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OMRON

Laser Displacement Sensor

3Z4M

High Resolution to 10 μ or 50 μ, Gives Precise Linear Output and Displays Distance



- Distance is displayed in millimeters on controller
- Ready-to-use linearized output is both -10 to +10 VDC and 4 to 20 mA
- Sensing distances of 40 mm and 100 mm
- Color of target has minimal effect on sensing
- UL/CSA approved, FDA Class IIIb certified
- Small sensing head

Ordering Information

■ LASER DISPLACEMENT SENSOR SYSTEM

Sensor heads and controllers are ordered by specifying the appropriate system part number for the desired sensor/controller combination. Each part includes a sensor and controller.

Sensing range	Resolution	Cable length	**Part number** (Sensor head + Controller) with distance display
30 mm to 50 mm (1.18 in to 1.97 in)	10 μm	5 m	**3Z4M-J1001-801**
		10 m	**3Z4M-J1001-802**
70 mm to 130 mm (2.76 in to 5.12 in)	50 μm	5 m	**3Z4M-J1222-805**
		10 m	**3Z4M-J1222-806**

■ EXPLANATION OF PART NUMBERS:

(Sensor heads and controllers cannot be ordered separately.)

System part number	Sensor head part number	Controller part number
3Z4M-J1001-801	3Z4M-S01-6	3Z4M-J10-801
3Z4M-J1001-802	3Z4M-S01-7	
3Z4M-J1222-805	3Z4M-S22-6	3Z4M-J12-805
3Z4M-J1222-806	3Z4M-S22-7	

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Specifications

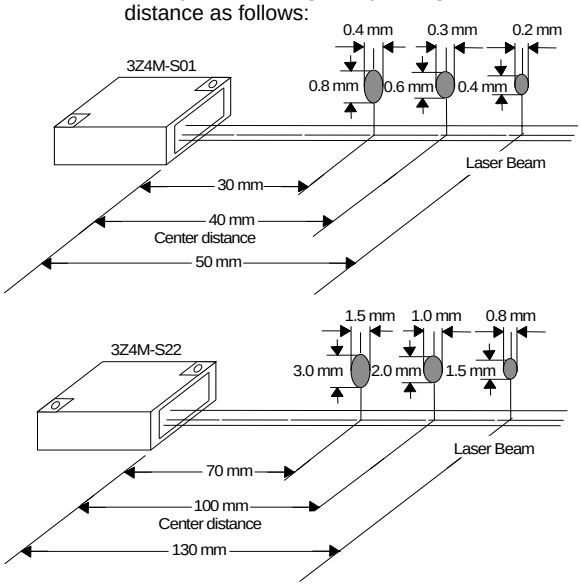
■ OPERATING CHARACTERISTICS

Model (with digital display)		**3Z4M-J1001-❑**	**3Z4M-J1222-❑**
Supply voltage		120 VAC, +10%, -15%, 50/60 Hz	
Current consumption		15 VA	
Measuring range		±10 mm (0.39 in)	± 30 mm (1.18 in)
Center distance of measurement (See Notes 1 and 2)		40 mm (1.57 in)	100 mm (3.94 in)
Light source		Laser diode (wavelength: 780 nm; light output: 5 mW max.)	
Spot size (See note 2)		0.6 X 0.3 mm	1.0 X 2.0 mm
Resolution (See note 3)		10 μm	50 μm
Zero point adjustment (for fine tuning to zero)		±0.7 mm	± 2 mm
Sensitivity selection		Switch-selectable between 2 levels, LOW and HIGH	
Input	Remote interlock input	External switching impedance: 30 Ω max.	
Outputs	Analog displacement output	-10 to +10 V/full scale, 4 to 20 mA/full scale	
	Alarm output	One open-collector output (100 mA max. load at 30 VDC); when DARK, BRIGHT, or RANGE indicator is ON, the alarm output is ON.	
Response speed (See note 4)		1 ms or 20 ms (switch selectable)	
Ambient operating light intensity		3,000 lux or less (white light)	
Ambient temperature	Operating	0° to 50°C (32° to 122°F)	
	Storage	-25° to 65°C (-13° to 149°F)	
Displays	Data display	3 1/2 digits (with minus sign)	3 digits (with minus sign)
	Alarm display	3 LED indicators: DARK, BRIGHT, RANGE	
	Power display	Green indicator LED is lit when power is ON	
Enclosure	UL	—	
	NEMA	—	
	IEC 144	Sensor- IP50; Controller -No protection	
Laser protection class		FDA Class IIIb, Accession # 9020115-00	
Approvals	UL	Recognized, File Number E41515	
	CSA	Certified, File Number LR4595-101	

