OMRON

Laser Displacement Sensor

Z4M-WR

Visible Beam Class II Laser Displacement Sensor Provides High Speed Precision Distance Measurement, Quick Setup, and Flexible Operation

- FDA, IEC Class II visible beam red laser
- 3-micron resolution maximum
- 4 to 20 mA analog output
- Automatic sensitivity setting
- Far and near range indicators on sensor and amplifier
- Stability indicator on amplifier
- 3 selectable response times
- Up to 140-mm sensing distance

Ordering Information

■ SENSOR

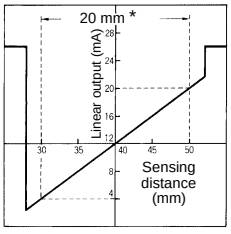
Sensing distance ± measurement range	Resolution (at response time)	**Part number**
40 ± 10 mm (1.57 ± 0.40 in)	3 μm (60 ms)	**Z4M-W40RA**
	20 μm (2 ms)	
	80 μm (0.15 ms)	
100 ± 40 mm (3.93 ± 1.57 in)	16 μm (500 ms)	**Z4M-W100RA**
	60 μm (20 ms)	
	300 μm (0.7 ms)	

■ ACCESSORIES (ORDER SEPARATELY)

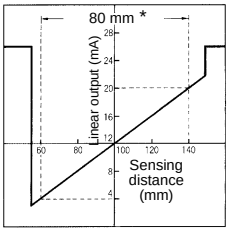
Description		**Part number**
Extension Cable	3m (9.84 ft)	**Z49-C1 3M**
	8m (26.25 ft)	**Z49-C1 8M**

■ LINEAR OUTPUT VS. SENSING DISTANCE

Z4M-W40RA



Z4M-W100RA



* Indicates the measurement range.

Conditions When the Linear Output of the Sensor Is Locked Between 21 and 26 mA

- On startup for the first 3 to 10 seconds after the sensor is turned ON. (No laser emission on startup for safety reasons.)
- When the target is outside the measurement range.
- When the enable output is OFF.

Specifications

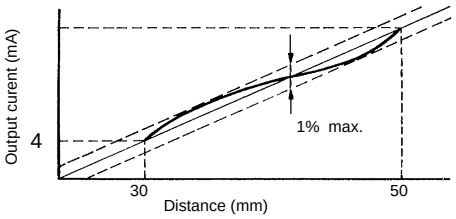
■ RATINGS

Part number	Z4M-W40RA	Z4M-W100RA
Measurement range	±10 mm	±40 mm
Measurement point	40 mm	100 mm
Offset adjustment range	±10 mm	±40 mm
Span adjustment range	0.8 mA/mm ±10%	0.2 mA/mm ±10%
Light source	Visible-light semiconductor lasers with a wavelength of 670 nm and an output of 1.5 mW max.; Class 2 (IEC), Class II (FDA)	
Spot diameter	1 mm dia. max. (at measurement point)	1 x 2 mm max. (at measurement point)
	The spot diameter is defined by $1/e^2$ (13.5%) of the sensor's laser beam center. There is light leakage outside the defined spot, and the environment of the object may influence sensing accuracy. Reduce the influence of the environment as much as possible. (Refer to spot diameter within the *ENGINEERING DATA*)	
Resolution at selected response speed	3 μm (60 ms), 20 μm (2 ms), 80 μm (0.15 ms)	16 μm (500 ms), 60 μm (20 ms), 300 μm (0.7 ms)
	The resolution is the peak-to-peak displacement conversion value of the analog output Using a white alumina ceramic target positioned at the rated sensing distance.	
Linearity (See Note 2.)	1% FS (See Note 1.)	1.5% FS (See Note 1.)
Response time (See Note 3.)	0.15 ms/2 ms/60 ms switch-selectable	0.7 ms/20 ms/500 ms switch-selectable
Sensitivity selector	WHITE/BLACK/AUTO switch-selectable	
Temperature characteristics (at measurement point)	Sensor: 0.03% FS/°C max. Amplifier: 0.03% FS/°C max.	Sensor: 0.02% FS/°C max. Amplifier: 0.03% FS/°C max.
Range indicators	Outside range, abnormal volume of light: NEAR indicator and FAR indicator flash. Near: NEAR indicator is lit. Measurement point: NEAR indicator and FAR indicator are lit. Far: FAR indicator is lit. **Note:** The range indicators, located on sensor and amplifier, are also used as laser warning lights (green).	
Stability indicator (amplifier)	Stable operating range: green Possible operating range: not lit Insufficient or excessive light: red	
Linear output	4 to 20 mA/30 to 50 mm Output impedance: 300 Ω max.	4 to 20 mA/60 to 140 mm Output impedance: 300 Ω max.
	It is possible to adjust the linear output of the sensor to between 3.2 to 20.8 mA with the span adjustment.	
Enable output	NPN open collector, 50 mA max. at 40 VDC, residual voltage: 1 V max.	
Laser emission OFF input	Short-circuited with the 0-V terminal (residual voltage: 2 V max.): Laser emission is turned OFF. Open (current leakage: 0.1 mA max.): Laser emission is turned ON. Linear output, indicators, and *enable output holding function* incorporated.	

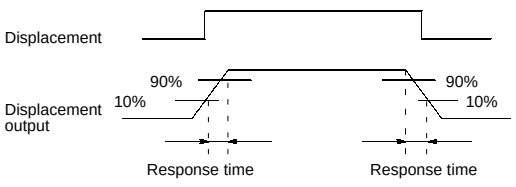
Note: 1. The **FS (Full Scale) value** (listed in the preceding table) is calculated as follows:
Example: 1% FS on the Z4M-W40RA
Distance full scale conversion: 20 mm x 0.01 = 0.2 mm
Voltage full scale conversion: 16 mA x 0.01 = 0.16 mA

Part Number	Z4M-W40RA	Z4M-W100RA
Distance full scale	20 mm	80 mm
Current full scale (The value changes according to the span to be adjusted.)	16 mA ±30%	16 mA ±30%

2. The **linearity of the sensor** is checked with a white alumina ceramic object. The peak-to-peak value deviated from the displacement linear output voltage is within the specified range, as shown in the graph. The deviation value may vary with the object. (Refer to the preceding table.)



3. The **response speed of the sensor** is the time required for the analog displacement output to increase from 10% to 90% of the full value (at the rise time) or decrease from 90% to 10% of the full value (at the fall time). To decrease the error ratio to within 1% at the rise time, the time required will be two or three times as long as the specified value. (Refer to the preceding table.)



