

# Edge Position Measurement for Any Workpiece



Suitable for  
edge measurement  
and width/gap  
measurement

Light axis alignment  
function for  
easy installation

Easily readable  
amplifier unit  
Sold separately: CDA-DM2

**OPTEX FA CO., LTD.**

# Edge Measurement

The TD1 Series is ideal for equipment where edge control is required, such as for measurement of the end surfaces of components or sheet materials.



Measurement range  
10 mm

Measurement even at  
up to 300 mm between heads

Through-beam edge sensor TD1 Series devices use a CMOS sensor as the light receiving element, allowing for highly accurate edge position measurement of end surfaces.

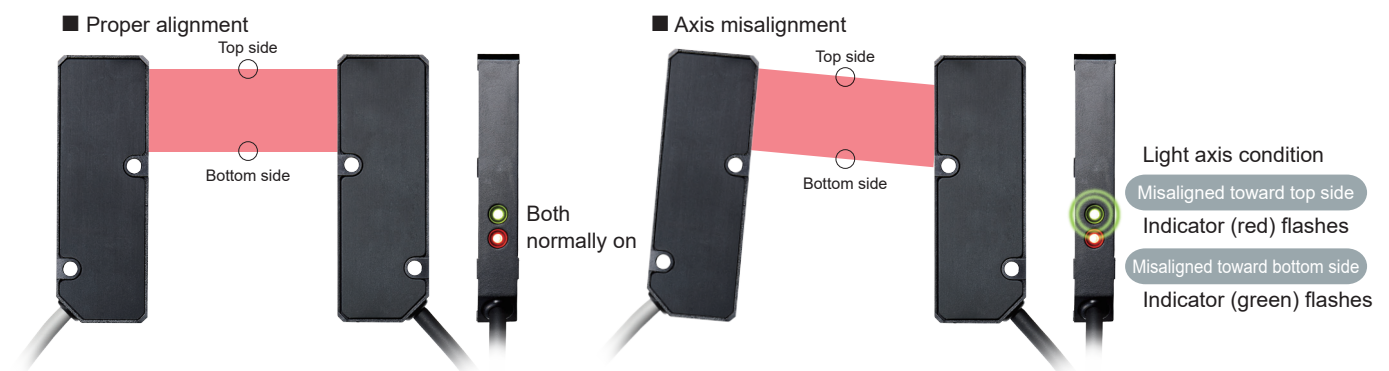
Repeatability  
 $\pm 4 \mu\text{m}$

Linearity  
 $\pm 0.4\%$   
of F.S.

## Easy Light Axis Alignment

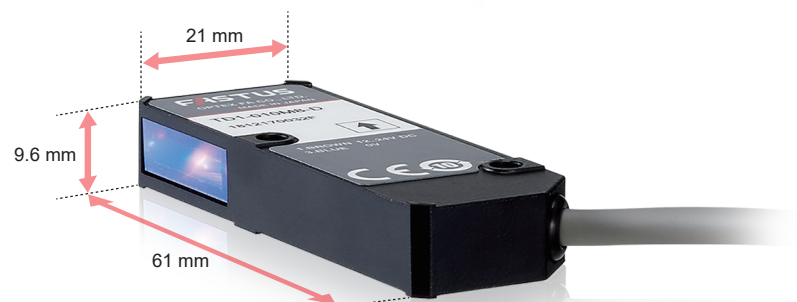
In Direction Checking mode, the indicator will flash when the light axis is misaligned, notifying that the alignment should be checked.

This makes it easier to check the light axis when installing sensors or during periodic maintenance.



## Compact Design

The compact size of the sensor head allows for easy installation even for devices with limited space. This makes it possible to keep equipment as small as possible.

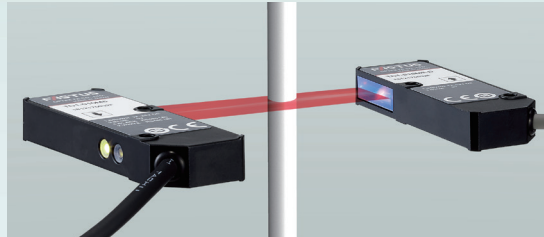




# Width/Gap Measurement

The measurement method used in a TD1 Series product can be changed to suit the inspection application, such as when measuring the width of small electronic components or the gaps between rollers.

