

CMOS Laser Sensor with Built-in Amplifier ZX0

Stable Detection of Level Differences in the Order of 0.1 mm

- Dependable detection without being influenced by color, material, or surface conditions.
- Stable detection of small level differences or small workpieces.
- Models with different distance specifications for installation in essentially any location.
- Easy setup with one button.
- Compact design with built-in amplifier to reduce installation work and space requirements.



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

⚠ Refer to the *Precautions for all Photoelectric Sensors and Safety Precautions* on page 5.

Features

Stability

Detection of Essentially Any Workpiece

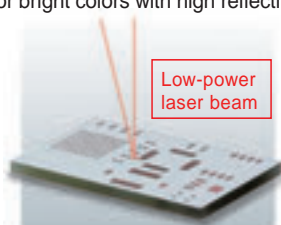
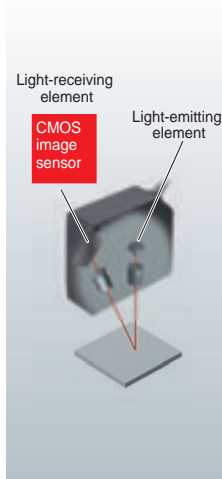
CMOS Image Sensor That Stably Detects Object without Being Influenced by Color, Material, or Surface Conditions

A CMOS image sensor combines with a step-less laser power adjustment algorithm to produce stable detection of all types of workpieces from black rubber with low reflectivity to stainless steel and other highly glossy materials.

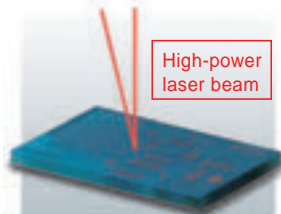
CMOS Image Sensor

Step-less Laser Power Adjustment Algorithm

For bright colors with high reflectivity:



For dark colors with low reflectivity:



Stable Detection of Small Level Differences or Small Workpieces

High Resolution and Narrow Beam Provide Stable Detection of Small Level Differences and Small Workpieces

The use of a CMOS image sensor ensures high resolution and enables detection of small level differences. An extremely narrow laser beam spot ensures detection of small workpieces.



Model	Sensing distance	Detectable level difference* ¹	Spot diameter* ²
ZX0-LD50	40 to 60 mm	0.2 mm	0.17 mm
ZX0-LD100	65 to 135 mm	0.7 mm	0.33 mm
ZX0-LD300	150 to 450 mm	3.0 mm	0.52 mm
ZX0-LD600	200 to 1,000 mm	15.0 mm	0.56 mm

*1. When the ambient temperature is 10 to 40°C.

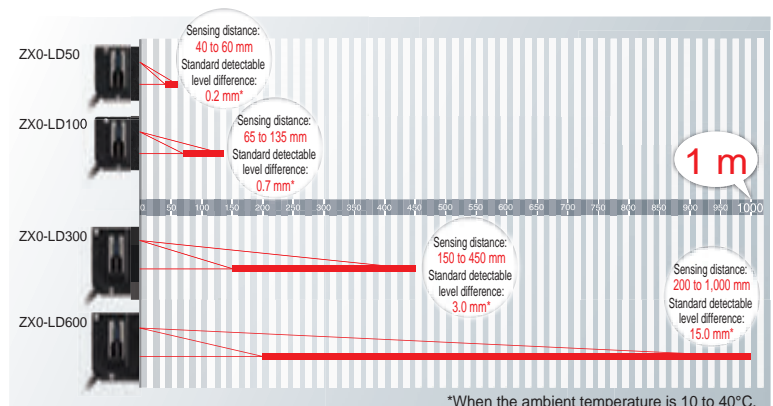
*2. Reference values at the center of sensing distance.

Simplicity

Elimination of Installation Restrictions

Models with Different Distance Specifications for Installation in Essentially Any Location and with Built-in Amplifier.

Models with four different distances, from long-distance to short-distance detection, cover a wide range of user designs. The built-in amplifier achieves a smaller body. And because you do not need to install an amplifier unit, installation work and footprint are reduced. Also, an IP67 body and robot cable are used to eliminate installation environment restrictions.