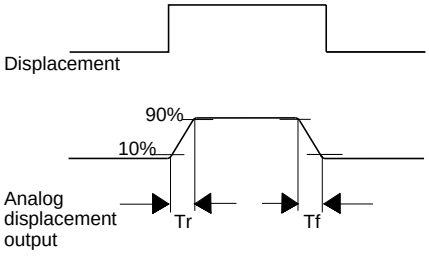
Note:

1. The reference point of the displacement measurement is the distance from the sensor front surface to the object to be measured.

2. The spot size changes depending on the distance as follows:



3. Rise and fall times (10% to 90%) of analog displacement output when the displacement variable changes stepwise.



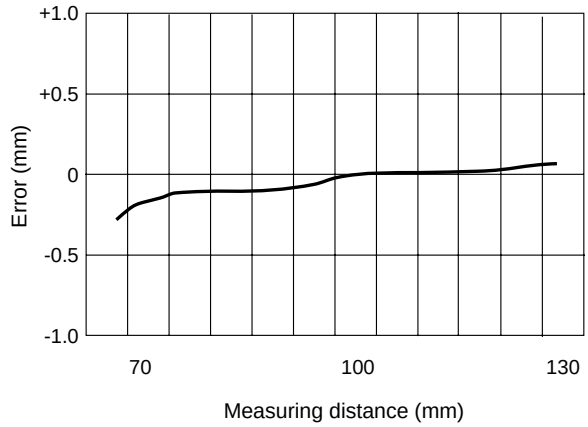
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Engineering Data

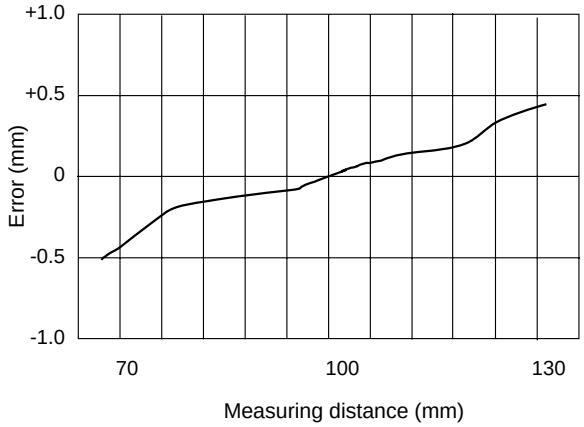
Objects that reflect diffused light can be measured with high precision. Errors may occur when shiny, reflective objects or transparent objects are measured. Measurements with various types of materials are shown below. (Temperature: 23°±3° C)

