

Troubleshooting

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8-1 Error Messages

For the displayed or output error messages in each communication, refer to the following manual.



6-1 Error Messages in Confocal Fiber Type Displacement Sensor User's Manual for Communication Settings (Z363).

8-2 Troubleshooting

This section describes how to temporarily remedy hardware-related trouble.

Check the items below before sending the hardware for repair.

Error type	Phenomenon	Cause	Countermeasure	Pages
Startup error	Device restarts during operation.	The power supply device is not connected correctly.	Check if the power supply device conforms to the power supply specifications.	p.6
		The power supply capacity is insufficient.		
	[NO.ROM] is displayed on the main digital.	The calibration ROM is not connected.	Connect the calibration ROM. If the Calibration ROM is lost, or it fails, perform the temporary solution indicated on p.176 and then contact your OMRON representative.	p.26
Sensor Head calibration error	Sensor Head calibration fails.	The connection between the Sensor Controller and the Sensor Head or the extension fiber cable is not normal.	Confirm that the Sensor Controller, Sensor Head, and extension fiber cable are connected correctly.	p.56
		Foreign matter is adhering to the fiber cable end surface.	Clean the Sensor Controller, Sensor Head, and end surface of the extension fiber cable connector.	p.60
		The extension fiber cable is not set properly.	Confirm that the set length of the extension fiber cable matches the length of the connected extension fiber cable.	p.250
		The fiber cable is disconnected.	The Sensor Head and extension fiber cable need to be replaced or repaired. Please contact an OMRON branch or sales office.	–
Display error	The main display remains on “- - - - -”.	TIMING input is not ON.	Turn the TIMING input ON.	p.69
		The trigger level is not appropriately set for self-trigger.	Set the self-trigger level to an appropriate value.	p.148 p.229
		Refer to the section of “[DARK] is displayed on the main digital.”.		–
	The main display becomes “SYSERR.”	A system error has occurred.	Identify the cause of the error based on the error code displayed on the sub-display and take an appropriate action.	*1

Error type	Phenomenon	Cause	Countermeasure	Pages
Measurement error	[DARK] is displayed on the main digital.	Amount of the light is insufficient.	Set the Exposure time to be long or reduce Noise Cut Level within the range of Noise Level.	–
		The target is not in the measurement range.	Check the measurement range and measurement area settings of the Sensor Head, then place the target.	–
		The connection of the Sensor Controller and the Sensor Head or the extension fiber cable is not normal.	Confirm the connection of fiber cable.	p.58
		Calibration of Sensor Head is not performed correctly.	Retry to execute the calibration of Sensor Head.	p.66
		Some contaminants may be adhered.	Clean the fiber cable.	p.58
	[BRIGHT] is displayed on the main digital.	Light amount is saturated.	Short the Exposure time.	p.122
	[NO.SRFC] is displayed on the main digital.	There is no surface to measure.	Change the settings so as to measure a surface that has been detected.	p.128
		The input values of the calculation formula are not applied.	Confirm the TASK measurement value set in parameter X and Y.	–
	[H.CALIB] is displayed on the main digital.	The calibration of Sensor Head is not performed correctly.	Perform the calibration of the Sensor Head again.	p.35
	The measurement value is unstable even if the workpiece and/or Sensor head is stationary. A measurement value is output even if there is no workpiece in the measurement area.	Control edge in Exposure time or surface setting for measurement is not correct.	Change the Control edge or surface setting in Exposure time from Peak to each surface, 1 to 4.	p.122 p.128
		Calibration of Sensor Head is not performed correctly.	Retry to execute the calibration of Sensor Head.	p.66
		There is a problem with the connection between the Sensor Controller and the Sensor Head or the extension fiber cable.	Check the fiber cable connections.	p.58
		The surface of fiber cable is dirty.	Clean the surface.	p.58
		Intense ambient light is present.	<ul style="list-style-type: none"> Shield the ambient light. Shorten the Measurement cycle or increase the background removal level so it is higher than the Noise level. 	
		Receiving light from the opposite Sensor.	Adjust the mounting position of Sensor Head so as not to receive the light from the opposite Sensor.	p.51
When measuring on a high-reflectivity object out of the measurement range, this cause a wrong operation.		Shorten the Measurement cycle (Exposure time) or increase the background removal level so it is higher than the Noise level.	–	