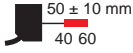
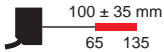

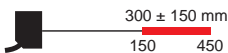
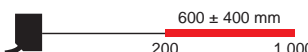


*When the ambient temperature is 10 to 40°C.

ZX0

Ordering Information

Sensors (Refer to Dimensions on page 6)

Appearance	Connection method	Cable length	Sensing distance	Model	
				NPN output	PNP output
	Pre-wired	2 m		ZX0-LD50A61 2M *	ZX0-LD50A81 2M *
		5 m		ZX0-LD50A61 5M	ZX0-LD50A81 5M
	Pre-wired connector	0.5 m	ZX0-LD50A66 0.5M	ZX0-LD50A86 0.5M	
	Pre-wired	2 m		ZX0-LD100A61 2M *	ZX0-LD100A81 2M *
		5 m		ZX0-LD100A61 5M	ZX0-LD100A81 5M
	Pre-wired connector	0.5 m	ZX0-LD100A66 0.5M	ZX0-LD100A86 0.5M	
	Pre-wired	2 m		ZX0-LD300A61 2M *	ZX0-LD300A81 2M *
		5 m		ZX0-LD300A61 5M	ZX0-LD300A81 5M
	Pre-wired connector	0.5 m	ZX0-LD300A66 0.5M	ZX0-LD300A86 0.5M	
	Pre-wired	2 m		ZX0-LD600A61 2M *	ZX0-LD600A81 2M *
		5 m		ZX0-LD600A61 5M	ZX0-LD600A81 5M
	Pre-wired connector	0.5 m	ZX0-LD600A66 0.5M	ZX0-LD600A86 0.5M	

* Sensors with Class 1 lasers are also available.



Add an "L" to the end of the model number when ordering. (Example: ZX0-LD50A61L 2M)

Accessories (sold separately)

Extension Cables for Pre-wired Connector Models (Refer to Dimensions on page 7)

Cable length	Model
10 m	ZX0-XC10R
20 m	ZX0-XC20R

Mounting Brackets A Mounting Bracket is not provided with the Sensor. Order a Mounting Bracket separately if required. (Refer to Dimensions on page 7)

Applicable sensors	Appearance	Model	Contents
ZX0-LD50□ ZX0-LD100□		E39-L180	Mounting Bracket: 1 Nut plate: 1 Phillips screws (M3 × 30): 2
ZX0-LD300□ ZX0-LD600□		E39-L181	Mounting Bracket: 1 Nut plate: 1 Phillips screws (M4 × 35): 2