■ Width measurement



■ Gap measurement



Displacement sensor amplifier unit

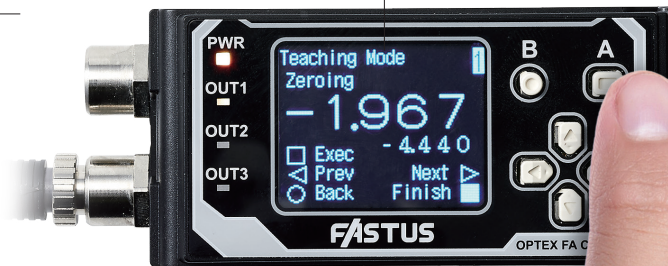
## CDA Series

CDA-DM2

Features an organic EL display that can display clearly in both Japanese and English. Calculations can be performed with up to two TD1 Series units.

[Actual size]

Easily readable display



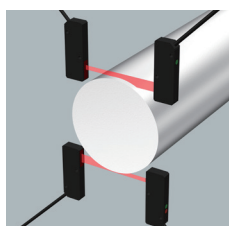
One-touch detection target position teaching

## Simple Teaching Mode

When teaching, the edge center position can be set as desired within the measurement range. Simply place the measurement target and press the button.

## Calculation Function

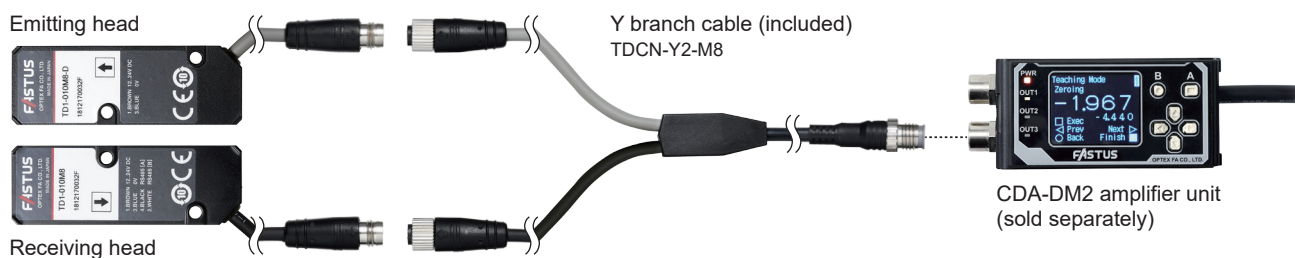
Connecting two TD1 Series units enables measurement of workpieces with outer diameters of 10 mm or more.



Cylindrical workpiece outer diameter measurement



# System Configuration Diagram



- Up to two units per amplifier

## Options/Accessories

### ■ Amplifier unit

- CDA-DM2 Dual analog output type

**NEW**



### ■ Sensor-to-amplifier extension cable

- DSL-0804-G02M Cable length: 2 m, robot cable specification
- DSL-0804-G05M Cable length: 5 m, robot cable specification



- Ensure that the cable length when using a CDA Series amplifier unit is within 10 m.

## Specifications

### ■ Sensor head

| Model                    |                              | TD1-010M8                                                                                               |
|--------------------------|------------------------------|---------------------------------------------------------------------------------------------------------|
| Measurement range        |                              | Edge: $\pm 5$ mm, width: 10 mm                                                                          |
| Distance between heads   |                              | Max. 300 mm                                                                                             |
| Light source             | Medium (Wavelength)          | Red semiconductor laser (Wavelength: 660 nm)                                                            |
|                          | Maximum output               | 390 $\mu$ W                                                                                             |
| Laser class              |                              | Class 1 (IEC/JIS) / Class I (FDA)*1                                                                     |
| Spot size                |                              | 3 $\times$ 14 mm                                                                                        |
| Linearity                |                              | With a distance between heads of 100 mm: $\pm 0.4\%$ of F.S. ( $\pm 40$ $\mu$ m)                        |
| Repeatability*2          |                              | $\pm 4$ $\mu$ m                                                                                         |
| Sampling period          |                              | 500 $\mu$ s                                                                                             |
| Temperature drift        |                              | $\pm 0.02\%$ of F.S./ $^{\circ}$ C                                                                      |
| Indicators               |                              | [Emitting head] Power indicator: Green<br>[Receiving head] Power indicator: Green, Alarm indicator: Red |
| Serial interface         |                              | RS-485                                                                                                  |
| Supply voltage           |                              | 12 to 24 VDC $\pm 10\%$                                                                                 |
| Current consumption      |                              | Emitting head: 20 mA or less (at 12 VDC)<br>Receiving head: 80 mA or less (at 12 VDC)                   |
| Connection type          |                              | Pig tail type: Cable with M8, 4-pin connector, 300 mm length                                            |
| Environmental resistance | Ambient temperature/humidity | -10 to $+50^{\circ}$ C / 35 to 85% RH (no freezing or condensation)                                     |
|                          | Storage temperature/humidity | -20 to $+60^{\circ}$ C / 35 to 85% RH (no freezing or condensation)                                     |
|                          | Ambient illuminance          | Sunlight: 10,000 lx or less, Incandescent lamp: 3,000 lx or less                                        |
|                          | Vibration resistance         | 10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions                     |
|                          | Shock resistance             | Approx. 50 G (500 m/s <sup>2</sup> ), 3 times in each of the X, Y, and Z directions                     |
|                          | Protection circuit           | Reverse connection protection                                                                           |
|                          | Degree of protection         | IP50 (IEC 60529)                                                                                        |
|                          | EMC                          | EMC directive (2014/30/EU)                                                                              |
| Applicable regulations   | Environment                  | RoHS directive (2011/65/EU), China RoHS (MIIT Order No. 32)                                             |
|                          | Safety                       | FDA regulations (21 CFR 1040.10 and 1040.11)*3                                                          |
| Applicable standards     |                              | EN60947-5-2                                                                                             |
| NRTL Certification       |                              | Recognized Components Proximity Switch Certified for US and Canada.                                     |
| Material                 |                              | Housing: Aluminum die cast, Emitting/receiving part: Glass                                              |
| Weight                   |                              | Emitting head, receiving head: 30 g each (including 300 mm connector cable)                             |