Error type	Phenomenon	Cause	Countermeasure	Pages
Measurement error	The logical beam is not emitted from the Sensor Head.	The connection between the Sensor Head and the Sensor Controller or the connection with the extension fiber cable is not normal.	Check the fiber cable connections.	p.58
		The fiber cable is disconnected.	The Sensor Head needs to be repaired. Please contact an OMRON branch or sales office. For Sensor Head repair, return as a set with the Calibration ROM.	p.58
	The logical beam does not come out of the Sensor Controller.	The LIGHT OFF input line is short-circuited.	Check the wiring.	p.69
	The measured values fluctuate gradually.	The operating ambient temperature of Sensor Head or Controller is fluctuating.	<ul style="list-style-type: none"> Maintain a certain operating ambient temperature. Execute zero reset periodically using the standard object. 	p.92 *2
		The warm-up time is inadequate.	Wait 30 minutes after switching ON the power before using.	p.9
	The measured values differ from the intended values.	The scaling has not been done correctly.	Check the scaling setting.	p.131 p.224
		The zero reset value is not correct.	Set the zero reset correctly.	p.154 p.233
		The serial numbers of the Sensor Head and calibration ROM do not match.	Confirm the serial numbers match.	
	Input error	No input signal received.	Cables are not connected correctly.	Check the input circuit and the wiring for proper connection.
The signal line is disconnected.				
Output error	The judgment result cannot be output to an external device.	Cables are not connected correctly.	Check the output circuit and the wiring for proper connection.	p.69
		The signal line is disconnected.		
		The signal logic is not correct.	Check the logic of the signal.	–
		The RESET input line is short-circuited.	Check the input circuit and the wiring for proper connection.	p.69
		The non-measurement setting is set to “CLAMP”, and measurement cannot be performed.	Set the non-measurement setting correctly. By selecting the non-measurement setting to “KEEP”, the judgment result before measurement is disabled can be output.	*2
	The analog output is not correct.	Cables are not connected correctly.	Check the output circuit and the wiring for proper connection.	p.72
		The signal line is disconnected.		
		The voltage and current values are off the meter.	Set the correct monitor focus based on the measured value.	*2
	An oscilloscope or a high-speed A/D board is being used.	Use of these devices may reduce the resolution. Change the monitor focus to minimize the effect.	*2	

Error type	Phenomenon	Cause	Countermeasure	Pages
Communication error	RS-232C communication cannot be established.	Cable wirings are wrong. Cables are not connected correctly.	Check the wiring to ensure proper connection.	–
		Communication settings are wrong.	Set the same communication setting for both the Sensor Controller and the external devices.	*3
	Ethernet communication cannot be established.	The Ethernet cable is not connected correctly.	Use a cross cable when connecting the controller directly with the personal computer.	–
		The IP address and subnet mask are not set correctly.	Set the IP address of the Sensor Controller and subnet mask correctly. * The setting change is applied after restarting.	p.31 *3
		The Sensor Controller and an external device are not connected at a 1:1 ratio.	Connect the Sensor Controller and an external device at a 1:1 ratio.	–
		The Ethernet cable is disconnected or about to be disconnected.	Check if the Ethernet cable is disconnected.	–
		The industrial switching hub is faulty (when the switching hub is used).	Check if the industrial switching hub is faulty.	–
		The security setting is not appropriate.	Check if the communication is blocked due to the firewall setting on the external device.	–
	Communication cannot be established by EtherCAT.	The node address setting switch is not set correctly.	Check to make sure that the node address setting switch is set correctly.	p.46
		Devices are not connected correctly to the EtherCAT connector (input/output).	Check to make sure that devices are connected correctly to the EtherCAT connector (input/output).	p.47
Other	Key input is not allowed.	The key lock setting is turned ON.	Turn OFF the key lock setting.	p.165 p.246

*1 Refer to “6-1 Error Messages” described in Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User’s Manual for Communications Settings (Z363).