Ratings and Specifications

Item	Model	NPN output	ZX0-LD50A61 ZX0-LD50A66	ZX0-LD100A61 ZX0-LD100A66	ZX0-LD300A61 ZX0-LD300A66	ZX0-LD600A61 ZX0-LD600A66
		PNP output	ZX0-LD50A81 ZX0-LD50A86	ZX0-LD100A81 ZX0-LD100A86	ZX0-LD300A81 ZX0-LD300A86	ZX0-LD600A81 ZX0-LD600A86
Sensing distance			50 ± 10 mm	100 ± 35 mm	300 ± 150 mm	600 ± 400 mm
Standard detectable level difference *1	Ambient temperature of 10 to 40°C		0.2 mm	0.7 mm	3.0 mm	15 mm
	Ambient temperature of -10 to 55°C		0.5 mm	1.0 mm	6.0 mm	25 mm
Light source (wavelength)		Visible-light semiconductor laser (wavelength: 660 nm, 1 mW max., IEC/EN Class 2, FDA Class 2 *2)				
Spot diameter (reference value) (Defined at the measurement center distance) *3			0.17 mm dia.	0.33 mm dia.	0.52 mm dia.	0.56 mm dia.
Power supply voltage		10 to 30 VDC (including 10% ripple (p-p))				
Power consumption		2,500 mW max. (105 mA max. at 24 VDC, 210 mA max. at 12 VDC)				
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 1 V max. (load current 10 mA or less), 2 V max. (load current of 10 to 100 mA))				
Monitor output		Current output: 4 to 20 mA, maximum load resistance: 300 Ω (The output is 20 mA for the nearest point in the measurement range in respect to the Sensor and 4 mA for the farthest point.)				
Functions		Smart tuning, keep function, background removal, OFF-delay timer, ON-delay timer, one-shot timer, ON/OFF-delay timer, zero reset, area output, eco function, hysteresis width setting, and setting initialization				
Indicators		Digital display (red), output indicator (OUT1, OUT2) (orange), zero reset indicator (orange), menu indicator (orange), laser ON indicator (green), and smart tuning indicator (blue)				
Response time	Judgment output		Super-high-speed (SHS) Mode: 1.5 ms, Very-high-speed (VHS) Mode: 3 ms, High-speed (HS) Mode: 10 ms, or Standard (STND) Mode : 50 ms			
	Laser OFF input		200 ms max.			
	Zero reset input		200 ms max.			
Ambient illumination		Illumination on received light surface: 7,500 lx or less (incandescent light)			Illumination on received light surface: 5,000 lx or less (incandescent light)	
Ambient temperature		Operating: -10 to 55°C, Storage: -15 to 70°C (with no icing or condensation)				
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)				
Dielectric strength		1,000 VAC, 50/60 Hz, 1 minute				
Vibration resistance (destruction)		10 to 55 Hz, 1.5-mm double amplitude, 2 hours each in X, Y, and Z directions				
Shock resistance (destruction)		500 m/s ² 3 times each in X, Y, and Z directions				
Degree of protection *4		IEC IP67				
Connection method *5		Pre-wired model (Standard cable length: 2 m) Pre-wired connector model (Standard cable length: 0.5 m)				
Weight (packed state/ sensor only)	Pre-wired models (2 m)		Approx. 240 g / Approx. 180 g		Approx. 270 g / Approx. 210 g	
	Pre-wired models (5 m)		Approx. 450 g / Approx. 330 g		Approx. 480 g / Approx. 360 g	
	Pre-wired connector models (0.5 m)		Approx. 170 g / Approx. 110 g		Approx. 200 g / Approx. 140 g	
Materials		Case and cover: Polybutylene terephthalate, Optical window: Glass, Cable: PVC				
Accessories		Instruction sheet, Laser warning label (English), and FDA certification label				

Note: Refer to the table given below for the ratings and specifications of Sensors with Class 1 lasers.

*1 The values were measured at the center of the sensing distance using OMRON's standard sensing object (white ceramic).

*2. Classified as Class 2 by IEC60825-1 criteria in accordance with the FDA standard provisions of Laser Notice No. 50. CDRH registration has been completed. (Center for Devices and Radiological Health) (Accession Number: 1210040)

*3. Spot diameter: Defined as $1/e^2$ (13.5%) of the central intensity at the measurement center distance.

False detections can occur in the case there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object.

Accurate measurements may not be possible for workpieces that are smaller than the spot diameter.

*4. IP67 protection applies to the connector on pre-wired connector models if an extension cable is connected.

*5. Use a Pre-wired Connector Model together with an Extension Cable (10 m or 20 m).

Ratings and Specifications of Sensors with Class 1 lasers (ZX0-LD□L)

The ratings and specifications that are different from those of the Sensors with Class 2 lasers are given below.

Item	Model	ZX0-LD50A61L/ZX0-LD50A81L ZX0-LD100A61L/ZX0-LD100A81	ZX0-LD300A61L/ZX0-LD300A81L ZX0-LD600A61L/ZX0-LD600A81L
FDA Class		Class1 0.24 mW max.	
IEC/EN Class		Class1 0.24 mW max.	
Ambient illumination		Illumination on received light surface 5,000 lx or less (incandescent light)	Illumination on received light surface 2,500 lx or less (incandescent light)
Connection method		Pre-wired model (2 m)	
Accessories		Instruction sheet and Explanatory label (English), FDA certification label	

