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Displacement/
Length Sensors

Sensing
Guide

Smart
Sensors

Displacement
Sensors

Other
Information

Smart Sensors (Laser Type)

ZX-L-N

A Host of Smart Functions Inside a Compact Body with a Full Range of Laser Types

- The world's smallest and lightest, with 8 reflective types and 3 through-beam types available.
- Light-intensity mode enables a high-performance laser beam.
- Top priority remains on easy operation while offering further advanced functionality.
- Average hold and delay hold functions have been added.
- Supports Smart Monitor V3.



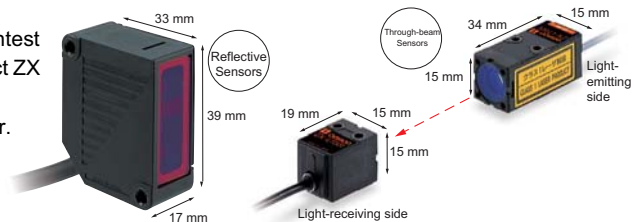
Be sure to read *Safety Precautions* on page 468.

Features

The World's Smallest and Lightest *As of October 1, 2001

In addition to the obvious size difference, the ZX Series offers the world's lightest Sensors. Approximately the same size as a photoelectric sensor, the compact ZX Sensors contribute considerably to space-saving efforts on production sites. Naturally, response speed is also equivalent to that of a photoelectric sensor.

* High-speed sampling: 0.15 ms (response speed: 0.3 ms)



8 Reflective Types and 3 Through-beam Types Available

Reflective Sensors **Class 2 visible laser** * For 4,096 sampling cycles

Select the model according to the application. Use a spot beam to detect small items, or a line beam for ordinary workpieces.

Measurement distance also ranges from 28 to 500 mm, enabling seamless coverage for various detection applications.



ZS-HL

ZS-L

ZX-L-N

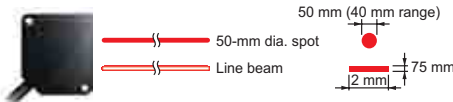
ZX-E

ZX-T

ZX-GT

Spot form

Two-spot Sensors



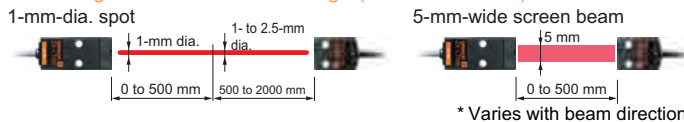
Distance range (resolution)



Through-beam Sensors **Class 2 visible laser** * For 64 sampling cycles

Use a 1-mm-dia. spot for precise positioning, or a 5- to 10-mm-wide screen beam for area detection.

Measuring width and distance range (4-mm resolution)



* Varies with beam direction

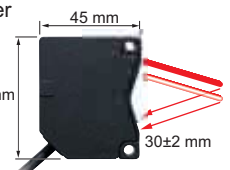
Regular reflection (displacement) **Class 2 visible light laser**

Ideal for detecting mirror surfaces.

Distance range (0.25 mm resolution) 55 mm

One range

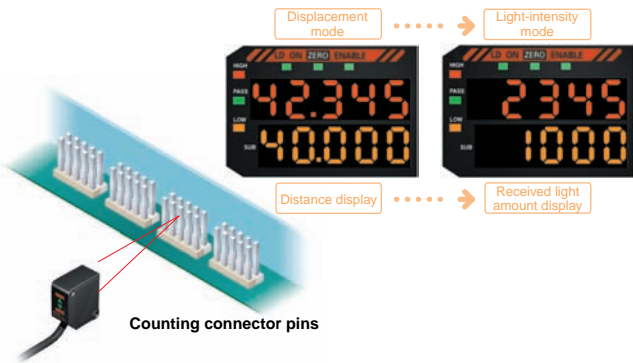
Spot form Two-spot Sensors



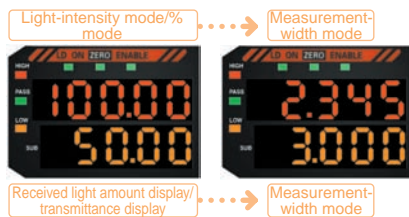
Light-intensity Mode: High-performance Laser Photoelectric Sensor

Light intensity can be detected by the ultra-small spot of the laser beam. By operating as a high-precision laser photoelectric sensor, rather than a displacement meter, this enables detection of small items with backgrounds, as well as color detection. Ideal function settings are possible by using both the displacement mode and the light-intensity mode to meet multiple application needs.

Reflective Sensors



Through-beam Sensors



Top Priority Placed on Easy Operation

Advanced functions and performance plus easy operation. This is a major feature of the ZX Series. Incorporating OMRON's Digital Fiber Amplifier interface. Experience operation that doesn't get any easier.



Equipped with a Laser Lifetime Monitor

Self-detection and Display of Laser Diode Lifetime




When laser diode deterioration is detected, a warning appears on the sub-digital display. Early detection enables timely, trouble-free replacement.



Comprehensive Teaching Functions

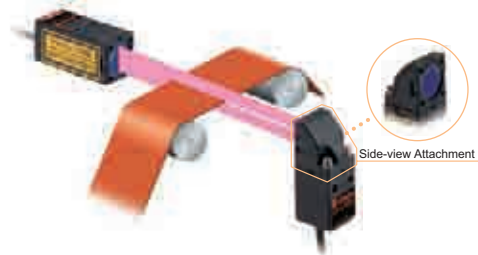
Position/2-point/Automatic

Three teaching functions rival the performance of photoelectric sensors.

-  Position teaching
For high-precision positioning applications
-  2-point teaching
For detecting ultra-small level differences between two points
-  Automatic teaching
For teaching without stopping the workpiece

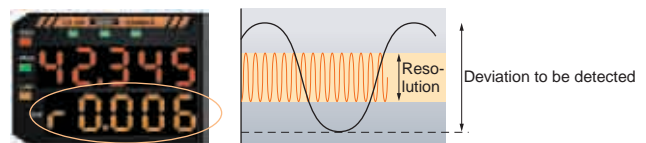
Flexible Mounting Direction

Install a Side-view Attachment (sold separately) for additional installation possibilities.



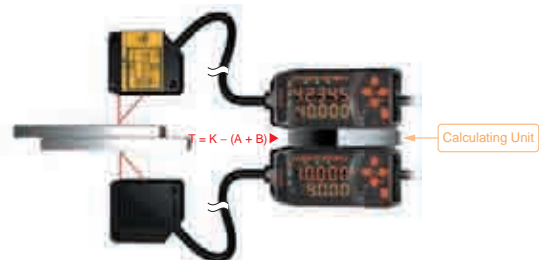
Easy-to-see Resolution Patent Pending

The resolution of the desired workpiece can also be easily determined by detection. The resolution display clearly shows the margin available for the threshold setting, to allow accurate judgement of detectability.



Operating Setting with No Need for a Digital Indicator Patent Pending

By simply fitting a Calculating Unit between two Amplifiers, the processing results of two Sensors can be displayed on a single Amplifier. Setting parameters need to be input only on one Amplifier.



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Other Information

ZS-HL

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Evolution from ZX-L: Point 1

More User Friendly

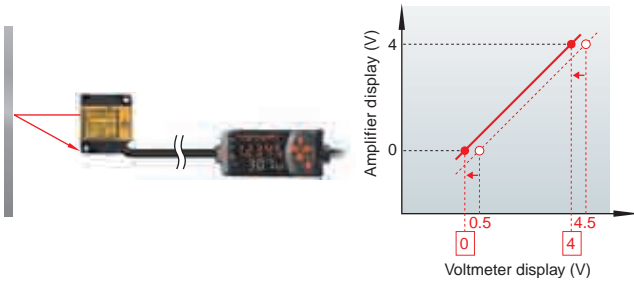
Zero Reset Time Display

A reference value other than zero can be set as the zero reset value.



Linear Output Correction

Various factors, such as conversion errors occurring with connected devices, may cause the output value displayed on the Amplifier to differ from the actual output from a voltmeter. Adjusting the Amplifier display while monitoring the actual output on a voltmeter can eliminate the difference between the two values.



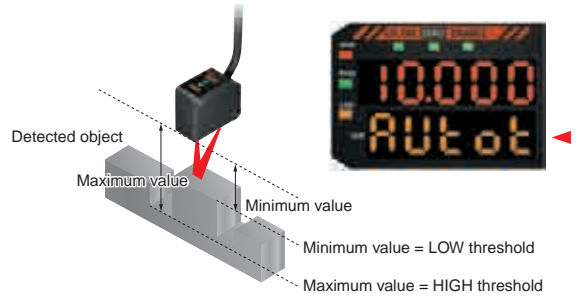
Present Value Display

The sub-digital display shows present values when the hold function is enabled. This makes it easy to check whether a measurement is within range.



Automatic Teaching

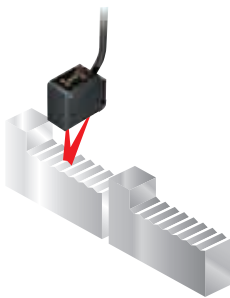
Maximum and minimum measurement values can be set as thresholds when automatic teaching is executed. It is useful for setting threshold values from actual measurements while the workpiece is moving.



Evolution from ZX-L: Point 2

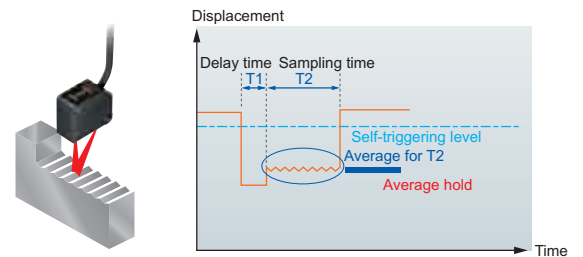
Enhanced Hold Function

Average hold and delay hold functions were added to enable accurate assessment of changes and the desired measurement position.



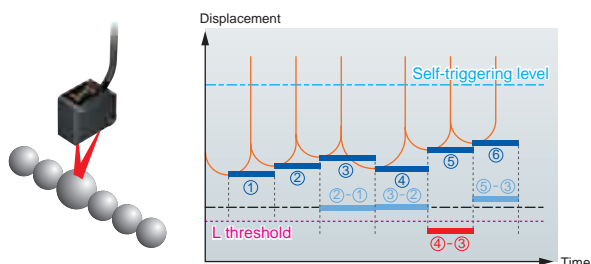
Delay Hold/Average Hold

The delay hold function measures only signals within the desired sampling time after a specified time delay from the trigger. The newly added average hold function is especially useful for measuring large workpieces with uneven surfaces.