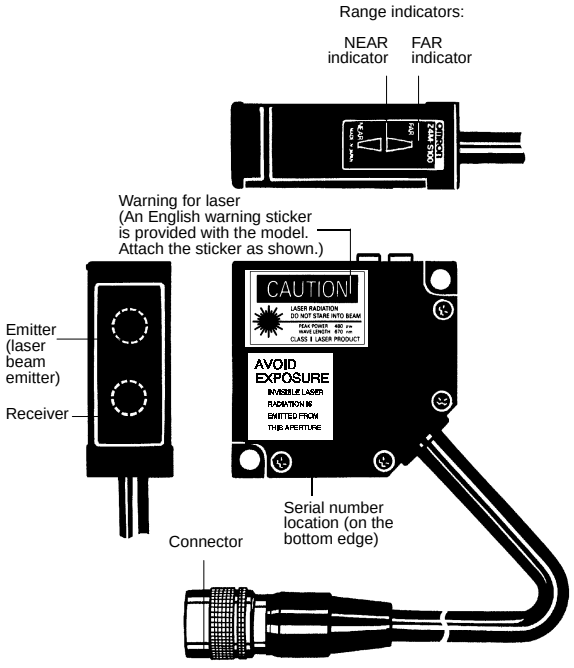
■ CHARACTERISTICS

Part number	Z4M-W40RA	Z4M-W100RA
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	
Current consumption	150 mA max.	
Dielectric strength	Sensor: 1,000 VAC, 50/60 Hz for 1 min. Amplifier: 300 VAC, 50/60 Hz for 1 min.	
Vibration resistance	Destruction: 10 to 55 Hz (1.5-mm double amplitude) for 32 minutes each in X, Y, and Z directions	
Shock resistance	Destruction: 300 m/s^2, 30G for 3 times each in ±X, Y, and Z directions	
Ambient temperature	Operating: 0° to 50°C (32° to 122°F) with no icing	
Ambient humidity	Operating: 35% to 85% (with no condensation)	
Ambient illumination	Operating: 3,000 lux max. (incandescent lamp)	
Weight	Sensor: Approx. 180 g (6.35 oz.) with 2-m cable Amplifier: Approx. 200 g (7.05 oz.) without cable	
Material	Sensor: Aluminum diecast Amplifier: ABS	
Enclosure rating	IP40	
Accessories supplied	Flat-blade screwdriver for sensor adjustment, FDA Caution Label	

Nomenclature

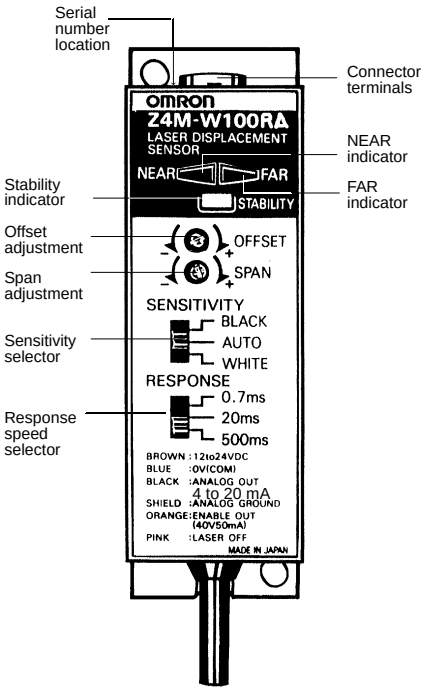
■ SENSOR

Z4M-S40R (for Z4M-W40RA)
Z4M-S100R (for Z4M-W100RA)



■ AMPLIFIER

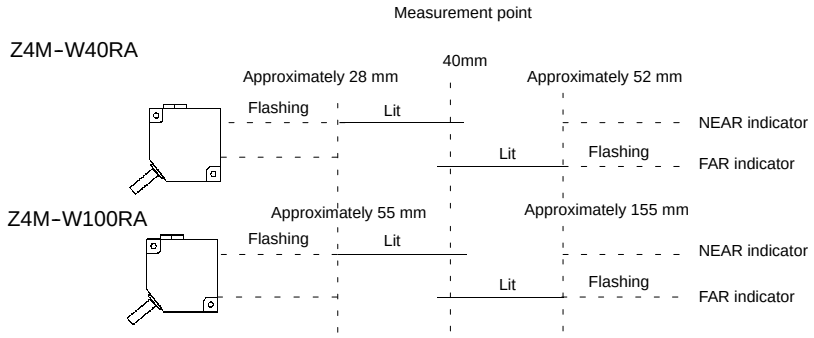
Z4M-W40AC (for Z4M-W40RA)
Z4M-W100AC (for Z4M-W100RA)



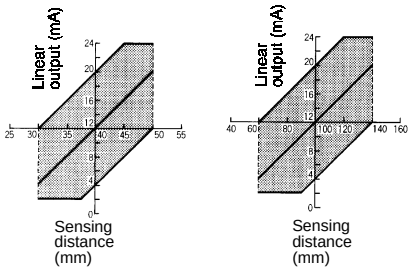
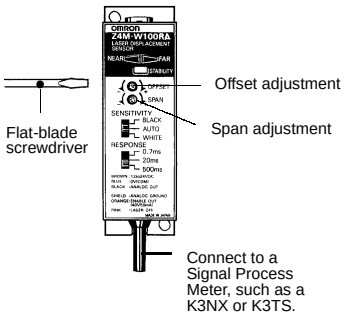
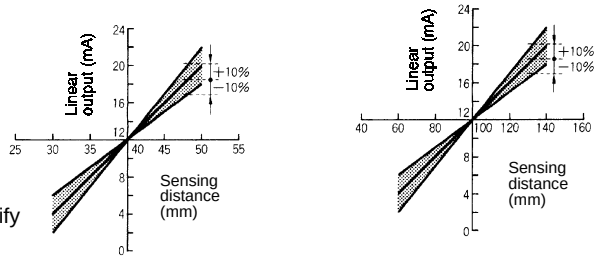
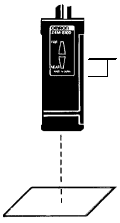
COMPATIBILITY NOTICE
The Z4M-WR Laser Displacement Sensor and Amplifier are adjusted as a set, and they have the same Serial No. Neither (sensor or amplifier) can be used with another amplifier or sensor having a different Serial No.