■ 3Z4M-J12❑

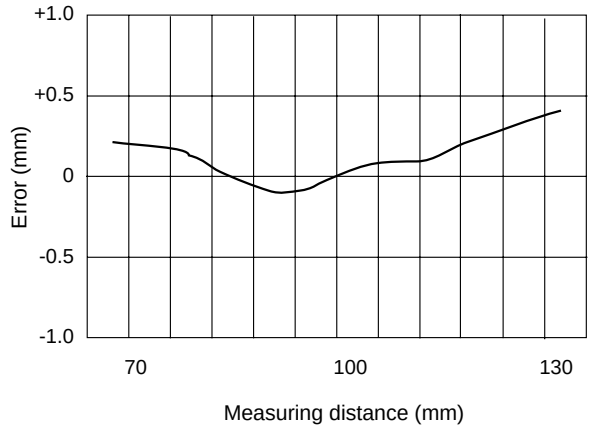
White paper



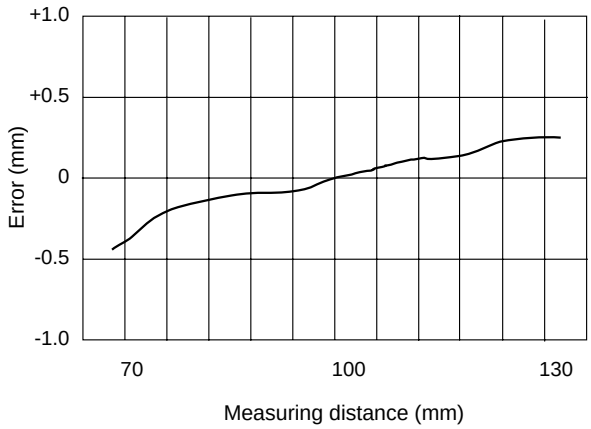
Black paper



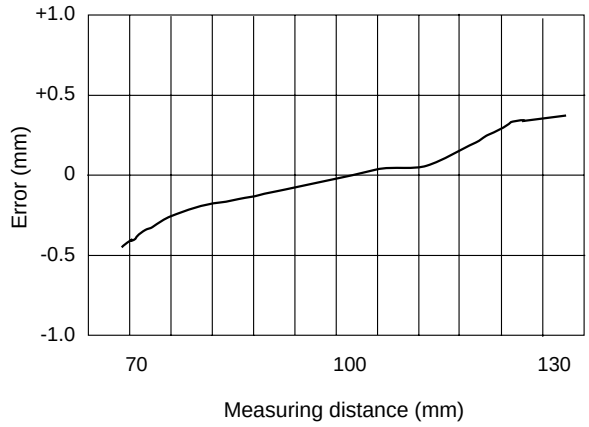
Aluminum



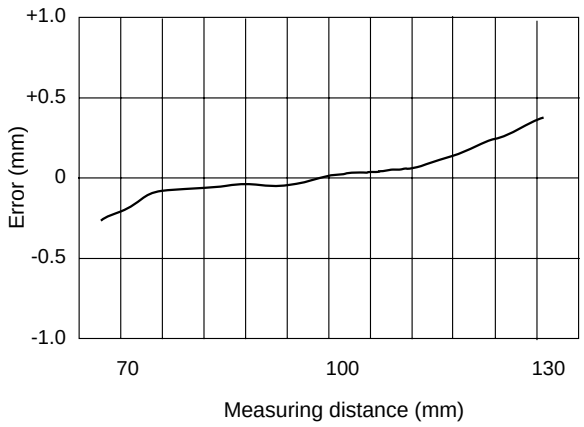
Iron sheet



Black rubber



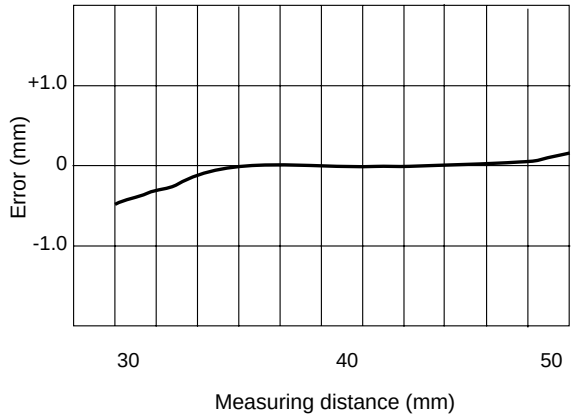
ABS resin



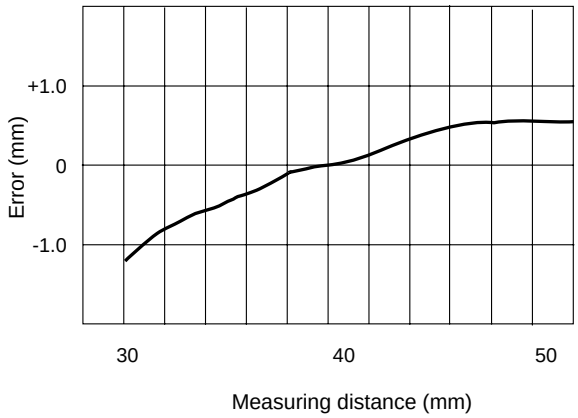
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■ 3Z4M-J10❑