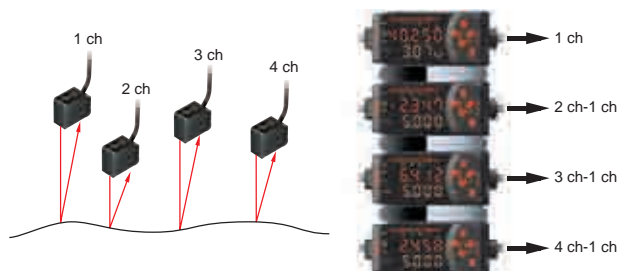
Previous Value Comparison Function

Gradual changes in measurements due to machine temperature changes or other factors can be ignored in certain situations, such as when detecting foreign matter around bearings. The previous value comparison function effectively detects any changes between previous and present values.



Multiple-point Measurements Computed Using 1 Point

The result computed for one point can be used as a basis for the output for every other point. This is especially useful for multiple-point measurements.



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Other Information

Introducing Smart Monitor V3

Smart Monitor V3

*1

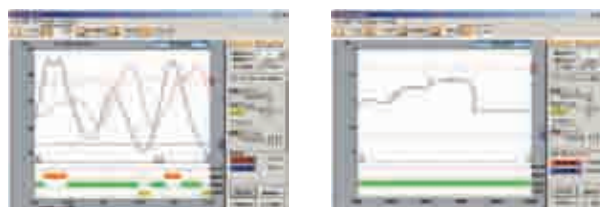
PC Connection Takes Full Advantage of Sensor Performance

Use of the PC screen greatly enhances the panel display. Unlike conventional systems, the detection results from applications such as waveform monitoring and data logging can also be easily processed.



Waveform Monitoring

Easy waveform monitoring replaces the conventional oscilloscope. Drag & drop threshold setting and other easy-to-use functions further enhance operation.



Waveform monitoring

One-shot waveform

Waveforms on up to 5 channels can be drawn with the new ZX-LDA-N. High-speed waveforms can be obtained and displayed in one-shot operation.

Flexible Quality Control

Data Logging

The ability to log detection data and manage the system history enables efficient and effective quality control, and aides in determining necessary countermeasures. Also displays data in waveform during logging.

List Display Simplifies Setup

Complicated settings can be easily made with only the Amplifier panel while referring to function menus. Settings can also be imported and exported as text data.

PC Software Specifications

Monitoring Digital Values

Setting differential direct threshold values
Teaching settings

Waveform Monitoring

Waveform collection
Waveform observation
Waveform saving and loading

Data Logging

Compilation settings
Microsoft Excel compatible *2

Configurator Functions

Setting Amplifier functions (actual measurement scaling, input scaling, etc.)
Saving and loading Amplifier setting conditions

*1. Smart Monitor V3 is compatible with the ZX-L-N, ZX-L, ZX-E, and ZX-T.
System Requirements
OS: Windows 98, 2000, or XP
CPU Unit: Celeron 400 MHz or better
RAM: 64 MB min.
Available hard disk space: 50 MB min.
Display screen: 800 × 600 dots and 256 colors min.
Baud rate: 38,400 bps min.
Use an RS-232C crossover cable to connect to the computer.
If the computer does not have an RS-232C port, use a USB-Serial Conversion Cable (CS1W-CF31 made by OMRON).

*2. Microsoft Excel is a registered trademark of the Microsoft Corporation.

ZS-HL

ZS-L

ZX-L-N

ZX-E

ZX-T

ZX-GT

ZX-L-N

Ordering Information

Sensors

Sensor Heads (Reflective)

Optical system	Beam shape	Sensing distance			Resolution *	Model
Diffuse reflective	Spot beam	40±10 mm			2 μm	ZX-LD40
		100±40 mm			16 μm	ZX-LD100
				300±200 mm	300 μm	ZX-LD300
	Line beam	40±10 mm			2 μm	ZX-LD40L
		100±40 mm			16 μm	ZX-LD100L
				300±200 mm	300 μm	ZX-LD300L
Regular reflective	Spot beam	30±2 mm			0.25 μm	ZX-LD30V
	Line beam					ZX-LD30VL


* For an average count of 4,096.

Sensor Heads (Through-beam)

Optical system	Measuring width	Sensing distance			Resolution *	Model
Through-beam	1-mm dia.	0 to 2000 mm			4 μm	ZX-LT001
	5 mm					ZX-LT005
	10 mm	0 to 500 mm				ZX-LT010
	30 mm				12 μm	ZX-LT030

* For an average count of 64.


Amplifier Units

Appearance	Power supply	Output type	Model
	DC	NPN	ZX-LDA11-N
		PNP	ZX-LDA41-N


Note: Compatible connection with the Sensor Head.

Accessories (Order Separately)



Side-view Attachments

Appearance	Applicable Sensor Head	Model
	ZX-LT001 ZX-LT005	ZX-XF12
	ZX-LT010	ZX-XF22

Calculating Unit

Appearance	Model
	ZX-CAL2

SmartMonitor Sensor Setup Tool for Personal Computer Connection

Appearance	Name	Model
	ZX-Series Communications Interface Unit	ZX-SF11
	ZX-Series Communications Interface Unit + ZX-Series Sensor Setup Software	ZX-SFW11EV3 *1 *2
CD-ROM	ZX-Series Function Setting and Logging Software	ZX-SW11EV3 *2

*1. When using the ZX-LDA11-N/41 with the SmartMonitor, either the ZX-SFW11EV3 or the ZX-SW11EV3 SmartMonitor must be used. Earlier versions cannot be used.

*2. The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

Cables with Connectors on Both Ends (for Extension) *1

Cable length	Model	Quantity
1 m	ZX-XC1A	1
4 m	ZX-XC4A	
8 m	ZX-XC8A	
9 m *2	ZX-XC9A	

*1. Robot Cable models are also available. The model numbers are ZX-XC□R.

*2. For use with ZX-L only.

ZS-HL

ZS-L

ZX-L-N

ZX-E

ZX-T

ZX-GT

Ratings and Specifications

Sensor Heads (Reflective)

Item	Model	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
Optical system	Diffuse reflective				Regular reflective	Diffuse reflective			
Light source (wave length)	Visible-light semiconductor laser with a wavelength of 650 nm and an output of 1 mW max.; class 2 (*5)								
Measurement distance at center	40 mm	100 mm	300 mm	30 mm	40 mm	100 mm	300 mm	30 mm	
Measurement range	±10 mm	±40 mm	±200 mm	±2 mm	±10 mm	±40 mm	±200 mm	±2 mm	
Beam shape	Spot				Line				
Beam diameter *1	50-μm dia.	100-μm dia.	300-μm dia.	75-μm dia.	75 μm × 2 mm	150 μm × 2 mm	450 μm × 2 mm	100 μm × 18 mm	
Resolution *2	2 μm	16 μm	300 μm	0.25 μm	2 μm	16 μm	300 μm	0.25 μm	
Linearity *3	±0.2% F.S. (entire range)	±0.2% F.S. (80 to 120 mm)	±2% F.S. (200 to 400 mm)	±0.2% F.S. (entire range)	±0.2% F.S. (32 to 48 mm)	±0.2% F.S. (80 to 120 mm)	±2% F.S. (200 to 400 mm)	±0.2% F.S. (entire range)	
Temperature characteristic *4	±0.03% F.S./°C (Except for ZX-LD300 and ZX-LD300L, which are ±0.1% F.S./°C.)								
Ambient operating illumination	Incandescent lamp: 3,000 lx max. (on light receiving side)								
Ambient temperature	Operating: 0 to 50°C, Storage: -15 to 60°C (with no icing or condensation)								
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)								
Insulation resistance	20 MΩ min. at 500 VDC								
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min								
Vibration resistance	Destruction: 10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions								
Shock resistance	Destruction: 300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)								
Degree of protection	IP50 (IEC)			IP40 (IEC)	IP50 (IEC)				IP40 (IEC)
Connection method	Connector relay (standard cable length: 500 mm)								
Weight (packed state)	Approx. 150 g			Approx. 250 g	Approx. 150 g				Approx. 250 g
Materials	Case: PBT (polybutylene terephthalate), Cover: Aluminum, Lens: Glass			Case and cover: Aluminum, Lens: Glass	Case: PBT (polybutylene terephthalate), Cover: Aluminum, Lens: Glass				Case and cover: Aluminum, Lens: Glass
Accessories	Instruction Manual, Laser warning label (English)								

Note: Highly reflective objects can result in incorrect detection by causing out-of-range measurements.

*1. Beam diameter: The beam diameter is defined by $1/e^2$ (13.5%) of the strength of the beam at the beam center (measured value). Incorrect detection may occur if there is light leakage outside the defined spot and the material around the sensing object is more reflective than the sensing object.

*2. Resolution: The resolution is the deviation ($\pm 3\sigma$) in the linear output when connected to the ZX-LDA Amplifier Unit. (The resolution is measured with OMRON's standard reference object (white ceramic) at the measurement center with the ZX-LDA set for an average count of 4,096 per period.)

The resolution is given at the repeat accuracy for a stationary workpiece, and is not an indication of the distance accuracy. The resolution may be adversely affected under strong electromagnetic fields.

*3. Linearity: The linearity is given as the error in an ideal straight line displacement output when measuring OMRON's standard reference object. The linearity and measurement values vary with the object being measured.

*4. Temperature characteristic: The temperature characteristic is measured at the measurement distance at center with the space between the Sensor Head and the workpiece (OMRON's standard reference object) fixed with an aluminum jig.