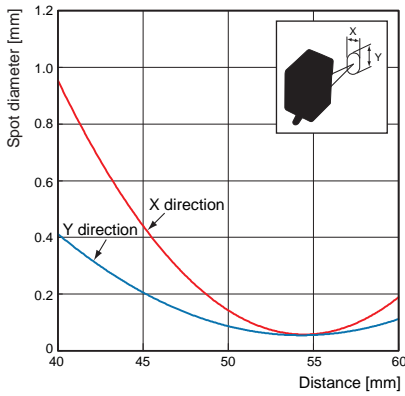
Accession Number: 1210040

ZX0

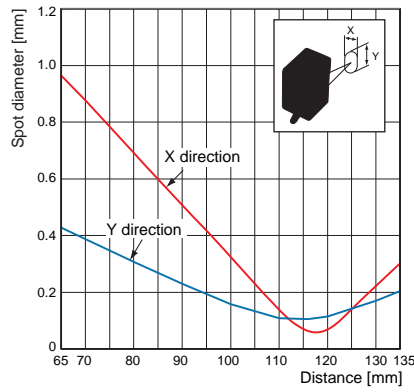
Engineering Data (Reference Value)

Spot Diameter Vs. Distance

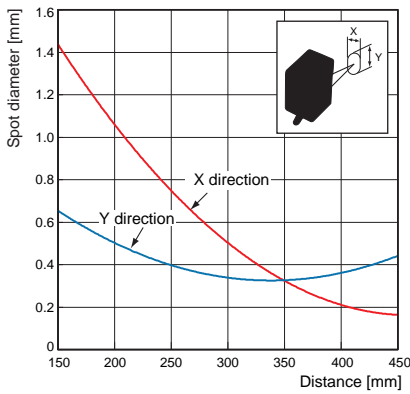
ZX0-LD50□



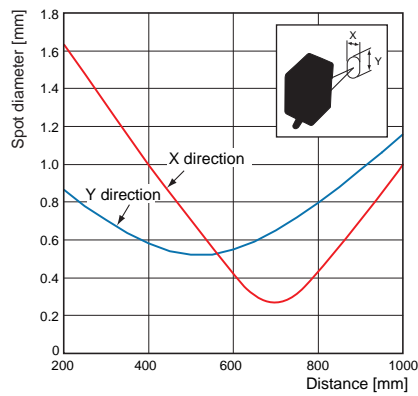
ZX0-LD100□



ZX0-LD300□

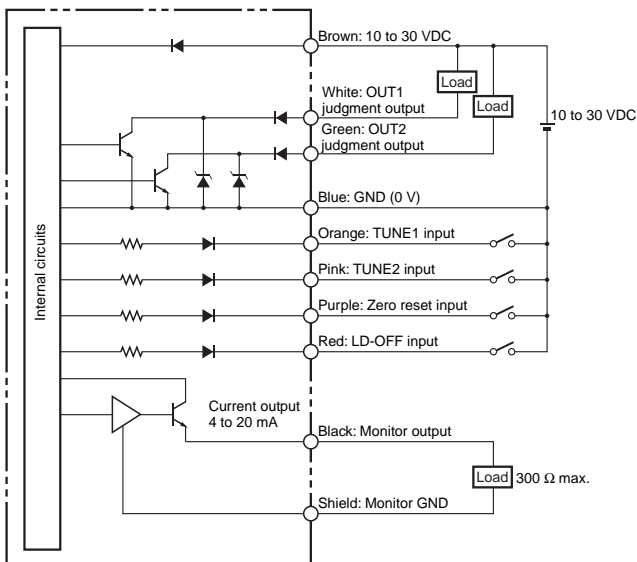


ZX0-LD600□

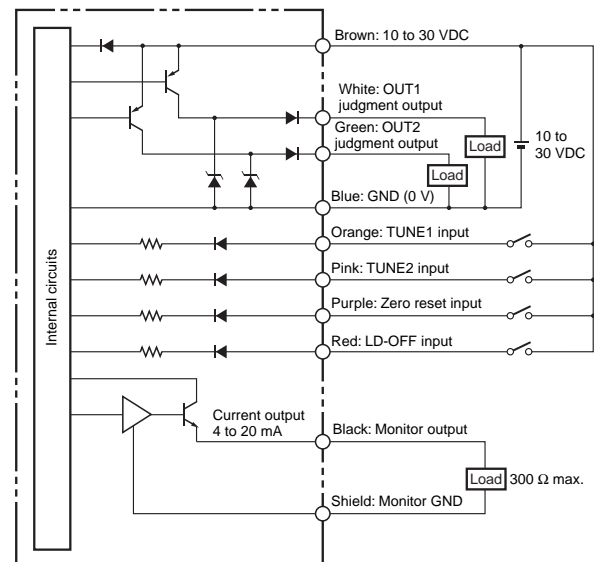


I/O Circuit Diagrams

NPN Output Model



PNP Output Model



Safety Precautions

Be sure to read the precautions for all models in the website at: <http://www.ia.omron.com/>.

**This datasheet contains information only for selecting the appropriate model.
Be sure to read the Instruction Sheet for usage precautions prior to using the product.**

SAFETY PRECAUTIONS FOR USING LASER EQUIPMENT

The ZX0-LD uses a laser as the light source. Lasers are classified based on EN standard (EN 60825-1).

⚠ WARNING

Do not expose your eyes to the laser radiation either directly or indirectly (i.e., after reflection from a mirror or shiny surface). Loss of sight may possibly occur in case of the exposure to laser high power density.

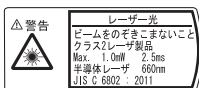


Do not disassemble the product. Doing so may cause the laser beam to leak, resulting in the danger of visual impairment.

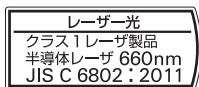