*2 Refer to “2-1 Parallel I/O connection” described in Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User’s Manual for Communications Settings (Z363).

*3 Refer to “5-1 No-protocol Communications” described in Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User’s Manual for Communications Settings (Z363).

APPENDICES

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9-1 Specifications and External Dimensions

Sensor Head

Specifications

● ZW-S7010/S7020/S7030

Item	Specifications		
	ZW-S7010	ZW-S7020	ZW-S7030
Sensor controller	ZW-7000□		
Measurement center distance	10 mm	20 mm	30 mm
Measuring range ^{*1}	±0.5 mm	±1 mm	±2 mm
Static resolution ^{*2}	0.004 μm	0.008 μm	0.016 μm
Linearity ^{*3}	±0.45 μm	±0.9 μm	±2.0 μm
Spot diameter (Total measurement range) ^{*4}	50 μm dia.	70 μm dia.	100 μm dia.
Measuring cycle ^{*5}	20 μs to 400 μs		
Operating ambient illumination	Illumination on object surface max.30000 Lx: (incandescent light)		
Ambient temperature range	Operation: 0 to 50°C, Storage: -15 to +60°C (No freezing and condensation)		
Ambient humidity range	Operation/storage: 35 or 85%RH (No condensation)		
Degree of protection	IP40 (IEC60529)		
Vibration resistance (destructive)	10 to 150 Hz (half amplitude 0.35 mm), 80 mins in each of X/Y/Z directions		
Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)		
Temperature characteristic ^{*6}	0.6 μm/°C	1.1 μm/°C	1.8 μm/°C
LED Safety	Risk Group 3 (IEC62471)		
Material	Chassis: aluminum die cast Fiber cable sheath: PVC Calibration ROM: PC		
Fiber cable length	0.3 m, 2 m (flex-resistant cable)		
Fiber cable minimum bend radius	20 mm		
Insulation resistance (Calibration ROM)	Between case and all terminals: 20 MΩ (by 250 VDC)		
Dielectric strength (Calibration ROM)	Between case and all terminals: 1000 VAC, 50/60 Hz, 1 min		
Weight	Fiber cable length 0.3m Approx. 170g Fiber cable length 2m Approx. 180g		
Accessories	Calibration ROM fixing screws (M2), 2 Fiber cable protective cap, 2 Fiber straps, Instruction Manual, Precautions		

*1: The measurement range is higher 28 μs than measurement cycle.

*2: Capacity value when OMRON standard mirror surface target is measured at the measurement center distance as the average of 16,384 times
When connected with the controller for the Export Control Trade Ordinance (ZW-7000T), the minimum resolution is 0.25 μm, regardless of the Sensor head or setting condition.

*3: Material setting for the OMRON standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.

*4: Capacity value defined by $1/e^2$ (13.5%) of the peak optical intensity of the measurement wavelength.
When an extension fiber cable of 5.5 mm or longer is connected, the setting range of the measurement cycle (exposure time) changes. For details, refer to "Setting Measurement Cycle" in this manual.

*5: When an extension fiber cable of 5 mm or longer is connected, the setting range of the measurement cycle (exposure time) changes. For details, refer to "Setting Measurement Cycle" in this manual.

*6: Capacity value of temperature characteristic at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target and the Sensor Head and the Sensor Controller are set in the same temperature environment.