Operation

■ FUNCTIONS

	Classification	Function
OUTPUT	**Linear Output (amplifier)**	An analog current signal according to the measuring distance will be output from the output line (black shield wire). Current output: 4 to 20 mA/30 to 50 mm (Z4M-W40RA), 4 to 20 mA/60 to 140 mm (Z4M-W100RA) Linear output will be locked between 21 to 26 mA when the enable output is OFF.
	Enable Output (amplifier)	Enable output is ON when the sensor is performing a displacement measuring operation. The enable output is OFF when there is no object in front of the sensor or if the light reflected from the object is either insufficient or too intense. An open collector output of 50 mA at 40 VDC maximum can be obtained. When measuring a metal or glossy object, the enable output may be ON even if the object is outside the measurement range.
INPUT	**Laser OFF Input (amplifier)**	The laser OFF input controls laser emission. Laser emission is turned ON when there is no laser OFF input (with a current leakage of 0.1 mA max.); it is turned OFF when the laser OFF input is short-circuited to the 0-V terminal (with a residual voltage of 2 V max.). When laser emission is turned OFF, the linear output, indicators, and the enable output of the sensor are *on hold*. There will be a drift of 0.1% FS/s when the analog output of the sensor is on hold. The response time required to turn laser emission ON or OFF is 3 ms max. Linear outputs have transient characteristics that vary with the response speeds.
INDICATORS	**Range Indicators (NEAR and FAR)** —also used as laser warning lights (sensor and amplifier)	The FAR green indicator and NEAR green indicator will be lit when the object is within the measurement range of the sensor. When the object is outside the measurement range or when there is insufficient or excessive light, both the NEAR indicator and FAR indicator will flash. If the object is near the sensor and outside the measurement range, only the NEAR indicator may flash.  Mount the sensor so that both the NEAR indicator and FAR indicator will be lit when the object is placed in front of the sensor. The NEAR indicator and FAR indicator are also used as laser warning lights. When the sensor is turned ON, the NEAR indicator or FAR indicator or both the indicators will be lit or flash. When the laser OFF input is ON, the previous condition will be *on hold* (i.e., the indicator(s) will be lit or flash), alerting the user that the laser beam will be turned ON when the laser OFF input is turned OFF.
	Stability Indicator (amplifier)	The indicator will be lit in green when the target is within the measurement range and the receiver receives enough intense light reflected from the object. When the indicator is green, the sensor's measuring operation is stable. If the indicator is not lit in green while the sensitivity selector is set to WHITE, set it to BLACK or AUTO for a more stable measuring operation. Normal output can be obtained even if the indicator is not lit in green. The indicator will be lit in red when there is no object in front of the sensor or if the light reflected from the object is insufficient or too intense. Check if the sensitivity selector is set correctly (according to the reflection ratio of the object if the indicator is red).
	Laser Emission Delaying Function (sensor and amplifier)	When the sensor is turned ON, the range indicators (green) will flash for 3 to 10 seconds, alerting the user to laser emission, and the linear output is locked between 21 to 26 mA. After this 3 to 10 seconds, the laser beam will be turned ON.

(This table continues on the next page.)

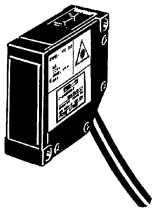
	Classification	Function
ADJUSTMENTS	**Sensitivity Selector (amplifier)**	Set the sensitivity selector according to the reflection ratio of the object. If the color of the object is white, set it to WHITE. If the color of the object is black, set it to BLACK. If the object is alternating white and black, set it to AUTO. When the sensitivity selector is set to AUTO, the enable output may be ON even if the target is outside the measurement range, in which case set the sensitivity selector to WHITE so that the number of errors that may occur can be minimized.
	Response Speed Selector (amplifier)	Select the response speed (by considering the required response speed and resolution). Response speed Fast: Resolution Low Response speed Slow: Resolution High
	Offset Adjustment (amplifier)	Offset adjustment shifts the actual current (solid line) in either the positive or negative direction. Offset adjustment is commonly used in applications where the displayed measurement is relative to 12 mA. The 12 mA current output would be preset using a gauged work piece of the specified tolerance range. Z4M-W40RA Z4M-W100RA   Offset adjustment is made using a white ceramic object before shipping, so the user may not need to adjust the output. To set the sensor output to 12 mA at the standard distance, connect a Signal Process Meter (such as K3TX or K3TS) to the output terminal of the sensor. Place a standard object in front of the sensor and adjust the output with the offset adjuster.
	Span Adjuster (amplifier) .	The Span adjustment changes the ratio of the output current (displacement) to the distance. By using the Span adjustment the actual current-distance relationship can be altered to either a higher output current at the same distance or to a lower output current. Span adjustment is used to modify the current output level if a 1:1 ratio is not obtained due to changes in material or color Z4M-W40RA Z4M-W100RA  **Span Adjustment** Span adjustment is made using a white ceramic object before shipping, so the user may not need to adjust the span. To calibrate the displacement output, adjust the span as follows: 1. Locate the target at the standard distance and adjust the offset adjustment. 2. Move the object for a specified distance and set the span adjustment so that the voltage will change appropriately, according to the displacement.
	Axis and Distance Adjustment	 Both the FAR and NEAR indicators are lit when the target is at the measurement point. • The Z4M-WR uses a visible laser beam emitter. The spot of the beam under normal lighting conditions can be confirmed without the use of phosphor cards. • The sensor incorporates a laser beam delaying circuit, so the laser will start emitting 3 to 10 seconds after the sensor is turned ON. • Ensure that the center of the object displacement will be in the center of the sensor's measurement range.

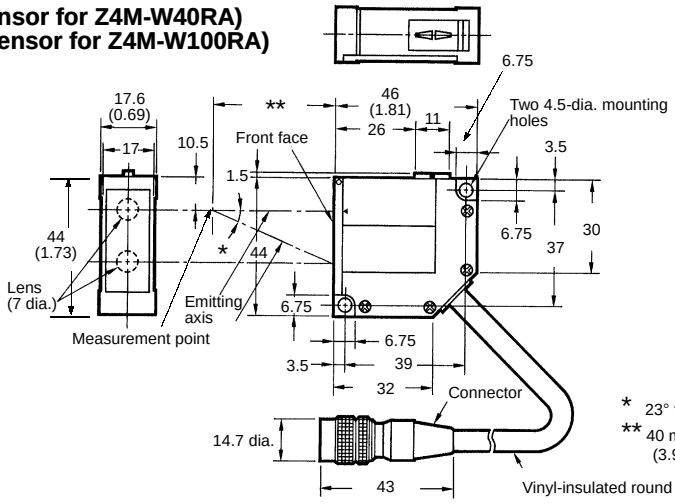
Dimensions

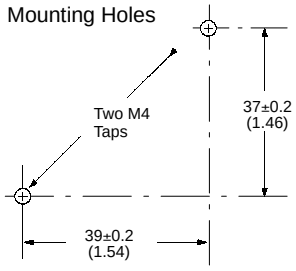
Unit: mm (inch)

