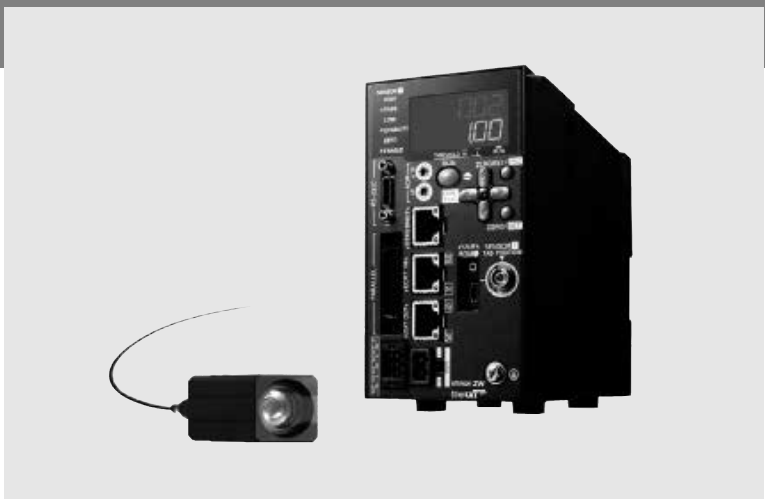
ZW-CE1□, ZW-S□□

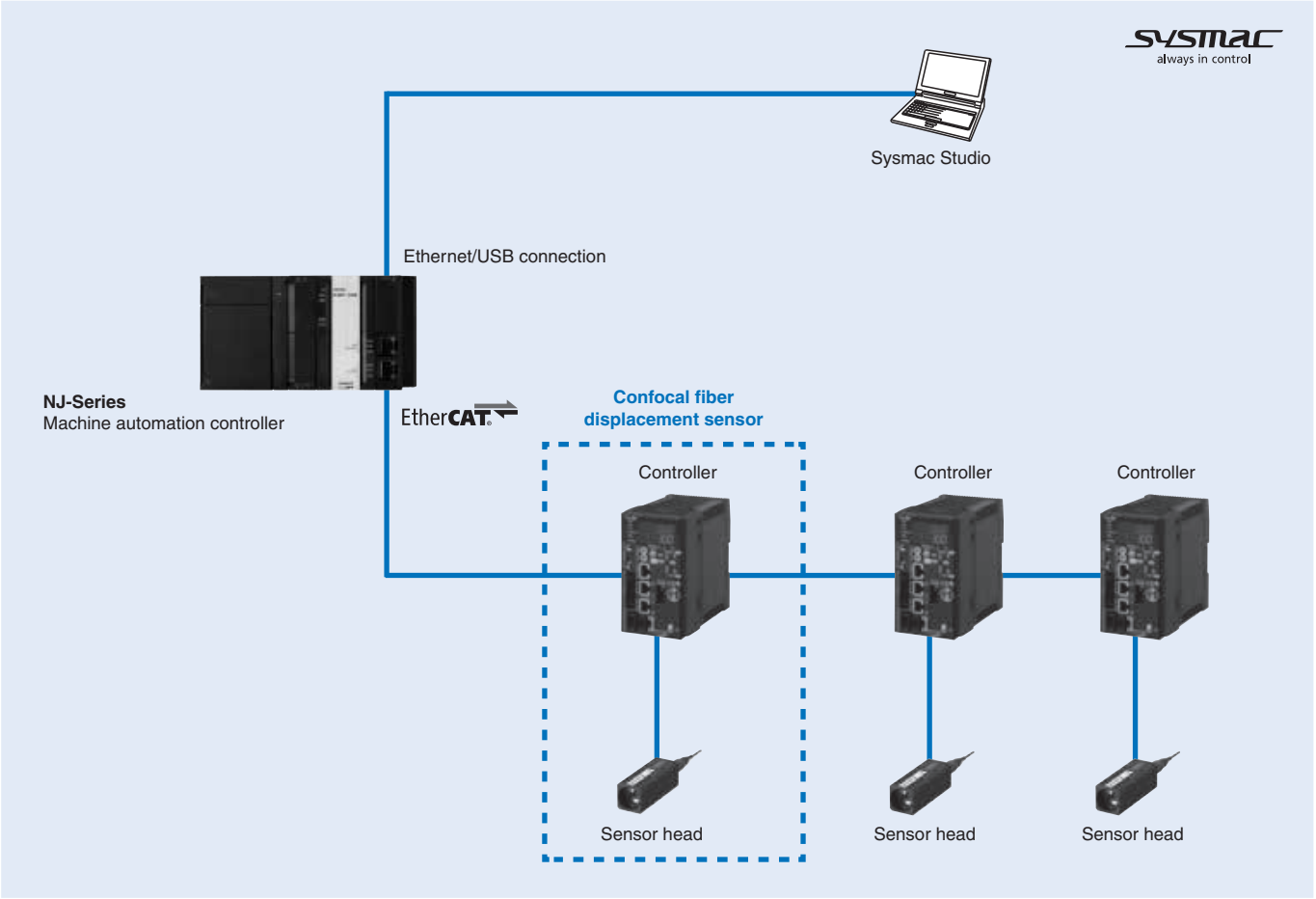
Fiber displacement sensor



The benefits of OMRON's white light confocal principle

- Small size and ultra-lightweight fiber displacement sensor
- Stable measurements for any material with same mounting position
- Robust sensor head structure
- Synchronous measurement with EtherCAT

System configuration



Specifications

Sensor head specifications

Item		ZW-S07	ZW-S20	ZW-S30	ZW-S40
Measuring center distance		7 mm	20 mm	30 mm	40 mm
Measuring range		±0.3 mm	±1 mm	±3 mm	±6 mm
Static resolution*1		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
Spot diameter*3	Near	20 μm dia.	45 μm dia.	70 μm dia.	90 μm dia.
	Center	18 μm dia.	40 μm dia.	60 μm dia.	80 μm dia.
	Far	20 μm dia.	45 μm dia.	70 μm dia.	90 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 50ºC, Storage: –15 to 60ºC (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/ºC	1.5 μm/ºC	2.8 μm/ºC	4.8 μm/ºC
Materials		Case: aluminium 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: 1000 VAC, 50/60 Hz, 1 min			
Weight		Approx. 105 g (chassis, fiber cable total)			
Accessories		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 centre 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 below table:

Item	ZW-S07	ZW-S20	ZW-S30	ZW-S40
Grass	±1.0 μm	±1.2 μm	±4.5 μm	±7.0 μm
SUS BA	±1.2 μm	±1.4 μm	±5.5 μm	±8.5 μm