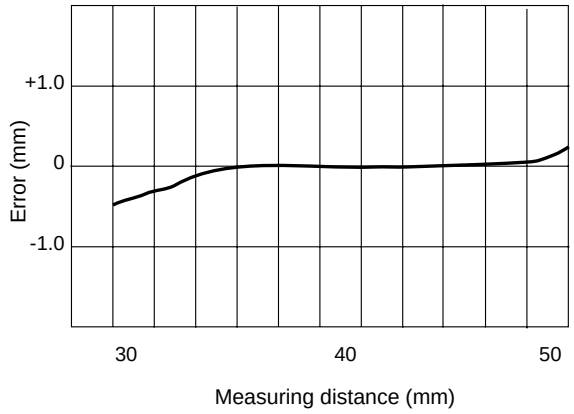
Colored paper: Green



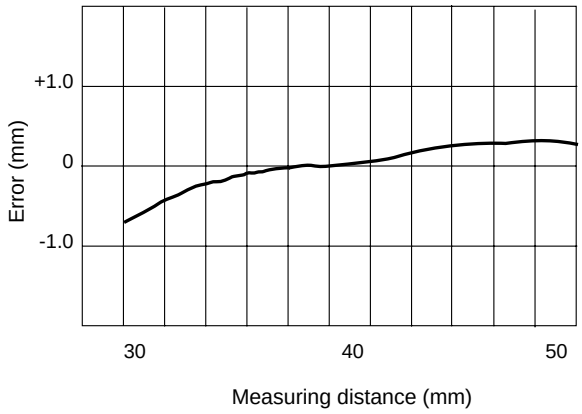
Black rubber



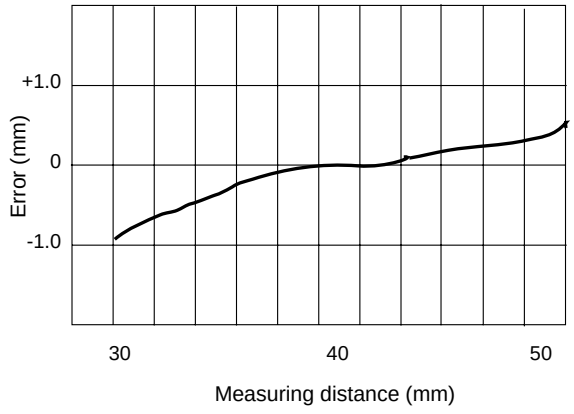
Colored paper: Red



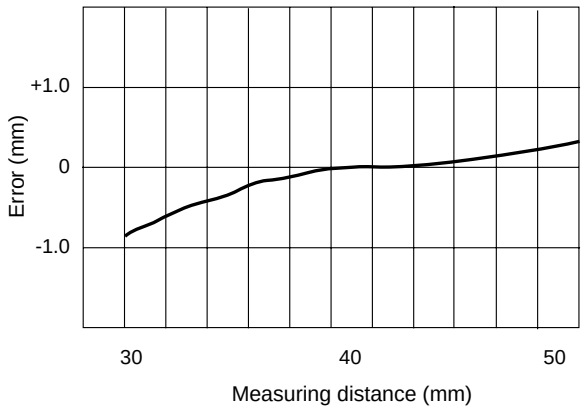
Iron sheet



Colored paper: Black



Aluminum plate

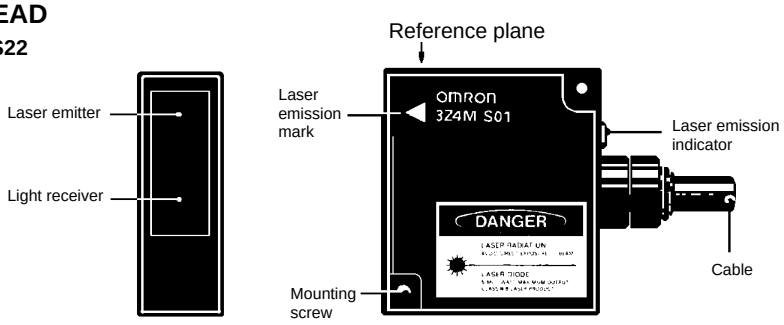


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Nomenclature

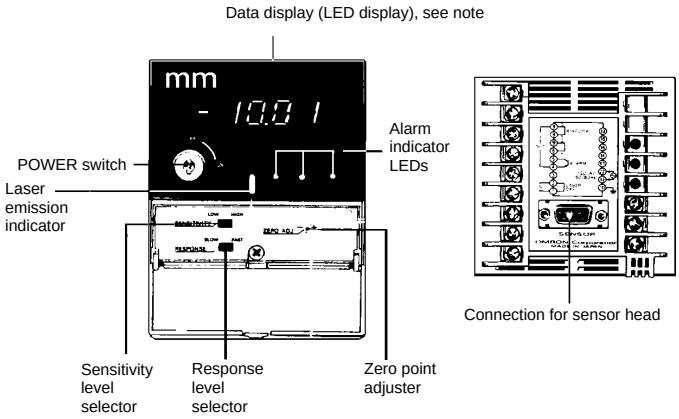
■ SENSOR HEAD

3Z4M-S01, 3Z4M-S22



■ CONTROLLER (WITH DISPLAY)

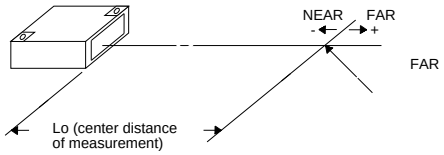
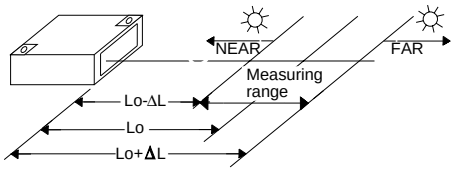
3Z4M-J10-801, 3Z4M-J12-805



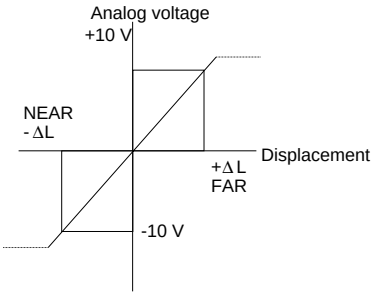
Note:
J10: 3 1/2-digit data display
J12: 3-digit data display

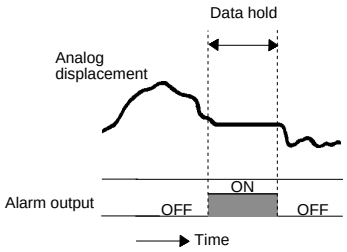
Operation

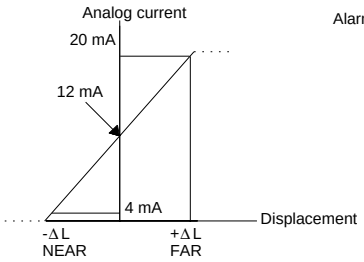
