2D CMOS Laser Measuring Sensor

ZS-L Series

The smart way to get higher performance and more flexibility for your process.

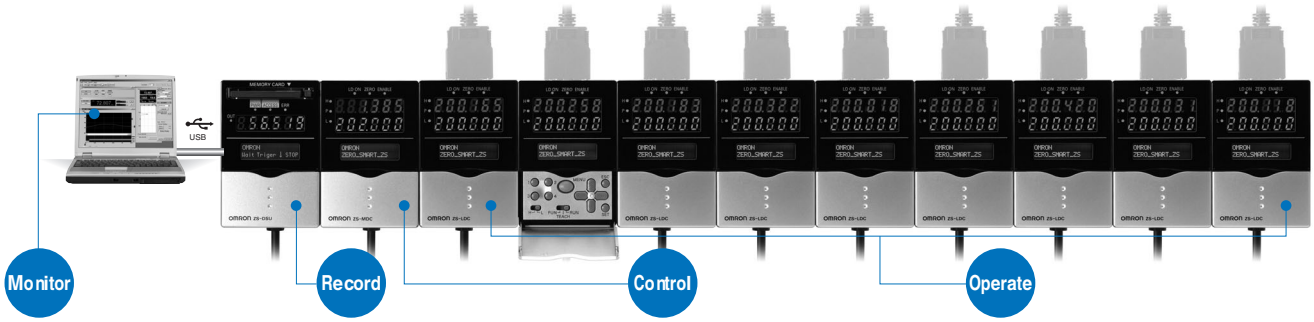
Features

The scalable platform for more flexibility

- Connect and expand up to 9 controllers
- Connect Multi-calculation controller for advanced calculations like evenness or flatness
- Connect Data storage module for process-data logging
- Connect PC software for easy system set up and signal monitoring
- Sensor head with 2D-CMOS technology with high dynamic sensing range for measuring black rubber, plastic, shiny, glass and mirrow surfaces
- Advanced application settings
- Easy reconfiguration and teaching

Measurement Tools:

- Hight measurement
- Step measurement
- Thickness measurement
- Flatness measurement
- Average measurement
- Excentricity
- Warpage/Evenness



Ordering Information

Sensors

Sensor Heads

Optical System	Sensing distance	Beam diameter	Resolution*1	Model
Diffuse reflection	50 ± 5 mm	900 x 60 µm	0.8 µm	ZS-LD50
	80 ± 15 mm	900 x 60 µm	2 µm	ZS-LD80
	200 ± 50 mm	900 x 100 µm	5 µm	ZS-LD200
Regular reflection	20 ± 1 mm	900 x 25 µm	0.25 µm	ZS-LD20T
	40 ± 2.5 mm	2,000 x 35 µm	0.4 µm	ZS-LD40T

*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.

Sensor Controllers

Shape	Supply Voltage	Control outputs	Model
	24 VDC	NPN outputs	ZS-LDC11
		PNP outputs	ZS-LDC41

Multi Controllers

Shape	Supply Voltage	Control outputs	Model
	24 VDC	NPN outputs	ZS-MDC11
		PNP outputs	ZS-MDC41

Data Storage Units

Shape	Supply Voltage	Control outputs	Model
	24 VDC	NPN outputs	ZS-DSU11
		PNP outputs	ZS-DSU41

Accessories (Sold Separately)

Controller Link

Shape	Model
	ZS-XCN

Panel Mount Adapter

Shape	Model	
	ZS-XPM1	For 1st Controller
	ZS-XPM2	For expansion (from 2nd Controller on

RS-232C Cable for Connecting to a Personal Computer

Shape	Model	Qty
	ZS-XRS2	1

Extension Cables for Sensor Heads

Cable length	Model	Qty
1 m	ZS-XC1A	1
4 m	ZS-XC4A	1
5 m	ZS-XC5B*1,*2	1
8 m	ZS-XC8A	1
10 m	ZS-XC10B*1	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

Name	Model
Smart Monitor Zero Professional	ZS-SW11E

Memory Card

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

Specifications

Sensor Heads

Item / Model	ZS-LD20T		ZS-LD40T		ZS-LD50		ZS-LD80		ZS-LD200	
Applicable Controllers	ZS-LDC Series									
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection
Measuring center distance	20 mm	6.3 mm	40 mm	30 mm	50 mm	47 mm	80 mm	78 mm	200 mm	200 mm
Measuring range	±1 mm	±1 mm	±2.5 mm	±2 mm	±5 mm	±4 mm	±15 mm	±14 mm	±50 mm	±48 mm
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., Class 2)									
Beam diameter*1	900 x 25 µm		2,000 x 35 µm		900 x 60 µm		900 x 60 µm		900 x 100 µm	
Linearity*2	±0.1% F.S.									±0.25% F.S.
Resolution*3	0.25 µm		0.4 µm		0.8 µm		2 µm		5 µm	
Temperature characteristic*4	0.04% F.S./°C		0.02% F.S./°C		0.02% F.S./°C		0.01% F.S./°C		0.02% F.S./°C	
Sampling cycle*5	110 µs									
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.									
Indicators: 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									
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-LDC11/LDC41