White ceramic	±1.6 μm	±1.7 μm	±6.4 μm	±9.5 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 fastened with an aluminium jig between the sensor head and the target and the sensor head and the controller are set in the same temperature environment.

Controller specifications

Item				ZW-CE10□	ZW-CE15□
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/A 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			Up to 115.200 bps	
	Analog output terminal block	Analog voltage output (OUT1V)		–10 to 10 V, output impedance: 100 Ω	
		Analog current output (OUT1A)		4 to 20 mA, max. load resistance: 300 Ω	
	32-pole extension connector	Judgment output (HIGH1/PASS1/LOW1)		Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA max. Residual voltage when turning ON: 1.2 V max. Leakage voltage when turning OFF: 0.1 mA max.	
		BUSY output (BUSY1)			
		ALARM output (ALARM1)			
		ENABLE output (ENABLE)			
		LED OFF input (LED OFF1)		DC input system Input voltage: 24 VDC ±10% (21.6 to 26.4 VDC) Input current: 7 mA Typ. (24 VDC) Voltage/current when turning ON: 19 V/3 mA min. Voltage/current when turning OFF: 5 V/1 mA max.	
		ZERO RESET input (ZERO)			
		TIMING output (TIMING1)			
		RESET output (RESET1)			
		Bank	Selected bank output (BANK_OUT 1 to 3)	Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA max. Residual voltage when turning ON: 1.2 V max. Leakage voltage when turning OFF: 0.1 mA max.	
			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 min. Voltage/current when turning OFF: 5 V/1 mA max.	

