

Industrial Automation Guide 2016



Industrial Products & Systems

industrial.omron.eu

Targeted Technologies

Creating maximum output with minimum input

By identifying the many ways of innovation in specific industries we developed the 'targeted technologies' concept. It's a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the examples on our website.

industrial.omron.eu/technologies



PROplus Line

If you have a complex application or one where you need to address special needs, then the PROplus Line is the answer. That's because PROplus is a product line that is designed to meet a wide range of needs. The PROplus Line is a family of products that are designed to meet a wide range of needs. The PROplus Line is a family of products that are designed to meet a wide range of needs.

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The 361° Approach

The 361° Approach is a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the examples below.

Technologies

Creating maximum output with minimum input
Whatever type of automated machinery you are specialized in, you know that there are many ways to innovate. You are already aware that there are many possible areas for improvement. But where do you start? Where do you focus your efforts? Where can you make the biggest difference with the least amount of effort?

At Omron, we asked ourselves these questions too. And by identifying the answers in specific industries we developed the 'targeted technologies' concept. It's a way of thinking about technology in a prioritized format. Prioritized according to our customers' most pressing needs. The result? A set of solutions that make immediate impact on the core of our customers' businesses. A set of solutions that hit the target every time. Take a look at the examples below.

Technologies

Sysmac: the all-in-one platform

We know that machine builders prefer different product solutions for different challenges. But this can cause hierarchy headaches and communications issues. That's why we developed Sysmac: a single unified platform that is open, scalable, flexible, and totally focused on maximizing the speed and flexibility of machines. A platform that integrates robotic, motion and sequential logic control into a single multitasking system.

[Learn more](#)



361°: the perfect match

When it comes to sensors and components, we know that our customers all have different needs. That's why our product development in this area is driven by the 361° Approach. It produces product families that offer a total all-round choice. From quality products suited to standard environments to specialist devices that can handle extremes. A full circle of choice, all with an extra degree of quality and proven reliability.

[Learn more](#)



The 361° portfolio

PRO Line
PROplus products are designed for specialty applications or customer demands.

[Learn more](#)



LITE Line
LITE sensors are the effective solution for maximum quality.

[Learn more](#)



Product groups

Sysmac controller
The Sysmac controller is a single unified platform that is open, scalable, flexible, and totally focused on maximizing the speed and flexibility of machines. A platform that integrates robotic, motion and sequential logic control into a single multitasking system.

Sensor
Omron's sensors are designed to meet a wide range of needs. The PROplus Line is a family of products that are designed to meet a wide range of needs. The PROplus Line is a family of products that are designed to meet a wide range of needs.

Robotics
The PROplus Line is a family of products that are designed to meet a wide range of needs. The PROplus Line is a family of products that are designed to meet a wide range of needs. The PROplus Line is a family of products that are designed to meet a wide range of needs.

3D Vision
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Image Processing
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Positioning
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Related product news



With new G2B sensors, you only pay for what you need
Optimizing relative proximity sensors in the new G2B range has been specifically designed to offer a cost-effective sensing solution or standard sensing conditions, making it unnecessary to buy more sensors than you actually need.

[Learn more](#)

Related product news



ES16 - Omron's new photo sensors combine simplicity with performance
Drawing on our experience of manufacturing over a million photoelectric sensors a year, we have developed a new generation of photoelectric products that combine simple selection, installation with reliability, versatility, rugged construction and value for money.

[Learn more](#)

Related product news



RS-485 Control: New step towards the full integration of automation equipment
The RS-485 Control is a new step towards the full integration of automation equipment. It is a new step towards the full integration of automation equipment. It is a new step towards the full integration of automation equipment.



3D Vision: New step towards the full integration of automation equipment
The 3D Vision is a new step towards the full integration of automation equipment. It is a new step towards the full integration of automation equipment. It is a new step towards the full integration of automation equipment.

Welcome to our world

Our best-in-class devices for your automation system

Welcome to Omron's world of advanced industrial automation. The INDUSTRIAL AUTOMATION GUIDE is your essential tool to select best-in-class devices for your automation system. It highlights our core competences in sensing, control, visualisation, motion and panel components.

Of course, Omron offers a much larger range of products than you can find on the attached DVD. For more information on services and company competence visit our website.

Here you will find:

- Latest product news
- Technical product specifications
- 2D / 3D CAD Library
- Customer references
- Technology concepts
- Supporting product documentation
- Knowledge Base - "myOmron"
- Events Calendar
- Contact information

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“To the machine the work of the machine,
to man the thrill of further creation.”

Kazuma Tateisi, founder of Omron

Omron at a glance

200.000 products ranging
input, logic and output

Sensing, Control Systems, Visualization, Drives, Robots, Safety,
Quality Control & Inspection, Control and Switching Components

7%

Investment in Research & Development

Innovation track
record of 80 years

Top 150 global patent assignee

1.200 employees dedicated to R&D

11.000 + issued and pending patents

37.000

Employees worldwide

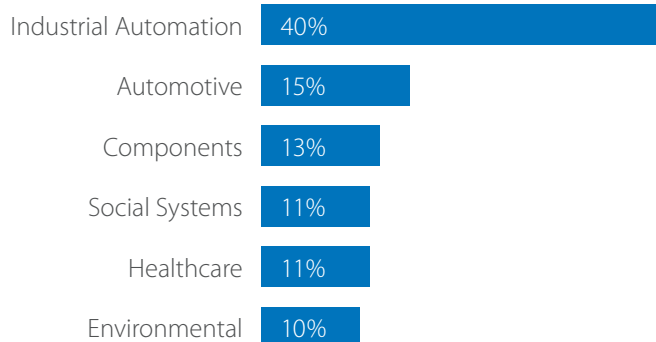
210

Locations worldwide

22

Countries in EMEA

Working for the
benefit of society



Close to your needs

Technical training & seminars, technical support, Automation Technology Centers, online community (MyOmron), online catalogues and technical documentation, customer service & sales support, inter-operability labs (Tsunagi), safety services, repairs.

Your needs, our focus

Solutions perfectly matching your needs

We asked ourselves: 'What do you need in sensors and components?' Well, first you need reliability. Then a variety and choice of performance levels. You may also want advanced functionality, with special features defined by you – or you may want standardized solutions, with highly competitive prices.

Whatever it is, it can all add up to a wish list that is difficult to fulfil. Until now. That's because our new 361° Approach not only provides a complete all-round offer without gaps, it also puts you at the very centre of the product selection process. It's an approach that leads to a Perfect Match – one with the extra degree of confidence that comes from choosing Omron.

361° in one view



Quality



Line-up



Application



Customization



Global availability



Specs

	Quality	Line-up	Application	Customization	Global availability	Specs
PRO^{plus}	Premium	Tailored	Special	Yes	Yes	Application oriented
PRO	Premium	Complete	Advanced	Yes	Yes	Above Standard
LITE	Premium	Standard	Basic	No	No	Basic
	'Quality' refers to the standard of manufacturing and the materials used – this translates into reliability	'Line-up' refers to the number of model types	'Application' indicates the complexity of the automation	'Customization' is the possibility to modify the product		'Specs' refers to the choice of performance levels

The extra degree of advantage

Three distinct lines of sensors and components

Three distinct lines

361° Approach offers three distinct lines within each sensor or component product category. LITE products are cost-effective without any compromise in quality. PRO products represent the “install & forget” option, offering longer lifetime, higher protection, and more features. While PROplus products are designed for specific applications or customer demands.

Optimized reliability

All three lines are backed by the Omron commitment to quality, so even when you need a price-competitive advantage, you can be confident that they will never let you down.

Solutions that perfectly match your needs

The 361° Approach ensures that you can quickly and easily identify the perfect match solution to your needs – nothing more, nothing less.

Optimized costs

Your sensor and component costs are also minimized – because it eliminates over-specification.

Why an extra 1°?

The extra degree is what you get when you do business with Omron, and that means different things to different customers – all depending on their needs. For example, if you need specification advice, the extra degree is ‘service’. But ultimately, to everyone it means “an extra degree of confidence in the perfect match”.



Sysmac: A fully integrated platform

Integration and Functionality

Sysmac is an integrated automation platform dedicated to providing complete control and management of your automation plant. At the core of this platform, the Machine Controller series offers synchronous control of all machine devices and advanced functionality such as motion, robotics and database connectivity. This multidisciplinary concept allows you to simplify solution architecture, reduce programming and optimize productivity.



Machine Automation Controller

FACTORY
AUTOMATION

MACHINE
CONTROL



Motion



Filling line

- Motion Control: Integrated within the IDE, and operating in real-time
- Standard PLCopen Function Blocks plus Omron generated motion FB's
- Direct Synchronous control for Position, Speed and Torque



Safety



Assembly

- All safety related data is synchronized with the whole network
- Safety functions such as muting, guard locking, EDM and valve monitoring are simple to manage

- ✓ **One Integrated Development Environment software** for Configuration, Programming, Simulation and Monitoring



Information



- Sysmac communicates in real-time with Databases such as SQL
- Secure Data: In the event of a server going down or losing communications, data is automatically stored in internal memory
- Sysmac operates with Databases at high speed [1000 table element/ 100 ms] ensuring realistic Big Data Processing to improve productivity and aid predictive maintenance etc.

✓ Integrated Automation Control:

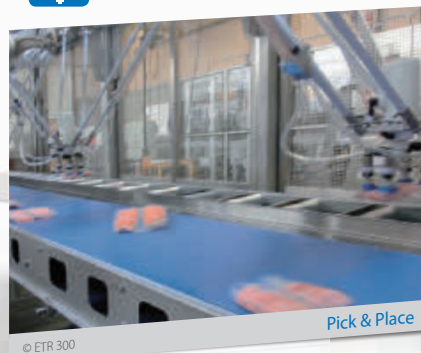
The Sysmac platform is scalable and provides the performance and functionality for a wide range of solutions from simple machines through to manufacturing cells

Vision



- Higher resolution images available without increasing the vision processing time
- Shape search technology: Provides more stable and accurate object detection for Pick & Place projects

Robotics



- Up to 8 Delta robots with one controller
- Time-based Robotic Function Blocks make programming easier

Sensing



- Full control of the process parameter setting and predictive maintenance functions
- High precision detection and positioning data synchronized on the network

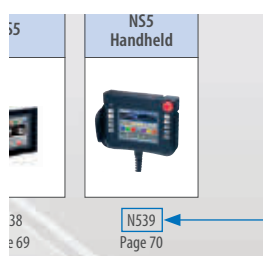
Product selection table

Automation systems				
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Sensing				
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Safety				
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Software				

Quality control & Inspection

Find information fast!

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Quick Link

Quality control & Inspection

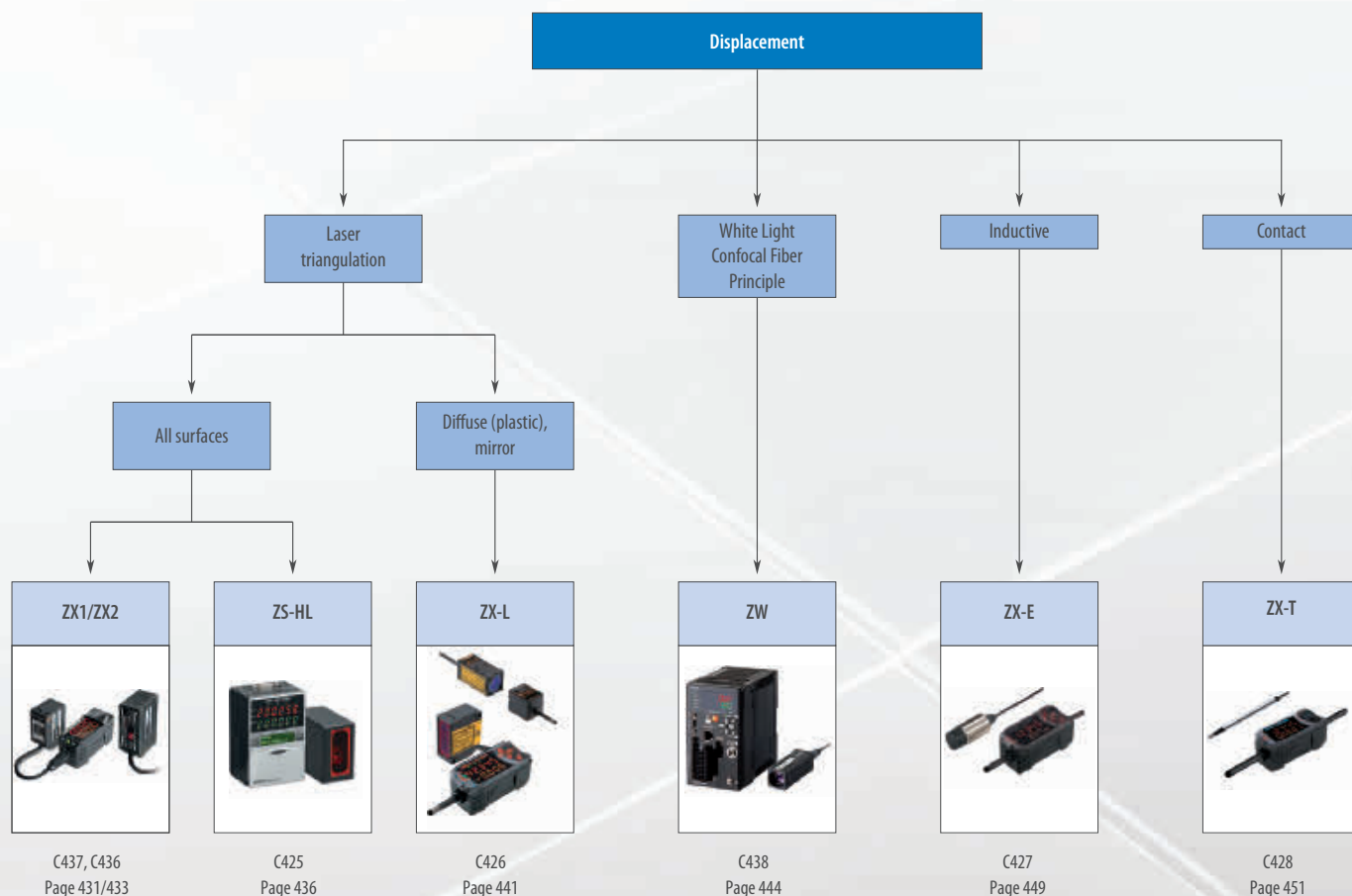
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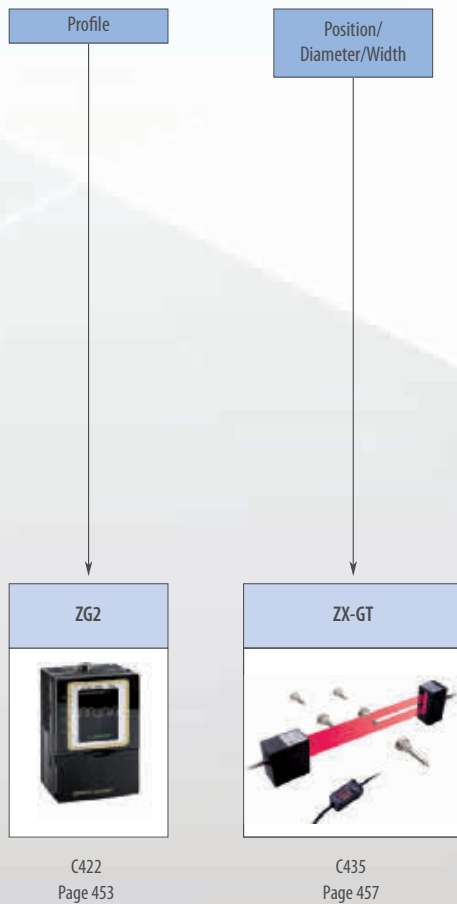
HIGH PRECISION QUALITY INSPECTION

