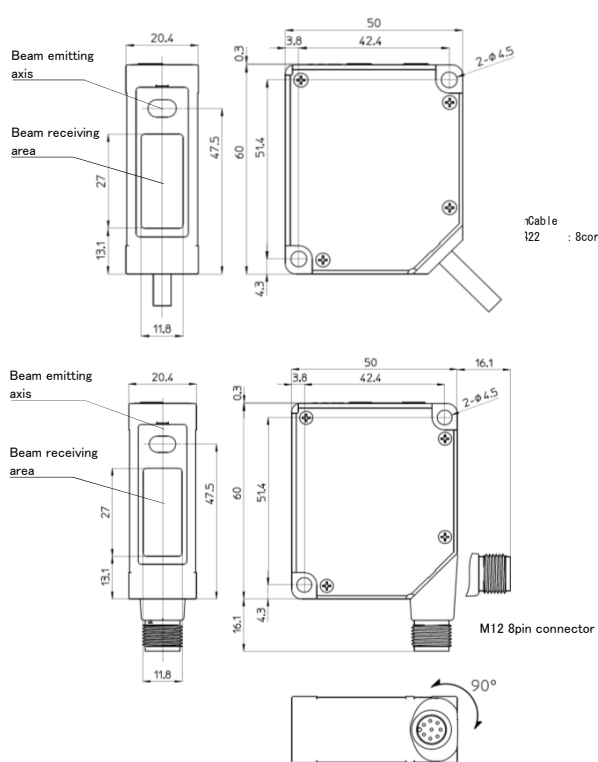
● This product cannot be used as a safety device to protect human body.

Specifications

● Specifications of Measuring Range				
Type	Cable type	CD33-L30N(P)	CD33-L50N(P)	CD33-L85N(P)
Center	Connector type	CD33-L30CN(P)	CD33-L50CN(P)	CD33-L85CN(P)
		26.3mm	47.3mm	82.9mm
Measuring range		±2mm	±5mm	±10mm
Light source		Red laser Diode (wave length 655nm)		
Peak power		Max. output 390 μW		
Laser Class	IEC/JIS	CLASS I		
	FDA	CLASS II		
Spot size (approx. volume) *1	Near	0.15 × 0.15mm	0.15 × 0.15mm	0.15 × 0.15mm
	Middle	0.1 × 0.1mm	0.1 × 0.1mm	0.1 × 0.1mm
	Far	0.15 × 0.15mm	0.15 × 0.15mm	0.15 × 0.15mm
Linearity *2		±0.2% F.S. (F.S.=4mm)	±0.2% F.S. (F.S.=10mm)	±0.2% F.S. (F.S.=20mm)
	Resolution *3	1 μm	2.5 μm	5 μm
	Response time	Fast	averaging: 1 time 5ms max.	
	Standard	averaging: 16 times 12.5ms max.		
	High resolution	averaging: 64 times 36.5ms max.		
Sampling period		500 / 1000 / 1500 / 2000 μs		
Temperature Drift		±0.08% F.S./°C		
Indicators	Distance Indicator	Bar graph LED		
	Output Indicator	ON status : Orange		
MF (multi functional) input		Laser off, Remote teaching, Sample Hold (choose one function) Response time : 3ms max.		
Circuit protection		Reverse polarity, Over current		
Protection Category		IP67		
Operating temp./humidity		-10~+45°C/35~85%RH (No condensation or freezing)		
Storage temp./humidity		-20~+60°C/35~95%RH (No condensation or freezing)		
Ambient Light		Sun light: 10,000 lx max. / Incandescent lamp: 3,000 lx max.		
Vibration resistance		10 to 55 Hz, Double amplitude 1.5 mm, 2 h for XYZ axes		
Shock resistance		50G (500m/s ²)		
Warm up period		15min max.		
Material		PBT (Case) PMMA (Front window)		
Weight	Cable type	Approx. 65g (without cable)		
	Connector type	Approx. 70g		