- The ZX0-LD has the following WARNING label or explanatory label on the side of the sensor.

ZX0-LD□□ Laser Warning Label



ZX0-LD□□L Explanatory Label



Using in the U.S.

When using devices in which ZX0-LD is installed in the U.S., the devices are subjected to the U.S. FDA (Food and Drug Administration) laser regulations. ZX0 series is classified into Class 2 or Class 1 by the standard of IEC/EN60825-1 according to deviations of Laser Notice No. 50 of this standard, and reported to CDRH (Center for Devices and Radiological Health). (Accession Number: 1210040)

Replace the WARNING label or Explanatory Label with the corresponding English label and put the FDA Certification label (supplied with the sensor).

Complies with 21 CFR 1040.10 and
1040.11 except for deviations pursuant to
Laser Notice No.50,dated(JUNE 24,2007)
OMRON Corporation
Shiookoji Horikawa,Shimogyo-ku,
Kyoto 600-8530 JAPAN
Place of manufacture:
AYABE Factory,OMRON Corp.
Manufactured in

Using in a country other than the U.S.

For countries other than Japan and the U.S., warning labels or explanatory labels must be replaced by English ones (supplied with the product).

Using in Europe

ZX0-LD□□ are classified in Class 2 under EN 60825-1, and ZX0-LD□□L are classified in Class 1 under EN 60825-1.

Note: For Precautions for safe use and Precautions for correct use, refer to the Instruction Sheet supplied with the product.