Zero defect becomes reality – scalable accuracy in inspection

The Smart displacement sensor family offers a modular and scalable approach to solve the most challenging measurement tasks. The powerful portfolio enables you to measure profiles, thickness, distance, evenness/warpage, as well as width, edge, etc. Several measurement profiles can be performed simultaneously, using a single- or multi-controller unit. Aided by Omron's advanced technologies, the highest accuracy over long distances, speed and reliability will be achieved.

- Accurate and fast – 0.25 μm at less than 110 μs sampling time
- Scalable – multi-controller unit to coordinate and calculate up to 9 units
- Smart – data storage and remote control via networking capabilities





Selection table

		Laser displacement sensor			Confocal fiber sensor
					
Selection criteria	Model	ZX1/ZX2	ZS-HL	ZX-L	ZW
	Measurement range Z Min.	50±10 mm	10±0.5 mm	30±2 mm	7 mm
	Max.	600±400 mm	1500±500 mm	300±200 mm	40 mm
	Measurement range X Min.	—	—	—	—
	Max.	—	—	—	—
	Resolution Z	1.5 µm	0.25 µm	0.25 µm	0.01 µm
	Resolution X	—	—	—	—
	Linearity (±% of full scale)	0.05%	0.05%	0.2%	0.1%
	Response time	60 µs	110 µs	150 µs	500 µs
	Spot beam	■	■	■	■
	Line beam	■	■	■	—
	IP-rating head	IP67	IP64/IP67	IP50	IP40
	IP-rating controller	IP40	IP40	IP40	IP20
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C	0 to 40°C
	Number of connectable sensors	5	9	5	4
Features	Thickness measurement	■	■	■	■
	Eccentricity	■	■	■	—
	Height	■	■	■	■
	Step	■	■	■	—
	Profile	—	—	—	—
	Distance	—	—	—	—
	Evenness	—	—	—	—
	Warpage	—	—	—	—
	Edge	—	—	—	—
	Width	—	—	—	—
	Peak	■	■	■	—
	Peak to peak	■	■	■	—
	Bottom	■	■	■	—
	Self-trigger	■	■	■	—
	Calibration	■	■	■	■
	Signal scaling	■	—	—	■
	PC-software	—	■	■	■
Application	Mirror	■	■	—	■
	Glass	■	■	—	■
	Metal	■	■	□	■
	Plastic	■	■	■	■
	Black rubber	■	■	—	■
	Paper	■	■	□	■
Supply voltage	12 to 24 VDC	■	—	■	■
	21.6 to 26.4 VDC	—	■	—	■
Control I/O	4 to 20 mA	■	■	■	■
	1 to 5 VDC	■	—	■	—
	Judgement output High/Pass/Low	■	■	■	■
	Trigger	■	■	■	■
Communication	RS-232C	■	■	■	—
	USB2.0	■	■	—	—
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		Inductive displacement sensor	Contact displacement sensor	Profile sensor	Laser micrometer
					
Selection criteria	Model	ZX-E	ZX-T	ZG2	ZX-GT
	Measurement range Z Min.	0.5 mm	1 mm	20 ±0.5 mm	–
	Max.	7 mm	10 mm	210 ±30 mm	28 mm
	Measurement range X Min.	–	–	3 mm	–
	Max.	–	–	70 mm	–
	Resolution Z	1 µm	0.1 µm	0.2 µm	10 µm
	Resolution X	–	–	3 mm/631 pixels	–
	Linearity (±% of full scale)	0.5%	0.3%	0.5%	0.1%
	Response time	150 µs	1 ms	5 ms	150 µs
	Spot beam	–	–	–	–
	Line beam	–	–	□	–
	IP-rating head	IP67	IP67	IP64/66	IP40
	IP-rating controller	IP40	IP40	IP20	IP40
	Ambient oper. temperature	0 to 50°C	0 to 50°C	0 to 50°C	0 to 50°C
	Number of connectable sensors	5	7	1	5
Features	Thickness measurement	■	■	■	■
	Eccentricity	■	■	■	■
	Height	■	■	■	■
	Step	■	■	■	■
	Profile	–	–	□	–
	Distance	■	■	–	–
	Evenness	■	■	–	–
	Warpage	■	■	–	–
	Edge	–	–	–	■
	Width	–	–	□	■
	Peak	■	■	■	■
	Peak to peak	■	■	■	■
	Bottom	■	■	■	■
	Self-trigger	■	■	■	■
	Calibration	–	–	■	–
	Signal scaling	■	■	–	■
	PC-software	■	■	■	■
Application	Mirror	–	■	■	■
	Glass	–	■	■	■
	Metal	■	■	■	■
	Plastic	–	■	■	■
	Black rubber	–	■	■	■
	Paper	–	–	■	■
Supply voltage	12 to 24 VDC	■	■	–	■
	21.6 to 26.4 VDC	–	–	■	■
Control I/O	4 to 20 mA	■	■	■	■
	1 to 5 VDC	■	■	–	■
	Judgement output High/Pass/Low	■	■	■	■
	Trigger	■	■	■	■
Communication	RS-232C	■	■	■	■
	USB2.0	■	–	■	–
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■ Standard

□ Available

– No/not available




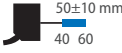
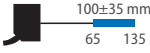

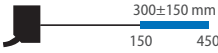
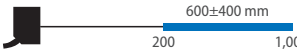
Highest performance for optimized productivity

Highest performance is now available in matchbox size. We are defining a new class of measurement sensors using an advanced HSDR-CMOS (High Speed and Dynamic Range) camera chip.

- Stable measurement for objects with any surface
- Best in class performance for accuracy and speed
- Compact size for quick mounting
- Increased measurement range
- Simple configuration by one-button, Smart Tuning
- Reliable measurement in harsh environments
- Integrated display

Ordering information

Sensors

Appearance	Connection method	Cable length	Sensing distance	Order code	
				NPN output	PNP output
	Pre-wired	2 m		ZX1-LD50A61 2M	ZX1-LD50A81 2M
		5 m		ZX1-LD50A61 5M	ZX1-LD50A81 5M
	Pre-wired connector	0.5 m		ZX1-LD50A66 0.5M	ZX1-LD50A86 0.5M
	Pre-wired	2 m		ZX1-LD100A61 2M	ZX1-LD100A81 2M
		5 m		ZX1-LD100A61 5M	ZX1-LD100A81 5M
	Pre-wired connector	0.5 m		ZX1-LD100A66 0.5M	ZX1-LD100A86 0.5M
	Pre-wired	2 m		ZX1-LD300A61 2M	ZX1-LD300A81 2M
		5 m		ZX1-LD300A61 5M	ZX1-LD300A81 5M
	Pre-wired connector	0.5 m		ZX1-LD300A66 0.5M	ZX1-LD300A86 0.5M
	Pre-wired	2 m		ZX1-LD600A61 2M	ZX1-LD600A81 2M
		5 m		ZX1-LD600A61 5M	ZX1-LD600A81 5M
	Pre-wired connector	0.5 m		ZX1-LD600A66 0.5M	ZX1-LD600A86 0.5M

Accessories (sold separately)

Extension cables for pre-wired connector models

An Extension cable is not provided with the sensor. Order an extension cable separately.

Cable length	Order code
10 m	ZX0-XC10R
20 m	ZX0-XC20R

Specifications

Model		NPN output	ZX1-LD50A61 ZX1-LD50A66	ZX1-LD100A61 ZX1-LD100A66	ZX1-LD300A61 ZX1-LD300A66	ZX1-LD600A61 ZX1-LD600A66
Item		PNP output	ZX1-LD50A81 ZX1-LD50A86	ZX1-LD100A81 ZX1-LD100A86	ZX1-LD300A81 ZX1-LD300A86	ZX1-LD600A81 ZX1-LD600A86
Measurement range			50±10 mm	100±35 mm	300±150 mm	600±400 mm
Light source (wave length)			Visible-light semiconductor laser (wavelength: 660 nm, 1 mW max., IEC/EN Class 2, FDA Class II*1)			
Spot diameter (typical) (Defined at the measurement center distance)*2			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)			
Current consumption			250 mA max. (at power supply voltage 10 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))			
Analog output			Current output: 4 to 20 mA, maximum load resistance: 300 Ω			
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 ms High-speed (HS) Mode: 10 ms Standard (Std) Mode: 100 ms			
	Laser OFF input		200 ms max.			
	Zero reset input		200 ms max.			
Temperature characteristic*3			0.03% F.S./°C			0.04% F.S./°C
Linearity*4			±0.15% F.S.		±0.25% F.S.	±0.25% F.S. (200 to 600 mm) ±0.5% F.S. (entire range)
Resolution *5			2 μm	7 μm	30 μm	80 μm
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 minute3			
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 *6			IEC 60529, IP67			
Connection method			Pre-wired model (Standard cable length: 2 m, 5 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: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC, Mounting hole part: SUS303			
Accessories			Instruction sheet and Laser warning label (English)			

^{*1} Classified as Class 2 by EN60825-1 criteria in accordance with the FDA standard provisions of Laser Notice No. 50. Notification to CDRH planned. (Center for Devices and Radiological Health)

^{*2} Spot diameter: Defined as 1/e² (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.

^{*3} Temperature characteristic: Value for the case the space between the sensor and Omron's standard target object is secured by an aluminum jig. (Measured at the measurement center distance)

^{*4} Linearity: Indicates the error with respect to the ideal straight line of the displacement output in the case of measuring Omron's standard target object (white ceramic) at a temperature of 25°C. Linearity and measured value may vary depending on target object.

^{*5} Resolution: Defined in Standard Mode for Omron's standard target object (white ceramic) after executing Smart Tuning.

The resolution indicates the repetition accuracy for a still workpiece. Not an indication of the distance accuracy.

Resolution performance may not be satisfied in a strong electromagnetic field.

^{*6} IP67 protection applies to the connector on pre-wired connector models if an extension cable is connected.

Note: False detection outside the measurement range can occur in the case of an object with high reflectance.



Stable, easy & affordable laser measurement sensor

High accuracy and measurement stability, at an affordable price. The new ZX2 laser sensor offers best in class performance for accuracy and speed for all linear displacement applications. Utilising an advanced HSDR-CMOS image sensor, high measurement stability is achieved, even on the most challenging of surfaces.

- One touch setup
- Accurate: 1.5 to 5 μm
- Any surface
- High speed: 30 μs

Ordering information

Sensor heads

Optical system	Beam shape	Sensing distance	Resolution	Order code
Diffuse-reflective	Line beam		1.5 μm	ZX2-LD50L
	Spot beam			ZX2-LD50
	Line beam		5 μm	ZX2-LD100L
	Spot beam			ZX2-LD100
Regular reflective	Spot beam		1.5 μm	ZX2-LD50V

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX2-LDA11
	PNP	ZX2-LDA41

Accessories (order separately)

These are not included with the sensor head or amplifier unit.
Please order as necessary.

Calculating unit

	Order code
Calculating unit	ZX2-CAL

Sensor head extension cables^{*1}

Cable length	Order code
1 m	ZX2-XC1R
4 m	ZX2-XC4R
9 m	ZX2-XC9R
20 m	ZX2-XC20R

^{*1}: Extension cables cannot be coupled and used together.