● ZW-S5010/S5020/S5030

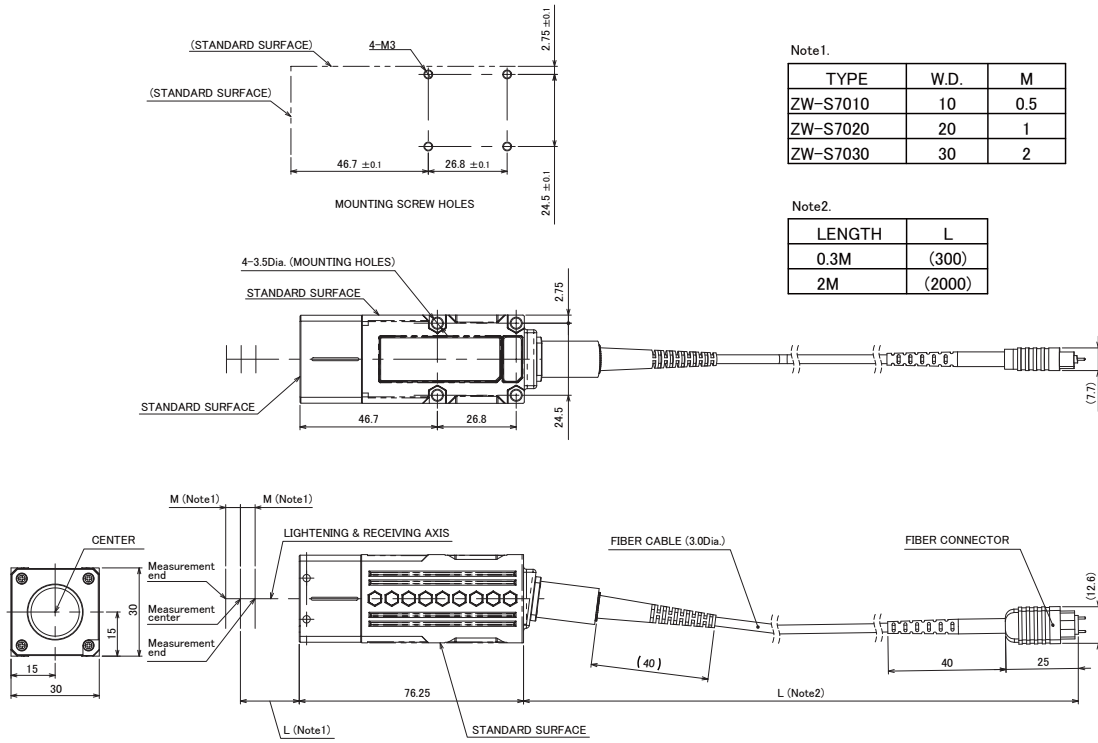
Item	Specifications		
	ZW-S5010	ZW-S5020	ZW-S5030
Sensor controller	ZW-5000□		
Measurement center distance	10 mm	20 mm	30 mm
Measuring range	±0.5 mm	±1 mm	±2 mm
Static resolution *1	0.004 μm	0.008 μm	0.016 μm
Linearity *2	±0.45 μm	±0.9 μm	±2.0 μm
Spot diameter (Total measurement range) *3	9 μm dia.	13 μm dia.	18 μm dia.
Measuring cycle *4	80 μs to 1600 μs		
Operating ambient illumination	Illumination on object surface max.30000 Lx: (incandescent light)		
Ambient temperature range	Operation: 0 to 50°C, Storage: -15 to +60°C (No freezing and condensation)		
Ambient humidity range	Operation/storage: 35 or 85%RH (No condensation)		
Degree of protection	IP40 (IEC60529)		
Vibration resistance (destructive)	10 to 150 Hz (half amplitude 0.35 mm), 80 mins in each of X/Y/Z directions		
Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)		
Temperature characteristic *5	0.6 μm/°C	1.1 μm/°C	1.8 μm/°C
LED Safety	Risk Group 3 (IEC62471)		
Material	Chassis: aluminum die cast Fiber cable sheath: PVC Calibration ROM: PC		
Fiber cable length	0.3 m, 2 m (flex-resistant cable)		
Fiber cable minimum bend radius	20 mm		
Insulation resistance (Calibration ROM)	Between case and all terminals: 20 MΩ (by 250 VDC)		
Dielectric strength (Calibration ROM)	Between case and all terminals: 1000 VAC, 50/60 Hz, 1 min		
Weight	Fiber cable length 0.3m Approx. 170g Fiber cable length 2m Approx. 180g		
Accessories	Calibration ROM fixing screws (M2), Fiber cable protective cap, Strap (1), Instruction Manual, Precautions		