*5. Europe: Class 2 EN60825-1 (IEC 60825-1)

U.S.A.: Class II FDA (21CFR 1040.10 and 1040.11)

Sensor Heads (Through-beam)

Item	Model	ZX-LT001	ZX-LT005	ZX-LT010	ZX-LT030
Optical system	Through-beam				
Light source (wave length)	Visible-light semiconductor laser with a wavelength of 650 nm; class1 (*4)				
Maximum output	0.2 mW max.		0.35 mW max.		0.2 mW max.
Measurement width	1-mm dia.	1- to 2.5-mm dia.	5 mm	10 mm	30 mm
Measurement distance	0 to 500 mm	500 to 2,000 mm	0 to 500 mm		
Minimum sensing object	8-μm dia. (opaque)	8- to 50-μm dia. (opaque)	0.05-mm dia. (opaque)	0.1-mm dia. (opaque)	0.3-mm dia. (opaque)
Resolution *1	4 μm *2	---	4 μm *3		12 μm *4
Temperature characteristic	0.2% F.S./°C				±0.3% F.S./°C
Ambient illumination	Incandescent lamp: 10,000 lx max. (on light receiving side)				
Ambient temperature	Operating: 0 to 50°C, Storage: -25 to 70°C (with no icing or condensation)				
Degree of protection	IP40 (IEC)				
Connection method	Connector relay (standard cable length: 500 mm)				
Cable length	Extendable up to 10 m with special extension cable				
Weight (packed state)	Approx. 220 g				Approx. 450 g
Materials	Unit cover: Glass				Case and Case cover: Zinc die-cast
	Case: Polyether imide, Case cover: Polycarbonate				
Tightening torque	0.3 N·m max.				---
Accessories	Sensor head-amplifier connection cable (1.5 m), instruction manual				Mounting bracket
	Optical axis adjustment seal				

*1. This value is obtained by converting the deviation ($\pm 3\sigma$) in the linear output that results when the sensor head is connected to the amplifier unit, into the measurement width.

*2. For an average count of 64. The value is 5 μm for an average count of 32.

This is the value that results when a minimum sensing object blocks the light near the center of the 1-mm measurement width.

*3. For an average count of 64. The value is 5 μm for an average count of 32.

*4. Europe: Class 2 EN60825-1 (IEC 60825-1)

U.S.A.: Class II FDA (21CFR 1040.10 and 1040.11)

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Displacement Sensors

Other Information

ZS-HL

ZS-L

ZX-L-N

ZX-E

ZX-T

ZX-GT

Amplifier Units

Item	Model	ZX-LDA11-N	ZX-LDA41-N
Measurement period		150 μs	
Possible average count settings *1		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Temperature characteristic		When connected to a Reflective Sensor Head: 0.01% F.S./°C, When connected to a Through-beam Sensor Head: 0.1% F.S./°C	
Linear output *2		4 to 20 mA/F.S., Max. load resistance: 300 Ω, ±4 V (±5 V, 1 to 5 V *3), Output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW) *1		NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Laser OFF input, zero reset input, timing input, reset input		ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within -1.5 V OFF: Open (leakage current: 0.1 mA max.)
Functions		Measurement value display, present value/set value/light level/resolution display, scaling, display reverse, display OFF mode, ECO mode, number of display digit changes, sample hold, peak hold, bottom hold, peak-to-peak hold, self-peak hold, self-bottom hold, average hold, delay hold, intensity mode, zero reset, initial reset, ON-delay timer, OFF-delay timer, one-shot timer, deviation, previous value comparison, sensitivity adjustment, keep/clamp switch, direct threshold value setting, position teaching, 2-point teaching, automatic teaching, hysteresis width setting, timing inputs, reset input, monitor focus, linear output compensation, (A-B) calculations *4, (A+B) calculations *4, mutual interference *4, laser deterioration detection, zero reset memory, zero reset display, function lock	
Indications		Operation indicators: High (orange), pass (green), low (yellow), 7-segment main display (red), 7-segment subdisplay (yellow), laser ON (green), zero reset (green), enable (green)	
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p): 10% max.	
Current consumption		140 mA max. with power supply voltage of 24 VDC (with Sensor connected)	
Ambient temperature		Operating: 0 to 50°C, Storage: -15 to 60°C (with no icing or condensation)	
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance		20 MΩ min. at 500 VDC	
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance		Destruction: 10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions	
Shock resistance		Destruction: 300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)	
Connection method		Prewired (standard cable length: 2 m)	
Weight (packed state)		Approx. 350 g	
Materials	Case	PBT (polybutylene terephthalate)	
	Cover	Polycarbonate	
Accessories		Instruction Manual	

*1. The response speed of the linear output is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

The response speed of the judgement outputs is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

*2. The output can be switched between a current output and voltage output using a switch on the bottom of the Amplifier Unit.

*3. Setting is possible via the monitor focus function.

*4. A Calculating Unit (ZX-CAL2) is required. (Mutual interference can be prevented between up to two Amplifier Units.)

Calculating Unit

Item	Model	ZX-CAL2
Applicable Amplifier Units		ZX-LD11-N/41-N/ ZX-EDA11/41/ZX-TDA11/41
Current consumption		12 mA max. (supplied from the Smart Sensor Amplifier Unit)
Ambient temperature		Operating: 0 to 50°C, Storage: -15 to 60°C (with no icing or condensation)
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)
Connection method		Connector
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min
Insulation resistance		100 MΩ (at 500 VDC)
Vibration resistance		Destruction: 10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions
Shock resistance		Destruction: 300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)
Materials	Display	Acrylic
	Case	ABS resin
Weight (packed state)		Approx. 50 g
Accessories		Instruction Manual

ZX-Series Communications Interface Unit

Item	Model	ZX-SF11
Current consumption		60 mA max. (supplied by the Amplifier Unit)
Applicable Amplifier Units		ZX Series
Applicable Amplifier Unit versions		ZX-LDA□1-N Ver. 1.000 or higher ZX-EDA□1 Ver. 1.100 or higher ZX-TDA□1 Ver. 1.000 or higher
Max. No. of Amplifier Units		5
Com- muni- cations func- tions	Communications port	RS-232C port (9-pin D-Sub Connector)
	Communications protocol	CompoWay/F *
	Baud rate	38,400 bps
	Data configuration	Data bits: 8, Parity: none, Start bits: 1, Stop bits: 1, Flow control: none
Indicators		Power supply: green, Sensor communications: green, Sensor communications error: red, External terminal communications: green, External terminal communications error: red
Protection circuits		Reverse polarity protection
Ambient temperature		Operating: 0 to 50°C, storage: -15 to 60°C (with no icing or condensation)
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min, Leakage current: 10 mA max.
Materials		Case: PBT (polybutylene terephthalate), Cover: Polycarbonate
Accessories		Instruction Manual, 2 clamps

* Contact your OMRON representative for CompoWay/F communications specifications.

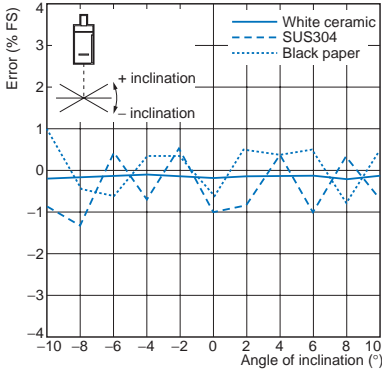
Engineering Data (Typical)

Angle Characteristic (Reflective Sensors)

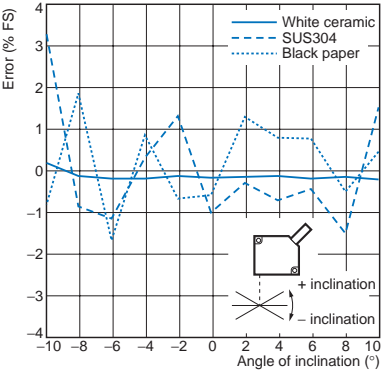
The angle characteristic plots the relation between the inclination of the measurement object and the error in the linear output at the measurement point.