Mounting brackets

Applicable Sensor Heads	Appearance	Contents	Order code
ZX2-LD50V ZX2-LD50L ZX2-LD50		Mounting Bracket: 1 Nut plate: 1 Phillips screws (M3×30): 2	E39-L178
ZX2-LD100L ZX2-LD100			E39-L179

Specifications

Diffuse reflective Sensor Heads

Item Model	ZX2-LD50L	ZX2-LD50	ZX2-LD100L	ZX2-LD100
Optical system	Diffuse reflective			
Light source (wave length)	Visible-light semiconductor laser with a wavelength of 660 nm and an output of 1 mW max. EN class 2,FDA class II ⁵			
Measurement center point	50 mm		100 mm	
Measurement range	±10 mm		±35 mm	
Beam shape	Line	Spot	Line	Spot
Beam size ^{*1}	Approx. 60 μm×2.6 mm	Approx. 60 μm dia.	Approx.110 μm×2.7 mm	Approx.110 μm dia.
Resolution ^{*2}	1.5 μm		5 μm	
Linearity ^{*3}	±0.05% F.S. (40 to 50 mm)	±0.1% F.S. (40 to 50 mm)	±0.05%F.S. (65 to 100 mm)	±0.1%F.S. (65 to 100 mm)
	±0.1% F.S. (entire range)	±0.15% F.S. (entire range)	±0.1% F.S. (entire range)	±0.15% F.S. (entire range)
Temperature characteristic ^{*4}	0.02% F.S./°C			
Ambient illumination	Incandescent lamp: 10,000 lx max. (on light receiving side)			
Ambient temperature	Operating: 0 to 50°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 for 1 minute.			
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude, 80 minutes, 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	IEC60529, IP67			
Connection method	Connector connection (standard cable length: 500 mm)			
Weight (packed state)	Approx.160 g (Sensor Head only: Approx.75 g)			
Materials	Case and cover: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC			
Accessories	Instruction sheet, Ferrite core, Laser warning label (English), FDA certification label			

Regular-reflective Sensor Heads

Item Model	ZX2-LD50V
Optical system	Regular reflective
Light source (wave length)	Visible-light semiconductor laser with a wavelength of 660 nm and an output of 0.24 mW max. EN class 1, FDA class I
Measurement center point	48 mm
Measurement range	±5 mm
Beam shape	Spot
Beam size ^{*1}	Approx. 60 μm dia.
Resolution ^{*2}	1.5 μm
Linearity ^{*3}	±0.3% F.S. (entire range)
Temperature characteristic ^{*4}	0.06% F.S./°C
Ambient illumination	Incandescent lamp: 10,000 lx max. (on light receiving side)
Ambient temperature	Operating: 0 to 50°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 for 1 minute.
Vibration resistance (destruction)	10 to 150 Hz, 0.7-mm double amplitude, 80 minutes, 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	IEC 60529, IP67
Connection method	Connector connection (standard cable length: 500 mm)
Weight (packed state)	Approx.160 g (Sensor Head only: Approx.75 g)
Materials	Case and cover: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC
Accessories	Instruction sheet, Ferrite core, Laser warning label (English)

^{*1} Beam size: Defined as 1/e² (13.5%) of the central intensity at the smallest value of diameter for the measurement range (typical value) 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.

^{*2} Resolution: indicates the degree of fluctuation (±3σ) of analog output when connected to the ZX2-LDA. (The measured value is given for the center distance for OMRON's standard target object (diffuse-reflective models: white ceramic object, regular-reflective models: 1/4 λ flat mirror) when the response time of the ZX2-LDA is set to 128 ms.) Indicates the repetition accuracy for when the workpiece is in a state of rest. Not an indication of distance accuracy. Resolution performance may not be satisfied in a strong electromagnetic field.

^{*3} Linearity: indicates the error with respect to the ideal straight line of the displacement output in the case of measuring Omron's standard target object. Linearity and measured value may vary depending on target object. F.S. indicates the full scope of the measurement range. (ZX2-LD50 (L): 20mm)

^{*4} Temperature characteristic: Value for the case the space between the sensor head and Omron's standard target object is secured by an aluminum jig. (Measured at the measurement center distance)

^{*5} These Sensors are classified as Class 2 laser devices for diffuse-reflective models and Class 1 for regular-reflective models under EN 606825-1 and the regulations of Laser Notice No. 50 for FDA certification. CDRH registration has been completed for diffuse-reflective models and is scheduled for regular-reflective models.

Note: False detection outside the measurement range can occur in the case of an object with high reflectance.

Amplifier units

Item	ZX2-LDA11	ZX2-LDA41
Measurement period ^{*1}	Min 30 μs	
Response time	60 μs, 120 μs, 240 μs, 500 μs, 1 ms, 2 ms, 4 ms, 8 ms, 12 ms, 20 ms, 36 ms, 66 ms, 128 ms, 250 ms, 500 ms	
Analog output ^{*2}	4 to 20 mA, Max. load resistance: 300Ω, ±5VDC or 1 to 5 VDC, Output impedance: 100Ω	
Judgement outputs (HIGH/PASS/LOW: 3 outputs), error output	NPN open-collector outputs, 30 VDC, 50 mA max.(residual voltage: 1 V max. for load current 10 mA max., 2 V max. for load current above 10 mA)	PNP open-collector outputs, 30 VDC, 50 mA max.(residual voltage: 1 V max. for load current 10 mA max., 2 V max. for load current above 10 mA)
Laser OFF input, zero reset input, timing input, reset input, bank 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	Smart tuning, scaling, sample hold, peak hold, bottom hold, peak-to-peak hold, self-peak hold, self-bottom hold, average hold, zero reset, On-delay timer, OFF-delay timer, keep/clamp switch, (A-B)calculations ^{*3} , thickness calculation ^{*3} , mutual interference prevention ^{*3} , laser deterioration detection, bank function (4 banks)	
Indications	Judgement indicators: HIGH (orange), PASS (green), LOW (orange), 11-segment main display (red), 11-segmentsub-display (orange), laser ON (green), zero reset (green), enable (green), menu (green), HIGH threshold (orange), LOW threshold (orange)	
Power supply voltage	10 to 30 VDC, including 10% ripple(p-p)	
Power consumption	3,000 mW max. with power supply voltage of 30 VDC and power supply current of 100 mA (with Sensor connected)	
Ambient temperature	Operating: 0 to 50°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 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	IEC60529, IP40P	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 200 g (unit only: Approx.135 g)	
Materials	Case: PBT(polybutylene terephthalate), Cover: Polycarbonate, Display: Acrylic resin, Button: Polyacetal, Cable: PVC	
Accessories	Instruction sheet	

^{*1} In the case of Omron's standard target object (white ceramic)

^{*2} Configure current output (4 to 20mA) and voltage output (±5 V or 1 to 5 V) by MENU mode.

^{*3} Calculating unit (ZX2-CAL) is necessary.

Calculating unit

Item	ZX2-CAL
Applicable amplifier units	ZX2-LDA11/ZX2-LDA41
Current consumption	12 mA max. (supplied from the smart sensor amplifier unit)
Ambient temperature	Operating: 0 to 50°C, storage: -15 to 70°C (with no icing or condensation)
Ambient humidity	Operating and storage: 35% to 85% RH (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 (destructive)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions
Shock resistance (destructive)	300 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)
Materials	Case: PBT (polybutylene terephthalate), Display: Acrylic resin
Weight (packed state)	Approx. 50 g
Accessories	Instruction sheet



The scalable high-precision laser measurement sensor

The ZS laser sensor family provides outstanding measurement performance on all kind of materials. Its huge range of sensor heads and scalable concept makes it a versatile platform for all high precision sensing applications.

- Highest resolution and dynamic sensing range for all surfaces
- Modular and scalable platform concept for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110 µs
- Multi-tasking capability – manages up to 4 measurement tools in one controller

Ordering information

Sensors

ZS-HL-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution ^{*1}	Order code
Regular reflective models	20±1 mm	Line beam	1.0 mm × 20 µm	0.25 µm	ZS-HLDS2T
	25±2 mm		2.2 mm × 45 µm	0.6 µm	ZS-HLDS2VT
Diffuse reflective models	50±5 mm	Line beam	1.0 mm × 30 µm	0.25 µm	ZS-HLDS5T
	100±20 mm		3.5 mm × 60 µm	1 µm	ZS-HLDS10
	600±350 mm		16 mm × 0.3 mm	8 µm	ZS-HLDS60
	1500±500 mm		40 mm × 1.5 mm	500 µm	ZS-HLDS150

^{*1} Refer to the table of ratings and specifications for details.

ZS-HL-series sensor heads (for nozzle gaps) also compatible with ZS-L controller

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution ^{*1}	Order code
Regular reflective models	10±0.5 mm	Line beam	900×25 µm	0.25 µm	ZS-LD10GT
	15±0.75 mm				ZS-LD15GT

^{*1} Refer to the table of ratings and specifications for details.

ZS-L-series sensor heads

Optical system	Sensing distance	Beam shape	Beam diameter	Resolution ^{*1}	Order code
Regular reflective models	20±1 mm	Line beam	900 × 25 µm	0.25 µm	ZS-LD20T
		Spot beam	25 µm dia.		ZS-LD20ST
	40±2.5 mm	Line beam	2000 × 35 µm		ZS-LD40T
Diffuse reflective models	50±5 mm	Line beam	900 × 60 µm	0.8 µm	ZS-LD50
		Spot beam	50 µm dia.		ZS-LD50S
	80±15 mm	Line beam	900 × 60 µm	2 µm	ZS-LD80
	130±15 mm	Line beam	600 × 70 µm	3 µm	ZS-LD130
	200 ±50 mm	Line beam	900 × 100 µm	5 µm	ZS-LD200
	350 ±135 mm	Spot beam	240 µm dia.	20 µm	ZS-LD350S

^{*1} This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

ZS-HL-series sensor controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-HLDC11
	PNP outputs	ZS-HLDC41
		ZS-HLDC41A (incl. USB cable + Smart monitor)

Multi-controllers

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-MDC11
	PNP outputs	ZS-MDC41

Data storage units

Supply voltage	Control outputs	Order code
24 VDC	NPN outputs	ZS-DSU11
	PNP outputs	ZS-DSU41

Accessories (sold separately)

Controller link

Item	Order code
Controller link	ZS-XCN

Panel mount adapter

Model	Order code
For 1st controller	ZS-XPM1
For expansion (from 2nd controller on)	ZS-XPM2

Cables for connecting to a Personal Computer

Type	Quantity	Order code
RS-232C	1	ZS-XRS2
USB	1	ZS-XUSB2

Extension cables for sensor heads

Cable length	Quantity	Order code
1 m	1	ZS-XC1A
4 m	1	ZS-XC4A
5 m	1	ZS-XC5B ^{*1,*2}
8 m	1	ZS-XC8A
10 m	1	ZS-XC10B ^{*1}

^{*1} Up to two ZS-XC_B cables can be connected (22 m max.).

^{*2} A robot cable (ZS-XC5BR) is also available.

Logging software

Item	Order code
Smart monitor zero professional	ZS-SW11E

Memory card

Model	Order code
64 MB	F160-N64S(S)
128 MB	QM300-N128S
256 MB	F160-N256S

Safety precautions for using laser equipment

Laser Label Indications

Attach the following warning label to the side of the ZS-L-series Sensor Head.



Specifications

Sensor heads

ZS-HL-series sensor heads

Item	ZS-HLDS2T	ZS-HLDS2VT	ZS-HLDS5T	ZS-HLDS10	ZS-HLDS60	ZS-HLDS150
Applicable controllers	ZS-HLDC series					
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Regular reflection	Diffuse reflection	Diffuse reflection
Measuring center distance	20 mm	5.2 mm	25 mm	44 mm	50 mm	94 mm
Measuring range	±1 mm	±1 mm	±2 mm	±4 mm	±5 mm	±16 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)					Visible semiconductor laser (wavelength 658 nm, 1 mW max., Class 2)
Beam shape	Line beam					
Beam diameter*1	1.0 mmx20 μm		2.2 mmx45 μm	1.0 mmx30 μm	3.5 mmx60 μm	0.3 mmx16 mm
Linearity*2	±0.05% F.S.		±0.2 %F.S.	±0.1% F.S.		±0.07 %F.S. (250 mm to 750 mm) ±0.1% F.S. (750 mm to 950 mm)
Resolution*3	0.25 μm (No. of samples to average: 256)		0.5 μm (No. of samples to average: 128)	0.25 μm (No. of samples to average: 512)	1 μm (No. of samples to average: 64)	8 μm (average 64) (at 250 mm) 40 μm (average 64) (at 600 mm)
Temperature characteristic*4	0.01% F.S./°C		0.1% F.S./°C	0.01% F.S./°C		
Sampling cycle	110 μs (high-speed mode), 500 μs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)					
Indicators	NEAR indicator	Lits near the measurement center, and nearer than the measurement center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
	FAR indicator	Lits near the measurement center, and further than the measurement center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.				
Operating ambient illumination	Illumination on received light surface 3,000 lx or less (incandescent light)					Illumination on received light surface 1,000 lx or less (incandescent light)
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)					
Degree of protection	IP64		IP67	Cable length 0.5 m: IP66, cable length 2 m: IP67		IP66 (IEC60529)
Vibration resistance (destructive)	10 to 150 Hz, 0.7 mm double amplitude, 80 min each in X, Y, and Z directions					
Shock resistance (destructive)	150 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)					
Materials	Case: aluminum die-cast, front cover: glass					
Cable length	0.5 m, 2 m		2 m	0.5 m, 2 m		
Weight	Approx. 350 g			Approx. 600 g		Approx. 800 g

^{*1} Defined as 1/e² (13.5%) of the center optical intensity in the measurement center distance. The beam diameter is sometimes influenced by the ambient conditions of the workpiece such as leaked light from the main beam.

^{*2} This is the error on the measured value with respect to an ideal straight line. Linear curve may change according to the workpiece. The following lists the workpieces

Model	Diffusive reflection	Mirror reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T/HLDS10	White alumina ceramic	Glass
ZS-HLDS60/HLDS150	White alumina ceramic	—
ZS-HLDS2VT	—	Glass

^{*3} This is the "peak-to-peak" displacement conversion value of the displacement output in the measurement center distance when high-resolution mode and the average number in the table are set (For ZS-HLDS60, the maximum resolution at 250 mm is also included). The following lists the workpieces.

Model	Diffusive reflection	Mirror reflection
ZS-HLDS2T	SUS block	Glass
ZS-HLDS5T	White alumina ceramic	Glass
ZS-HLDS10	White alumina ceramic	—
ZS-HLDS60/HLDS150	White alumina ceramic	—
ZS-HLDS2VT	—	Glass

^{*4} Value obtained when the sensor part and object part are fixed with an aluminum jig.