Sensor Controllers / Model			ZS-LDC11	ZS-LDC41
No. of samples to average			1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096	
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), MINI-B	
		RS-232C	1 port, 115,200 bps max.	
	Outputs	Judgement outputs	3 outputs: HIGH, PASS, and LOW NPN open-collector, 30 VDC, 50 mA max., residual voltage: 1.2 V max.	3 outputs: HIGH, PASS, and LOW PNP open-collector, 50 mA max., residual voltage: 1.2 V max.
		Linear outputs	Selectable from 2 types of output, voltage or current (selected by slide switch on base). Voltage output: –10 to 10 V, output impedance: 40 . Current output: 4 to 20 mA, maximum load resistance: 300 .	
	Inputs	Laser OFF, ZERO reset timing, RESET	ON: Short-circuited with 0V 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 Sensing: Mode, gain, measurement object, head installation Filter: Smooth, average, and differentiation Outputs: Scaling, various hold values, and zero reset I/O settings: Linear (focus/correction), judgements (hysteresis and timer), non-measurement, and bank (switching and clear) System: Save, initialization, measurement information display, communications settings, key lock, language, and data load	
Status indicators			HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (orange), and ENABLE (green)	
Segment display		Main display	8-segment red LED, 6 digits	
		Sub-display	8-segment green LED, 6 digits	
LCD			16 digits x 2 rows, Color of characters: green, Resolution per character: 5 x 8 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)	

Sensor Controllers / Model	ZS-LDC11	ZS-LDC41
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)	
Materials	Case: Polycarbonate (PC)	
Weight	Approx. 280 g (excluding packing materials and accessories)	
Accessories	Ferrite core (1), Instruction Sheet	

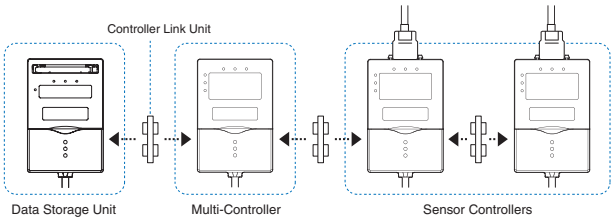
ZS-MDC11/MDC41 Multi-Controllers

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-LDC: 9 Controllers max.)*1	
Connectable Controllers			ZS-LDC□□, 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.	3 outputs: HIGH, PASS, and LOW PNP open-collector, 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.)	ON: Short-circuited to supply voltage or within 1.5 V of supply voltage OFF: Open (leakage current: 0.1 mA max.)
Data resolution			32 bits	
Functions	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 digits x 2 rows, Color of characters: green, Resolution per character: 5 x 8 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.	
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)	

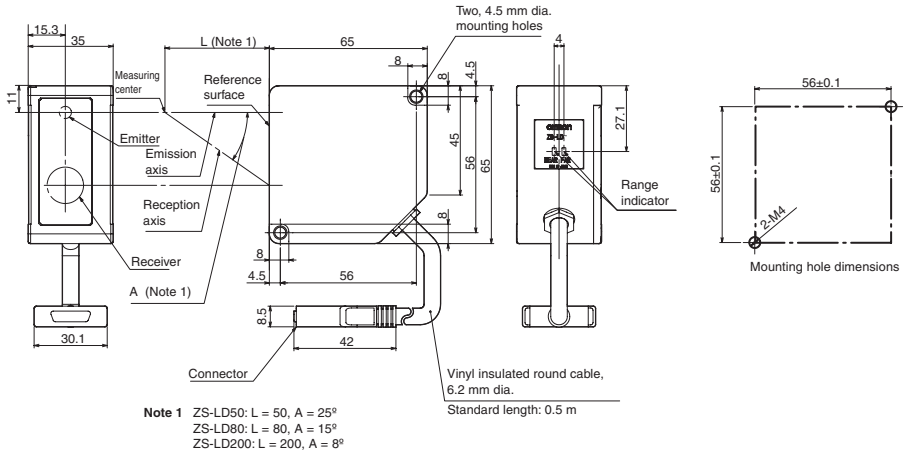
*1. Control Link Units are required to connect Controllers.