Sensors

Pre-wired Models

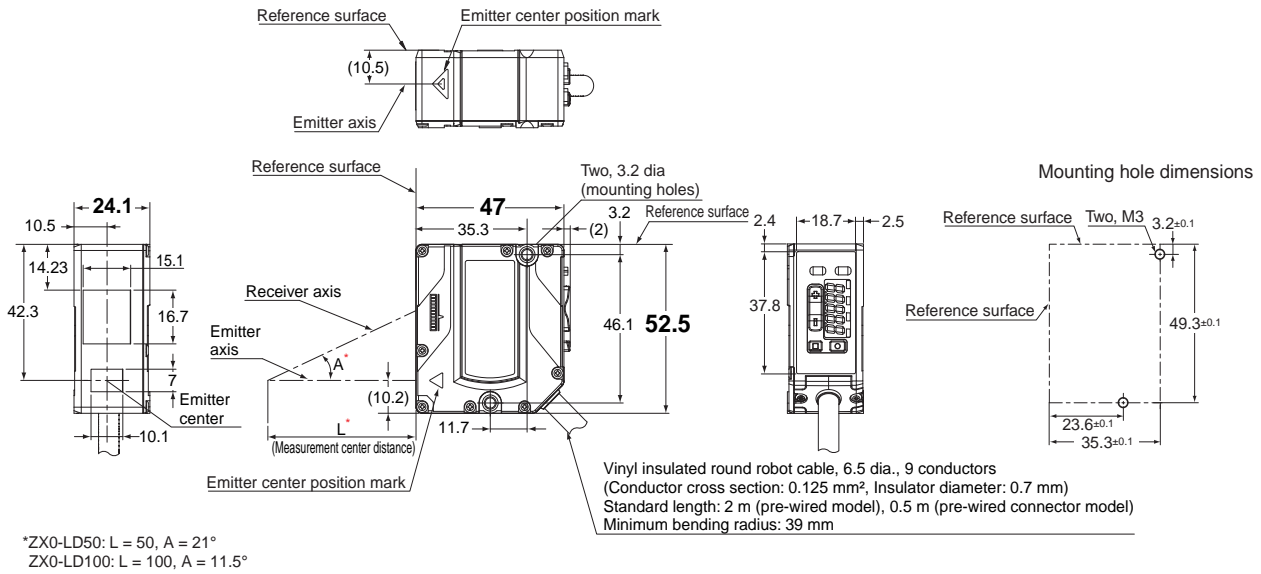
ZX0-LD50A□1(L)

ZX0-LD100A□1(L)

Pre-wired Connector Models

ZX0-LD50A□6

ZX0-LD100A□6



Pre-wired Models

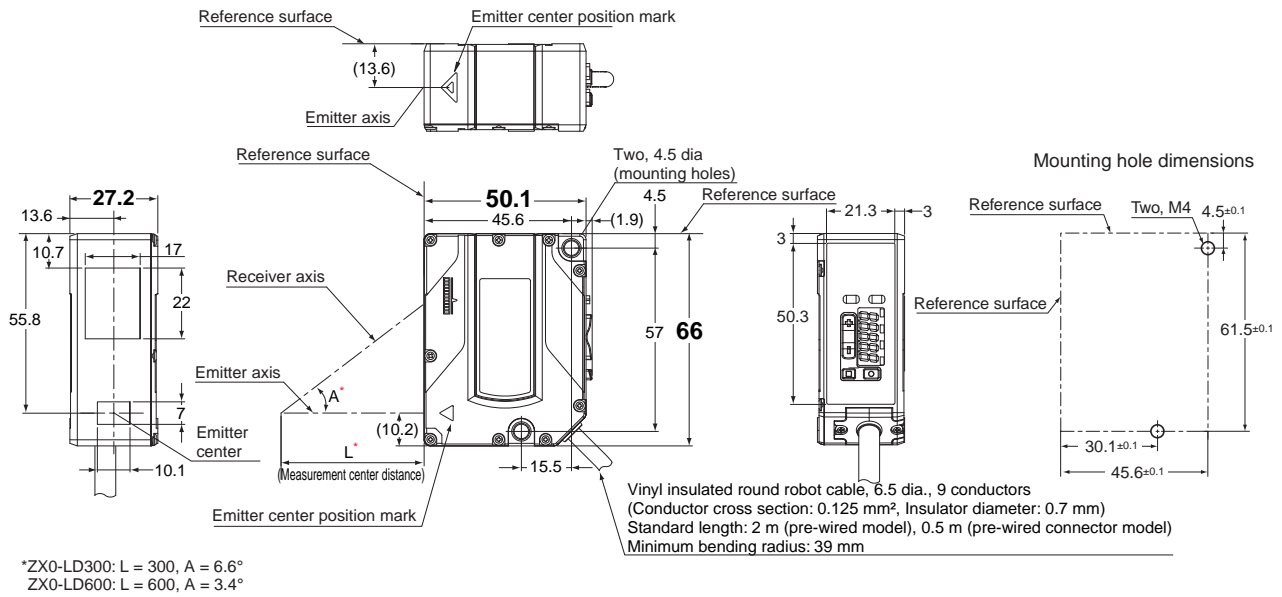
ZX0-LD300A□1(L)