- *1: Capacity value when OMRON standard mirror surface target is measured at the measurement center distance as the average of 16,384 times
When connected with the controller for the Export Control Trade Ordinance (ZW-5000T), the minimum resolution is 0.25 μm, regardless of the Sensor head or setting condition.
- *2: Material setting for the OMRON standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.
- *3: Capacity value defined by 1/e² (13.5%) of the peak optical intensity of the measurement wavelength.
- *4: When an extension fiber cable of 5 mm or longer is connected, the setting range of the measurement cycle (exposure time) changes. For details, refer to "Setting Measurement Cycle" in this manual.
- *5: Capacity value of temperature characteristic at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target and the Sensor Head and the Sensor Controller are set in the same temperature environment.

External Dimensions

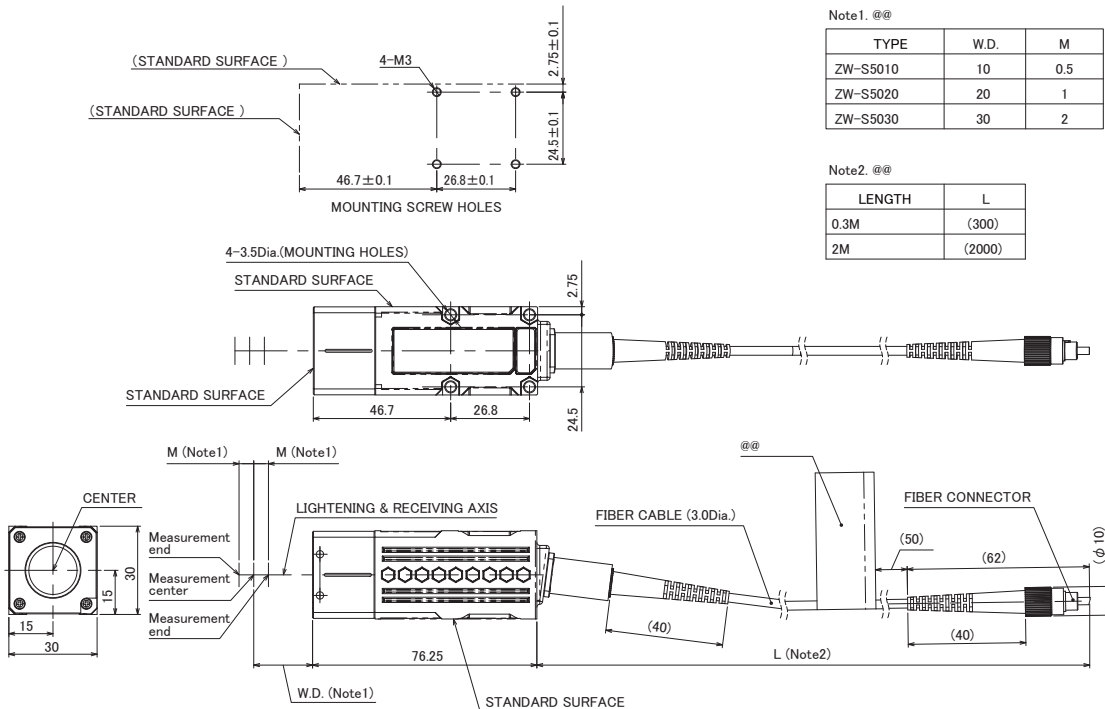
● ZW-S7010/S7020/S7030

(Unit: mm)