■ SENSOR

Z4M-S40R (Sensor for Z4M-W40RA)
Z4M-S100R (Sensor for Z4M-W100RA)





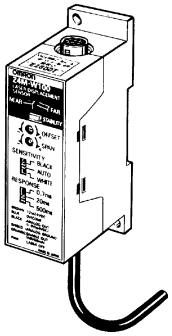


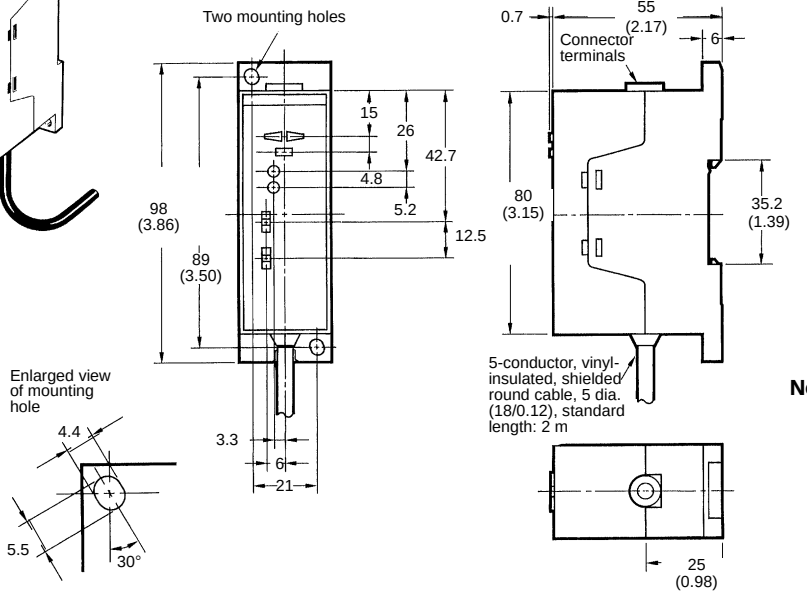
* 23° for Z4M-S40R and 11° for Z4M-S100R.
** 40 mm (1.6in) for Z4M-S40 and 100 mm (3.9in) for Z4M-S100.

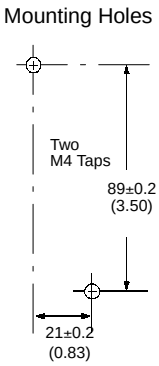
Vinyl-insulated round cable, 6.6 dia, standard length: 2 m

■ AMPLIFIER

Z4M-W40AC(Amplifier for Z4M-W40RA)
Z4M-W100AC (Amplifier for Z4M-W100RA)





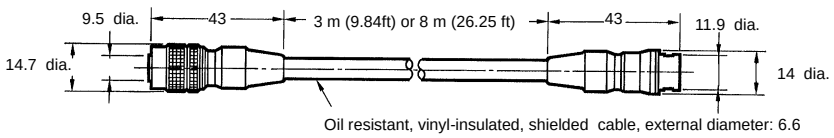


Note: 1. Do not mount the Z4M-WR to a DIN track in applications where excessive vibration is a concern.

2. The sensor and amplifier can easily be connected to each other via connectors. (Do not turn or twist the cable — the cable could break as a result.)

■ ACCESSORIES (SOLD SEPARATELY)

Z49-C1 Extension Cable

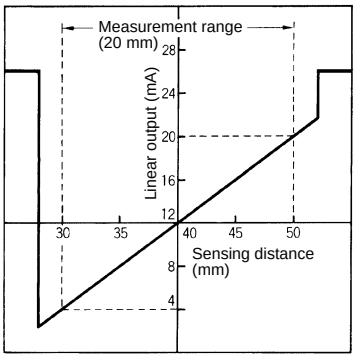


Oil resistant, vinyl-insulated, shielded cable, external diameter: 6.6

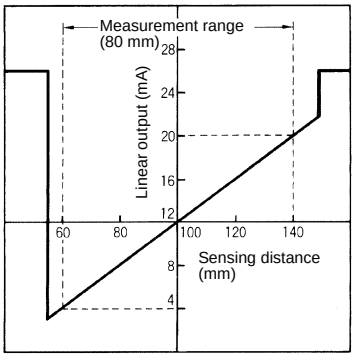
Engineering Data

■ LINEAR OUTPUT VS. SENSING DISTANCE

Z4M-W40RA



Z4M-W100RA



Conditions when the linear output of the sensor Is locked between 21 and 26 mA:

- On startup for the first 3 to 10 seconds after the sensor is turned ON. (No laser emission on startup for safety reasons.)
- When the target is outside the measurement range.
- When the enable output is OFF.

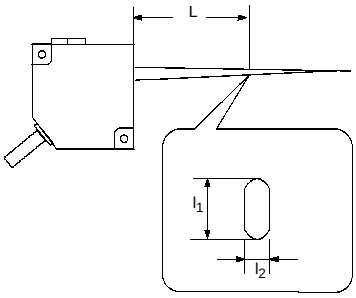
■ SPOT DIAMETER (TYPICAL EXAMPLE)

Z4M-W40RA

Distance L	30 mm (1.18 in)	40 mm (1.57 in)	50 mm (1.97 in)
l_1	1.2 mm (0.047 in)	0.6 mm (0.024 in)	0.2 mm (0.008 in)
l_2	0.6 mm (0.024 in)	0.3 mm (0.012 in)	0.1 mm (0.004 in)

Z4M-W100RA

Distance L	60 mm (2.36 in)	100 mm (3.94 in)	140 mm (5.51 in)
l_1	2 mm (0.079 in)	1.4 mm (0.055 in)	0.7 mm (0.028 in)
l_2	1 mm (0.039 in)	0.7 mm (0.028 in)	0.4 mm (0.016 in)



Cross-section of the beam

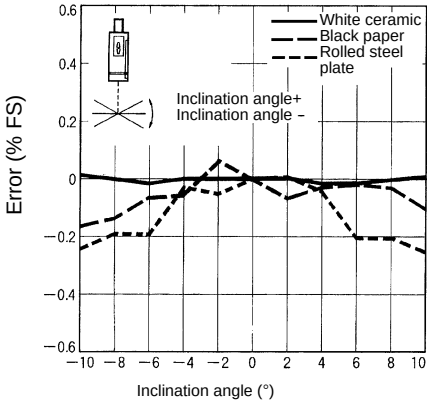
Note: Spot diameter is defined by $1/e^2$ (13.5%) of the sensor's laser beam center.