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

\*2 With an averaging count of one.

\*3 Except for deviations pursuant to Laser Notice No.56.

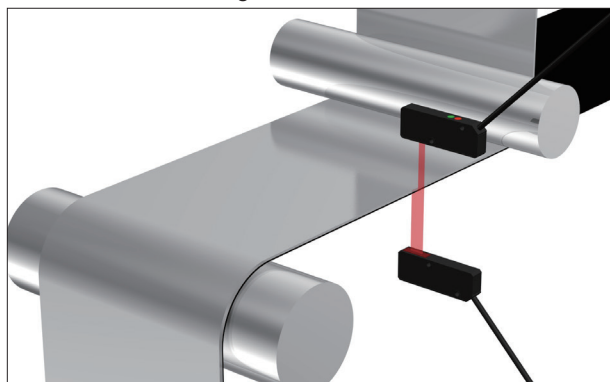
### ■ Amplifier unit

| Type                     |                              | Dual analog output                                                                                        |
|--------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------|
| Model                    |                              | CDA-DM2                                                                                                   |
| Sensor head              | No. of connectable units     | Max. 2 units                                                                                              |
|                          | Connection type              | Amplifier side: M8, 4-pin connector                                                                       |
| Display                  | Dot matrix display           | Organic EL panel, 128 $\times$ 96 pixels                                                                  |
|                          | Indicators                   | Power indicator: Red/Green, Output indicator: Orange                                                      |
| Supply voltage           |                              | 12 to 24 VDC $\pm 10\%$ , including 10% ripple (p-p)                                                      |
| Current consumption      |                              | 120 mA or less (at 12 V)*1                                                                                |
| Analog output            | No. of outputs               | 2 outputs                                                                                                 |
|                          | Type                         | 4 to 20 mA/F.S. Load impedance 300 $\Omega$ or less, 0 to 10 V output impedance 100 $\Omega$ (switchable) |
| Control output           | No. of outputs               | 2 outputs                                                                                                 |
|                          | Type                         | NPN/PNP open collector (switchable), Max. 100 mA / 30 VDC, Residual voltage: 1.8 V or less                |
| External input           |                              | 1 input                                                                                                   |
| Connection type          |                              | Cable type: Cable: 2 m ( $\phi 5.8$ )                                                                     |
| Environmental resistance | Ambient temperature/humidity | -20 to $+50^{\circ}$ C / 35 to 85% RH (no freezing or condensation)                                       |
|                          | Storage temperature/humidity | -20 to $+60^{\circ}$ C / 35 to 85% RH (no freezing or condensation)                                       |
|                          | Vibration resistance         | 10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions                       |
|                          | Shock resistance             | Approx. 50 G (500 m/s <sup>2</sup> ), 3 times in each of the X, Y, and Z directions                       |
|                          | Protection circuit           | Reverse connection protection, overcurrent protection                                                     |
|                          | Degree of protection         | IP50 (IEC 60529)                                                                                          |
| Applicable regulations   | EMC                          | EMC directive (2014/30/EU)                                                                                |
|                          | Environment                  | RoHS directive (2011/65/EU), China RoHS (MIIT Order No. 32)                                               |
| Applicable standards     |                              | EN 60947-5-2                                                                                              |
| NRTL Certification       |                              | Recognized Components Proximity Switch Certified for US and Canada.                                       |
| Material                 |                              | Housing: Polycarbonate                                                                                    |
| Weight                   |                              | 170 g                                                                                                     |