ZS-L-series sensor heads

Item	ZS-LD20T		ZS-LD20ST		ZS-LD40T		ZS-LD10GT	ZS-LD15GT
Applicable controllers	ZS-HLDC/LDC series							
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	
Measuring center distance	20 mm	6.3 mm	20 mm	6.3 mm	40 mm	30 mm	10 mm	15 mm
Measuring range	±1 mm	±1 mm	±1 mm	±1 mm	±2.5 mm	±2 mm	±0.5 mm	±0.75 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)							
Beam shape	Line beam		Spot beam		Line beam			
Beam diameter*1	900 x 25 μm		25 μm dia.		2,000 x 35 μm		Approx. 25 x 900 μm	
Linearity*2	±0.1%F.S							
Resolution*3	0.25 μm		0.25 μm		0.4 μm		0.25 μm	0.25 μm
Temperature characteristic*4	0.04% FS/°C		0.04% FS/°C		0.02% FS/°C		0.04% FS/°C	
Sampling cycle*5	110 μs (high-speed mode), 500 μs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)							
Indicators	NEAR indicator	Lights near the measuring center distance, and nearer than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.						
	FAR indicator	Lights near the measuring center distance, and further than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.						
Operating ambient illumination	Illumination on received light surface: 3,000 lx or less (incandescent light)							
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)							
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67						IP40	
Materials	Case: Aluminum die-cast, front cover: Glass							
Cable length	0.5 m, 2 m							
Weight	Approx. 350 g						Approx. 400 g	
Accessories	Laser labels (1 each for JIS/EN, 3 for FDA), ferrite cores (2), insure Locks (2), instruction sheet						Laser safety labels (1 each for JIS/EN), ferrite cores (2), insure locks (2)	

^{*1} Defined as $1/e^2$ (13.5%) of the center optical intensity at the actual measurement center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.

^{*2} This is the error in the measured value with respect to an ideal straight line. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode of the ZS-LD20T/40T/50. Linearity may change according to the workpiece.

^{*3} This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

^{*4} This is the value obtained at the measuring center distance when the Sensor and workpiece are fixed by an aluminum jig.

^{*5} This value is obtained when the measuring mode is set to the high-speed mode.

ZS-L-series sensor heads

Item	ZS-LD50		ZS-LD50S		ZS-LD80		ZS-LD130		ZS-LD200		ZS-LD350S	
Applicable controllers	ZS-HLDC/LDC series											
Optical system (reflection)	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular	Diffuse	Regular	Diffuse	
Measuring center distance	50 mm	47 mm	50 mm	47 mm	80 mm	78 mm	130 mm	130 mm	200 mm	200 mm	350 mm	
Measuring range	±5 mm	±4 mm	±5 mm	±4 mm	±15 mm	±14 mm	±15 mm	±12 mm	±50 mm	±48 mm	±135 mm	
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., JIS Class 2)											
Beam shape	Line beam		Spot beam		Line beam		Line beam		Line beam		Spot beam	
Beam diameter ^{*1}	900 x 60 μm		50 μm dia.		900 x 60 μm		600 x 70 μm		900 x 100 μm		240 μm dia.	
Linearity ^{*2}	±0.1%F.S.						±0.25%F.S.		±0.1%F.S.		±0.25%F.S.	±0.04%F.S.
Resolution ^{*3}	0.8 μm		0.8 μm		2 μm		3 μm		5 μm		20 μm	
Temperature characteristic ^{*4}	0.02% FS/°C		0.02% FS/°C		0.01% FS/°C		0.02% FS/°C		0.02% FS/°C		0.04% FS/°C	
Sampling cycle ^{*5}	110 μs (high-speed mode), 500 μs (standard mode), 2.2 ms (high-precision mode), 4.4 ms (high-sensitivity mode)											
Indicators	NEAR indicator	Lights near the measuring center distance, and nearer than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.										
	FAR indicator	Lights near the measuring center distance, and further than the measuring center distance inside the measuring range. Flashes when the measurement target is outside of the measuring range or when the received light amount is insufficient.										
Operating ambient illumination	Illumination on received light surface: 3,000 lx or less (incandescent light)						Illumination on received light surface: 2,000 lx or less (incandescent light)		Illumination on received light surface: 3,000 lx or less (incandescent light)			
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)											
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67											
Materials	Case: Aluminum die-cast, front cover: Glass											
Cable length	0.5 m, 2 m											
Weight	Approx. 350 g											
Accessories	Laser labels (1 each for JIS/EN, 3 for FDA), ferrite cores (2), insure Locks (2), instruction sheet											

^{*1} Defined as $1/e^2$ (13.5%) of the center optical intensity at the actual measurement center distance (effective value). The beam diameter is sometimes influenced by the ambient conditions of the workpiece, such as leaked light from the main beam.

^{*2} This is the error in the measured value with respect to an ideal straight line. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode of the ZS-LD20T/40T/50. Linearity may change according to the workpiece.

^{*3} This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

^{*4} This is the value obtained at the measuring center distance when the sensor and workpiece are fixed by an aluminum jig.

^{*5} This value is obtained when the measuring mode is set to the high-speed mode.

Sensor controllers

ZS-HL-series sensor controllers

Item			ZS-HLDC11	ZS-HLDC41
NPN/PNP			NPN	PNP
No. of samples to average			1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Number of mounted sensors			1 per sensor controller	
External interface	Connection method		Serial I/O: connector, other: pre-wired (standard cable length: 2 m)	
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps max.), MINI-B	
		RS-232C	1 port, 115,200 bps. max.	
	Output	Judgement output	HIGH/PASS/LOW 3 outputs NPN open collector, 30 VDC, 50 mA max., residual voltage 1.2 V max	
		Linear output	Selectable from 2 types of output, voltage or current (selected by slide switch on bottom). Voltage output: .10 to 10 V, output impedance: 40 Ω Current output: 4 to 20 mA	
	Inputs	Laser OFF, ZERO reset timing, RESET	ON: Short-circuited with 0 V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Short-circuited to supply voltage or within 1.5 V of supply voltage. OFF: Open (leakage current: 0.1 mA max.)
Functions			Display: Measured value, threshold value, voltage/current, received light amount, and resolution/terminal block output Sensing: Mode, gain, measurement object, head installation Measurement point: Average, peak, bottom, thickness, step, and calculations Filter: Smooth, average, and differentiation Outputs: Scaling, various hold values, and zero reset I/O settings: Linear (focus/correction), judgments (hysteresis and timer), non-measurement, and bank (switching and clear) System: Save, initialization, measurement information display, communications settings, key lock, language, and data load Task: Single task or multitask (up to 4)	
Status indicators			HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (green), and ENABLE (green)	
Segment display	Main digital	8-segment red LED, 6 digits		
	Sub-digital	8-segment green LEDs, 6 digits		
LCD			16 digitsx2 rows, color of characters: green, resolution per character: 5x8 pixel matrix	
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)		
	Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)		
Power supply voltage			21.6 V to 26.4 VDC (including ripple)	
Current consumption			0.5 A max. (when sensor head is 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)	
Degree of protection			IP20	
Materials			Case: Polycarbonate (PC)	
Weight			Approx. 280 g (excluding packing materials and accessories)	
Accessories			Ferrite core (1), instruction sheet	

ZS-MDC11/MDC41 multi controllers

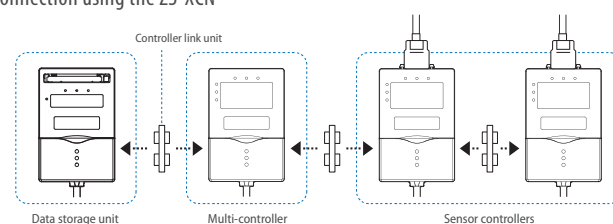
Basic specifications are the same as those for the sensor controllers.

The following points, however, are different.

- (1) Sensor heads cannot be connected.
- (2) A maximum 9 of controllers can be connected. Control link units are required to connect controllers.
- (3) Processing functions between controllers: Math functions

Controller link unit

Connection using the ZS-XCN



Data storage units

Sensor controllers	Model	ZS-DSU11	ZS-DSU41
Number of mounted sensor heads		Cannot be connected	
Number of connectable controllers		10 controllers max. (ZS-MDC: 1 controller, ZS-HLDC: 9 controllers max.)*1	
Connectable controllers		ZS-HLDC__, ZS-MDC	
External interface	Connection method		Serial I/O: connector, other: pre-wired (standard cable length: 2 m)
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps), MINI-B
		RS-232C	1 port, 115,200 bps. max.
	Outputs		3 outputs: HIGH, PASS, and LOW NPN open-collector, 30 VDC, 50 mA max., residual voltage: 1.2 V max.
	Inputs		ON: Short-circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Data resolution		32 bits	
Function ⁵	Logging trigger functions		Start and stop triggers can be set separately; external triggers, data triggers (self-triggers), and time triggers
	Other functions		External banks, alarm outputs, saved data format customization, and clock
Status indicators		OUT (orange), PWR (green), ACCESS (orange), and ERR (red)	
Segment display		8-segment green LEDs, 6 digits	
LCD		16 digitsx2 rows, color of characters: green, resolution per character: 5x8 pixel matrix	
Setting inputs	Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)	
	Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)	

Sensor controllers	Model	ZS-DSU11	ZS-DSU41
Power supply voltage		21.6 V to 26.4 VDC (including ripple)	
Current consumption		0.5 A max.	
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)	
Materials		Case: Polycarbonate (PC)	
Weight		Approx. 280 g (excluding packing materials and accessories)	
Accessories		Ferrite core (1) instruction sheet, tools for data storage unit: CSV file converter for data storage unit, smart analyzer macro edition (Excel macros for analysis of collected data)	

*1 Control link units are required to connect controllers.



Smart, fast and accurate laser measurement sensor

Smart ZX-L-N offers plug & measure technology for applications where high resolution and fast response time is required. A wide range of interchangeable sensor heads provides greater flexibility in solving most demanding applications.

- Small and light sensor heads for easy integration
- High speed response time of 150 μ s
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors
- Wide range of sensor heads offering laser beam width from 1 mm to 30 mm

Ordering information

Sensors

Sensor head (reflection type)

Optical method	Beam shape	Sensing distance	Resolution ^{*1}	Size in mm (H \times W \times D)	Order code
Diffuse-reflective	Spot beam	40 \pm 10 mm	2 μ m	39 \times 33 \times 17	ZX-LD40
		100 \pm 40 mm	16 μ m		ZX-LD100
		300 \pm 200 mm	300 μ m		ZX-LD300
	Line beam	40 \pm 10 mm	2 μ m		ZX-LD40L
		100 \pm 40 mm	16 μ m		ZX-LD100L
		300 \pm 200 mm	300 μ m		ZX-LD300L
Regular reflection type	Spot beam	30 \pm 2 mm	0.25 μ m	45 \times 55 \times 25	ZX-LD30V
	Line beam				ZX-LD30VL

^{*1} At average count of 4,096 times

Sensor head (through-beam)

Optical method	Measurement width	Sensing distance	Resolution ^{*1}	Size in mm (H \times W \times D)		Order code
				Transmitter	Receiver	
Through-beam	1 mm dia.	0 to 2,000 mm	4 μ m	15 \times 15 \times 34	15 \times 15 \times 19	ZX-LT001
	5 mm	0 to 500 mm				ZX-LT005
	10 mm			20 \times 20 \times 42	20 \times 20 \times 25	ZX-LT010
	30 mm		12 μ m	64.25 \times 70 \times 22.6	64.25 \times 54 \times 22.6	ZX-LT030

^{*1} At average count of 64 times

Amplifier units

Power supply	Output specifications	Order code
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

Note: Compatible with sensor head connection.

Accessories (order separately)

Calculating unit

	Order code
Calculating unit	ZX-CAL2

Side-view attachments

Applicable sensor head	Order code
ZX-LT1001/LT005	ZX-XF12
ZX-LT010	ZX-XF22

SmartMonitor sensor setup tool for Personal Computer connection

Name	Order code
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + Setup Software (CD-ROM)	ZX-SFW11EV3 ^{*1,*2}
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3 ^{*1}

^{*1} When using the ZX-TDA11/41 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 wave-forms.

Cables with connectors on both ends (for extension)^{*1}

Cable length	Order code
1 m	ZX-XC1A
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 only with reflective sensors.

Specifications

Sensor head (reflection type)

Item	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
Optical method	Diffuse reflection			Regular reflection	Diffuse reflection			Regular reflection
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 2)							
Measurement center distance	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 μmx2mm	150 μmx2 mm	450 μmx2 mm	100 μmx1.8 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 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)	±0.2% F.S. (32 to 49 mm)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)
Temperature characteristic ^{*4}	±0.03% FS/°C (except for ZX-LD300 and ZX-LD300L, which are ±0.1% FS/°C.)							
Ambient 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)							
Protective structure	IEC 60529 IP50			IEC standard IP40	IEC 60529 IP50			IEC standard IP40
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 sheet, Laser warning label (English)							

^{*1} Beam diameter: This is the value of the measurement center distance (actual value), and is defined at 1/e² (13.5%) of the central light intensity. If there is stray light outside, the defined area and the area around the object has a higher reflectance than the object.

^{*2} Resolution: Indicates the amount of fluctuation (±3 δ) in the linear output when connected to the ZX-LDA. (The measured value when the average count of the ZX-LDA is set to 4,096 and our standard object (white ceramic) is used for the central distance.) This indicates the repeatability precision when the work is in a static state, and does indicate the distance precision. The resolution performance may not be satisfactory in a strong electromagnetic field.

^{*3} Linearity: This indicates the error with respect to the ideal straight line of the displacement output when measuring our standard object.

^{*4} Temperature characteristic: The temperature characteristic is measured at the measurement point with the sensor and reference object (Omron's standard reference object) secured with an aluminum jig.