■ ANGLE CHARACTERISTICS (TYPICAL EXAMPLE)

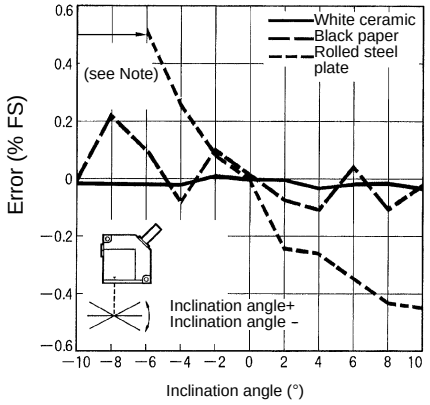
The angle characteristics are obtained by detecting an object with different angles of inclination at the measurement point and plotting the linear output error resulting from each operation.

Z4M-W40RA

Inclined Object



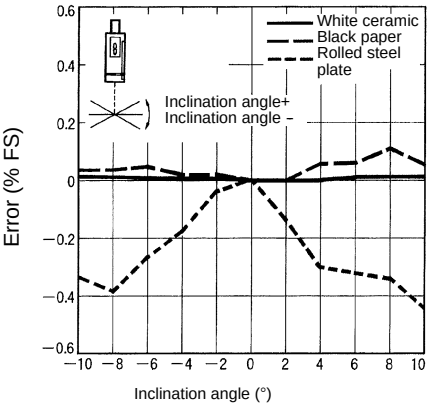
Obliquely Positioned Object



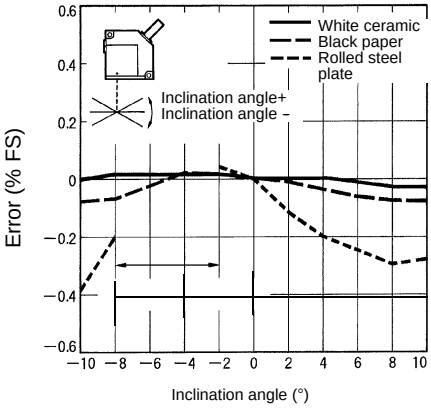
Note: Rolled steel cannot be measured, due to excessive light reflection.

Z4M-W100RA

With Inclined Object



Obliquely Positioned Object



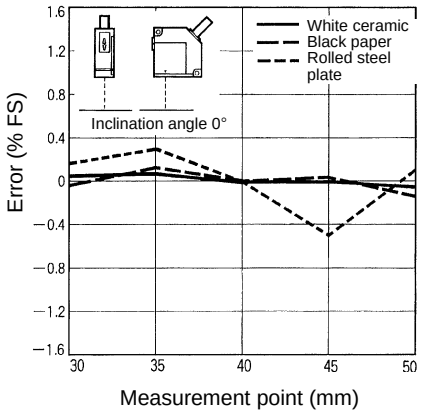
Note: Rolled steel cannot be measured, due to excessive light reflection.

■ LINEARITY CHARACTERISTICS VS. OBJECTS (TYPICAL EXAMPLE)

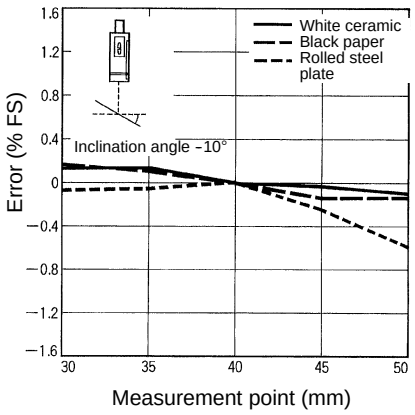
Linearity characteristic curves are obtained by detecting an object at different positions within the measurement range and plotting the linear output error resulting from each operation.

Z4M-W40RA

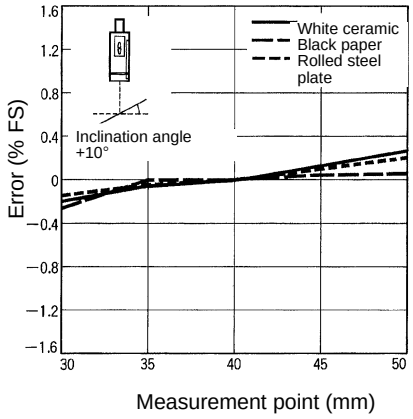
Inclined Object
Angle: 0°



Inclined Object
Angle: -10°

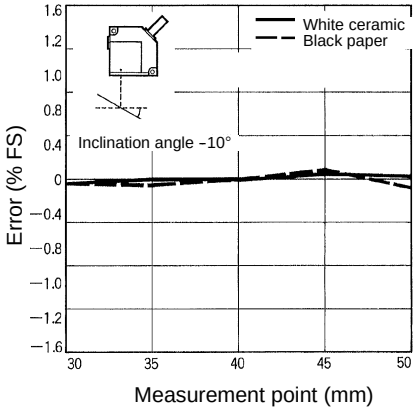


Inclined Object
Angle: 10°

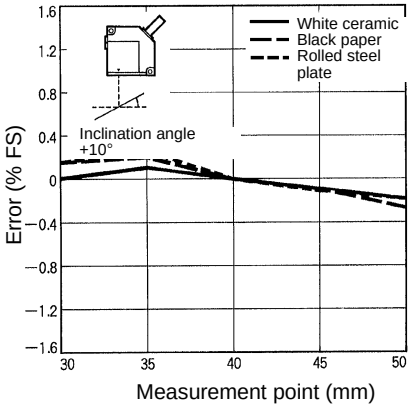


Note: Rolled steel cannot be measured, due to excessive light reflection.