ZX-LD40

Side-to-side Inclination

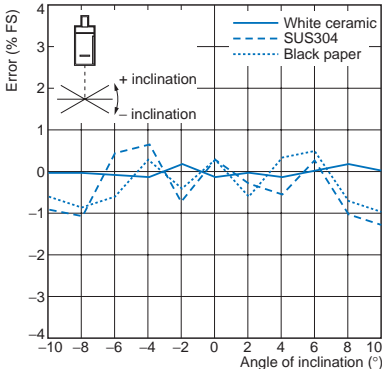


Front-to-back Inclination

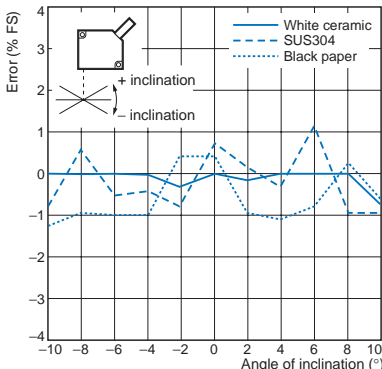


ZX-LD100

Side-to-side Inclination

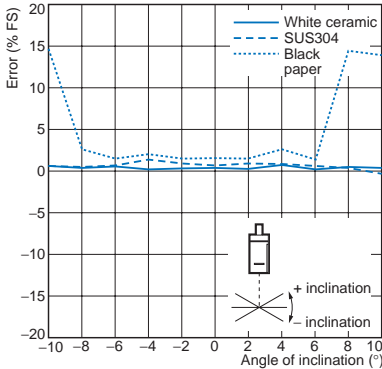


Front-to-back Inclination

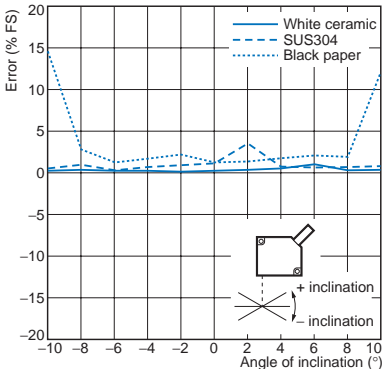


ZX-LD300

Side-to-side Inclination



Front-to-back Inclination



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ZS-L

ZX-L-N

ZX-E

ZX-T

ZX-GT

ZX-L-N

Sensing
Guide

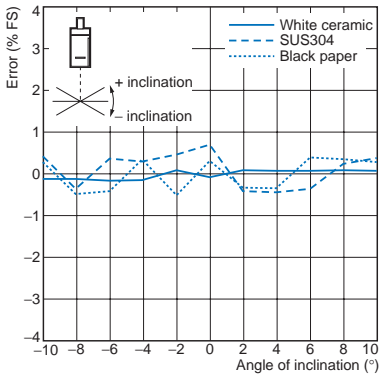
Smart
Sensors

Displacement
Sensors

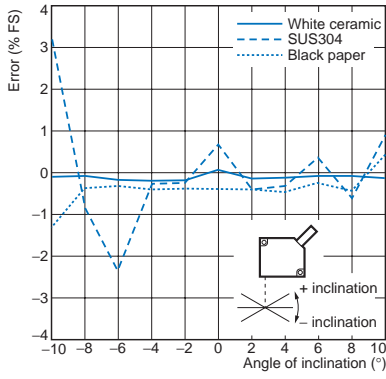
Other
Information

ZX-LD40L

Side-to-side Inclination

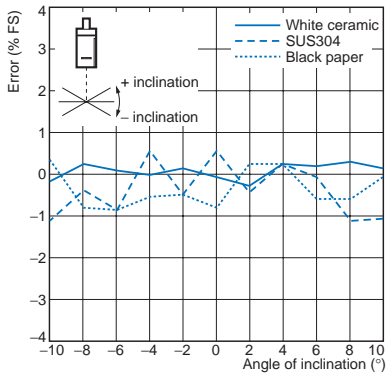


Front-to-back Inclination

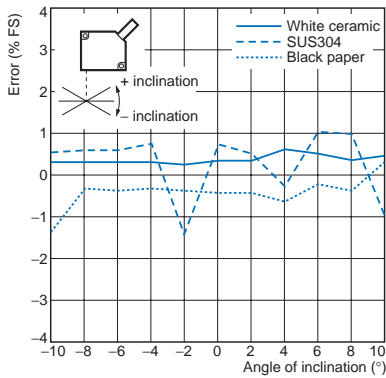


ZX-LD100L

Side-to-side Inclination

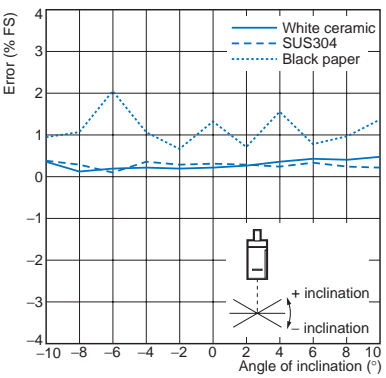


Front-to-back Inclination

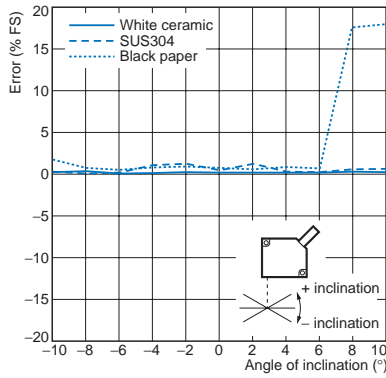


ZX-LD300L

Side-to-side Inclination



Front-to-back Inclination



ZS-HL

ZS-L

ZX-L-N

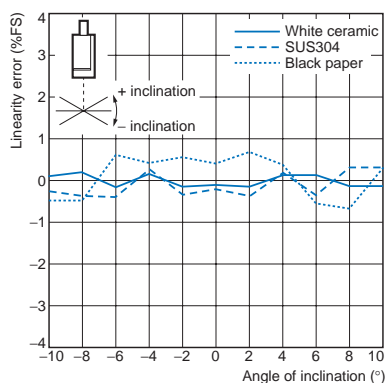
ZX-E

ZX-T

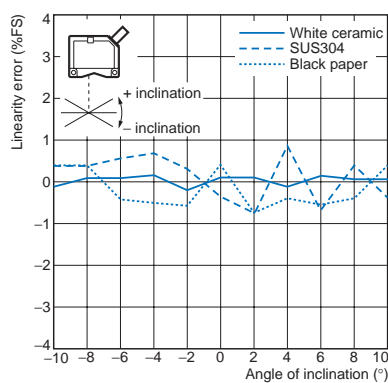
ZX-GT

ZX-LD30V

Side-to-side Inclination

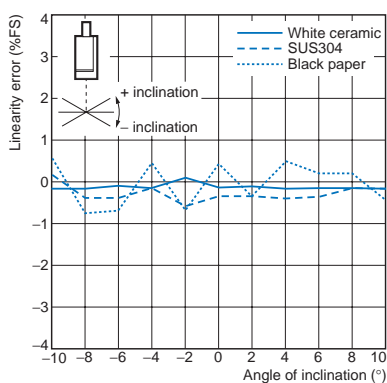


Front-to-back Inclination

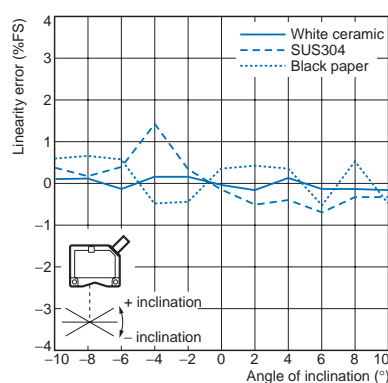


ZX-LD30VL

Side-to-side Inclination



Front-to-back Inclination



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ZX-L-N

ZX-E

ZX-T

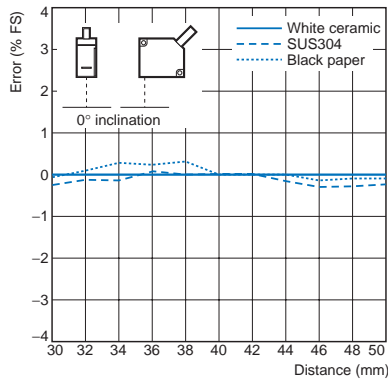
ZX-GT

ZX-L-N

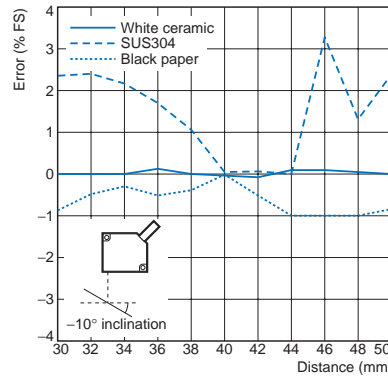
Linearity Characteristic for Different Materials (Reflective Sensors)

