

**OPTEX FA**

Displacement Sensor  
**CD33 SERIES** Laser type

CD33-30      CD33-120  
CD33-50  
CD33-85

**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 described in this manual.

**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 time)

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.

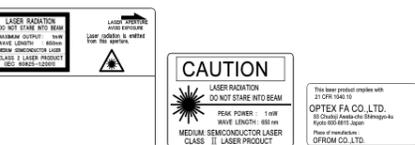
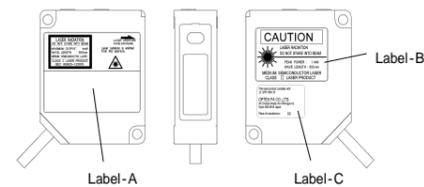
Wipe off dirt on the emitting/receiving parts to maintain correct detection. Also, avoid direct impact on the product.

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

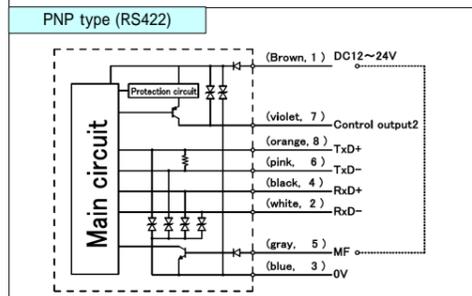
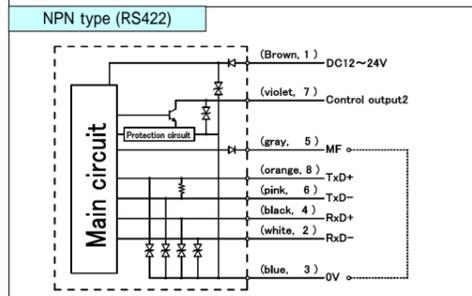
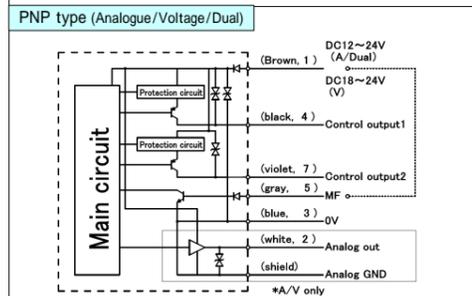
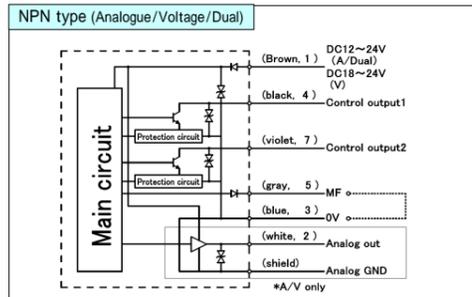
**Precautions for using laser**

Laser label  
This product is classified as Class 2 ( ) Laser Product by JIS C6802/IEC/FDA Laser Safety Standard.

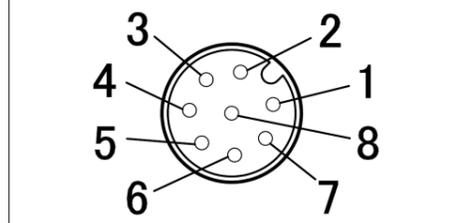
Regulations in the USA  
When exporting laser devices to the USA, the USA laser control, FDA (Food and Drug Administration) is applied. This product has been already reported to CDRH (Center for Devices and Radiological Health). For details, contact our customer service.



**Connection diagram**



**Pins configuration**



**Caution for connection**

Analog ground wire is not equipped for connector type. Therefore connect the analog ground terminal of analog input equipment and the 0V terminal of power supply.

- 1) Connect the lead wires correctly. The analog output wire must not be in contact with any other wire. Do not turn on the power while wiring.
- 2) The blue wire (0V) and shield wire (analog GND) are internally connected. Use the blue wire (0V) for the power supply and use the shield wire (analog GND) for analog output.