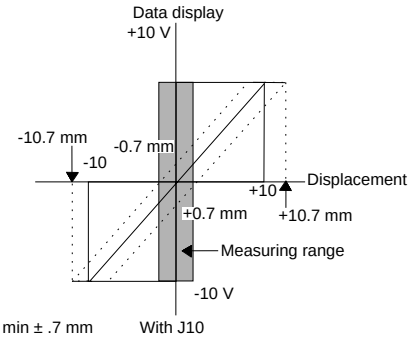
■ FUNCTIONS

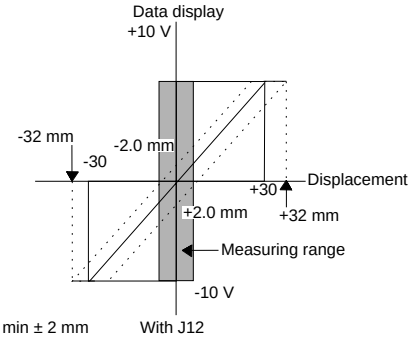
Item	Applicable model	Function
Data display	3Z4M -J10❑ -J12❑	Displays the position displacement from the center of the measurement in units of mm. Model / Lo / Measuring range (± ΔL) -J10 / 40 mm / -10 to 10 mm -J12 / 100 mm / -30 to 30 mm 
Alarm indication	3Z4M -J10❑ -J12❑	The RANGE indicator (LED) lights when the object to be measured is outside the measuring range of the displacement meter. The following two LED indicators light according to the quantity of light incident on the receiver. When the light is too strong, the BRIGHT indicator is ON. When the incident light is too weak, the DARK indicator is ON. Model / Measuring range (± ΔL) -J10 / 40 mm ± 10 mm -J12 / 100 mm ± 30 mm 