ZX-LD40

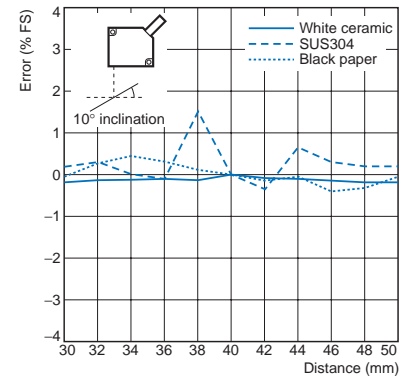
0° Inclination



-10° Inclination Front-to-back

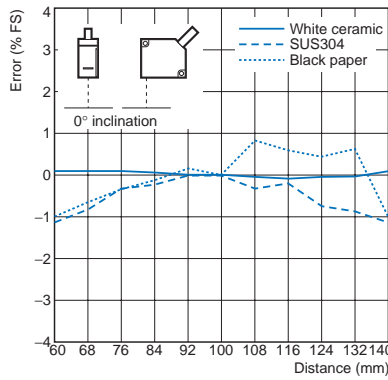


10° Inclination

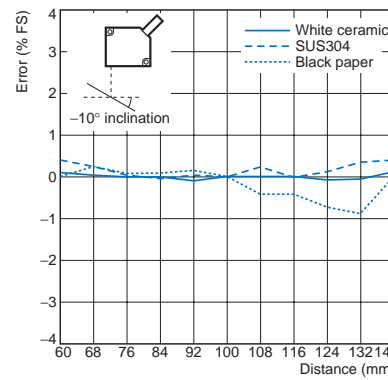


ZX-LD100

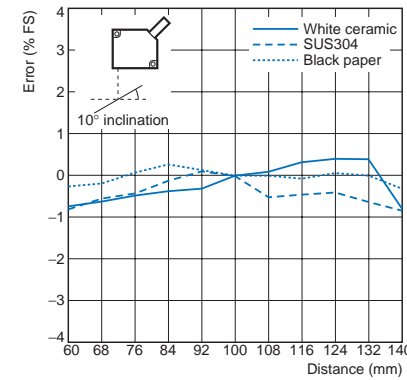
0° Inclination



-10° Inclination Front-to-back

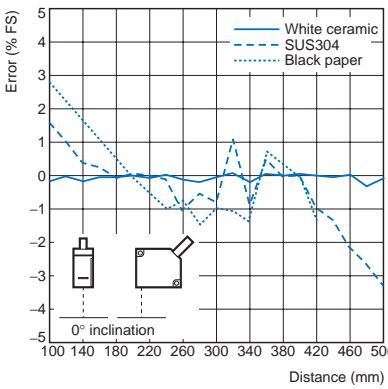


10° Inclination

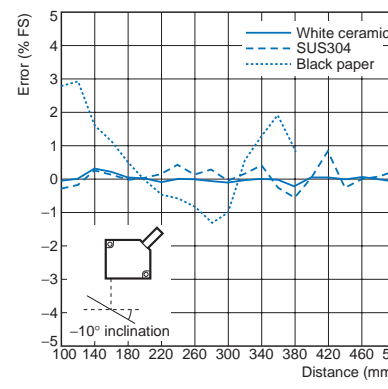


ZX-LD300

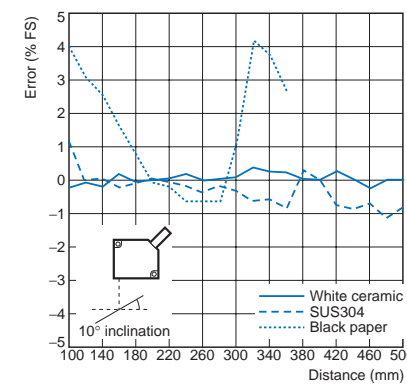
0° Inclination



-10° Inclination Front-to-back

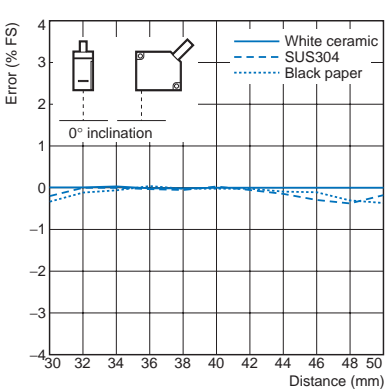


10° Inclination

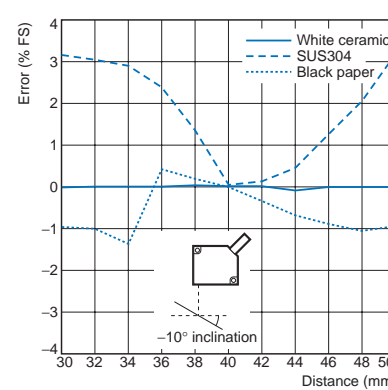


ZX-LD40L

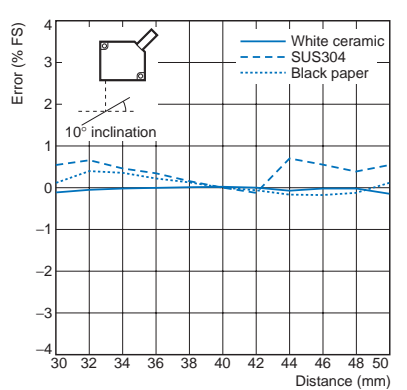
0° Inclination



-10° Inclination Front-to-back



10° Inclination



ZS-HL

ZS-L

ZX-L-N

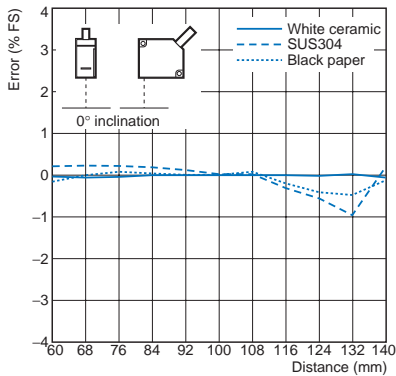
ZX-E

ZX-T

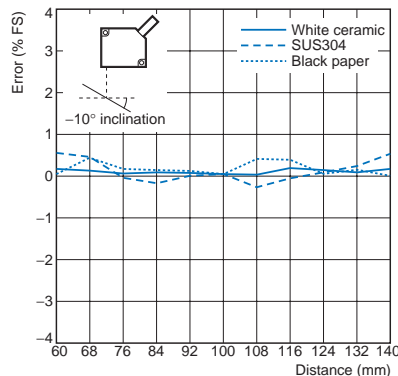
ZX-GT

ZX-LD100L

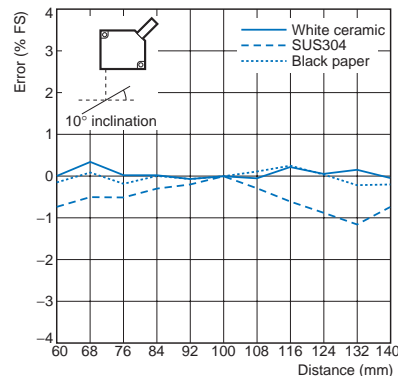
0° Inclination



-10° Inclination Front-to-back

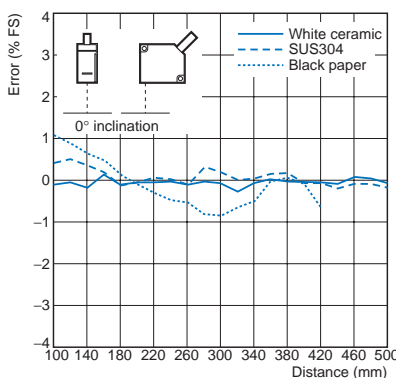


10° Inclination

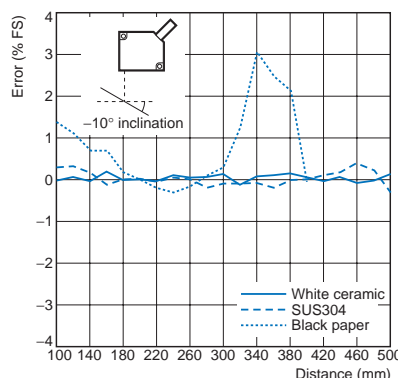


ZX-LD300L

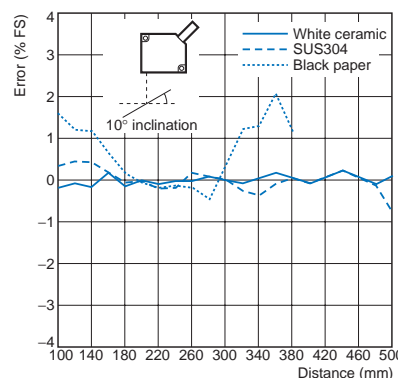
0° Inclination



-10° Inclination Front-to-back

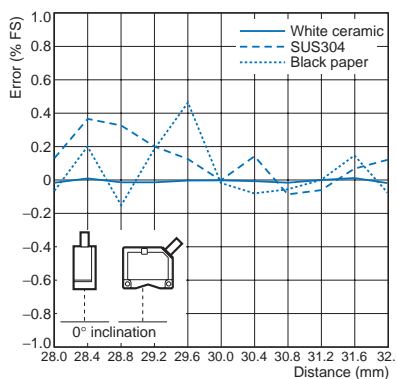


10° Inclination

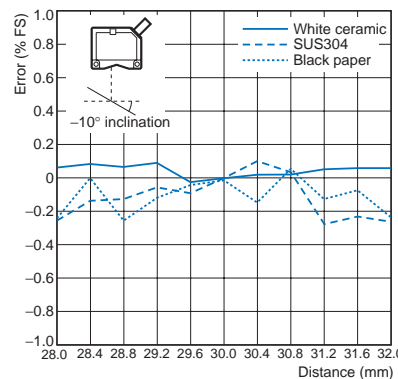


ZX-LD30V

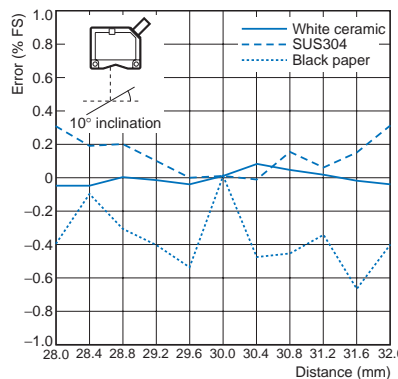
0° Inclination



-10° Inclination Front-to-back

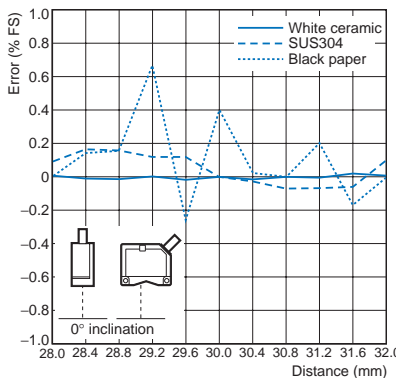


10° Inclination

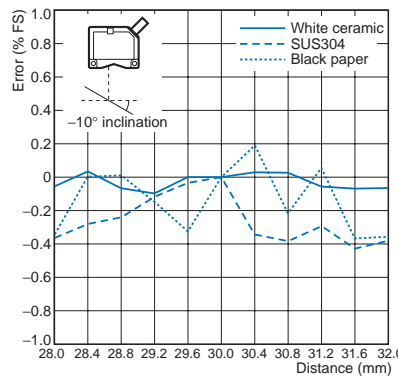


ZX-LD30VL

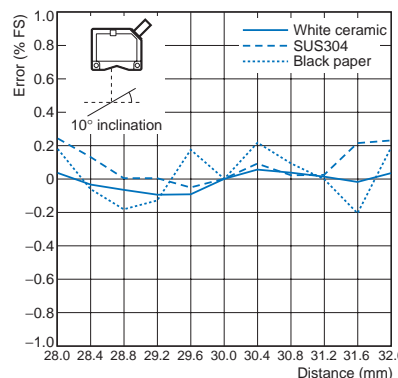
0° Inclination



-10° Inclination Front-to-back



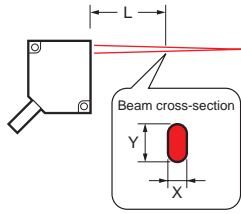
10° Inclination



ZX-L-N

Beam diameter (Reflective Sensors)

Spot Beams



ZX-LD40

L	30 mm	40 mm	50 mm
X	240 μm	40.0 μm	250 μm
Y	350 μm	30.0 μm	370 μm

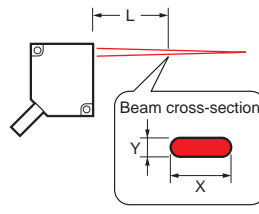
ZX-LD100

L	60 mm	100 mm	140 mm
X	390 μm	100 μm	430 μm
Y	620 μm	65.0 μm	650 μm

ZX-LD300

L	100 mm	300 mm	500 mm
X	1050 μm	180 μm	1100 μm
Y	450 μm	300 μm	850 μm

Line Beams



ZX-LD40L

L	30 mm	40 mm	50 mm
X	2000 μm	2000 μm	2000 μm
Y	240 μm	50.0 μm	250 μm

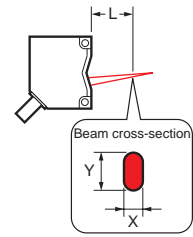
ZX-LD100L

L	60 mm	100 mm	140 mm
X	2000 μm	2000 μm	2000 μm
Y	410 μm	100 μm	430 μm

ZX-LD300L

L	100 mm	300 mm	500 mm
X	2000 μm	2000 μm	2500 μm
Y	750 μm	300 μm	650 μm

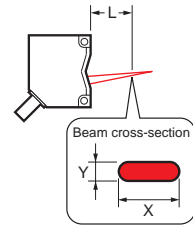
Spot Beams



ZX-LD30V

L	28 mm	30 mm	32 mm
X	60.0 μm	30.0 μm	120 μm
Y	50.0 μm	40.0 μm	90.0 μm

Line Beams



ZX-LD30VL

L	28 mm	30 mm	32 mm
X	1800 μm	1800 μm	1800 μm
Y	90.0 μm	60.0 μm	110 μm

ZS-HL

ZS-L

ZX-L-N

ZX-E

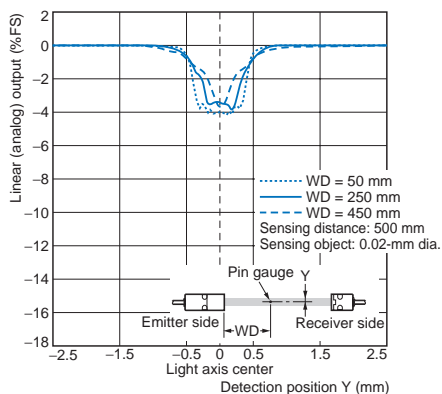
ZX-T

ZX-GT

Sensing Object Characteristics (Through-beam Sensors)