Obliquely Positioned Object
Angle: -10°



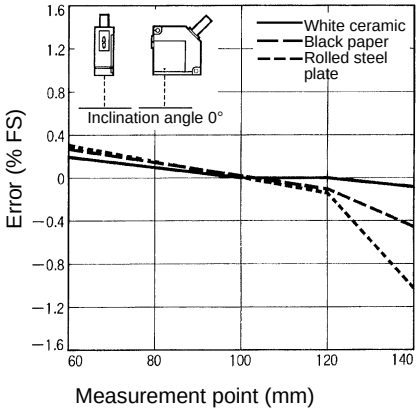
Obliquely Positioned Object
Angle: 10°



Z4M-W100RA

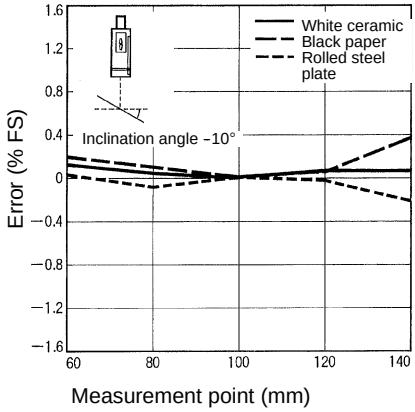
Inclined Object

Angle: 0°



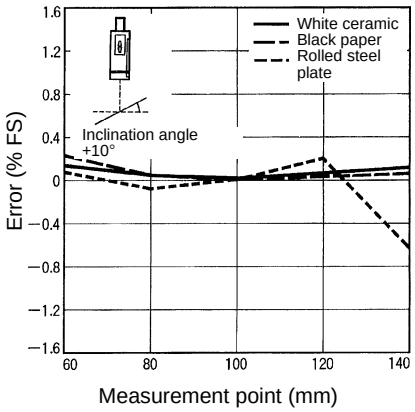
Inclined Object

Angle: –10°



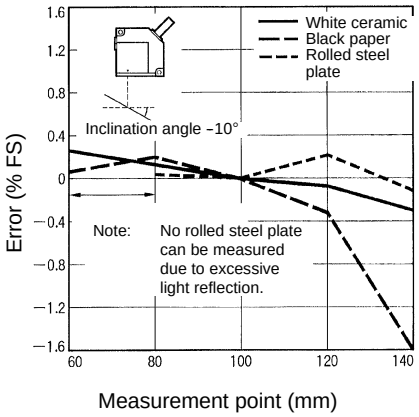
Inclined Object

Angle: 10°



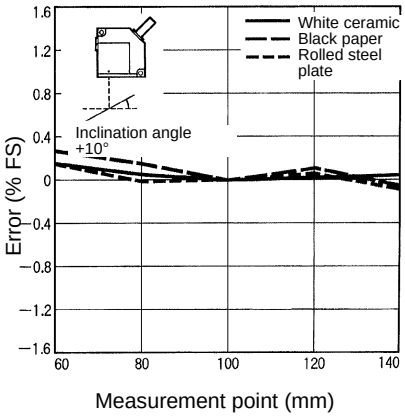
Obliquely Positioned Object

Angle: –10°



Obliquely Positioned Object

Angle: 10°

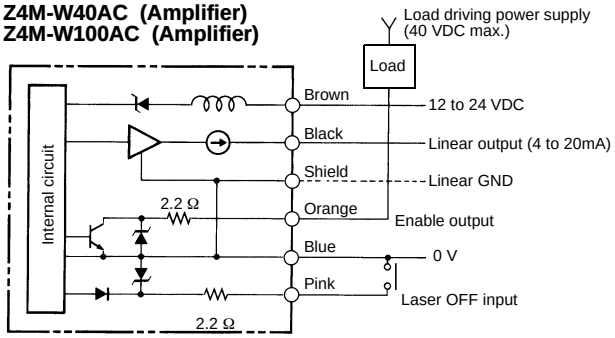


Installation

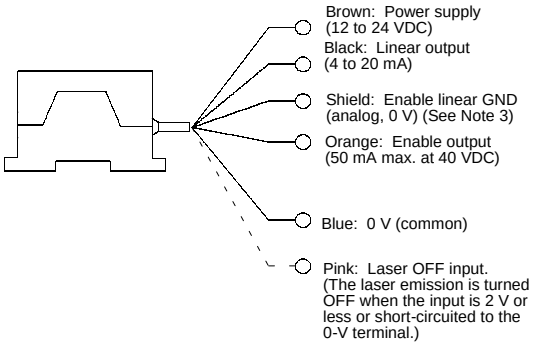
■ ELECTRICAL CONNECTIONS

Output Circuit Diagram

Z4M-W40AC (Amplifier)
Z4M-W100AC (Amplifier)



Connections



Wiring Guide

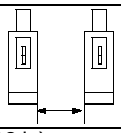
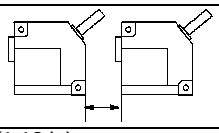
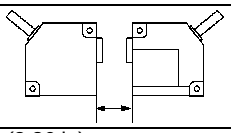
Power supply terminal	Connect a power supply with a capacity of 150 mA minimum at 12 to 24 VDC.
0 V	Used as the common terminal for the enable output and laser OFF input.
Enable output	Turned on with open collector output when the sensor can be operated (the stability indicator is not red).
Laser OFF input	The laser emission of the sensor will be turned off by short-circuiting the laser OFF input line with the 0-V terminal (with a residual voltage of 2 V max.), and the linear output of the sensor will be ON HOLD at this time.
Linear output	According to the displacement value, the following output will be obtained. Z4M-W40RA/-W100RA: current output, 4 to 20 mA
Linear GND	Used as a ground (0V) terminal for the linear output of the sensor. Connect this line to the input device.

Note: 1. If high resolution is required, connect an independent regulated power supply to the sensor. Place in increasing accuracy or resolution.

2. Wire the sensor correctly (refer to the *Precautions Section*), or the sensor may be damaged. The linear output line must not be in contact with any other line.

3. The 0-V (blue) and linear GND (shielded) line are internally connected via a resistor. Use the 0-V (blue) line for the power supply and use the shield wire (linear GND) and linear output (black) line for linear output.

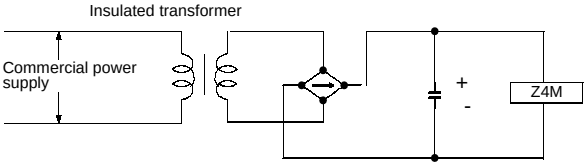
■ MUTUAL INTERFERENCE

When using more than two sensors in close proximity to each other, separate each sensor as specified in this table.			
Installing direction			
Z4M-W40RA	30 mm (1.18 in)	30 mm (1.18 in)	60 mm (2.36 in)
Z4M-W100RA	60 mm (2.36 in)	60 mm (3.15 in)	80 mm (3.15 in)

■ POWER SUPPLY

Use an insulated transformer for the power supply of the Z4M, as shown in the illustration provided below.

Do not use an autotransformer. Use of an autotransformer may cause the Z4M to malfunction.