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

Sensor head (through-beam)

Item		ZX-LT001		ZX-LT005		ZX-LT010		ZX-LT030	
Optical method		Through-beam							
Light source (wave length)		Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 1)							
	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	
Sensing distance		0 to 500 mm	500 to 2,000 mm	0 to 500 mm					
Min. sensing object		8 mm dia. opaque object	8 to 50 μm opaque object	opaque: 0.05 mm dia.		opaque: 0.1 mm dia.		opaque: 0.3 mm dia.	
Resolution*1		4 μm*2	—	4 μm*3				12 μm*4	
Temperature characteristic		±0.2% FS/°C						±0.3% FS/°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)							
Ambient humidity		Operating: 35% to 85% (with no condensation)							
Protective structure		IEC 60529 IP40						IP 40	
Connection method		Connector relay (standard cable length: 500 mm)							
Weight (packed state)		Approx. 220 g						Approx. 450 g	
Cable length		Extendable up to 10 m with special extension cable.							
Materials	Case	Polyetherimide						Zinc die-cast	
	Cover	Polycarbonate							
	Front filter	Glass							
Tightening torque		0.3 Nm max.							
Accessories		Instruction sheet, sensor head-amplifier connection cable							
		Optical axis adjustment seal						Mounting Bracket	

^{*1} The amount of fluctuation (±3 δ) of the linear output when connected to an amplifier unit, converted to a detection span.

^{*2} When the average count is 64. 5 μm when the count is 32. The value when the smallest detection object shades the vicinity of the center of the 1 mm dia. detection span.

^{*3} When the average count is 64. 5 μm when the count is 32.

^{*4} For an average count of 64. The value is 15 μm for an average count of 32.

Amplifier units

Item	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% FS/°C, when connected to a through-beam sensor head: 0.1% FS/°C	
Linear output ^{*2}	4 to 20 mA/FS, 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, key 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 sheet	

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

The response speed of the judgement outputs is calculated as the measurement period x (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.

Calculating unit

Item	ZX-CAL2
Applicable amplifier units	ZX-LDA11-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 (destructive)	10 to 150 Hz, 0.7-mm double amplitude 80 min each in X, Y, and Z directions
Shock resistance (destructive)	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

ZX-series Communications Interface Unit

Item		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
Communications functions	Communications port	RS-232C port (9-pin D-Sub connector)
	Communications protocol	CompoWay/F ^{*1}
	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
Protective 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 sheet, 2 clamps

^{*1} Contact your Omron representative for CompoWay/F communications specifications.



Ultra-compact, lightweight sensor measures any material

The ZW confocal fiber displacement sensor delivers stable, non-contact, in-line measurement of heights, thicknesses and other dimensions. It solves the problems of traditional laser triangulation sensors: deviation between different material and inclination tolerance. The compact sensing head has no electronic parts to eliminate problems of installation space and mutual interference, electrical/magnetic noise, temperature rise and mechanical positioning.

- Minimum resolution: 0.01 μm
- Ultra-compact sensing head: 24 × 24 mm; weighs only 105 g
- High flexibility robotic cable from sensor to controller, extends 32 m
- Mount sensing head one time: no need to re-tune for changing materials
- Separate amplifier provides white LED light source, spectroscope and processor to convert reflected color light to distance
- Automation Software Sysmac Studio simplifies system operation and setting

Ordering information

Sensor heads

Type	Measuring range	Spot diameter	Static resolution	Order code ^{*1}
Straight type	7±0.3 mm	18 μm dia.	0.01 μm ^{*2} /0.25 μm	ZW-S07
	20±1 mm	40 μm dia.	0.02 μm ^{*2} /0.25 μm	ZW-S20
	30±3 mm	60 μm dia.	0.06 μm ^{*2} /0.25 μm	ZW-S30
	40±6 mm	80 μm dia.	0.08 μm ^{*2} /0.25 μm	ZW-S40
Right-angle type	7±0.3 mm	18 μm dia.	0.25 μm	ZW-SR07
	20±1 mm	40 μm dia.	0.25 μm	ZW-SR20
	40±6 mm	80 μm dia.	0.25 μm	ZW-SR40

^{*1} When ordering, specify the cable length (0.3 m, 2.0 m).

^{*2} The high resolution types are subject to the export control restrictions

Controller with EtherCAT

Power supply	Output type	Order code
24 VDC	NPN	ZW-CE10T/ZW-C10 ^{*1}
	PNP	ZW-CE15T/ZW-C15 ^{*1}

^{*1} The high resolution types are subject to the export control restrictions

Note: Controllers with binary outputs are also available (ZW-C10T/-C15T). Please contact your OMRON sales representative for details.

Cable

Item	Cable length	Order code
Sensor Head - Controller Extension Fiber Cable (flexible cable) (Fiber Adapter ZW-XFC provided)	2 m	ZW-XF02R
	5 m	ZW-XF05R
	10 m	ZW-XF10R
	20 m	ZW-XF20R
	30 m	ZW-XF30R
Fiber Adapter (between Sensor Head pre-wired cable and Extension Fiber Cable)	—	ZW-XFC
Parallel cable for ZW-CE1□ 32-pole ^{*1}	2 m	ZW-XCP2E
RS-232C Cable for personal computer	2 m	ZW-XRS2
RS-232C Cable for PLC/programmable terminal	2 m	ZW-XPT2

^{*1} A parallel cable for Controllers with binary outputs is also available (ZW-XCP2). Please contact your OMRON sales representative for details.

Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

Product name	Specifications	Order code	
		Number of licenses	Media
Sysmac Studio Standard Edition Ver.1.□□ ^{*1}	The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ-series controllers and other machine automation controllers, as well as EtherCAT slaves. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version)/Vista (32-bit version)/7 (32-bit/64-bit version) This software provides functions of the Measurement Sensor Edition. Refer to Sysmac Catalog (P072) for details such as supported models and functions.	— (Media only)	DVD
		1 license ^{*2}	—
Sysmac Studio Measurement Sensor Edition Ver.1.□□ ^{*3}	Sysmac Studio Measurement Sensor Edition is a limited license that provides selected functions required for ZW-series Displacement Sensor settings. Because this product is a license only, you need the Sysmac Standard Edition DVD media to install it.	1 license	—
		3 licenses	—

^{*1} ZW-series is supported by Sysmac Studio version 1.05 or higher.

^{*2} Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

^{*3} Setting Software Smart Monitor ZW is also available (ZW-SW101). Please contact your OMRON representative for details.

Setting software

Item	Order code
Smart Monitor ZW	ZW-SW101

Accessories

Item	Order code
Fiber Connector Cleaner	ZW-XCL

Recommended EtherCAT communications cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.

Cable with connectors

Item	Recommended manufacturer	Cable length (m) ^{*1}	Order code
Standard type Cable with connectors on both ends (RJ45/RJ45) Wire gauge and number of pairs: AWG27, 4-pair Cable Cable Sheath material: LSZH ^{*2} Cable color: Yellow ^{*3}	OMRON	0.3	XS6W-6LSZH8SS30CM-Y
		0.5	XS6W-6LSZH8SS50CM-Y
		1	XS6W-6LSZH8SS100CM-Y
		2	XS6W-6LSZH8SS200CM-Y
		3	XS6W-6LSZH8SS300CM-Y
Rugged type Cable with connectors on both ends (RJ45/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable	OMRON	5	XS6W-6LSZH8SS500CM-Y
		0.3	XS5W-T421-AMD-K
		0.5	XS5W-T421-BMD-K
		1	XS5W-T421-CMD-K
		2	XS5W-T421-DMD-K
Rugged type Cable with connectors on both ends (M12 Straight/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable	OMRON	5	XS5W-T421-GMD-K
		10	XS5W-T421-JMD-K
		0.3	XS5W-T421-AMC-K
		0.5	XS5W-T421-BMC-K
		1	XS5W-T421-CMC-K
Rugged type Cable with connectors on both ends (M12 Right-angle/RJ45) Wire gauge and number of pairs: AWG22, 2-pair cable	OMRON	2	XS5W-T421-DMC-K
		5	XS5W-T421-GMC-K
		10	XS5W-T421-JMC-K
		0.3	XS5W-T422-AMC-K
		0.5	XS5W-T422-BMC-K
		1	XS5W-T422-CMC-K
		2	XS5W-T422-DMC-K
		5	XS5W-T422-GMC-K
		10	XS5W-T422-JMC-K

^{*1} Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20m are available.

^{*2} Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15m are available.

^{*3} The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.

^{*3} Cables colors are available in blue, yellow, or Green

Note: For details, refer to Cat.No.G019.

Cables/connectors

Wire gauge and number of pairs: AWG24, 4-pair cable

Item	Recommended manufacturer	Order code
Cables	Hitachi Cable, Ltd.	NETSTAR-CSE SAB 0.5 × 4P ^{*1}
	Kuramo Electric Co.	KETH-SB ^{*1}
	SWCC Showa Cable Systems Co.	FAE-5004 ^{*1}
RJ45 connectors	Panduit Corporation	MPS588-C ^{*1}

^{*1} We recommend you to use above cable and connector together.

Wire gauge and number of pairs: AWG22, 2-pair cable

Item	Recommended manufacturer	Order code
Cables	Kuramo Electric Co.	KETH-PSB-OMR ^{*1}
	Nihon Electric Wire&Cable Co.,Ltd.	PNET/B ^{*1}
RJ45 Assembly connector	OMRON	XS6G-T421-1 ^{*1}

^{*1} We recommend you to use above cable and connector together.

Note: Connect both ends of cable shielded wires to the connector hoods.

Industrial switching hubs for Ethernet

Number of ports	Failure detection	Current consumption	Order code
3	None	0.22 A	W4S1-03B
5	None	0.22 A	W4S1-05B
	Supported		W4S1-05C

Note: Industrial switching hubs are cannot be used for EtherCAT.

EtherCAT junction slaves

Number of ports	Power supply voltage	Current consumption	Order code
3	20.4 to 28.8 VDC	0.08 A	GX-JC03
6	(24 VDC – 15 to 20%)	0.17 A	GX-JC06

Note: 1 Please do not connect EtherCAT junction slave with OMRON position control unit, Model CJ1W-NC_81/_82.

2 EtherCAT junction slaves cannot be used for EtherNet/IP™ and Ethernet.

Specifications

Sensor head

Item	ZW-S07	ZW-S20	ZW-S30	ZW-S40	ZW-SR07	ZW-SR20	ZW-SR40
Measuring center distance	7 mm	20 mm	30 mm	40 mm	7 mm	20 mm	40 mm
Measuring range	±0.3 mm	±1 mm	±3 mm	±6 mm	±0.3 mm	±1 mm	±6 mm
Static resolution ^{*1}	0.25 μm	0.25 μm	0.25 μm	0.25 μm	0.25 μm	0.25 μm	0.25 μm
Linearity ^{*2}	±0.8 μm	±1.2 μm	±4.5 μm	±7.0 μm	±1.1 μm	±1.6 μm	±9.3 μm
Spot diameter ^{*3}	Near	20 μm dia.	45 μm dia.	70 μm dia.	90 μm dia.	20 μm dia.	45 μm dia.
	Center	18 μm dia.	40 μm dia.	60 μm dia.	80 μm dia.	18 μm dia.	40 μm dia.
	Far	20 μm dia.	45 μm dia.	70 μm dia.	90 μm dia.	20 μm dia.	45 μm dia.
Measuring cycle	500 μs to 10 ms						
Operating ambient illumination	Illumination on object surface 10,000 lx or less: incandescent light						
Ambient temperature range	Operating: 0 to 50°C, Storage: -15 to 60°C (with no icing or condensation)						
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)						
Degree of protection	IP40 (IEC60529)						
Vibration resistance (destructive)	10 to 150 Hz, 0.35 mm single amplitude, 80 min each in X, Y, and Z directions						
Shock resistance (destructive)	150 m/s ² 3 times each in six directions (up/down, left/right, forward/backward)						
Temperature characteristic ^{*4}	0.6 μm/°C (0.45 μm/°C)	1.5 μm/°C (1.0 μm/°C)	2.8 μm/°C (2.0 μm/°C)	4.8 μm/°C (3.8 μm/°C)	0.6 μm/°C (0.45 μm/°C)	1.5 μm/°C (1.0 μm/°C)	4.8 μm/°C (3.8 μm/°C)
Materials	Case: aluminum die-cast Fiber cable sheat: PVC Calibration ROM: PC						
Fiber cable length	0.3 m, 2 m (Flex-resistant cable)						
Fiber cable minimum bending radius	20 mm						
Insulation resistance (Calibration ROM)	Between case and all terminals: 20 MΩ (by 250 V megger)						
Dielectric strength (Calibration ROM)	Between case and all terminals: 1,000 VAC, 50/60 Hz, 1 min						
Weight	Approx. 105 g (Chassis, fiber cable total)						
Accessories included with sensor head	Instruction sheet, Fixing screw (M2) for Calibration ROM, Precautions for correct use						

^{*1}. Capacity value when Omron standard mirror surface target is measured at the measurement center distance as the average of 4,096 times.

^{*2}. Material setting for the Omron standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.
The reference values for linearity when targets to measure other than the above are as in the table below

Item	ZW-S07	ZW-S20	ZW-S30	ZW-S40	ZW-SR07	ZW-SR20	ZW-SR40
Glass	±1.0 μm	±1.2 μm	±4.5 μm	±7.0 μm	±1.1 μm	±1.6 μm	±9.3 μm
SUS BA	±1.2 μm	±1.4 μm	±5.5 μm	±8.5 μm	±1.2 μm	±1.8 μm	±9.3 μm
White ceramic	±1.6 μm	±1.7 μm	±6.4 μm	±9.5 μm	±1.6 μm	±1.9 μm	±11.0 μm

^{*3}. Capacity value defined by $1/e^2$ (13.5%) of the center optical intensity in the measured area.