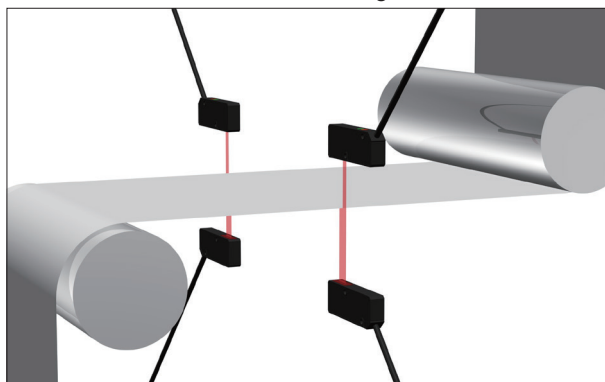
\*1 Does not include current supplied to any connected sensor head or expansion unit.

# Applications

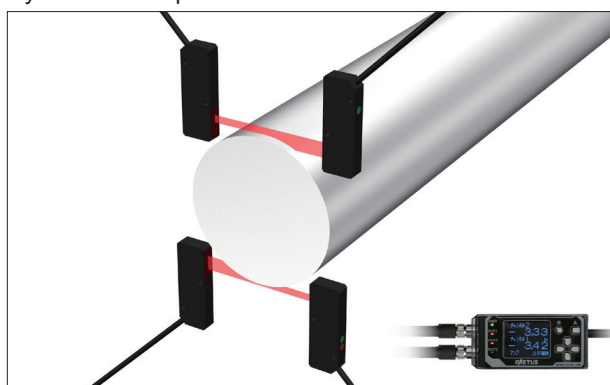
Sheet material winding control



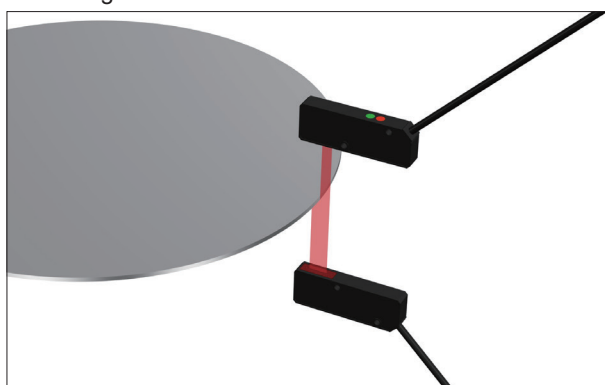
Sheet material meander control/edge measurement



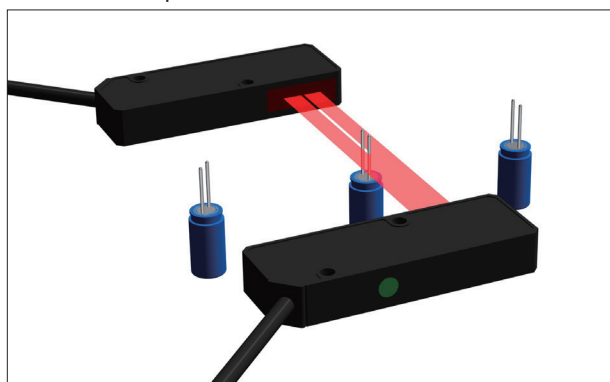
Cylindrical workpiece outer diameter measurement