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<table>
<tr><th>Item</th><th>Applicable model</th><th>Function</th></tr>
<tr><td>Analog displacement output</td><td>3Z4M
-J10❑
-J12❑</td><td>Outputs an analog signal according to the measuring distance.
<table>
<tr><th>Model</th><th>Measuring range (ΔL)</th><th>Voltage output</th><th>Current output</th></tr>
<tr><td>-J10</td><td>-10 to 10 mm</td><td>Load impedance:
10 KΩ min.
-10 V to 10 V</td><td>Load impedance:
500 Ω max.
4 to 20 mA</td></tr>
<tr><td>-J12</td><td>-30 to 30 mm</td><td>Load impedance:
10 KΩ min.
-10 V to 10 V</td><td>Load impedance:
500 Ω max.
4 to 20 mA</td></tr>
</table>





</td></tr>
<tr><td>Alarm output</td><td>3Z4M
-J10❑
-J12❑</td><td>When one of the RANGE, BRIGHT, or DARK alarm indicators light, the alarm output turns on. The output is an open-collector type (maximum load current: 100 mA: maximum voltage: 30 V). External DC voltage must be provided.</td></tr>
<tr><td>Zero point adjustment</td><td>3Z4M
-J10❑
-J12❑</td><td>Minute adjustments can be performed on the zero point of the displayed value (analog displacement output) with the variable resistor (VR) on the lower side of the front panel.



</td></tr>
<tr><td>Response speed selection</td><td>3Z4M
-J10❑
-J12❑</td><td>The averaged time of the analog displacement output can be selected with the response selector switch on the lower side of the front panel.</td></tr>
<tr><td>Sensitivity selection</td><td>3Z4M
J10❑
J12❑</td><td>Normally, objects with a high reflection factor, as well as those with an allowable reflection factor can be measured without sensitivity selection. However, when measuring an object which reflects an extremely low quantity of light, use with the SENSITIVITY selector switch on the lower side of the front panel.</td></tr>
<tr><td>Remote interlock terminals</td><td>3Z4M
-J10❑
-J12❑</td><td>These terminals are in series with the on/off switch on the controller. A jumper is provided across terminals 1, 2, and 3 (3 is unused). If a remote interlock is needed, remove the jumper and connect a switch across terminals 1 and 2.</td></tr>
<tr><td>Laser emission indicator</td><td>3Z4M
-J10❑
-J12❑</td><td>When power is turned ON, the laser emission indicator lights immediately.</td></tr>
</table>

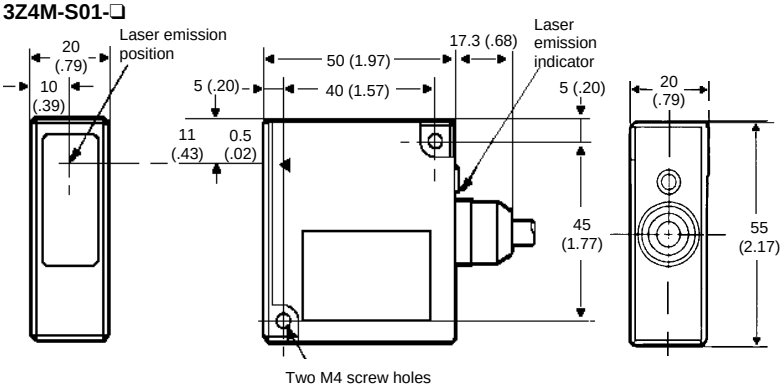
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Dimensions

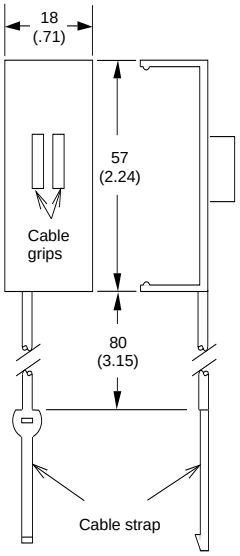
Unit: mm (inch)