^{*4}. Temperature characteristic at the measurement center distance when the sensor head and the target are fastened with an aluminum jig and the sensor head and the controller are set in the same temperature environment.
Figures in parentheses are converted value obtained by subtracting the effect of expansion or contraction of the aluminum jig itself.

Automation software Sysmac Studio

System requirements

Item	Condition
Operating system (OS) ^{*1, *2}	Windows XP (Service Pack 3 or higher, 32-bit version)/Vista(32-bit version)/7(32-bit/64-bit version)
CPU	Windows computers with Celeron 540 (1.8 GHz) or faster CPU. Core i5 M520 (2.4 GHz) or equivalent or faster recommended
Main memory	2 GB min.
Recommended video memory/video card for using 3D motion trace	Video memory: 512 MB min. Video card: Either of the following video cards: • NVIDIA GeForce 200 Series or higher • ATI RadeonHD5000 Series or higher
Hard disk	At least 1.6 GB of available space
Display	XGA 1024 × 768, 16 million colors. WXGA 1280 × 800 min. recommended
Disk drive	DVD-ROM drive
Communication ports	USB port corresponded to USB 2.0, or Ethernet port ^{*3}
Supported languages	Japanese, English, German, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean

^{*1} Sysmac Studio operating system precaution: System requirements and hard disk space may vary with the system environment.

^{*2} The following restrictions apply when Sysmac Studio is used with Microsoft Windows Vista or Windows 7.

Some Help files cannot be accessed.

The Help files can be accessed if the Help program distributed by Microsoft for Windows (WinHlp32.exe) is installed. Refer to the Microsoft homepage listed below or contact Microsoft for details on installing the file. (The download page is automatically displayed if the Help files are opened while the user is connected to the Internet.)

<http://support.microsoft.com/kb/917607/en-us>

^{*3} Refer to the hardware manual for your Controller for hardware connection methods and cables to connect the computer and Controller.

Setting software Smart Monitor ZW ZW-SW101

System requirements

Item	Condition
Operating System(OS)	Windows 7 (32 or 64-bit version) Windows XP (Service Pack3 or more, 32-bit version)
CPU	Intel Pentium III, 850 MHz or more (2 GHz or more is recommended.)
Main memory	1 GB or more
Hard disk	50 MB or more
Display	1024 × 768 dots or more, 16 million colors or more
Supported languages	Japanese/English
Communication port	Ethernet port

Controller

Item	ZW-CE10T	ZW-CE15T
Input/Output type	NPN	PNP
Number of connected sensor heads	1 per Controller	
Sensor head compatibility	Available	
Light source for measurement	White LED	
Segment display	Main display	11-segment red display, 6 digits
	Sub-display	11-segment green display, 6 digits
LED display	Status indicators	HIGH (orange), PASS (green), LOW (orange), STABILITY (green), ZERO (green), ENABLE (green), THRESHOLD-H (orange), THRESHOLD-L (orange), RUN (green)
	EtherCAT indicators	L/A IN (Link Activity IN) (green), L/O OUT (Link Activity OUT) (green), ECAT RUN (green), ECAT ERR (red)
External interface	Ethernet	100BASE-TX, 10BASE-T, No-protocol communications (TCP/UDP), EtherNet/IP™
	EtherCAT	EtherCAT-specific protocol 100BASE-TX
	RS-232C	115,200 bps max.
	Analog output terminal block	Analog voltage output (OUT1V) -10 to 10 V, output impedance: 100 Ω
		Analog current output (OUT1A) 4 to 20 mA, maximum load resistance: 300 Ω
	32-pole extension connector	Judgment output (HIGH1/PASS1/LOW1) Transistor output system Output voltage: 21.6 to 30 VDC
		BUSY output (BUSY1) Load current: 50 mA or less
		ALARM output (ALARM1) Residual voltage when turning ON: 1.2 V or less
		ENABLE output (ENABLE) Leakage voltage when turning OFF: 0.1 mA or less
		LED OFF input (LED OFF1) DC input system
		ZERO RESET input (ZERO) Input voltage: 24 VDC -10% (21.6 to 26.4 VDC)
		TIMING output (TIMING1) Input current: 7 mA Typ. (24 VDC)
		RESET output (RESET1) Voltage/Current when turning ON: 19 V/3 mA or more Voltage/Current when turning OFF: 5 V/1 mA or less
	Bank	Selected bank output (BANK_OUT 1 to 3) Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA or less Residual voltage when turning ON: 1.2 V or less Leakage voltage when turning OFF: 0.1 mA or less
		Selected bank input (BANK_SEL 1 to 3) DC input system Input voltage: 21.6 to 26 VDC Input current: 7 mA Typ. (24 VDC) Voltage/Current when turning ON: 19 V/3 mA or more Voltage/Current when turning OFF: 5 V/1 mA or less
Main functions	Exposure time	Auto/Manual
	Measuring cycle	500 μs to 10 ms
	Material setting	Standard/Mirror/Diffusion surfaces
	Measurement Item	Height/Thickness/Calculation
	Filtering	Median/Average/Differentiation/High pass/Low pass/Band pass
	Outputs	Scaling/Different holds/Zero reset/Logging for a measured value
	Display	Measured value/Threshold value/Analog output voltage or current value/Judgment result/Resolution/Exposure time
	Number of configurable banks	Max. 8 banks
	Task process	Multi-task (up to 4 tasks per bank)
Ratings	System	Save/Initialization/Display measurement information/Communication settings/Sensor Head calibration/Key-lock/Trigger-key input
	Power supply voltage	21.6 to 26.4 VDC (including ripple)
	Current consumption	600 mA max.
	Insulation resistance	Across all lead wires and controller case: 20 MΩ (by 250 V megger)
	Dialectic strength	Across all lead wires and controller case: 1,000 VAC, 50/60 Hz, 1 min.
Environmental	Degree of protection	IP20 (IEC60529)
	Vibration resistance (destructive)	10 to 55 Hz, 0.35-mm single amplitude, 50 min each in X, Y, and Z directions
	Shock resistance (destructive)	150 m/s ² , 3 times each in six directions (up/down, left/right, forward/backward)
	Ambient temperature	Operating: 0 to 40°C Storage: -15 to 60°C (with no icing or condensation)
	Ambient humidity	Operating and storage: 35% to 85% (with no condensation)
Grounding	D-type grounding (Grounding resistance of 100 Ω or less) Note: For conventional Class D grounding	
Materials	Case: PC	

Item	ZW-CE10T	ZW-CE15T
Weight	Approx. 750 g (main unit only), approx. 150 g (Parallel cable)	
Accessories included with controller	Instruction sheet, Member registration sheet, Parallel cable ZW-XCP2E	

Note: Controllers with binary outputs are also available (ZW-C10T/-C15T). Please contact your OMRON sales representative for details.

ZW series EtherCAT communications specifications

Item	Specification
Communications standard	IEC61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 × 2 ECAT IN: EtherCAT input ECAT OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Variable PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization in DC mode.
LED display	L/A IN (Link/Activity IN) × 1, AL/A OUT (Link/Activity OUT) × 1, AECAT RUN × 1, AECAT ERR × 1



Smart inductive measurement sensor

ZX-E offers the best solution for the accurate measurement of metallic objects. It is highly recommended in harsh environments such as automotive and metal working machines.

- High resolution of 1 μm
- High-speed response time of 150 μs
- Easy sensor head replacement
- Modular platform concept for different sensing technologies
- Easy linearity adjustment for any metal

Ordering information

Sensors

Sensor heads

Shape	Dimensions	Sensing distance	Resolution ^{*1}	Order code
Cylindrical	3 dia. \times 18 mm	0.5 mm	1 μm	ZX-EDR5T
	5.4 dia. \times 18 mm	1 mm		ZX-ED01T ^{*2}
	8 dia. \times 22 mm	2 mm		ZX-ED02T ^{*2}
Screw-shaped	M10 \times 22 mm	2 mm		ZX-EM02T ^{*2}
	M18 \times 46.3 mm	7 mm		ZX-EM07MT ^{*2}
Flat	30 \times 14 \times 4.8 mm	4 mm		ZX-EV04T ^{*2,*3}
Heat-resistant, cylindrical	M12 \times 22 mm	2 mm		ZX-EM02HT ^{*4}

^{*1} For an average count of 4,096.

^{*2} Models with protective spiral tubes are also available. Add a suffix of "-S" to the above model numbers when ordering. (Example: ZX-ED01T-S)

^{*3} Be sure to use ZX-EDA amplifier unit version 1,200 or later with the ZX-EV04.

^{*4} Be sure to use ZX-EDA amplifier unit version 1,300 or later with the ZX-EM02H.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-EDA11
	PNP	ZX-EDA41

Note: Compatible connection with the sensor head.

Accessories (order separately)

Calculating unit

	Model
Calculating unit	ZX-CAL2

Amplifier mounting brackets

Remarks	Model
Attached to each sensor head	ZX-XBE1
For DIN track mounting	ZX-XBE2

SmartMonitor sensor setup tool for Personal Computer connection

Name	Model
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + setup software (CD-ROM)	ZX-SFW11EV3 ^{*1}
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3

^{*1} The ZX-SFW11EV3 SmartMonitor can be used only to set functions and monitor waveforms.

Cables with connectors on both ends (for extension)^{*}

Cable length	Model
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A

^{*} Robot cable models are also available. The model numbers are ZX-XC_R.

Specifications

Sensor heads

Item	ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Measurement range	0 to 0.5 mm	0 to 1 mm	0 to 2 mm	0 to 7 mm	0 to 4 mm	0 to 2 mm
Sensing object	Magnetic metals (Measurement ranges and linearities are different for non-magnetic metals. Refer to engineering data on B-67.)					
Standard reference object	18 × 18 × 3 mm	30 × 30 × 3 mm	60 × 60 × 3 mm	45 × 45 × 3 mm		
	Material: Ferrous (S50C)					
Resolution* ¹	1 μm					
Linearity* ²	±0.5% F.S.					±1% F.S.* ³
Linear output range	Same as measurement range.					
Temperature characteristic* ⁴ (including amplifier unit)	0.15% F.S./°C	0.07% F.S./°C				0.1% F.S./°C
Ambient temperature	Operating* ⁵	0 to 50°C (with no icing or condensation)				–10 to 200°C
	Storage* ⁵	–20 to 70°C (with no icing or condensation)				–20 to 200°C

Item			ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Ambient humidity			Operating and storage: 35% to 85% (with no condensation)					
Insulation resistance			50 MΩ min. (at 500 DC)					
Dielectric strength			1,000 VAC, 50/60 Hz for 1 min between charged parts and case					
Vibration resistance (destruction)			10 to 55 Hz with 1.5-mm double amplitude for 2 h 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 (sensor head)			IEC60529, IP65	IEC60529, IP67				IEC60529, IP60 ^{*6}
Connection method			Connector relay (standard cable length: 2 m)					
Weight (packed state)			Approx. 120 g	Approx. 140 g		Approx. 160 g	Approx. 130 g	Approx. 160 g
Materials	Sensor head	Case	Brass	Stainless steel	Brass		Zinc (nickel-plated)	Brass
		Sensing surface	Heat-resistant ABS					PEEK
	Preamplifier		PES					
Accessories			Amplifier mounting brackets (ZX-XBE1), instruction manual					

^{*1} Accuracy: The resolution is the deviation ($\pm 3\sigma$) in the linear output when connected to the ZX-EDA amplifier unit. The above values indicate the deviations observed 30 minutes after the power is turned ON.

(The resolution is measured with Omron's standard reference object at 1/2 of the measurement range with the ZX-EDA set for the maximum 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.

^{*2} Linearity: The linearity is given as the error in an ideal straight line displacement output when measuring the standard reference object. The linearity and measurement values vary with the object being measured.

^{*3} The value given is for an ambient temperature of 25°C.

^{*4} Temperature characteristic: The temperature characteristic is measured with Omron's standard reference object at 1/2 of the measurement range.

^{*5} The ambient temperature given is only for the sensor head. It is -10 to 60°C for the preamp.

^{*6} Do not use in moist environments because the case is not waterproof.

Amplifier units

Item	ZX-EDA11	ZX-EDA41
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	
Linear output ^{*2}	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ± 4 V (± 5 V, 1 to 5 V ^{*3}), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	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.
Zero reset input, timing input, reset input, judgement output hold 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.)
Function	<ul style="list-style-type: none"> – Measurement value display – Linearity adjustment (materials selection) – Display reverse – Number of display digit changes – Bottom hold, peak-to-peak hold – Average hold – Initial reset – OFF-delay timer – Non-measurement setting – Automatic teaching – Reset input – Linear output correction – K-(A+B) calculation^{*4} – Sensor disconnection detection – Key lock 	
Indications	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Voltage influence (including sensor)	0.5% F.S. of linear output value at $\pm 20\%$ of power supply voltage	
Power supply voltage	12 to 24 VDC $\pm 10\%$, ripple (p-p): 10% max.	
Current consumption	140 mA max. with power supply voltage of 24 VDC (with sensor connected)	
Ambient temperature	Operating and storage: 0 to 50°C (with no icing or condensation)	
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 DC)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance (destruction)	10 to 150 Hz with 0.7-mm double amplitude for 80 min each in X, Y, and Z directions	
Shock resistance (destruction)	300 m/s ² , 3 times each in 6 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 x (average count setting + 1) (with fixed sensitivity).

The response speed of the judgement outputs is calculated as the measurement period x (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-CAL or ZX-CAL2) is required.



Smart contact measurement sensor

ZX-T is ideal for applications where the target object may contain oil deposits or other micro-structures. In this case contact measurement is the most reliable way.