Item		ZW-CE10□	ZW-CE15□
Main functions	Exposure time	Auto/Manual	
	Measurement 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	Up to 8 banks	
	Task process	Multi-task (up to 4 tasks per bank)	
	System	Save/Initialization/Display measurement information/Communication settings/Sensor head calibration/ Key-lock/Trigger key input	
Ratings	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 (250 VDC megger)	
	Dielectric strength	Across all lead wires and controller case: 1000 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 40ºC Storage: –15 to 60ºC (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 max.) **Note:** For conventional Class D grounding	
Materials		Case: PC	
Weight		Approx. 750 g (main unit only), approx. 150 g (parallel cable)	
Accessories		Instruction sheet, member registration sheet, parallel cable (ZW-XCP2E)	

Note: Controllers with binary outputs are also available (ZW-CE10T/CE15T). Please contact your OMRON sales representative for details.

Sysmac Studio software specifications

Item	Conditions
Operating system (OS)*1*2	Windows XP (Service Pack3 or more, 32-bit version), Vista (32-bit version), 7 (32 or 64-bit version)
CPU	Windows PC with a Celeron 540 (1.8 GHz) or faster CPU Equivalent or higher recommended Core i5 M520 (2.4 GHz)
Memory	2 GB or more
Using the 3D motion trace	Video memory: 512 MB min. One of the following video card: NVIDIAR GeForceR 200 series or ATI RaedonHD5000 series
Free hard disk space	1.6 GB or more
Display	XGA 1024×768 16 million colors WXGA 1280×800 or higher recommended
Disk device	DVD-ROM drive
Communication port	USB port supports 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 / 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.

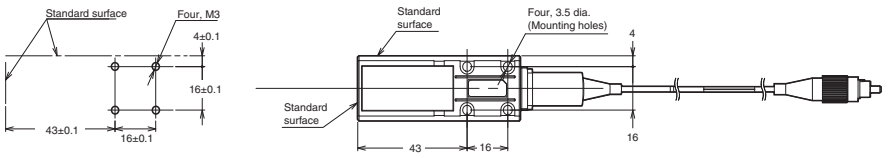
EtherCAT communication specifications

Item	Specifications
Communication standards	IEC61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 × 2, EtherCAT IN: EtherCAT input, EtherCAT OUT: EtherCAT output
Communication system	Category 5 or higher (cable with double, aluminium type and braided shielding) is recommended
Max. communication distance value	Distance between nodes: within 100 m
Process data	Variable PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, SDO information
Distributed clock	Synchronization in DC mode
LED display	L/A IN (Link Activity IN) × 1, L/A OUT (Link Activity OUT) × 1, AECAT RUN × 1, AECAT ERR × 1

