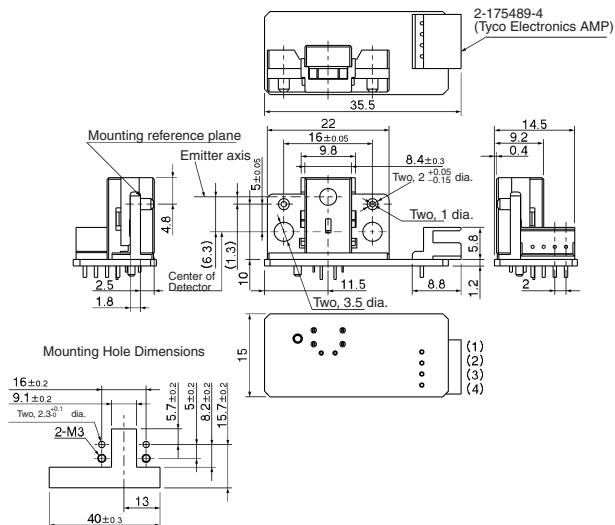


# Micro-displacement Sensor Z4D-B01

## ■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



Recommended Mating Connectors:  
Tyco Electronics AMP

- 175778-4 (crimp connector)
- 173977-4 (press-fit connector)

## ■ Features

- Easier control enabled by built-in processor circuit.
- Resolution: ±10 μm.
- Operating area: 6.5±1 mm.
- Adapts well to changes in reflection factor using division processing.

Pin no.	Remarks
1	PLS
2	V <sub>CC</sub>
3	OUT
4	GND

Unless otherwise specified, the tolerances are as shown below.

Dimensions	Tolerance
3 mm max.	±0.3
3 < mm ≤ 6	±0.375
6 < mm ≤ 10	±0.45
10 < mm ≤ 18	±0.55
18 < mm ≤ 30	±0.65
30 < mm ≤ 50	±0.8

## ■ Ordering Information

Description	Model
Micro-displacement sensor	Z4D-B01

## ■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Value	Unit	Remarks
Supply voltage	V <sub>CC</sub>	7	VDC	---
LED pulse light emission control signal	PLS	7	VDC	LED
LED light emission pulse	t <sub>FP</sub>	100	ms	---
Operating temperature	T <sub>opr</sub>	-10 to 65	°C	No icing or condensation
Storage temperature	T <sub>stg</sub>	-25 to 80	°C	---

## ■ Electrical and Optical Characteristics (Ta = -10°C to 65°C)

Item	Symbol	Rated value	Remarks
Supply voltage	V <sub>CC</sub>	5 VDC±10%	Ripple (p-p): 10 mV p-p max.
Output voltage	OUT	0.2 VDC to (V <sub>CC</sub> -0.3) V	(see note 1)
Response time	t <sub>r</sub>	100 μs max.	(see note 2)
LED pulse light emission control signal	PLS	3.5 VDC to V <sub>CC</sub>	(see note 3)

- Note: 1. Load impedance (between OUT-GND) is set at more than 10 kΩ.  
 2. The time for output voltage to rise from 10% to 90% of the full output range.  
 3. Apply the voltage ranging from 3.5 V to V<sub>CC</sub> on the LED pulse light emission control signal terminal. In this case, a maximum of 2 mA (TYP 1 mA) current is sunk.

■ Characteristics (Ta = -10°C to 65°C)

Object: N8.5 Munsell paper with a reflection factor of 70%.

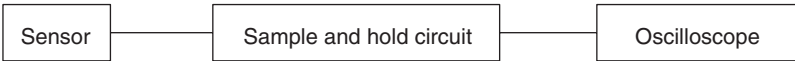
Item	Value
Operating area (see note 1)	6.5 ±1 mm
Sensitivity variation (see note 2)	-1.4 mV/μm ±10% max.
Resolution (see note 3)	±10 μm max. (Ta = 25°C)
Linearity (see note 4)	2% F.S. (full scale) max.

- Note:**
- Distance from the mounting reference plane.
  - “Sensitivity” is defined as “inclination of divided output line” and the variation value between individual products of fluctuating divided output voltage per unit length.

$$\text{Sensitivity} = \frac{V_2 - V_0}{2000} \quad (\text{mV/mm})$$

Where V0: Output voltage when d = 5.5 mm  
 V2: Output voltage when d = 7.5 mm  
 d: Distance from reference mounting plane to an object.

- Value of electrical noise range of divided output signal converted to distance under the following conditions.