■ WIRING

DANGER!
Do not wire the power supply cable for the Z4M Sensor in the same conduit with high-voltage lines or power lines. The result would be interference, damage, or malfunction.

Extension Cable

A Z49-C1 Extension Cable can be connected to the Sensor cable or to the amplifier cable. The total length of the Sensor cables or amplifier cables must not exceed 10 m (32.91 ft.). To extend the amplifier cable, use a shielded cable of the same kind.

Configuring Z4M-WR with a Controller and Output Boards

■ SELECTING A CONTROLLER — ORDERING INFORMATION

Use a Signal Process Meter to display the linear output of the Z4M-WR.

Item	Signal Process Meter	Signal Process Meter
Unit		
Model (part number)	**K3NX-AD□C** **1=**100 to 240 VAC supply voltage **2** 12 to 24 VDC supply voltage	**K3TS-SD1□B** **1=**100 to 240 VAC supply voltage **2=**12 to 24 VDC supply voltage
Features	DC current input; separate present value, and set-point value LEDs; scaling function and forced zero function included; five level discrimination output with output boards.	DC current input; high-speed sampling of 1.04 ms; two-input operation; forced zero function and other versatile functions incorporated.

■ SELECTING OUTPUT BOARDS — ORDERING INFORMATION

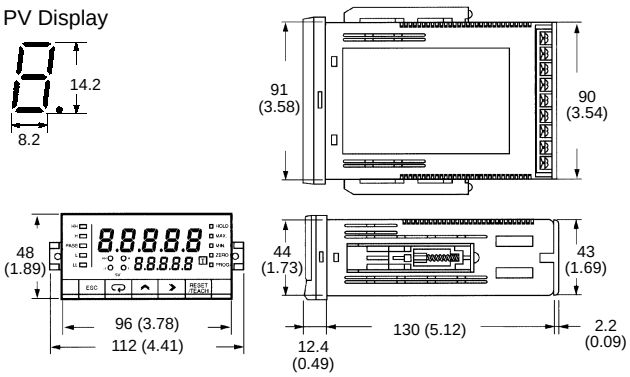
Output type	Output configuration	Part number	
		K3TS meter	**K3NX meter**
Comparative relay contact output	3 outputs (H, PASS, L); all SPDT	**K31-C1**	
Comparative transistor output	5 outputs (HH, H, PASS, L, LL); PASS is SPDT; others are SPST-NO	**K31-C2**	
Linear output	5 outputs (HH, H, PASS, L, LL); PASS is SPDT; others are SPST-NC	**K31-C5**	
	5 outputs (HH, H, PASS, L, LL); all NPN open collector	**K31-T1**	
	5 outputs (HH, H, PASS, L, LL); all PNP open collector	**K31-T2**	
	4 to 20 mA	**K31-L1**	
	1 to 5 VDC	**K31-L2**	
	1 mV/digit	**K31-L3**	
BCD	4 1/2 digit	**K31-B2**	
Serial communication	RS-232C	**K31-S1**	**K31-FLK1**
	RS-485	**K31-S2**	**K31-FLK2**
	RS-422	**K31-S3**	**K31-FLK3**
Combination output and communications boards	4 to 20 mA linear output and 5 NPN open collector outputs	**K31-L4**	
	1 to 5 VDC linear output and 5 NPN open collector outputs	**K31-L5**	
	mV/digit linear output and 5 NPN open collector outputs	**K31-L6**	
	BCD output and 5 NPN open collector outputs	**K31-B4**	
	RS-485 serial output and 5 NPN open collector outputs	**K31-S5**	**K31-FLK5**
	RS-422 serial output and 5 NPN open collector outputs	**K31-S6**	**K31-FLK6**

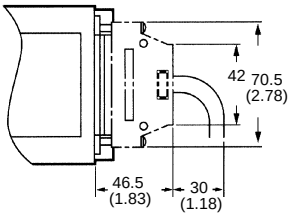
Note: Model K3TS requires an Output Board for correct operation. K3TS requires a minimum of five cooperative outputs.

■ K3NX CONTROLLER DIMENSIONS

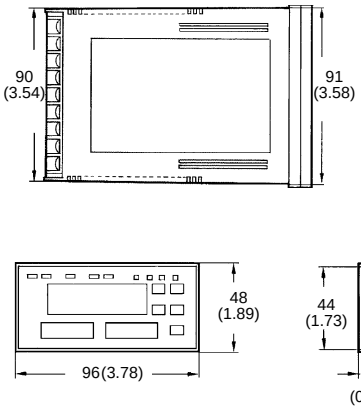
Unit: mm (inch)

PV Display

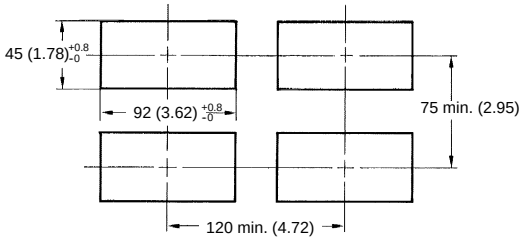




■ K3TS CONTROLLER DIMENSIONS

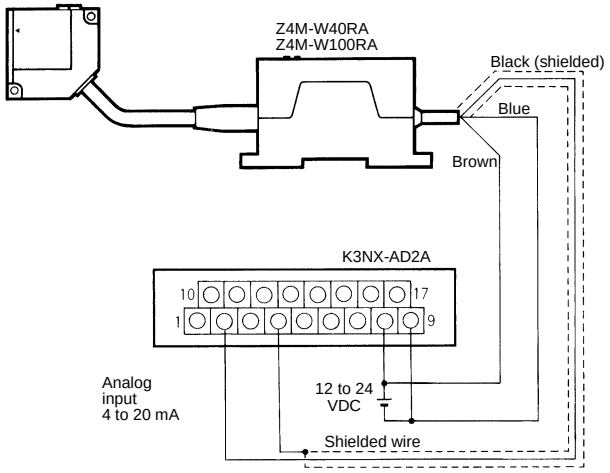


■ PANEL CUTOUTS FOR K3NX OR K3TS



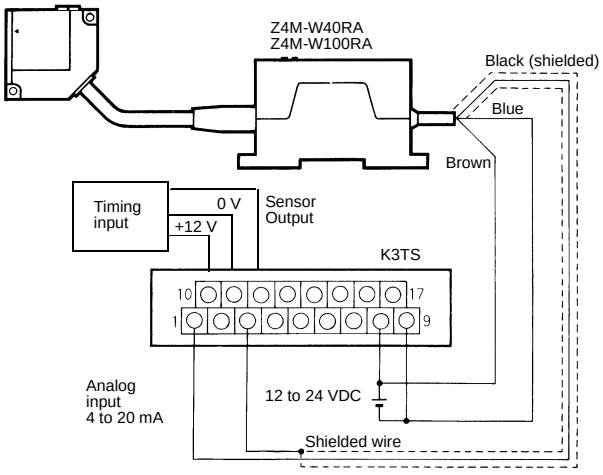
■ ELECTRICAL CONNECTIONS TO SIGNAL PROCESS METER