**Specifications**

**Specifications of Measuring Range**

Type	Cable type	CD33-30N(P)	CD33-50N(P)	CD33-85N(P)	CD33-120N(P)
Type	CD33-30NA(PA)	CD33-50NA(PA)	CD33-85NA(PA)	CD33-120NA(PA)	
	CD33-30NV(PV)	CD33-50NV(PV)	CD33-85NV(PV)	CD33-120NV(PV)	
Connector type	CD33-30N-422 (P-422)	CD33-50N-422 (P-422)	CD33-85N-422 (P-422)	CD33-120N-422 (P-422)	
	CD33-30CN(P)	CD33-50CN(P)	CD33-85CN(P)	CD33-120CN(P)	
Measuring Range	CD33-30CNA(PA)	CD33-50CNA(PA)	CD33-85CNA(PA)	CD33-120CNA(PA)	
	CD33-30CNV(PV)	CD33-50CNV(PV)	CD33-85CNV(PV)	CD33-120CNV(PV)	
Full scale	CD33-30CN-422 (P-422)	CD33-50CN-422 (P-422)	CD33-85CN-422 (P-422)	CD33-120CN-422 (P-422)	
Light Source		30 ± 4mm	50 ± 10mm	85 ± 20mm	120 ± 60mm
Peak Power		8mm	20mm	40mm	120mm
IEC/JIS CLASS		Red laser Diode (wave length 650nm)			
FDA CLASS		1mW max.			
Spot size (approx. volume)		CLASS2			
*1		CLASS			
Linearity*2	Near	0.15 × 0.15mm	0.6 × 1.2mm	0.9 × 1.5mm	1.2 × 1.8mm
Resolution*3	Middle	0.1 × 0.1mm	0.5 × 1.0mm	0.75 × 1.25mm	1.0 × 1.5mm
	Far	0.15 × 0.15mm	0.4 × 0.9mm	0.6 × 1.0mm	0.5 × 0.8mm
		± 0.1% F.S.			
Temperature Drift		± 0.08%F.S./			
Response Time*3	Fast	1ms+ selecting sensitivity (averaging: 1)			
	Standard	8.5ms+ selecting sensitivity (averaging: 16)			
	High resolution	32.5ms+ selecting sensitivity (averaging: 64)			
Indicators	Selecting sensitivity	4ms max.			
Distance Indicator		bar graph LED			
Output Indicator		ON status : Orange			
Protection Category		IP67			
Operating temp./humidity		-10 ~ +45 /35 ~ 85%RH (No condensation or freezing)			
Storage temp./humidity		-20 ~ +60 /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 <sup>2</sup> )			
Material		PBT (Case) PMMA (Front window)			
Weight	Cable type	approx.65g (without cable)			
	Connector type	approx.70g			

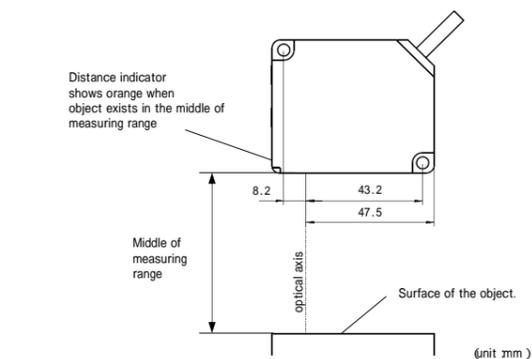
**Specifications of Output**

Type	Dual output	Analogue	Voltage	RS422
	CD33-	CD33-	CD33-	CD33-
Supply Voltage	DC12..24V (-5%,+10%)		DC18..24V (-5%,+10%)	DC12..24V (-5%,+10%)
Current Consumption	max.75mA (DC24V)	max.80mA (DC24V) including analog output value		max.75mA (DC24V)
Outputs	Control output1	NPN/PNP open collector 100mA max. /30V DC (residual voltage Max. 1.8 V)		-
	Control output2	NPN/PNP open collector 100mA max. /30V DC (residual voltage Max. 1.8 V)		-
	Analog output	-	4-20mA	0-10V
Interface	RS422			
Connection	Cable type*4	5 Score 2m cable(PVC) AWG24	5 6core 2m cable(PVC) AWG24	5 Score 2m cable(PVC) AWG24
	Connector type	M12 8pin		

\*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), Object: white ceramic.  
\*3 Middle of measuring range, Object: white ceramic.  
\*4 Response Time : response time plus selecting sensitivity time.  
\*5 Diameter of min bend cable is 40mm