- Modular platform concept for different sensing technologies
- Air-retracting types for automated inspection
- Multipoint measurement with up to 8 sensors
- Pressing force alarm prevents malfunction
- Strong ball bearing structure assures long life time

Ordering information

Sensors

Sensor heads

Size	Type	Sensing distance	Resolution (See note.)	Order code
6 dia.	Short type	1 mm	0.1 μm	ZX-TDS01T
	Standard type	4 mm		ZX-TDS04T
	Low-load type			ZX-TDS04T-L
8 dia.	Standard type	10 mm	0.4 μm	ZX-TDS10T
	Ultra-low-load type			ZX-TDS10T-L
	Air lift type			ZX-TDS10T-V
	Air lift/air push type			ZX-TDS10T-VL

Note: The resolution refers to the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected.

Amplifier units

Power supply	Output type	Order code
DC	NPN	ZX-TDA11
	PNP	ZX-TDA41

Accessories (order separately)

Calculating unit

	Order code
Calculating unit	ZX-CAL2

SmartMonitor sensor setup tool for Personal Computer connection

Name	Order code
ZX-series communications interface unit	ZX-SF11
ZX-series communications interface unit + setup software (CD-ROM)	ZX-SFW11EV3 ^{*1,*2}
ZX-series sensor setup and logging software (CD-ROM)	ZX-SW11EV3 ^{*1}

^{*1} When using the ZX-TDA11/41 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.

ZX-series communications interface unit

Name	Order code
ZX-series communications interface unit	ZX-SF11

Cables with connectors on both ends (for extension)*

Cable length	Order code
1 m	ZX-XC1A
4 m	ZX-XC4A
8 m	ZX-XC8A





* Robot cable models are also available. The model numbers are ZX-XC_R.

Preamplifier mounting brackets

Remarks	Order code
Attached to each sensor head	ZX-XBT1
For DIN track mounting	ZX-XBT2

Actuators

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.) ZX-TDS_T	Order code
Ball type (steel)	Female screw M2.5x0.45		Measuring ordinary flat surfaces (standard actuator supplied with the ZX-TDS series)	○	D5SN-TB1
Ball type (carbide steel)	Female screw M2.5x0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or lower.	○	D5SN-TB2
Ball type (ruby)	Female screw M2.5x0.45		Measurements where abrasion resistance is critical Measured objects: Carbide (HR90) or higher.	○	D5SN-TB3
Needle type (carbide steel)	Male screw M2.5x0.45		Measuring the bottom of grooves and holes	△	D5SN-TN1

Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.)	Order code
Flat (carbide steel)	Male screw M2.5x0.45		Measuring spherical objects		D5SN-TF1
Conversion adapter (stainless steel)	Through-hole female screw M2.5x0.45		Mounting D5SN-TN1/-TF1 or commercially available actuators on ZX-TDS-series sensors		D5SN-TA

Note: ○ Replacement possible △ Conversion adapter required

Specifications

Amplifier units

Item	ZX-TDA11	ZX-TDA41
Measurement period	1 ms	
Possible average count settings ^{*1}	1, 16, 32, 64, 128, 256, 512, or 1,024	
Linear output ^{*2}	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V ³), output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold 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 of 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Function	<div> <ul style="list-style-type: none"> – Measurement value display – Display reverse – Sample hold – Self-peak hold – Initial reset – Hysteresis width setting – Judgement output hold input – (A+B) calculations (see note 4.) – Zero reset memory – Clamp value setting – Span adjustment </div> <div> <ul style="list-style-type: none"> – present value/set value/output value display – ECO mode – peak hold – self-bottom hold – direct threshold value setting – timing inputs – monitor focus – sensor disconnection detection – function lock – scale inversion – warming-up display </div> <div> <ul style="list-style-type: none"> – number of display digit changes – bottom hold, peak-to-peak hold – zero reset – position teaching – reset input – (A-B) calculations^{*4} – non-measurement setting – zero reset indicator – pressing force alarm </div>	
Indicators	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power 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 sensor connected), for 24-VDC power supply voltage: 140 mA max. (with sensor connected)	
Ambient temperature	Operating and storage: 0 to 50°C (with no icing or condensation)	
Temperature characteristic	0.03% F.S./°C	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	

^{*1} The response speed of the linear output is calculated as the measurement period x (average count setting + 1).

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

^{*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.

Sensor heads

Item	ZX-TDS01T	ZX-TDS04T	ZX-TDS04T-L
Measurement range	1 mm	4 mm	
Maximum actuator travel distance	Approx. 1.5 mm	Approx. 5 mm	
Resolution ^{*1}	0.1 μm		
Linearity ^{*2}	±0.3% F.S.		
Operating force ^{*3}	Approx. 0.7 N		Approx. 0.25 N
Degree of protection (sensor head)	IEC60529, IP67		IEC60529, IP54
Mechanical durability	10,000,000 operations min.		
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 icing or condensation)		
Temperature characteristic ^{*4}	Sensor head	0.03% F.S./°C	
	Preamplifier	0.01% F.S./°C	
Weight (packed state)	Approx. 100 g		
Materials	Sensor head	Stainless steel	
	Preamplifier	Polycarbonate	
Accessories	Instruction manual, preamplifier mounting brackets (ZX-XBT1)		

^{*1} The resolution is given as the minimum value that can be read when a ZX-TDA_1 amplifier unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.

^{*2} The linearity is given as the error in an ideal straight line displacement output.

^{*3} These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.

^{*4} These figures are representative values that apply for the mid-point of the measurement range.



Easy profile measurement – “teach&go”

The ZG2 enables precise shape measurement on challenging materials and surfaces. An easy and intuitive user interface enables efficient installation, setup and operation. A built-in LCD monitor indicates the measurement result in real time.

- Easy to use – intuitive user interface
- Live – built-in LCD monitor for setup and immediate profile display
- Versatile – 18 measurement tools
- Accurate – 5 µm resolution (3 mm / 631 pixels)
- Wide profiles – up to 70 mm

Ordering information

Sensor heads

Optical method	Sensing distance		Resolution		Order code
	Height direction	Width direction	Height direction	Width direction	
Diffuse reflective	210±48 mm	70 mm	6 µm	111 µm	ZG2-WDS70
Diffuse reflective	100±12 mm	22 mm	2.5 µm	35 µm	ZG2-WDS22
Diffuse reflective	50±3 mm	8 mm	1 µm	13 µm	ZG2-WDS8T
Regular reflective	22.3±0.5 mm	3 mm	0.25 µm	5 µm	ZG2-WDS3VT

Note: - For details, refer the ratings and specifications table.
- Designate the cable length (0.5 m, 2 m) when ordering.

Sensor controllers

Power supply	Output type	Order code
24 VDC	NPN	ZG2-WDC11A ^{*1}
	PNP	ZG2-WDC41A

^{*1} Setup support software for PC is attached

Accessories (order separately)

Real-time parallel output unit

Output type	Order code
NPN	ZG-RPD11
PNP	ZG-RPD41

RS-232C cable

Connecting device	Order code
For personal computer connection (2 m)	ZS-XRS2
For PLC/PT connection (2 m)	ZS-XPT2

Sensor head extension cable

Name	Order code
3 m extension cable	ZG2-XC3CR
8 m extension cable	ZG2-XC8CR
15 m extension cable	ZG2-XC15CR
25 m extension cable	ZG2-XC25CR
Digital equalizer (relay device)	ZG2-XEQ
0.2 m digital equalizer connection cable	ZG2-XC02D

Parallel mounting adaptor

	Order code
For 1 unit	ZS-XPM1
For 2 units or more	ZS-XPM2

Controller link unit

Item	Order code
Controller link unit	ZS-XCN

Memory card

Capacity	Order code
128 MB	F160-N1285
256 MB	F160-N2565

Specifications

Sensor heads

Item		ZG2-WDS70	ZG2-WDS22		ZG2-WDS8T		ZG2-WDS3VT	
Optical system		Diffuse reflective	Diffuse reflective	Regular reflective	Diffuse reflective	Regular reflective	Regular reflective	Diffuse reflective
Measurement range	Height direction	210±48 mm (In the high-precision mode)	100±12 mm	94±10 mm	50±3 mm	44±2 mm	22.3±0.5 mm	10.6±0.4 mm
	Width direction (typical)	70 mm	22 mm		8 mm		3 mm	
Resolution	Height direction ^{*1}	6 μm	2.5 μm		1 μm		0.25 μm	
	Width direction	111 μm (70 mm/631 pixels)	35 μm (22 mm/631 pixels)		13 μm (8 mm/631 pixels)		5 μm (3 mm/631 pixels)	
Linearity (in the height direction) ^{*2}		±0.1% F.S.						
Temperature characteristic ^{*3}		0.02% F.S./°C			0.03% F.S./°C		0.08% F.S./°C	
Light source	Type	Visible semiconductor laser						
	Wavelength	658 nm						650 nm
	Output	5 mW max. output, 1 mW max. exposure (without using optical instruments)						1 mW max.
	Laser class	Class 2M of EN60825-1 / IEC60825-1 Class IIIB of FDA (21CFR 1040.10 and 1040.11)						Class 2 of EN60825-1 / IEC60825-1 Class II of FDA (21CFR 1040.10 and 1040.11)
Beam shape (at measurement center distance) ^{*4}		120 μm × 75 mm (typical)	60 μm × 45 mm (typical)		30 μm × 24 mm (typical)		25 μm × 4 mm (typical)	
LED		STANDBY: Lights when laser irradiation preparation is complete (indication color: green) LD_ON: Lights when the laser is irradiating (indication color: green)						
Measurement object		Surface of non-transparent objects	Surface of non-transparent/transparent objects					
Environmental resistance	Ambient light intensity	Illumination on the photo-receiving face 7,000 lx max.: Incandescent lamp						
	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)						
	Degree of protection	IP66 (IEC60529)						IP67 (IEC60529)
	Vibration resistance (destruction)	10 to 150 Hz with 0.35 mm single amplitude for 80 min each in X, Y, and Z directions						
Shock resistance (destruction)		150 m/s ² , 3 times each in 6 directions (up / down, right / left, forward / backward)						
Materials		Case: Aluminum diecast, Front cover: Glass, Cable insulation : Heat-resistive polyvinyl chloride (PVC), Connector: Zinc alloy or brass						
Cable length		0.5 m, 2 m (flexible cable)						
Weight		Approx. 650 g		Approx. 500 g			Approx. 300 g	
Accessories		Laser labels (EN : 2 labels, FDA : 3 labels), Ferrite core (1), Instruction manual						

^{*1} Obtained by setting an Omron standard measurement object at the measurement center distance and determining the average height of the beam line. The conditions are given in the table below. However, satisfactory resolution cannot be attained in strong electromagnetic fields. The minimum resolution of the ZG2-WDS8T/WDS3VT is 0.25 f_{Em}, even when the average number of operations is increased. Resolution does not go any lower.

Model	CCD Mode	Average No. of operations	Measurement object	
			Regular reflective	Diffuse reflective
ZG2-WDS70/WDS22/WDS8T	Standard mode	64	Omron standard white alumina ceramic object	
ZG2-WDS3VT	Standard mode		Omron standard mirrored object	Omron standard diffuse reflective object

^{*2} The tolerance for an ideal straight line obtained by determining the average height of an Omron standard measurement object for the beam line. The CCD high-resolution mode is used. Linearity varies depending on the measurement object.

Model	Measurement object	
	Regular reflective	Diffuse reflective
ZG2-WDS70/WDS22/WDS8T	Omron standard white alumina ceramic object	
ZG2-WDS3VT	Omron standard mirrored object	Omron standard diffuse reflective object

^{*3} A value attained by using an aluminum jig to secure the distance between the Sensor head and the measurement object. The CCD standard mode is used.

^{*4} Defined as 1/e² (13.5%) of the center light intensity. This may be influenced when light leakage also exists outside the defined area and the reflectivity of the light around the measurement object is higher than that of the measurement object.

Sensor controllers

Item		ZG2-WDC11/WDC11A	ZG2-WDC41/WDC41A
Input/output type		NPN	PNP
No. of connectable Sensor Heads		1 per Controller	
No. of connectable Controllers		2	
Measurement cycle ^{*1}		16 ms (high-precision mode), 8 ms (standard mode), 5 ms (high-speed mode)	
Min. display unit		10 nm	
Display range		-999.99999 to 999.99999	
Display	LCD monitor	1.8-inch TFT color LCD (557x234 pixels)	
	LEDs	<ul style="list-style-type: none"> Judgment indicators for each task (indication color: orange): T1, T2, T3, T4 Laser indicator (indication color: green): LD_ON Zero reset indicator (indication color: green): ZERO Trigger indicators (indication color: green): TRIG 	
External interface	Input/output signal lines	Analog outputs	Select voltage or current (using the sliding switch on the bottom surface) <ul style="list-style-type: none"> Voltage output: 10 to 10 V, output impedance: 40 Ω Current output: 4 to 20 mA, maximum load resistance: 300 Ω
		Judgment output (ALL-PASSING/ERROR)	NPN open collector 30 VDC, 50 mA max.
		Trigger auxiliary output (ENABLE/GATE)	Residual voltage: 1.2 V max.
		Laser stop input (LD-OFF)	ON: 0 V short or 1.5 V max.
		Zero reset input (ZERO)	OFF: Open (leakage current: 0.1 mA max.)
		Measurement trigger input (TRIG)	
		Bank switching input (BANK A, B)	
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B
		RS-232C	1 port, 115,200 bps max.
	Parall output ^{*2}	Output	18 - terminal
Main functions	No. of settings banks	16	
	Sensitivity adjustment	Multi, High-speed multi, Auto, Fixed	
	Measurement items	Height, 2-point Step, 3-point Step, Edge position, Edge width, Angle, Intersection coordinates, Intersection angle, Sectional area (up to eight items can be measured simultaneously)	
	Auxiliary functions	Filter, Laser power adjustment, Position correction (height, position, lope), Linked operation, Point of inflection measurement	
	Profiles saved	16 profiles (1 profile per bank)	
	Trigger modes	External trigger/continuous	
Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
	Current consumption	0.8 A max. (per sensor head)	
	Insulation resistance	20 MΩ at 250 V between lead wires and Controller case	
	Dielectric strength	1,000 VAC, 50 / 60 Hz for 1 min between lead wires and Controller case	
Environmental resistance	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)	
	Degree of protection	IP20 (IEC 60529)	
	Vibration resistance (destruction)	Vibration frequency: 10 to 150 Hz, single amplitude: 0.35 mm, acceleration: 50 m/s ²	
	Shock resistance (destruction)	150 m/s ² , 3 times each in 6 directions (up/down, right/left, forward/backward)	
Material		Case: Polycarbonate (PC), Cable insulation : Heat-resistive polyvinyl chloride (PCV)	
Cable length		2 m	
Weight		Approx. 300 g (including cable) (Packed state: Approx. 450 g)	
Accessories		ZG2-WDC_1: Large Ferrite Core (1 piece), Instruction Manual ZG2-WDC_1A: Large Ferrite Core (1 piece), Small Ferrite Core (2 pieces), Instruction Manual, Setup Support Software (CD-ROM), USB cable (1 m)	

^{*1} The image input periods listed here are for fixed/auto sensitivity. The image input period will be longer for multi-sensitivity, high-speed multi-sensitivity, or other settings. When the high-power mode is ON, the shortest image input period is 95 ms regardless of the setting of the CCD mode. Use the eco monitor in the RUN mode to determine the actual image input period.