ZX0-LD600A□1(L)

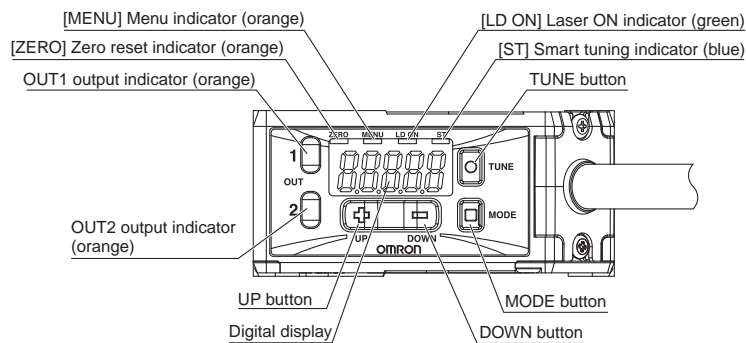
Pre-wired Connector Models

ZX0-LD300A□6

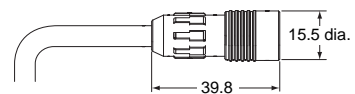
ZX0-LD600A□6



Display, Indicators, and Controls

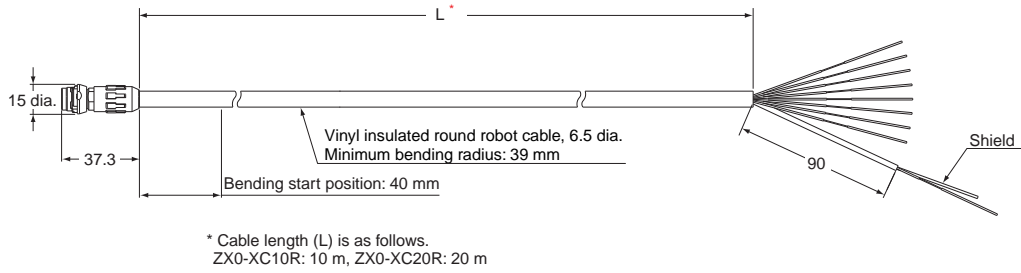


Pre-wired connector

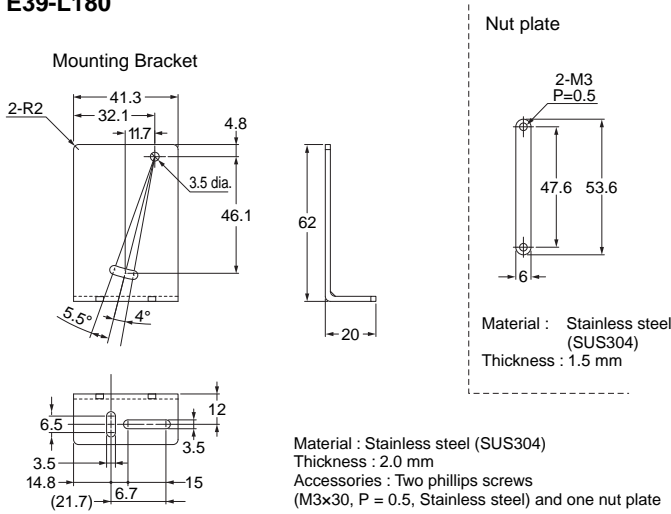


Accessories (sold separately)