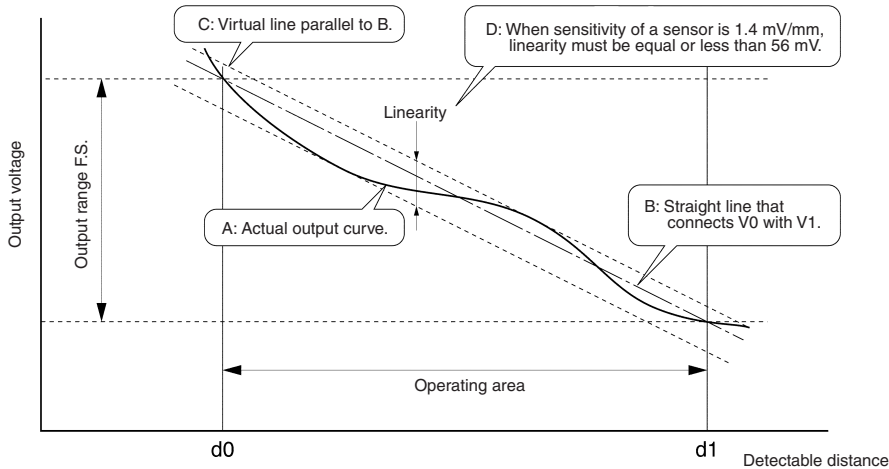
- Ripple noise of power supply: 10 mV p-p max.
- Sampling time of the sample and hold circuit: 50 μsec
- Distance to object: Distance from the reference mounting plane is 6.5 mm ±1 mm.

\*\* When the testing conditions are deviated from the above conditions, resolution changes. For details, please consult OMRON sales representative.

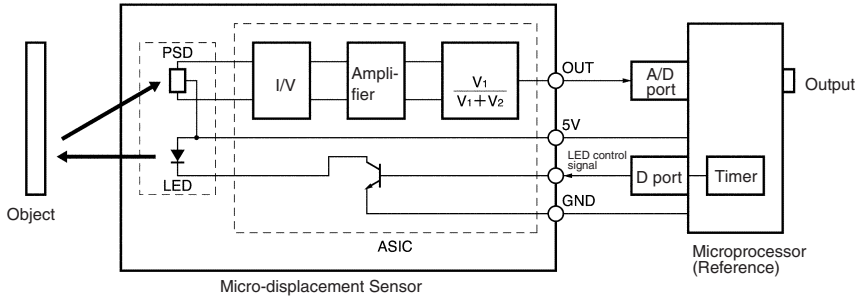
- The peak-to-peak value of the output error from the ideal line.

Calculation, based on a linearity of 2% F.S., is as follows:

- The conversion value based on the full scale distance: 2 mm × 0.02 = 0.04 mm (40 μm)
- The conversion value based on the output voltage: 1.4 mV/μm × 40 μm = 56 mV  
 (When the product sensitivity variation is 1.4 mV/μm.)

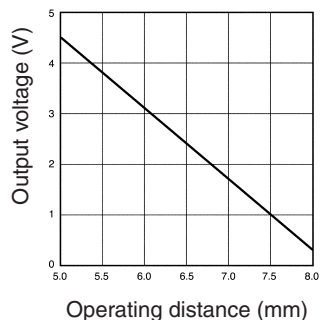


■ Circuit Diagram

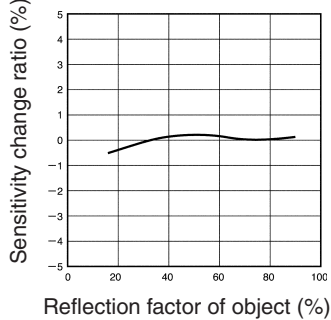


■ Engineering Data

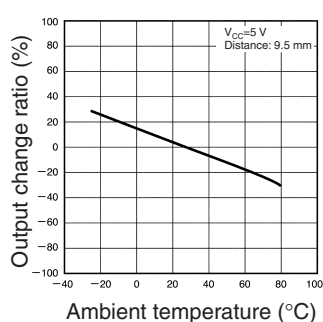
Operating Distance Characteristics (Typical)



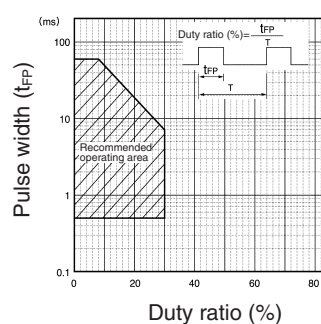
Dependency of Object on Reflection Factor (Typical)



Temperature Characteristics (Typical)

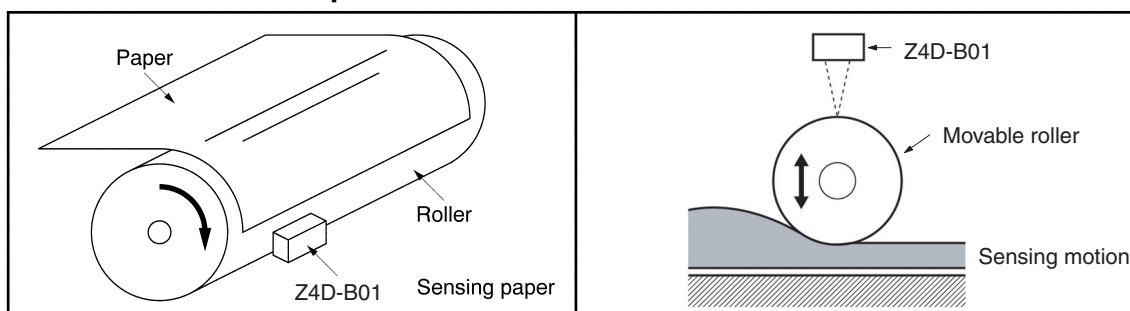


Pulsed Forward Current Rated Curve



■ Typical Application

Paper thickness detection for printers



MEMO

A large grid of dashed lines for taking notes, consisting of 20 columns and 25 rows.

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