■ SENSORS

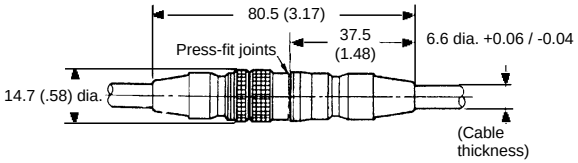
3Z4M-S01-❑



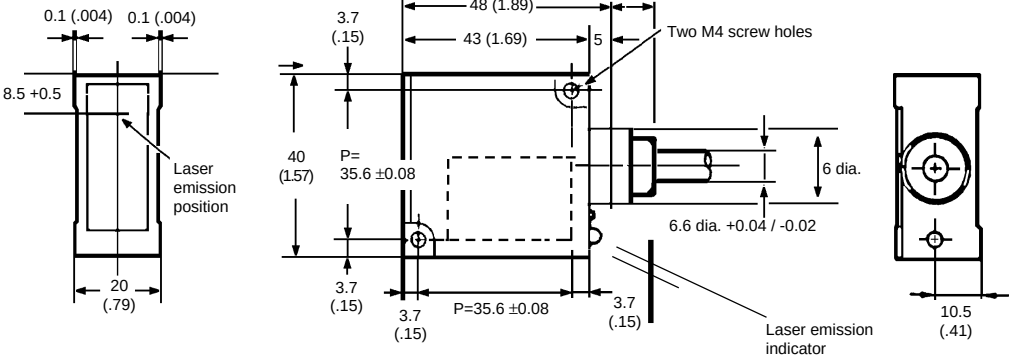
Lens Cover



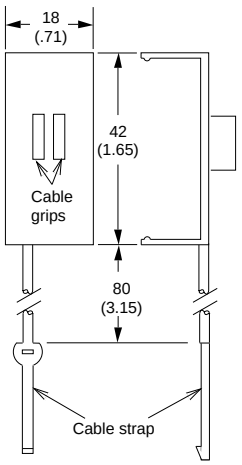
In-line Connector in Sensor Cable



3Z4M-S22-❑

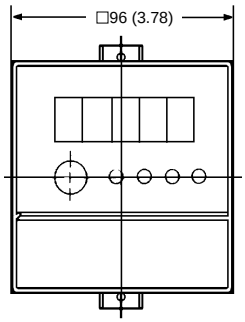


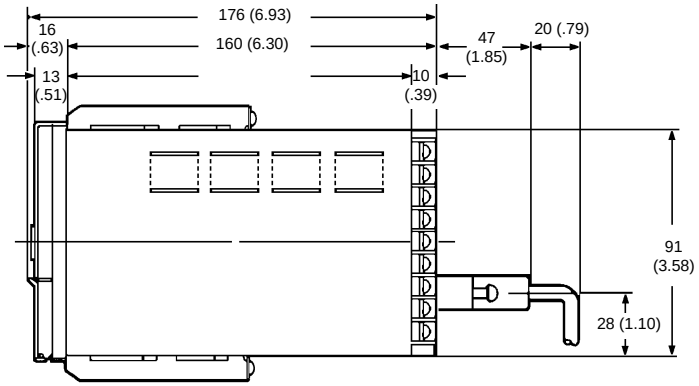
Lens Cover



■ CONTROLLERS

3Z4M-J10-801
3Z4M-J12-805



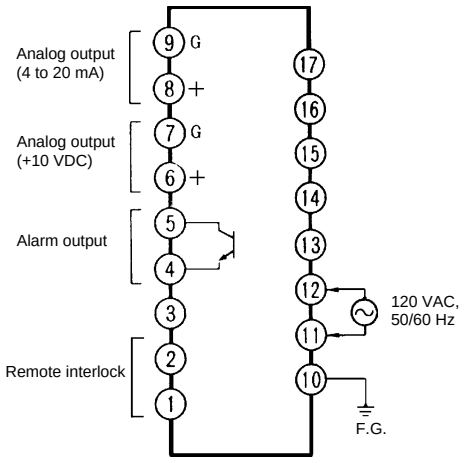


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Installation

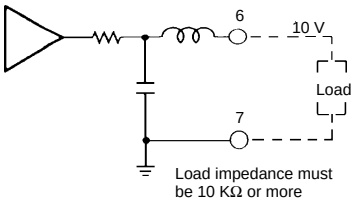
■ TERMINAL ARRANGEMENT

3Z4M-J10-❑, 3Z4M-J12-❑

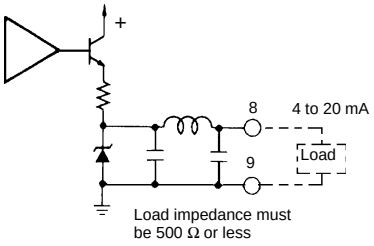


■ OUTPUTS OF DISPLACEMENT METER CONTROLLER

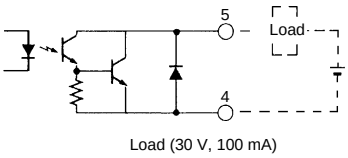
Analog Voltage Output



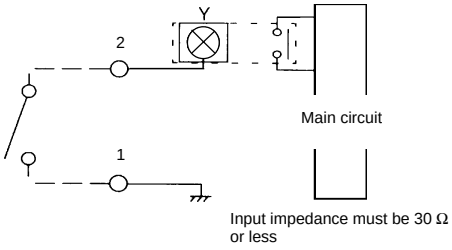
Analog Current Output



Alarm Output



Remote Interlock



Precautions

■ SAFETY

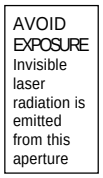
The laser displacement sensors 3Z4M-J10 and 3Z4M-J12 are classified as Class IIIb laser products by the FDA. Accession number is 9020115-00 and is identified as such by the warning label. Looking directly into the beam may cause damage to the eyes.

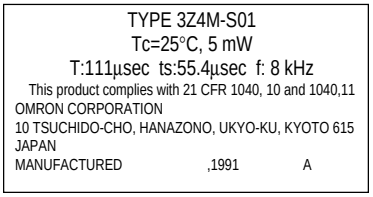
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■ LABELS

Information labels and a laser radiation warning label are located on the 3Z4M sensor head. When installing the 3Z4M, position the sensor head so these labels can be viewed easily by the operator and maintenance personnel.