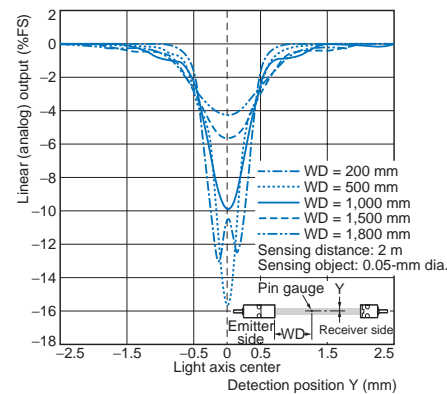
ZX-LT001

(For 0.02-mm-dia. pin gauge)



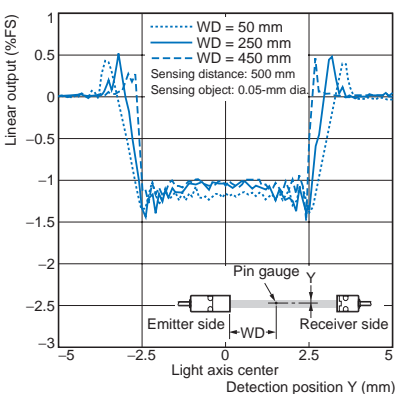
ZX-LT001

(For 0.05-mm-dia. pin gauge)



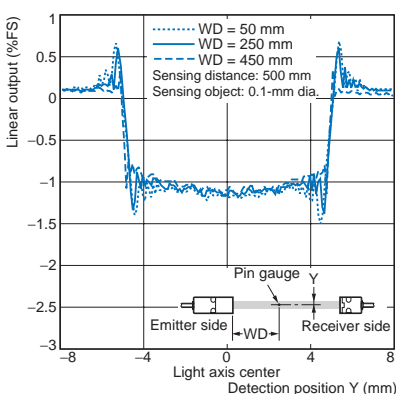
ZX-LT005

(For 0.05-mm-dia. pin gauge)



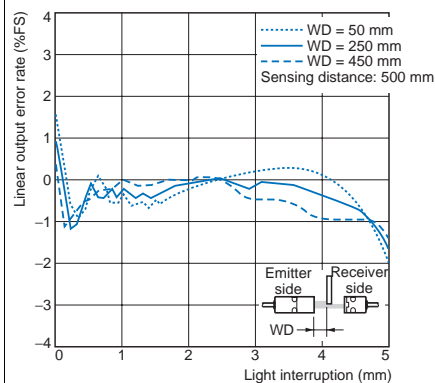
ZX-LT010

(For 0.1-mm-dia. pin gauge)

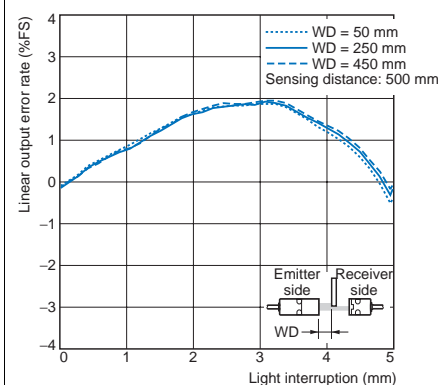


Linearity Characteristics

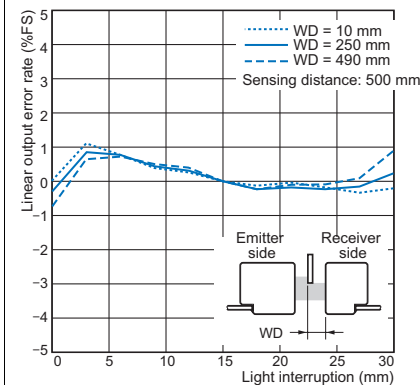
ZX-LT005



ZX-LT010



ZX-LT030



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Linear Output vs. Sensing Distance

The output can be switched between a current output and a voltage output using a switch on the Amplifier Unit.

ZX-LD40/LD40L

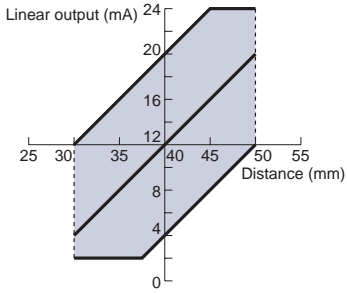
Sensing
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Smart
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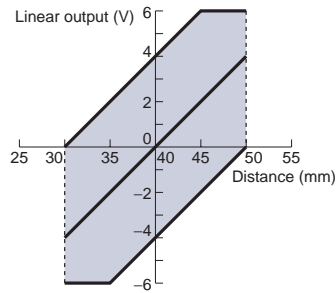
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Current Output

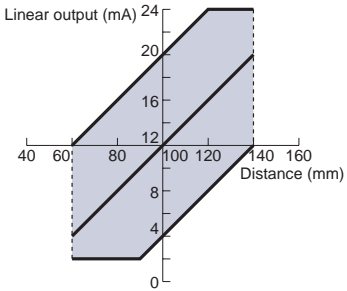


Voltage Output

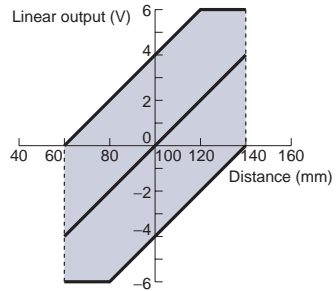


ZX-LD100/LD100L

Current Output

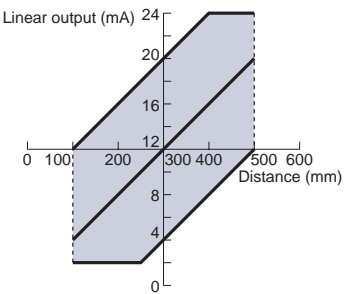


Voltage Output

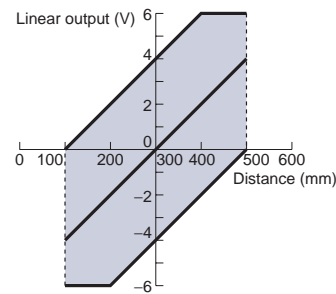


ZX-LD300/LD300L

Current Output

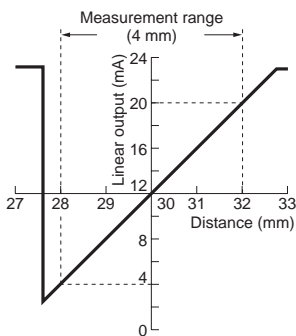


Voltage Output

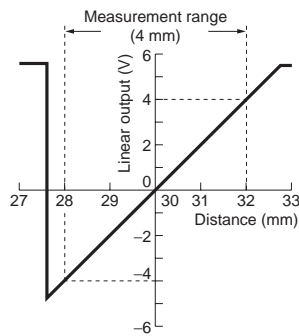


ZX-LD30V/LD30VL

Current Output



Voltage Output



ZS-HL

ZS-L

ZX-L-N

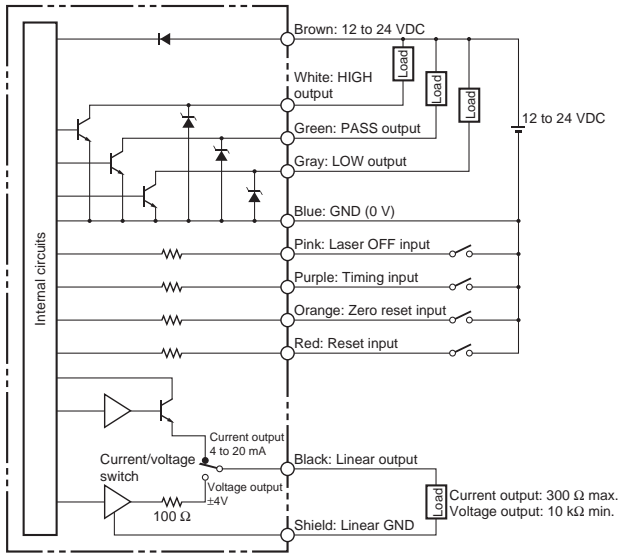
ZX-E

ZX-T

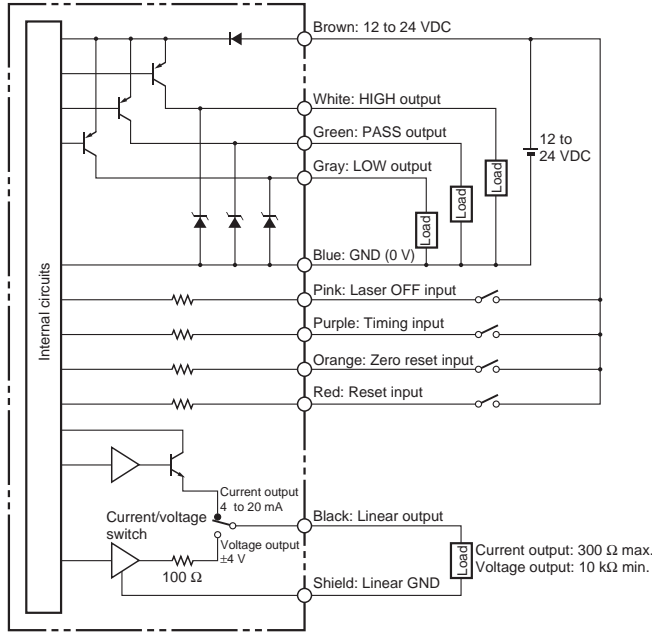
ZX-GT

I/O Circuit Diagrams

NPN Amplifier Unit: ZX-LDA11-N

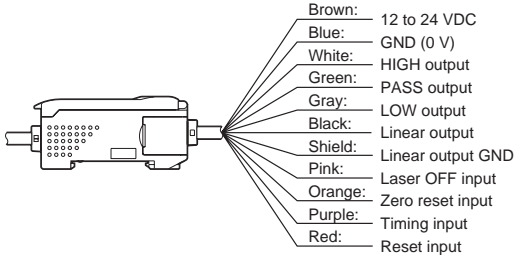


PNP Amplifier Unit: ZX-LDA41-N



Connections

Amplifier Unit ZX-LDA11-N/41-N



- Note: 1. Use a separate stabilized power supply for the Amplifier Unit, particularly when high resolution is required.
 2. Wire the Unit correctly. Incorrect wiring may result in damage to the Unit. (Do not allow wiring, particularly the linear output, to come into contact with other lines.)
 3. Use the 0-V line (blue) for the power supply and use the shield wire (linear output ground) together with the linear output (black line) for linear output. Each of these grounds must be used for the designed purpose. When not using the linear output, connect the linear ground (shield) to the 0-V ground.