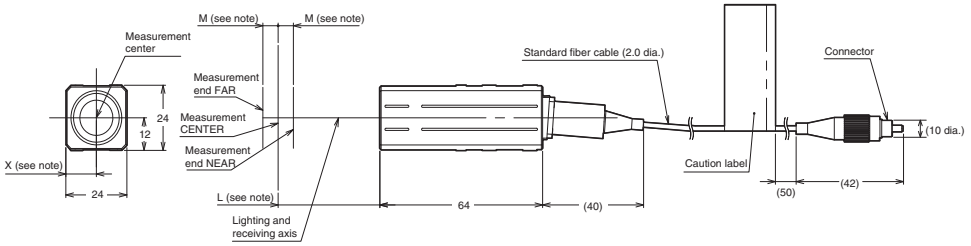
Dimensions

Sensor head

ZW-S07/S20/S30/S40



Mounting hole dimensions

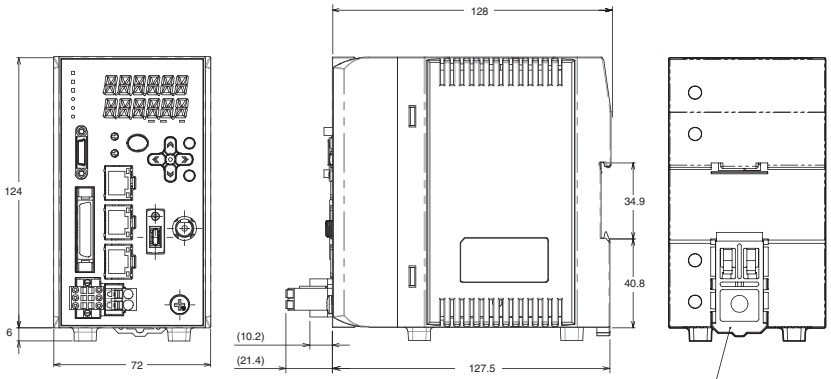


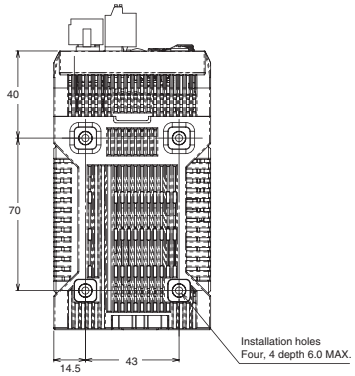
Note:

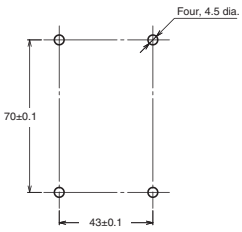
Model	L	M	X
ZW-S07	7	0.3	12
ZW-S20	20	1	11.8
ZW-S30	30	3	11.7
ZW-S40	40	6	11.7

Controller

ZW-CE10□/CE15□



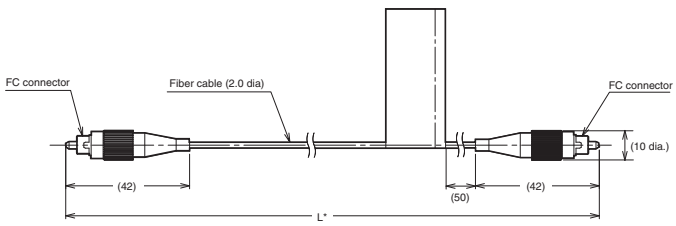




Mounting hole dimensions

Extension fiber cable

ZW-XF02R/XF05R/XF10R/XF20R/XF30R

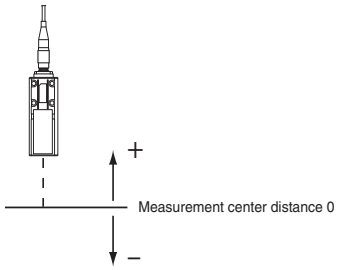


* The following table lists cable lengths per models.

Model	Cable length	L
ZW-XF02R	2 m	2000±20
ZW-XF05R	5 m	5000±50
ZW-XF10R	10 m	10000±100
ZW-XF20R	20 m	20000±200
ZW-XF30R	30 m	30000±300