K3NX Signal Process Meter



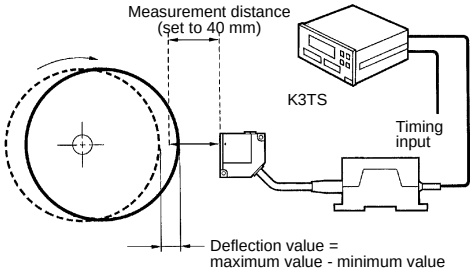
1. Choose an appropriate K3NX model according to the application.
2. Refer to the K3NX data sheet for detailed operating instructions.
3. If a K3NX model is used with an AC power supply, connect an independent DC power supply to the Z4M.

K3TS Signal Process Meter



1. Choose an appropriate K3TS model according to the application.
2. For the K3TS operation in detail refer to the *K3TS Signal Processor Operation Manual.*
3. If a K3TS model is used with an AC power supply, connect an independent DC power supply to the Z4M.

■ OPERATION EXAMPLE: Z4M SENSOR AND K3TS SIGNAL PROCESS METER



Eccentricity Measurement

Using the scaling function, it is possible to convert the sensor's output (4 to 20 mA) into the actual measured dimension of the object for display. By selecting the appropriate measurement mode that corresponds to the application, necessary data can be easily obtained. In the following application, the peak-to-peak hold mode is used to measure the eccentricity of an object by measuring the difference between the maximum and minimum values while the timing input is ON.

Note: Use a pushbutton switch to turn ON the timing input while measuring the eccentricity of the object.

Precautions

■ LASER BEAM SAFETY

"Low-Power" lasers are by definition incapable of causing eye injury within the duration of the blink, or aversion response (0.25 s), and must be visible (400 to 700 nm). Therefore, an ocular hazard can only exist if an individual overcomes their natural aversion to bright light and stares directly into the laser beam. The two product safety requirements for these lasers are: (1.) to have a CAUTION label and (2.) to have an indicator light to indicate laser emission.

Two operational safety rules are:

- Do not permit a person to stare at the laser from within the beam.
- Do not point the laser at a person's eye at close range.
- Follow the instructions for the *Installation*, as well as for the *Operation and Adjustment* of the Z4M-WR.

Make sure that the laser beam will not be directly or indirectly reflected into human eyes. The safety distance is approximately 1 m for the Z4M-W40/W40RA. If there is a possibility of laser beam reflection by any objects around the emitter at the time of adjustment, apply paint with a low light reflection ratio to the objects.

The sensor incorporates laser emission warning light and laser OFF input circuit. It is possible to interlock laser emission via an external circuit.

■ LASER CLASS

CLASS	I	IIa	II	IIIa	IIIb	IV
Remote interlock connector	N/A	N/A	N/A	N/A	R	R
Key control	N/A	N/A	N/A	N/A	R	R
Emission indicator	N/A	N/A	R	R	R	R
Beam attenuator	N/A	N/A	N/A	R	R^1	R^1

Note: In the chart above: R = Require; N/A = Not Applicable; R^1 = Delay required between indication and emission.

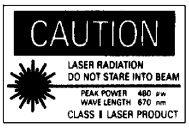
■ LASER CONTROL REGULATIONS

The Z4M Laser Displacement Sensor meets the standards required by the U.S. Food and Drug Administration (FDA). OMRON has also reported to the Center for Devices and Radiological Health (CDRH). The report includes the condition that the sensor be used as part of a larger system.

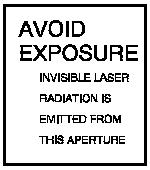
Labels (FDA Regulations)

Attach the following three FDA labels to the sensor body prior to use:

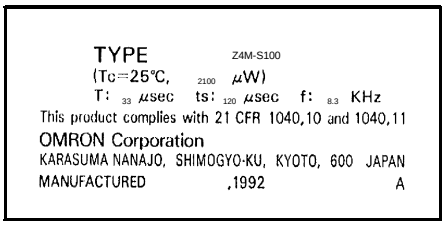
Caution Label



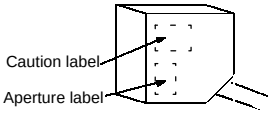
Aperture Label

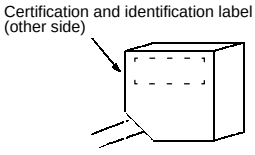


Certification and Identification Label

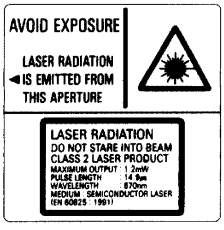


Safety Label Locations

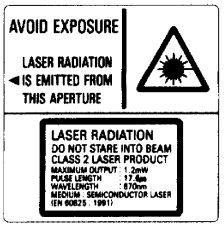




Z4M-S40R



Z4M-S100R



■ ENVIRONMENT

- Install the sensor in clean environment ensuring that the filter on the sensor's front panel is kept free from oil and dust.
- Do not install the Laser Displacement Sensor in a strong electromagnetic field or in an environment where the operation of the sensor is subjected to the reflection of intensive light (such as, light from a laser beam or an electric arc welding machine).
- The Laser Displacement Sensor cannot accurately detect objects that are mirror-like, transparent, inclined or have an extremely small reflection ratio (smaller than the sensor's sensing spot diameter).

■ MAINTENANCE

DANGER!
Never disassemble the sensor. Users expose themselves to the risk of laser radiation if they disassemble the device.

Do not attempt repairs or maintenance of the Z4M. The Z4M contains no user serviceable parts. Refer all servicing to an authorized OMRON agent.

■ CLEANING

If the filter is affected by oil or dust, clean it as follows:

1. Use a small device that blows air (as is used to clean camera lenses) to remove dust particles from the surface.
   Do not attempt to blow the dust away with your mouth.
2. Use a soft cloth (for lenses) moistened with alcohol to remove the remaining dust. Do not use a scrubbing action when cleaning; a scratch on the filter could result in the sensor malfunctioning.

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

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