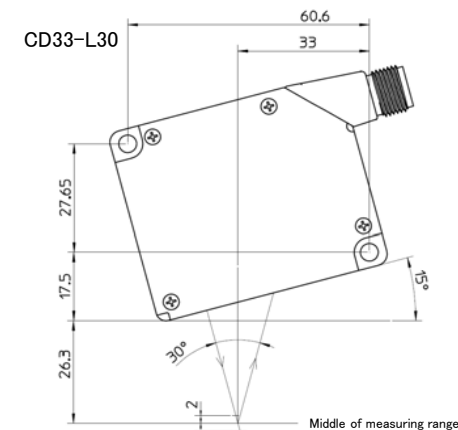
*1 Defined with center strength 1/e²(13.5%). There may be leak light other than the specified spot size. The sensor may be damaged when there is a highly reflective object around the targets.
*2 Averaging: 64(High resolution), Sampling period: 500 μs. Object: white ceramic.
*3 Middle of measuring range, Object: white ceramic.
*4 Diameter of min bend cable is 40mm.

Dimension

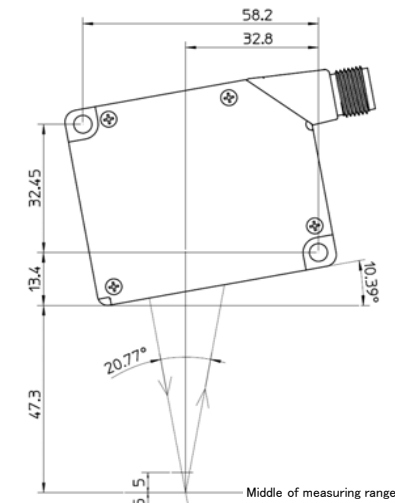


Installation

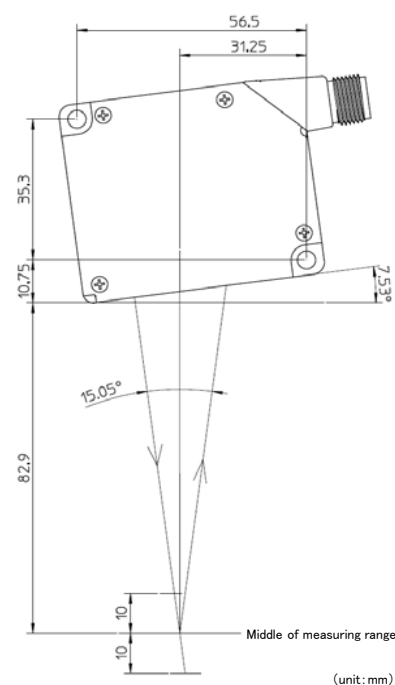
Install the sensor and adjust the light spot onto the measuring point so that the distance indicator turns ON (orange) at the middle of measuring range. Use M4 screw (tightening torque need to be under 0.8N·m).