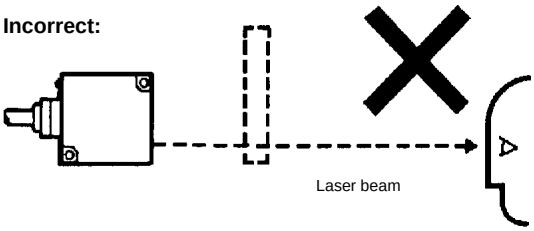
■ INSTALLATION

Install the sensor head in a location where the laser beam will not enter the operator's eyes directly or from reflection by a mirror surface. Also, mount the operation indicator (LED) in an easily visible position.

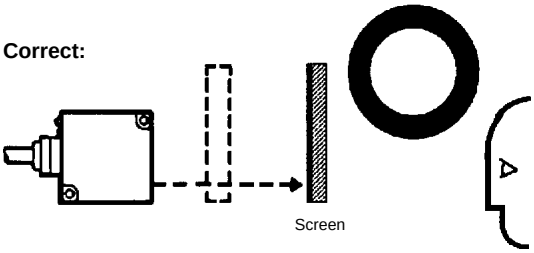
When installation in a location presents unavoidable exposure, use a screen or another item to guard the laser beam from leaking to the outside.

The laser radiation emitted by the 3Z4M is invisible. Avoid eye and body contact with the beam. Do not look directly into the beam.

Incorrect:



Correct:



■ MAINTENANCE

Users should not try to carry out repairs or maintenance on the 3Z4M, which contains no serviceable parts. Refer all servicing to OMRON .
Never disassemble the unit.

■ SENSOR CABLE

The sensor cable must not be connected to, nor disconnected from, the 3Z4M when the controller is switched ON.

■ REMOTE INTERLOCK

By removing the jumper across terminals 1 & 2, a remote interlock switch may be connected. The laser will only work when the remote interlock switch is closed and the power switch is ON.

NOTE: DIMENSIONS ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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