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- ZS-L
- ZX-L-N
- ZX-E
- ZX-T
- ZX-GT

ZX-L-N

Safety Precautions

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Refer to *Warranty and Limitations of Liability* on page F-2.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons. Do not use it for such purpose.



Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

Laser Safety

Laser products are subject to safety requirements stipulated both in Japan and overseas. These requirements are described here according to three conditions, covering use of the product in Japan and incorporation of the product into equipment for export overseas.



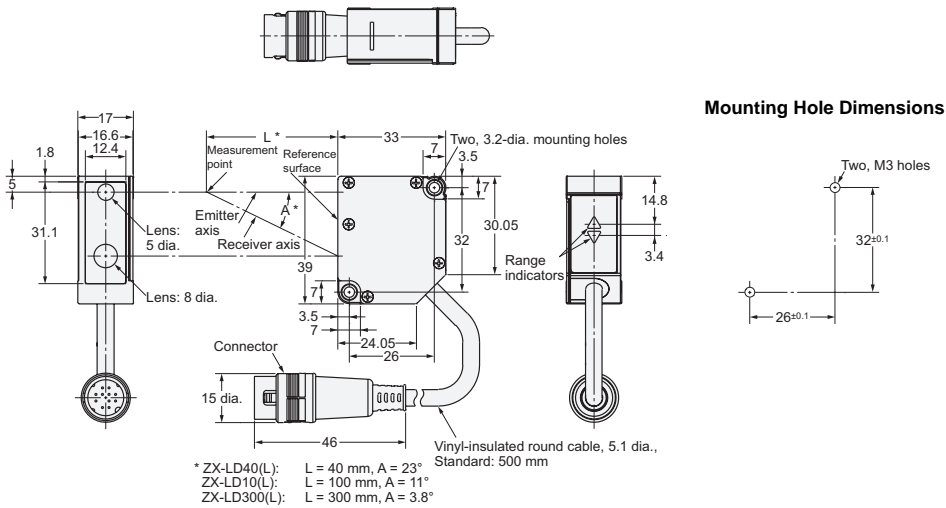
Dimensions

(Unit: mm)

Sensors

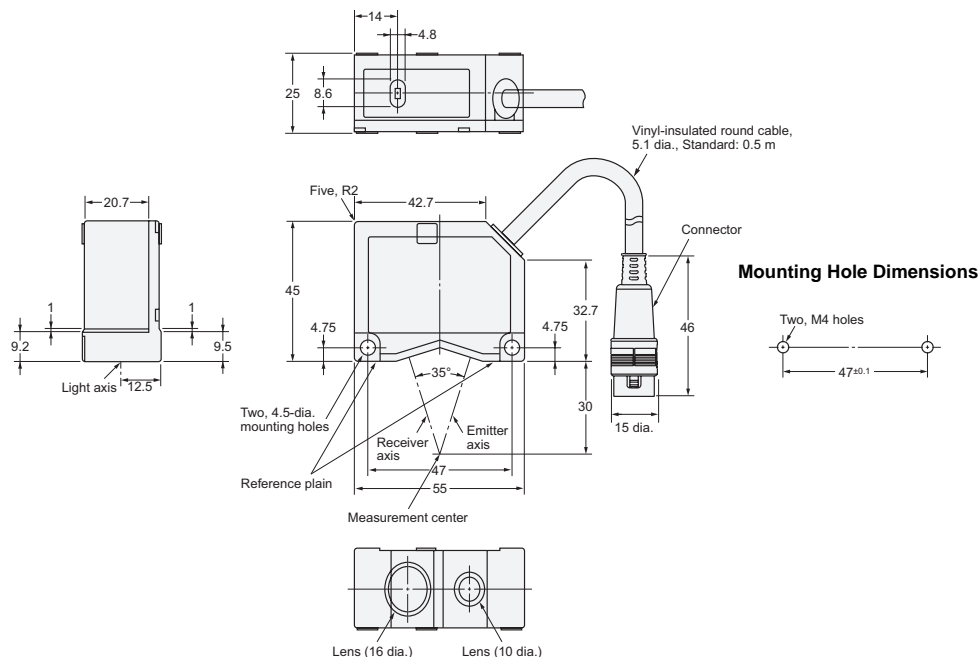
Sensor Heads (Diffuse Reflective)

- ZX-LD40
- ZX-LD100
- ZX-LD300
- ZX-LD40L
- ZX-LD100L
- ZX-LD300L



Sensor Heads (Regular Reflective)

- ZX-LD30V
- ZX-LD30VL



ZS-HL

ZS-L

ZX-L-N

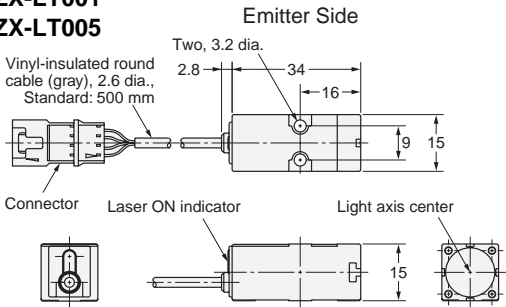
ZX-E

ZX-T

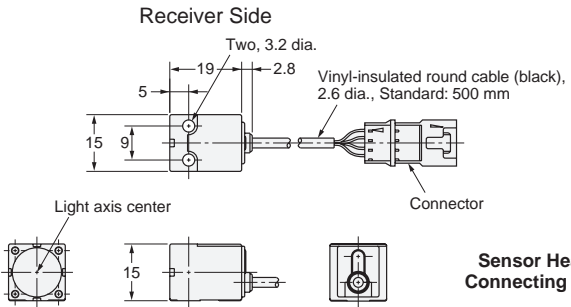
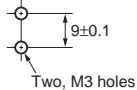
ZX-GT

Sensor Heads (Through-beam)

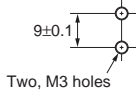
ZX-LT001
ZX-LT005



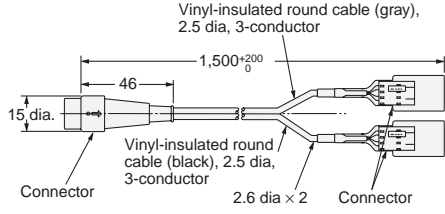
Mounting Hole Dimensions



Mounting Hole Dimensions

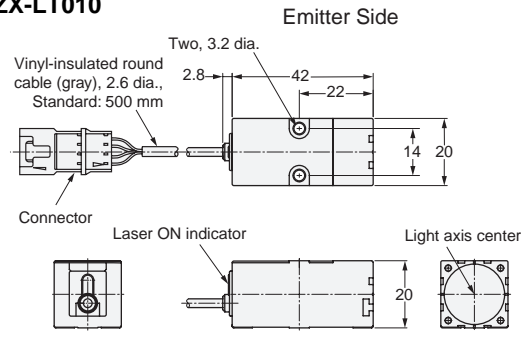


Sensor Head-Amplifier Unit
Connecting Cable (Provided)

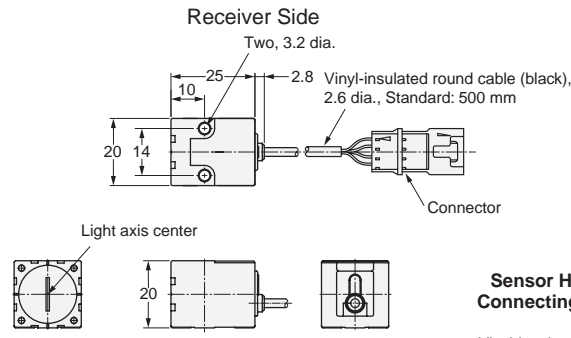
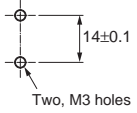


Sensor Heads (Through-beam)

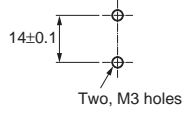
ZX-LT010



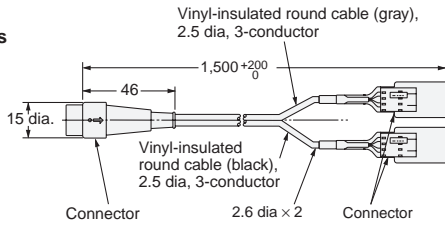
Mounting Hole Dimensions



Mounting Hole Dimensions



Sensor Head-Amplifier Unit
Connecting Cable (Provided)



- Sensing Guide
- Smart Sensors
- Displacement Sensors
- Other Information

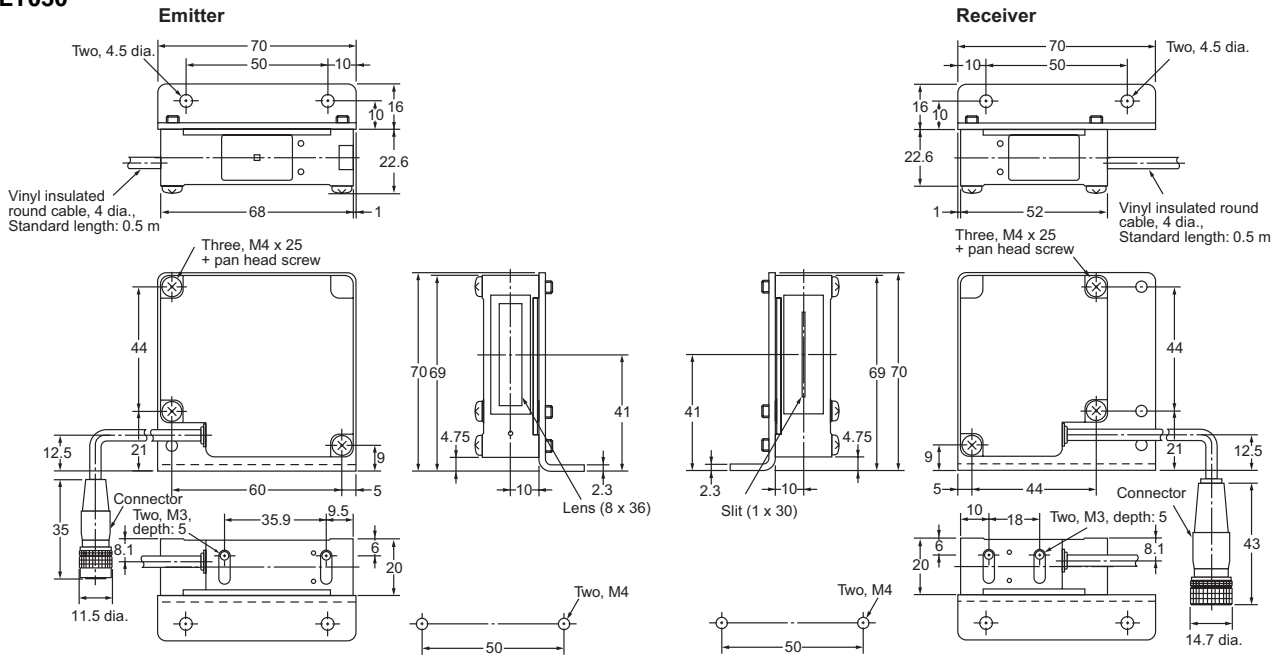
- ZS-HL
- ZS-L
- ZX-L-N
- ZX-E
- ZX-T
- ZX-GT