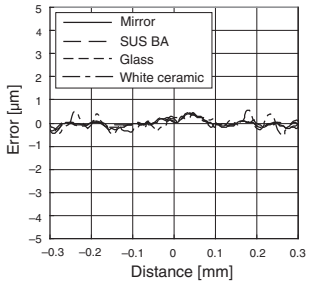
Characteristic data

Linearity characteristic by materials

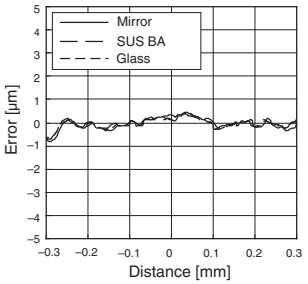


ZW-S07

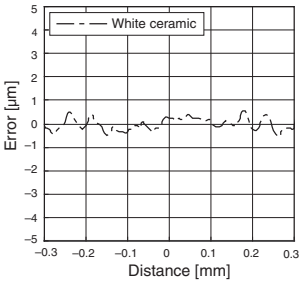
Material setting: Normal



Material setting: Mirror surface

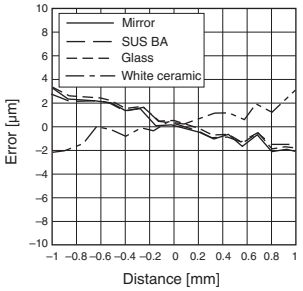


Material setting: Diffusion surface

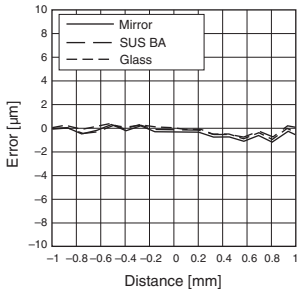


ZW-S20

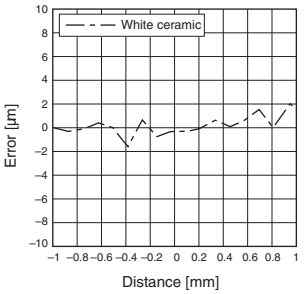
Material setting: Normal



Material setting: Mirror surface

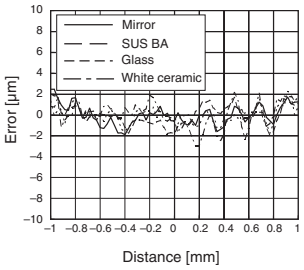


Material setting: Diffusion surface

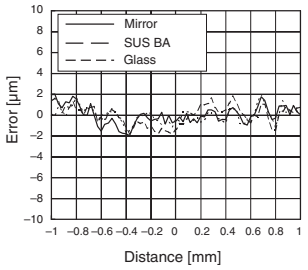


ZW-S30

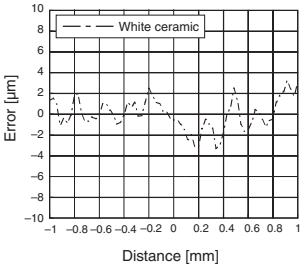
Material setting: Normal