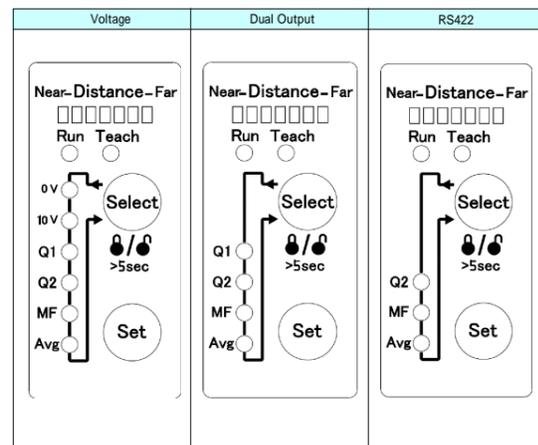
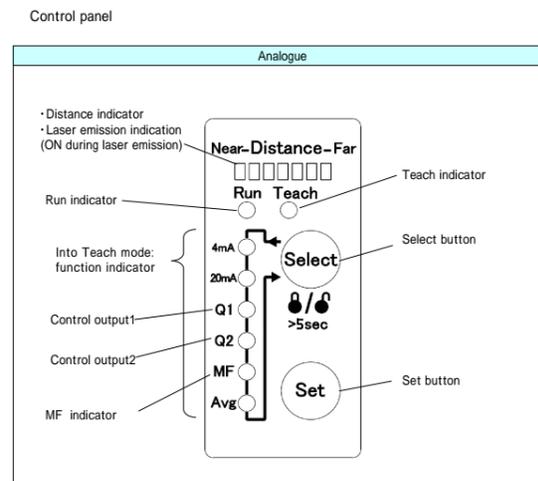
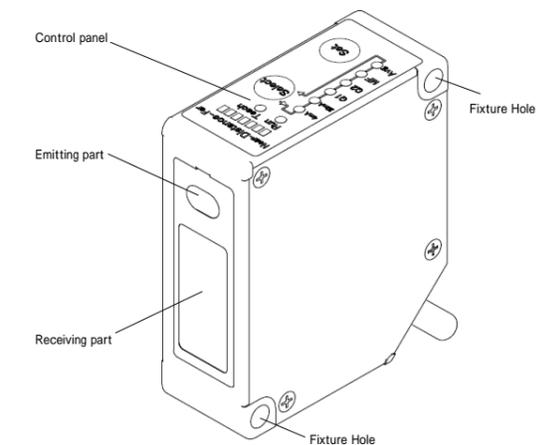
**Installation**

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).



\*Adjust the sensor position so that it is set parallel to the surface of object obtain reliable measurement (see above). If there is any foreign object around the spot that is glossier than the measuring object, it may cause incorrect measurement.

**Functions of components**

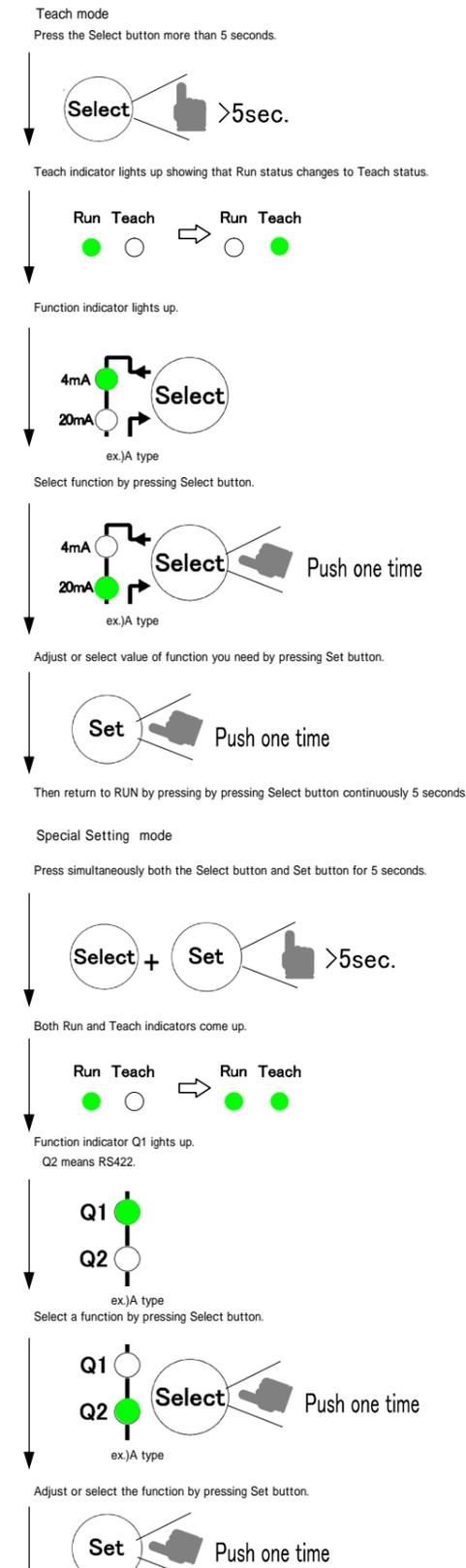


**Distance indicator**

Distance indicator has seven LEDs. LED indicate distance by moving at near to far side.

Status of LED	Status of measurement	Indicator
<b>Near-Distance-Far</b> [Red LEDs lit]	Out of range. *This LED indicate when due to too high/low reflection	Both side of red LED lights up
[Red LED lit]	Object is near of range.	Near side of red LED lights up
[Green LED lit]	Object is far of range.	Far side of red LED lights up
[Green LEDs lit]	Object is some far of range.	Far side of green LED lights up
[Orange LED lit]	Object is middle of range.	Middle of orange LED lights up

**Select Function**



**Reset the presets**

Turn on the power by pressing Select button and Set button at the same time and keeping them pushed continuously 5 seconds. Then make sure if all the indicator blinks 3 times to confirm cancel of all presets.