CD33-L50



CD33-L85



Functions

Functions	Functions indicated	Details	Settings and Adjustments	Factory Setting
Output setting	Q1 Q2	<p>set the range of Control Output.</p> <p>One point teaching : From the position of the teaching - 0.15%(FS) to the Near side of the sensing range.</p> <p>Two points teaching : Between the position of the first point teaching +0.15%(FS) and the position of the second point teaching -0.15%(FS).</p> <p>One point reverse teaching : From the position of the teaching +0.15%(FS) to the Far side of the sensing range.</p>	<p>● One point teaching</p> <ol style="list-style-type: none"> 1. Push the Select button more than five seconds to enter Teach mode. 2. Push the Select button and let Q1(Q2) indication turn on. 3. Set up the object in the position that you want to measure and push the Set button. 4. Q1(Q2) indication flashes one time. <p>In the case of adjustment failure, indication flashes for five seconds. Try again getting back to ② of above.</p> <p>● Two points teaching</p> <ol style="list-style-type: none"> 1. Push the Select button more than five seconds to enter Teach mode. 2. Push the Select button and let Q1(Q2) indication turn on. 3. Set up the object at the first point of the range that you want to measure and push the Set button. 4. Q1(Q2) indication flashes one time. In the case of adjustment failure, the indication flashes for five seconds. Try again getting back to ② of above. 5. Q1(Q2) which you Set up the object to the second point you want to measure, and push the Set button. Q1(Q2) indication flashes two times. In the case of the adjustment failure that the indication flashes for five seconds. Try again getting back to ② of above. 6. Push the Select button more than five seconds to return to Run mode. <p>● One point Reverse teaching</p> <ol style="list-style-type: none"> 1. Push the Select button more than five seconds to enter Teach mode. 2. Push the Select button and let Q1(Q2) indication turn on. 3. Set the object in the position that you want to measure and push the Set button more than five seconds. 4. Q1(Q2) indication flashes one time. 5. In the case of adjustment failure, the indication flashes five seconds. Try again getting back to ② of above. 6. Push the Select button more than five seconds to return to Run mode. 	The output in the measurement range & Self-diagnosis *1
External input	MF	<p>Select the function of the external input.</p> <p> Blink Once : Laser OFF Blink twice : Remote teaching Blink three times : Sample Hold </p> <p>*Possible to choose One Shot Trigger by Special setting mode.</p>	<ol style="list-style-type: none"> 1. Push the Select button more than five seconds to enter Teach mode. 2. Push the Select button and let MF indication turn on. 3. Choose the function you need by pushing Set button. 4. Push the Select button more than five seconds to return to Run mode. 	Laser OFF
Averaging	Avg	<p>Average count setting</p> <p> Blink Once : Fast (averaging 1 time) Blink twice : Standard (averaging 16 times) Blink three times : High Res. (averaging 64 times) </p>	<ol style="list-style-type: none"> 1. Push the Select button more than five seconds to enter Teach mode. 2. Push the Select button and let Avg. indication turn on. 3. Choose the function by pushing Set button. 4. Push the Select button more than five seconds to return to Run mode. 	averaging: 16

Special setting mode function

Functions	Functions indicated	Details	Settings and Adjustments	Factory Setting
Measurement settings	Q2	<p>This setting is choice of measurement peak at receiver.</p> <p> On : measures the 2nd peak Blink Once : measures higher peak Blink twice : measures the 1st peak Blink three times : measures distance between 2 peaks </p>	<ol style="list-style-type: none"> 1. Push the Select and set button at same time for more than five seconds to enter Special setting mode 2. Push the Select button and let MF indication turn on. 3. Choose the function by pushing Set button. 4. Push the Select and set button more than five seconds to return to Run mode. 	measures higher peak
One shot trigger	MF	<p>One shot trigger is possible to select through external input.</p> <p> On : One shot trigger Blink Once : Laser OFF Blink twice : Remote teaching Blink three times : Sample Hold </p>	<ol style="list-style-type: none"> 1. Push the Select and set button at same time for more than five seconds to enter Special setting mode 2. Push the Select button and let MF indication turn on. 3. Choose the function by pushing Set button. 4. Push the Select and set button more than five seconds to return to Run mode. 	Laser OFF
Sampling period	Avg	<p>Sampling period setting</p> <p> Blink Once : 500 μs Blink twice : 1000 μs Blink three times : 1500 μs On : 2000 μs </p> <p>High response ↑ High sensitivity ↓</p> <p>Shorter sampling period increases the response and longer sampling period enhances the sensitivity.</p>	<ol style="list-style-type: none"> 1. Push the Select button more than five seconds to enter Teach mode. 2. Push the Select button and let Avg. indication turn on. 3. Choose the function by pushing Set button. 4. Push the Select and set button more than five seconds to return to Run mode. 	500 μs

(Remarks)
When the Teach mode / special setting mode it returns to RUN if no operation is given for 60 seconds.
*1 Self-diagnosis output comes at the time of (1) laser stop (2) saturation by mirror-like object or (3) low sensitivity.
This function does not work when you set the output of Q2. Reset the product when you want to use self-diagnosis again.

Precautions for using laser

■ Laser label
This product is classified as Class I by JIS C6802/IEC and Class II by FDA Laser Product Laser Safety Standard.

● Regulations in the USA
When exporting laser devices to the USA, the USA laser control, FDA (Food and Drug Administration) is applied. This product has been already reported to CDRH (Center for Devices and Radiological Health). For details, contact our customer service.