Dimensions

Unit: mm

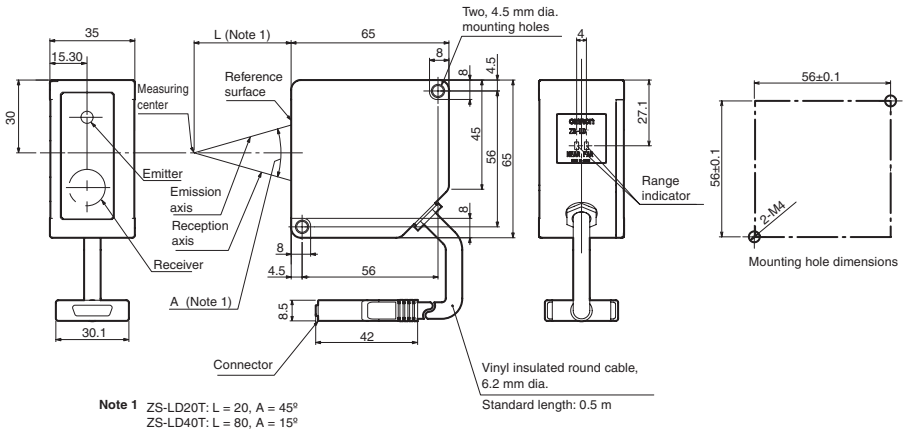
Sensor Heads

ZS-LD50/LD80/LD200



Note 1 ZS-LD50: L = 50, A = 25°
ZS-LD80: L = 80, A = 15°
ZS-LD200: L = 200, A = 8°

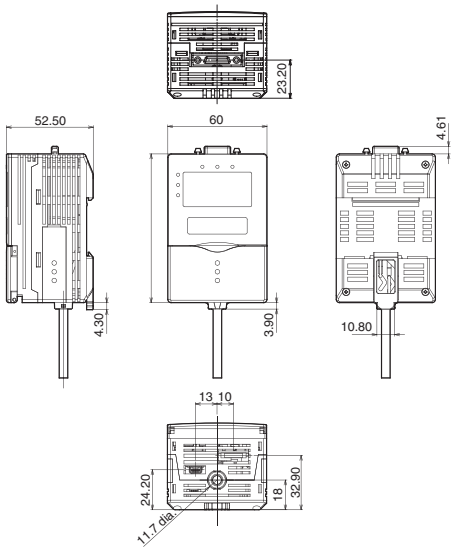
ZS-LD20T/LD40T



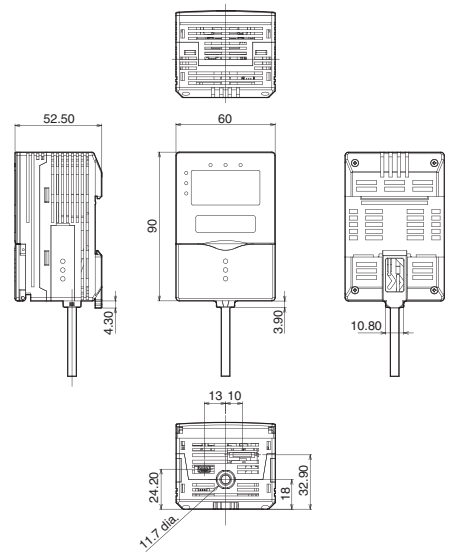
Note 1 ZS-LD20T: L = 20, A = 45°
ZS-LD40T: L = 80, A = 15°

Sensor Controllers

ZS-LDC11/LDC41

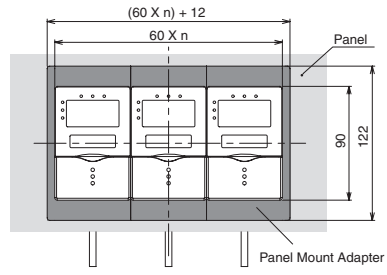


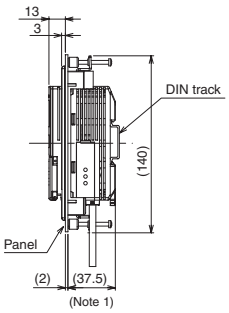
ZS-MDC11/MDC41 Multi-Controllers



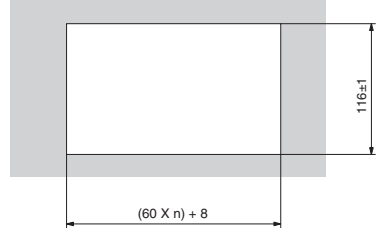
Panel Mount Adapters

ZS-XPM1/XPM2 (Dimension for Panel Mounting)





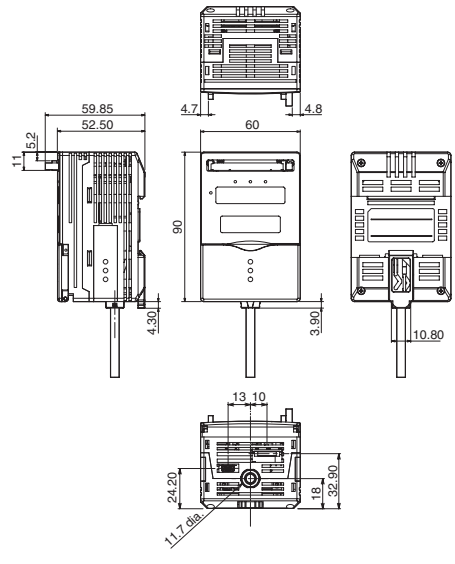
Panel cutout dimensions



Note 1: Dimensions are shown for a panel thickness of 2.0 mm.
n: Number of gang-mounted Controllers (1 to 11)

Data Storage Unit

ZS-DSU11/DSU41



Safety Precautions for Using Laser Equipment

Laser Label Indications

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

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To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. Z215-E2-01A-X In the interest of product improvement, specifications are subject to change without notice.