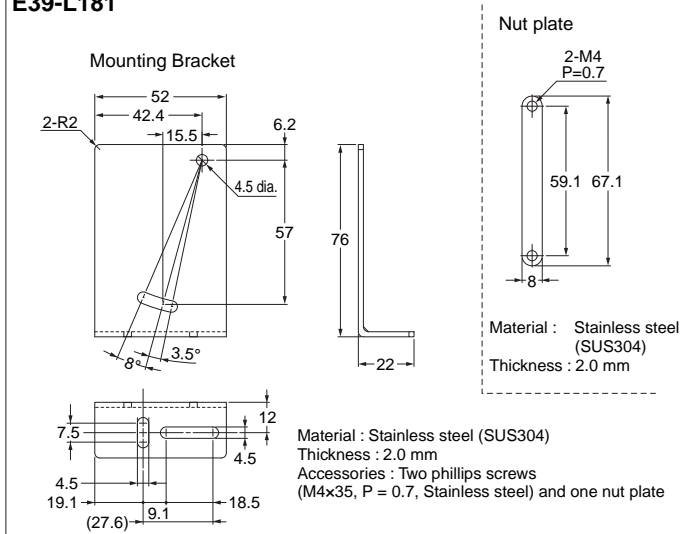
Extension Cables for Pre-wired Connector Models
 ZX0-XC10R (10 m)
 ZX0-XC20R (20 m)



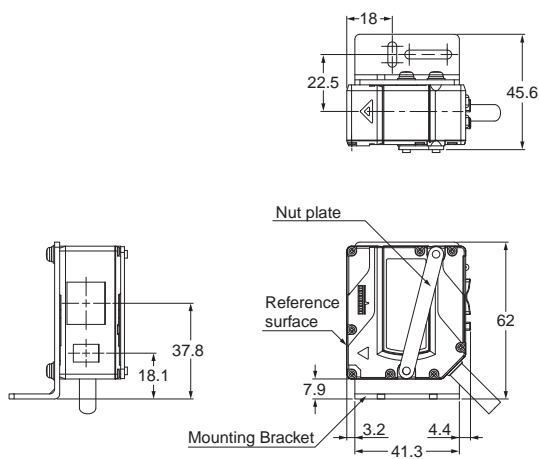
Mounting Bracket for ZX0-LD50□/ZX0-LD100□
 E39-L180



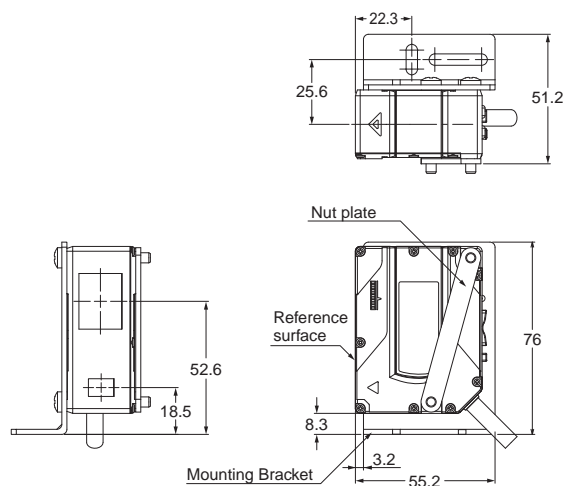
Mounting Bracket for ZX0-LD300□/ZX0-LD600□
 E39-L181



Installation Method (ZX0-LD50□/ZX0-LD100□)
 Using E39-L180 Mounting Bracket



Installation Method (ZX0-LD300□/ZX0-LD600□)
 Using E39-L181 Mounting Bracket



Terms and Conditions Agreement

Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.

- (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.
- (b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See <http://www.omron.com/global/> or contact your Omron representative for published information.

Limitation on Liability: Etc.

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Note: Do not use this document to operate the Unit.

OMRON Corporation Industrial Automation Company

Kyoto, JAPAN

Contact : www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.

Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31) 2356-81-300 Fax: (31) 2356-81-388

OMRON ELECTRONICS LLC

2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900 Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.

438B Alexandra Road, #08-01/02 Alexandra
Technopark, Singapore 119968
Tel: (65) 6835-3011 Fax: (65) 6835-3011

OMRON (CHINA) CO., LTD.

Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-6023-0333 Fax: (86) 21-5037-2388

Authorized Distributor:

©OMRON Corporation 2015-2023 All Rights Reserved.
In the interest of product improvement,
specifications are subject to change without notice.

CSM_2_1

Cat. No. E444-E1-02 0523 (0815)

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Omron:](#)

[ZX0-LD300A61 5M](#)