Material setting: Mirror surface

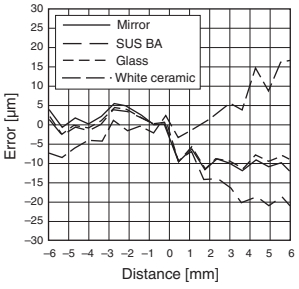


Material setting: Diffusion surface

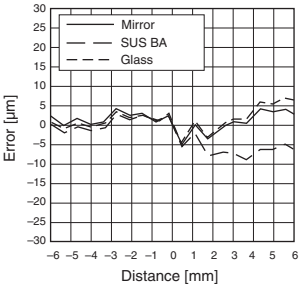


ZW-S40

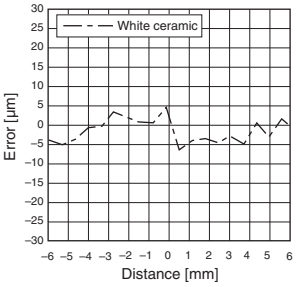
Material setting: Normal



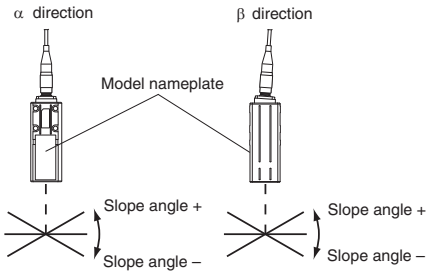
Material setting: Mirror surface



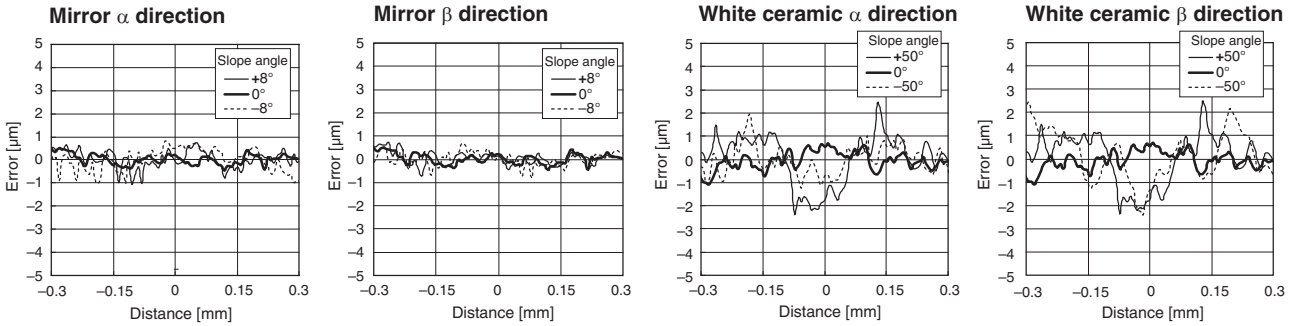
Material setting: Diffusion surface



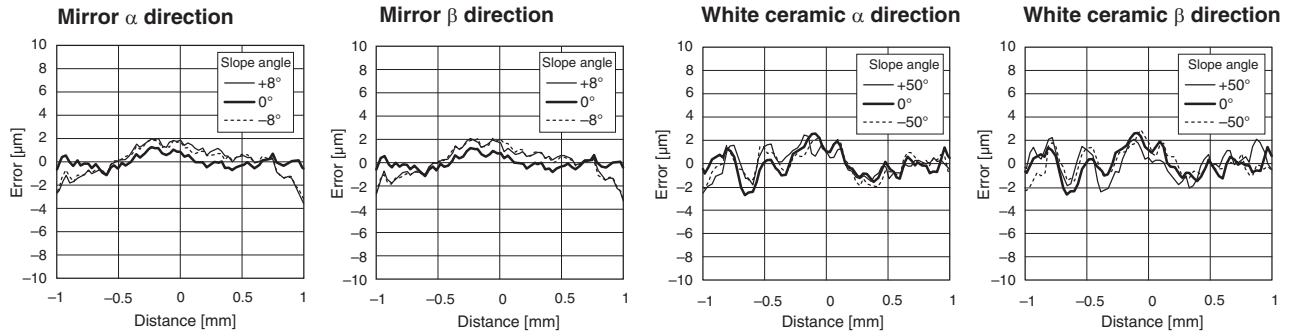
Angle characteristic*



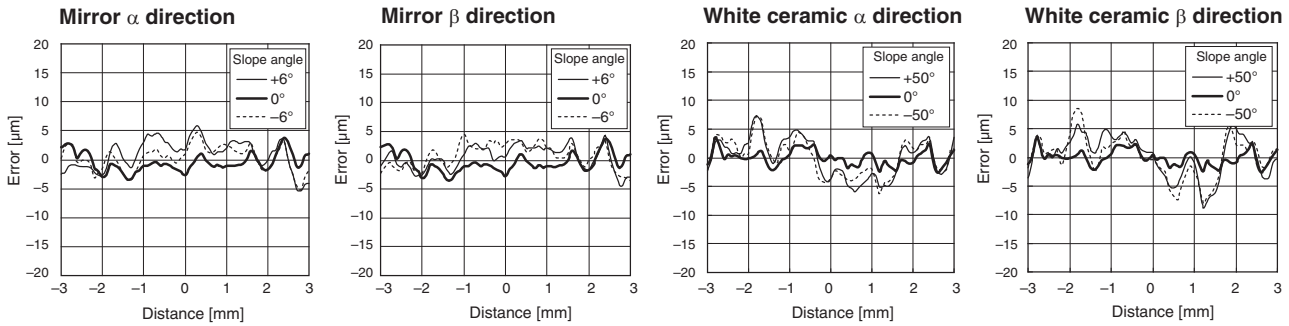
ZW-S07



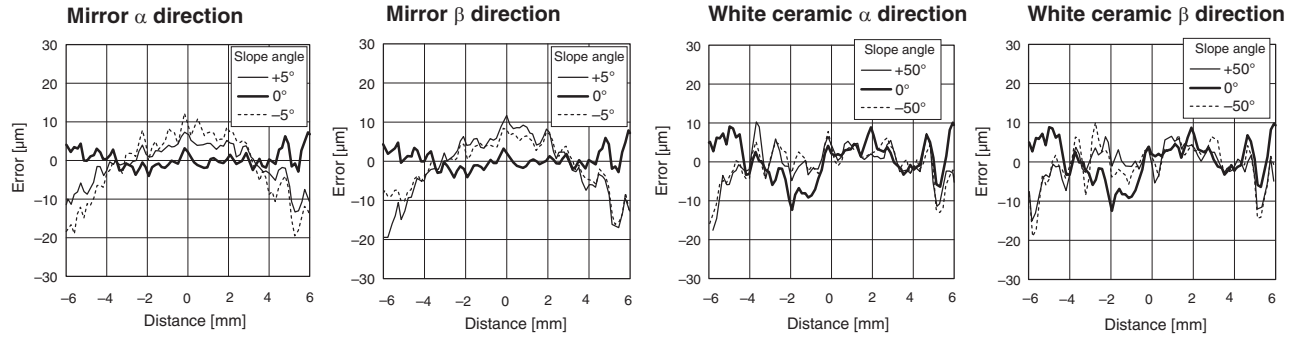
ZW-S20



ZW-S30

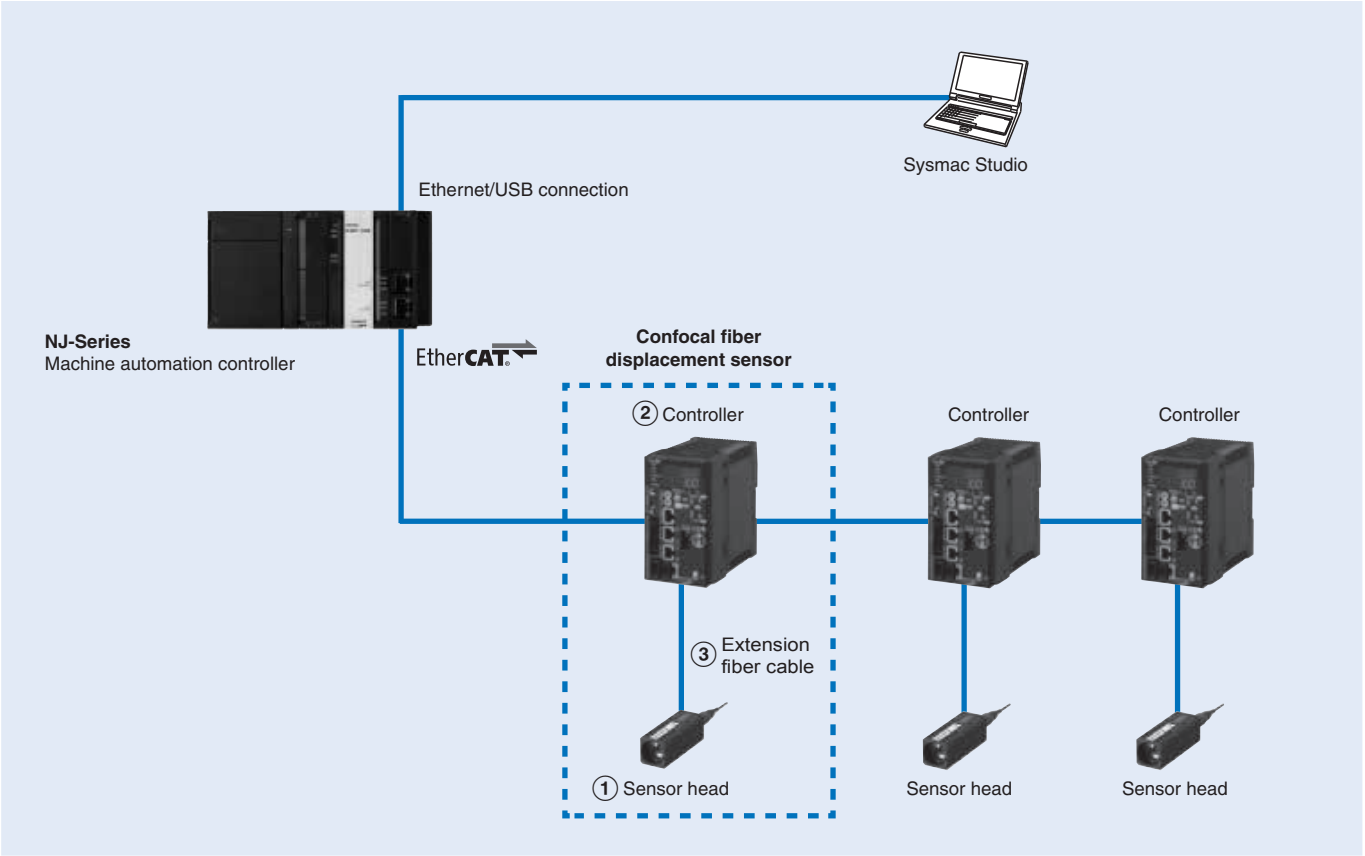


ZW-S40



* The above show the results after executing scaling.

Ordering information



Sensor head