^{*2} when ZG-RPD is mounted

Data storage unit

Item			ZG2-DSU11	ZG2-DSU41
Input/output type			NPN	PNP
No. of connectable Controllers			2*1	
Connectable controllers			ZG2-WDC11/WDC41	
External interface	Input/output signal lines	Inputting starting/terminating logging	ON: 0 V short or 1.5 V max. OFF: Open (leakage current : 0.1 mA max.)	ON: Power supply voltage short or power supply voltage –1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
		Judgment output (HIGH/PASS/LOW/ERROR)	NPN open collector 30 VDC, 50 mA max. Residual voltage : 1.2 V max.	PNP open collector 50 mA max. Residual voltage: 1.2 V max.
	Serial I/O	USB2.0	1 port, full speed (12 Mbps), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
Functions	No. of logged data*2	Memory of the main unit	Profiles saved: 5,120 profiles Measurement values saved: 65,000 values max.*3	
		Memory card (256 MB)*4	Profiles saved: 35,328 profiles max. (256 profiles x 138 files) Measurement values saved: 7,150,000 values max. (65,000 values x 110 files)	
	Logging trigger functions		External triggers, data triggers (self-triggers), and time triggers	
	External banks functions		4096	
	Other functions		Alarm output functions	
	Ratings	Power supply voltage	21.6 to 26.4 VDC (including ripple current)	
Current consumption		0.5 A max.		
Environmental resistance	Ambient temperature	Operating: 0 to 50°C, Storage: 0 to 60°C (with no icing or condensation)		
	Ambient humidity	Operating and storage: 35% to 85% (with no condensation)		
Material			Case : Polycarbonate (PC)	
Cable length			2 m	
Weight			Approx. 280 g	
Accessories			Ferrite Core (1 piece), Instruction Manual	

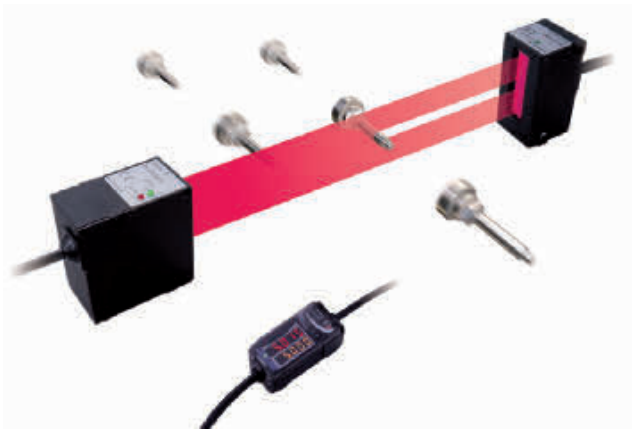
^{*1} The controller link unit is necessary for linking.

^{*2} Data is saved in the memory of the main unit during logging. The data is automatically saved in a memory card after logging is completed. The maximum number of logging differs according to set conditions. For details, refer to the Users Manual.

^{*3} Measurement values for 65,000 measurements can be saved even when two sensor controllers are connected and each performs eight tasks.

^{*4} The value is the maximum number achieved in the following conditions:

- One sensor controller performs one measurement task.
- Either profiles or measurement values are logged.



Smart laser micrometer

- High accuracy: 5 to 10 μm
- All surfaces
- Long sensing distance: < 500 mm
- Line width up to 28 mm
- Calculation unit for multiple heads
- Fast sampling time: 0.5 ms
- PC software for setup

Ordering information

Sensors

Type	Optical system	Measuring width	Sensing distance	Resolution	Output type	Order code
Separate type	Through-beam	28 mm	0 to 500 mm	10 μm	NPN	ZX-GT28S11
Integrated type			40 mm		PNP	ZX-GT28S41
					NPN	ZX-GT2840S11
					PNP	ZX-GT2840S41

Controller

Power supply	Output type	Order code
DC	NPN	ZX-GTC11
	PNP	ZX-GTC41

Accessories (order separately)

Set of interface unit and setup software PCs

Output type	Order code
NPN	ZX-GIF11A
PNP	ZX-GIF41A

Interface unit(RS-232C/binary output)

Power supply	Output type	Order code
DC	NPN	ZX-GIF11
	PNP	ZX-GIF41

Setup software PCs

Name	Order code
Smart monitor GT	ZX-GSW11

Calculating units

	Order code
Calculating unit	ZX-CAL2

Receiver-controller extension cable

Cable length	Quantity	Order code	
		Standard cable	Flexible cable
1 m	1 m	ZX-XGC1A	ZX-XGC1R
2 m		ZX-XGC2A	ZX-XGC2R
5 m		ZX-XGC5A	ZX-XGC5R
8 m		ZX-XGC8A	ZX-XGC8R
20 m		ZX-XGC20A	ZX-XGC20R

Up to two extension cables can be connected. However, be sure to limit the total extension cable length between the receiver and the controller to 30 meters (including the receiver cable).

Specifications

Sensor				
Item	ZX-GT28S11	ZX-GT2840S11	ZX-GT28S41	ZX-GT2840S41
Output type	NPN		PNP	
Appearance	Separate type	Integrated type	Separate type	Integrated type
Light source	Visible semiconductor laser diode (wavelength 650 nm, CLASS 1 of EN60825-1/IEC60825-1, CLASS of FDA(21CFR 1040.10 and 1040.11)			
Measuring width	28 mm			
Sensing distance	0 to 500 mm	40 mm	0 to 500 mm	40 mm
Minimum sensing object	0.5 mm dia. *1	0.2 mm dia.	0.5 mm dia. *1	0.2 mm dia.
Linearity	±0.1% F.S. *2			
Resolution	10 μm (number of process values to average: 16) *3			
Temperature characteristic	±0.01% F.S/C° *4			
Indicators (emitter)	Laser ON indicator (green), laser alarm indicator (red)			
Indicator (receiver)	Optical axis setting indicator (green)			
Laser OFF input/sync input	ON: Short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)		ON: Short-circuited with power supply voltage or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	
Laser deterioration alarm output	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.		PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.	
Power consumption (emitter)	30 mA max.			
Power supply voltage (emitter)	24 VDC+10%, -15% ripple (p-p) 10% max.			
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min			
Insulation resistance	20 MΩ (at 500 VDC megger)			
Operating ambient illumination (emitter)	3,000 lx (incandescent light)			
Operating ambient illumination (receiver)	1,000 lx (incandescent light) *5			
Ambient temperature	Operating: 0 to 40°C, storage: -15 to 50°C (with no icing or condensation)			
Ambient humidity	Operating and storage: 35% to 85% (with no condensation)			
Vibration resistance (durability)	10 to 150 Hz single-amplitude: 0.75 mm for 80 min each in X, Y and Z directions			
Degree of protection	IEC60529 IP40			
Cable length	2 m			
Material	Case: aluminum die-cast, Lens: glass			
Weight (packed state)	Approx. 550 g	Approx. 570 g	Approx. 550 g	Approx. 570 g
Accessories	Laser warning labels, instruction sheet			
F.S.: 28 mm measuring range of receiver				

F.S.: 28 mm measuring range of receiver

^{*1} Distance between emitter and receiver: 500 mm, measurement object at 250 mm from receiver. Glass ends of chamfer 0.1 mm or more can be detected in glass edge measurement mode. (at binary level 70%)

^{*2} Linearity is given to be a typical error with respect to an ideal straight line when the distance between the emitter and receiver is 100 mm and light is blocked at a distance of 50 mm from the receiver. (On the ZX-GT2840_, the measurement object is measured at a distance of 20 mm from the receiver.)

^{*3} The amount of fluctuation (±3 σ) in the analog output when the distance between the emitter and receiver is 100 mm and a ZX-GTC_ is connected

^{*4} Change in the light cutoff value on one side when the distance between the emitter and receiver is 100 mm and the light is half-cutoff at a distance of 50 mm from the receiver (On the ZX-GT2840_, the measurement object is measured at a distance of 20 mm from the receiver.)

^{*5} Standard mode (NORM) used

Controller

Item		ZX-GTC11	ZX-GTC41
Output type		NPN	PNP
Measurement cycle ^{*1}		1.5 ms (standard mode (NORM)) 0.5 ms (high-speed mode (FAST)) ^{*2}	
Samples to average		1/2/4/8/16/32/64/128/256/512/1024/2048/4096	
Analog output ^{*3}		For current output: 4 to 20 mA/F.S., max. load resistance 300 Ω For voltage output: ±4 V, (±5 V, 1 to 5 V ^{*4}), output impedance 100 Ω	
Timing input, bank switching input, zero reset input, reset input		ON: short-circuited with 0 V or 1.5 V max. OFF: Open (leakage current: 0.1 mA max.)	ON: short-circuited with power supply voltage or power supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)
HIGH/PASS/LOW Judgment output ^{*5} Sync output ^{*6}		NPN open-collector output 30 VDC 50 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 50 mA max. Residual voltage 2 V max.
Indicator		Judgment output indicator: HIGH (orange), PASS (green), LOW (orange) Main display (red) sub-display (yellow) bank 1/2 (orange), zero reset (green)	
Main functions	Number of registered setups	2 banks	
	Measurement mode	Interrupted beam width measurement, incident beam width measurement, outer diameter measurement, center position measurement, IC lead pitch, IC lead width judgment, specified edge measurement, wire position measurement, glass edge position measurement	
	Display during measurement	Measured value, resolution, threshold, voltage output value, current output value (number of display digits can be changed)	
	Zero reset functions	Offset setting of zero reset value, zero reset value memory	
	Hold	Sample hold, peak hold, bottom hold, peak-to-peak hold, average hold, delay hold	
	Timer functions	ON-delay, OFF-delay, one-shot	
	Adjustment functions	Optical axis adjust mode/light intensity writing mode, variable binary level, variable edge filter, analog output scaling	
	Calculation	2 possible on up to two controllers (calculation Unit ZX-CAL2 is required for connecting controllers to each other.) A-B, A+B, width	
Other		Measurement cycle setting, threshold setting, hysteresis setting, initialization, key lock	

Item	ZX-GTC11	ZX-GTC41
Temperature characteristic	±0.005% F.S./°C	
Current consumption	150 mA max. (including receiver)	
Power supply voltage	24 VDC+10%, -15% ripple (p-p) 10% max.	
Dielectric strength	1,000 VAC, 50/60 Hz for min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
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)	
Vibration resistance(durability)	10 to 150 Hz single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	2 m	
Material	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Weight (packed state)	Approx. 330 g	
Accessories	Instruction sheet	

*1 The first response time is "measurement cycle x (number of samples to average setting + 1) + 1 ms" max. For the second response time onwards, the specified measurement cycle time is output.

*2 The response time in the high-speed mode (FAST) for the IC lead pitch and IC lead width judgment modes is 1 ms.

*3 Current/voltage can be switched using the switch provided on the rear of the Controller.

*4 Can be set by the analog output scaling function.

*5 The error (ERR) state is displayed when all HIGH/PASS/LOW outputs turn OFF.

*6 Normally, wire the sync output wire directly to the emitter's sync input wire and run the controller in the standard mode. On an NPN type controller, use an NPN type emitter, and on a PNP type controller, use a PNP type emitter. Wiring of the sync wires is not required when the controller is run in the high-speed mode.

(Note, however, that the controller becomes more susceptible to the influence of ambient light in this case.)

Interface unit

Item	ZX-GIF11/-GIF11A	ZX-GIF41/-GIF41A
Compatible controller	ZX-GTC11	ZX-GTC41
Indicator	Power ON (green), controller communications (orange), controller communications error (red), RS-232C communications (orange), RS-232C communications error (red), binary output (orange)	
Communications port	RS-232C (9-pin D-sub connector)	
12-bit binary output (D11 to D0, GATE)	NPN open-collector output 30 VDC 20 mA max. Residual voltage 1.2 V max.	PNP open-collector output 30 VDC 20 mA max. Residual voltage 2 V max.
Power supply voltage	Supplied from controller (power consumption: 60 mA max.)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Insulation resistance	20 MΩ (at 500 VDC megger)	
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)	
Vibration resistance(durability)	10 to 150 Hz single-amplitude: 0.35 mm for 80 min each in X, Y and Z directions	
Degree of protection	IEC60529 IP20	
Cable length	RS-232C 0.5 m, binary output 2 m	
Material	Case: PBT (polybutylene terephthalate), cover: Polycarbonate	
Weight (packed state)	ZX-GIF_1A: Approx. 550 g ZX-GIF_1: Approx. 330 g	
Accessories	ZX-GIF_1A: Setup software (CD-ROM), 2 clamps, instruction sheet ZX-GIF_1: 2 clamps, instruction sheet	