ZX-L-N

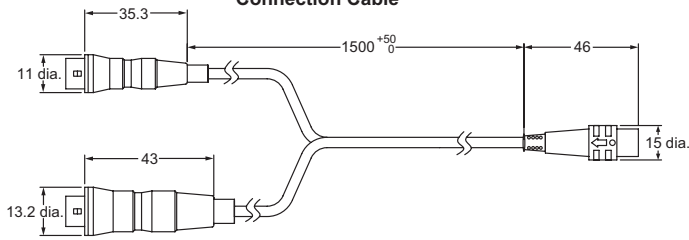
Sensor Heads (Through-beam)

ZX-LT030

- Sensing Guide
- Smart Sensors
- Displacement Sensors
- Other Information



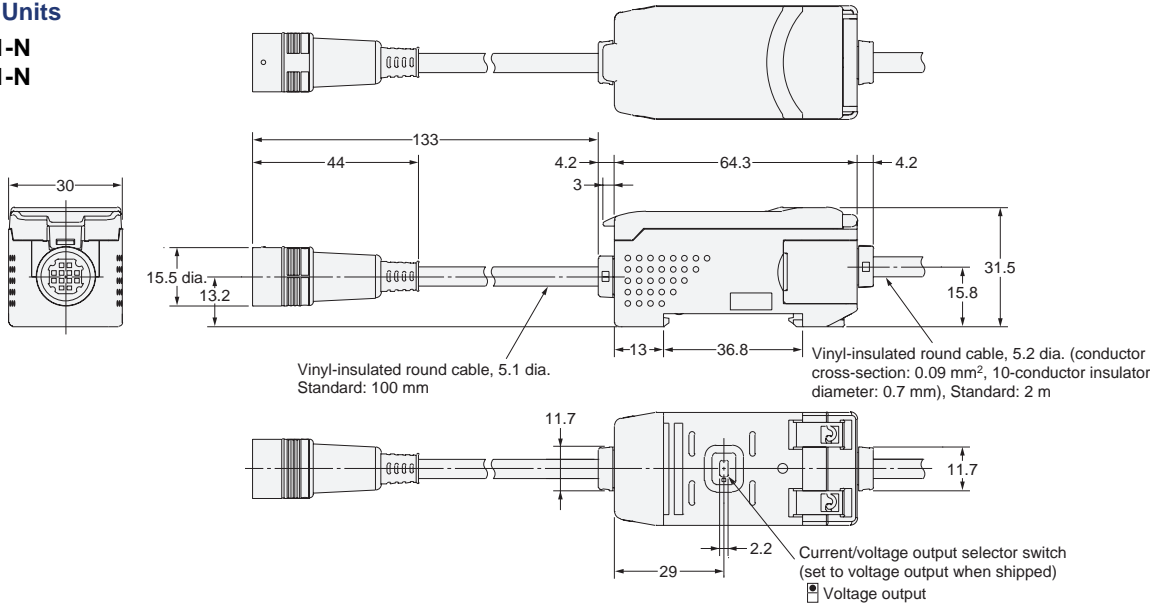
Sensor Head - Amplifier Unit Connection Cable



Amplifier Units

ZX-LDA11-N

ZX-LDA41-N



ZS-HL

ZS-L

ZX-L-N

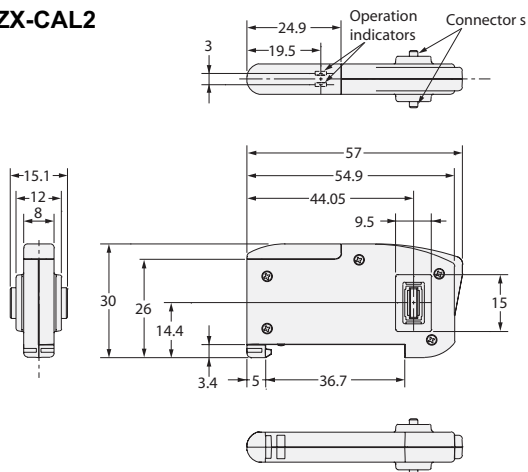
ZX-E

ZX-T

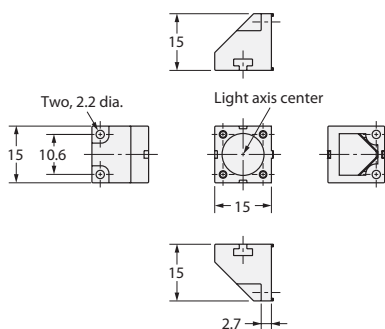
ZX-GT

Accessories (Order Separately)

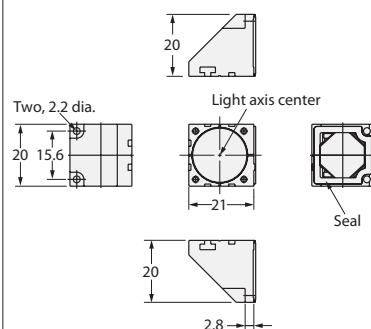
Calculating Unit
ZX-CAL2



Side-view Attachment
ZX-XF12



Side-view Attachment
ZX-XF22



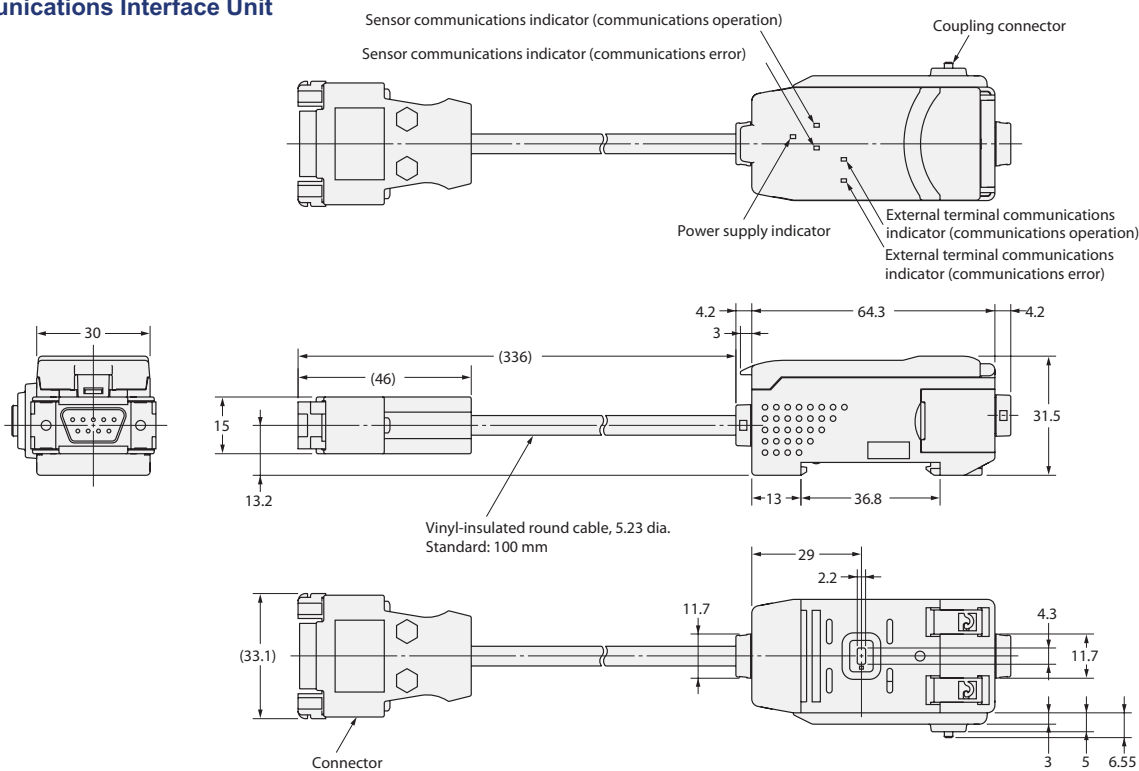
Sensing
Guide

Smart
Sensors

Displacement
Sensors

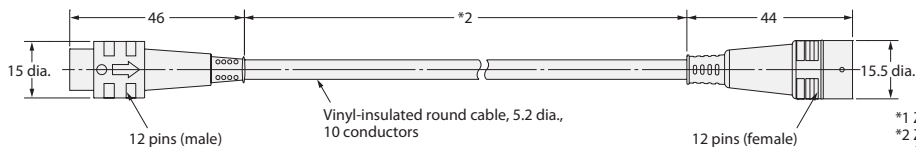
Other
Information

ZX-Series Communications Interface Unit
ZX-SF11



Cables with Connectors on Both Ends (for Extension)

- ZX-XC1A (1 m)
- ZX-XC4A (4 m)
- ZX-XC8A (8 m)
- ZX-XC9A (9 m) *1



*1 ZX-L only
*2 ZX-XC1A: 1000
ZX-XC4A: 4000
ZX-XC8A: 8000
ZX-XC9A: 9000

ZS-HL

ZS-L

ZX-L-N

ZX-E

ZX-T

ZX-GT

Cat. No. E828-E1-02

In the interest of product improvement, specifications are subject to change without notice.



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