Symbol	Measuring range	Spot diameter	Static resolution	Model
①	7 ±0.3 mm	18 μm dia.	0.01 μm*1/0.25 μm	ZW-S07
	20 ±1 mm	40 μm dia.	0.02 μm*1/0.25 μm	ZW-S20
	30 ±3 mm	60 μm dia.	0.06 μm*1/0.25 μm	ZW-S30
	40 ±6 mm	80 μm dia.	0.08 μm*1/0.25 μm	ZW-S40

*1 The high resolution types are subject to the export control restrictions.

Note: When ordering, specify the cable length (0.3 m, 2.0 m).

Controller

Symbol	Power supply voltage	Output type	Model	Appearance
②	24 VDC	NPN	ZW-CE10*1	
			ZW-CE10T	
		PNP	ZW-CE15*1	
			ZW-CE15T	

*1 The high resolution types are subject to the export control restrictions.

Note: Controller with binary outputs are also available (ZW-CE10T/CE15T).

Cables

Symbol	Item	Cable length	Model	Appearance
③	Sensor head to 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□T 32-pole*1 (included with controller ZW-CE1□T)	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-XCP2E). Please contact your OMRON sales representative for details.

Accessories

Item	Model
Fiber connector cleaner	ZW-XCL

Note: Place orders in units of boxes (contacting 10 units).

Setting software

Item	Model
Smart monitor ZW	ZW-SW101

Computer software

Item	Model
Sysmac Studio version 1.05 or higher	SYSMAC-SE2□□□

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat.No. SysCat_E421-E2-01 In the interest of product improvement, specifications are subject to change without notice.