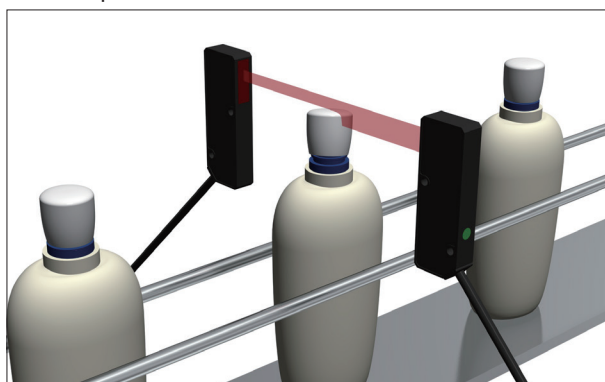
Wafer alignment



Electronic component orientation identification



Bottle cap float detection



## 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.

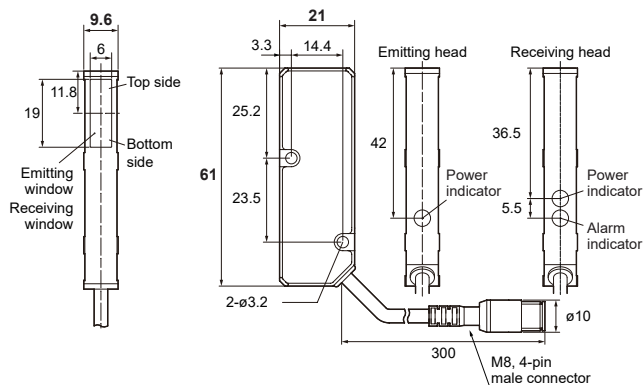


TD1-010M8

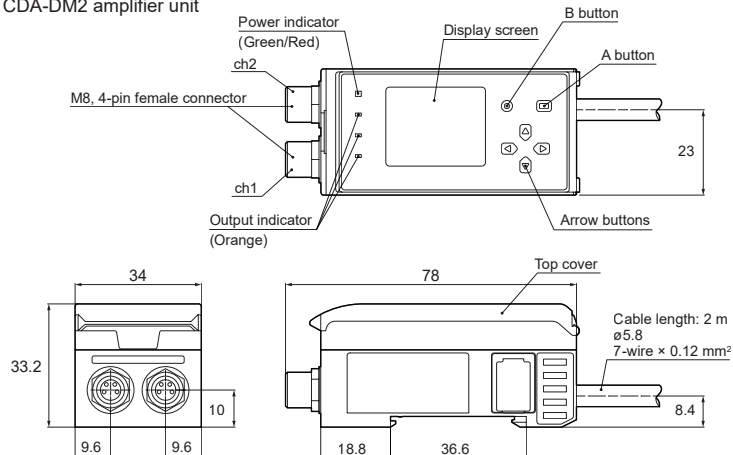


## Dimensions (Unit: mm)

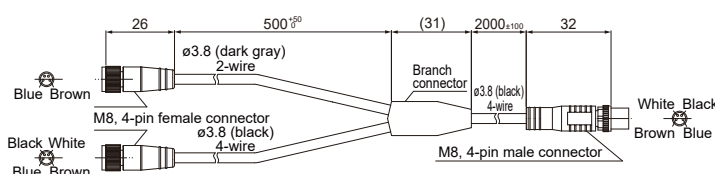
■ TD1 Series



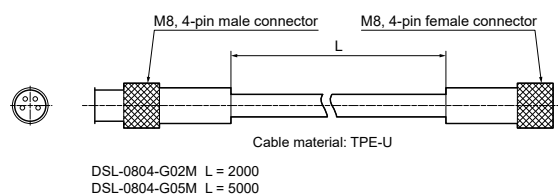
■ CDA-DM2 amplifier unit



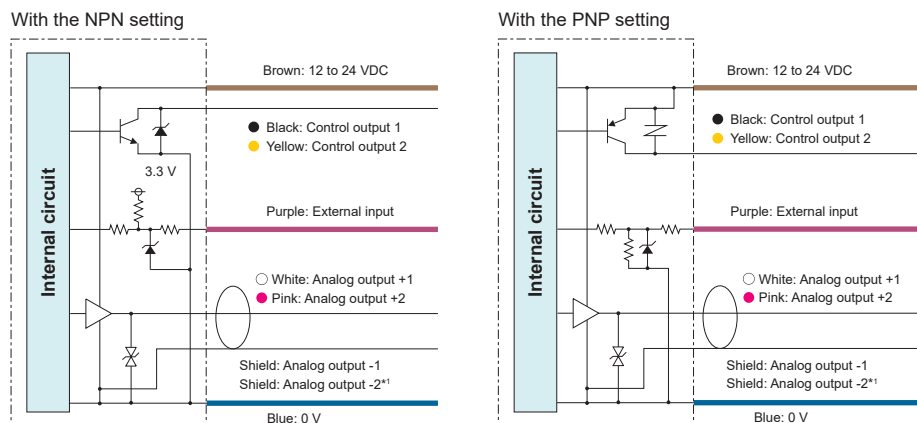
■ TDCN-Y2-M8 Y branch cable



■ DSL-0804-G02M / DSL-0804-G05M sensor-to-amplifier extension cable



## I/O Circuit Diagram (CDA-DM2 amplifier unit)



\*1 Use shielded cables for analog output (+) and analog output (-), and wire as a pair up to the analog input device.

**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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