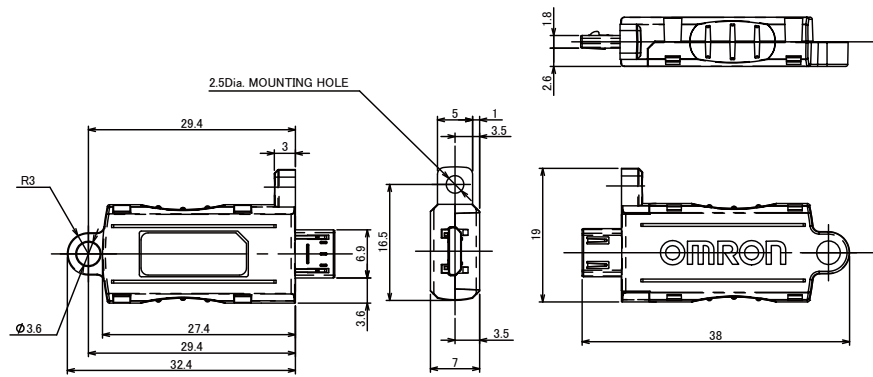
● ZW-S5010/S5020/S5030

(Unit: mm)



● Calibration ROM *

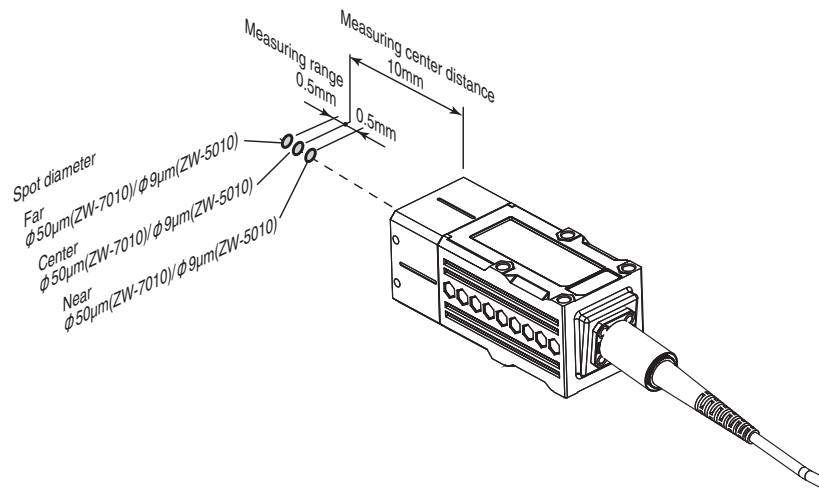
(Unit: mm)



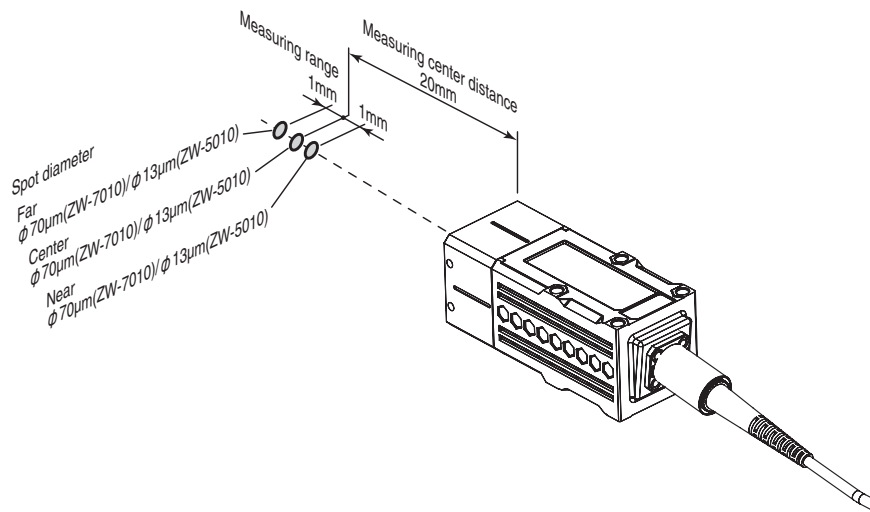
* This comes with the Sensor Head (ZW-S7010/S7020/S7030/S5010/S5020/S5030). Be sure to use a Calibration ROM together with the Sensor Head with the same serial number.

Spot diameter

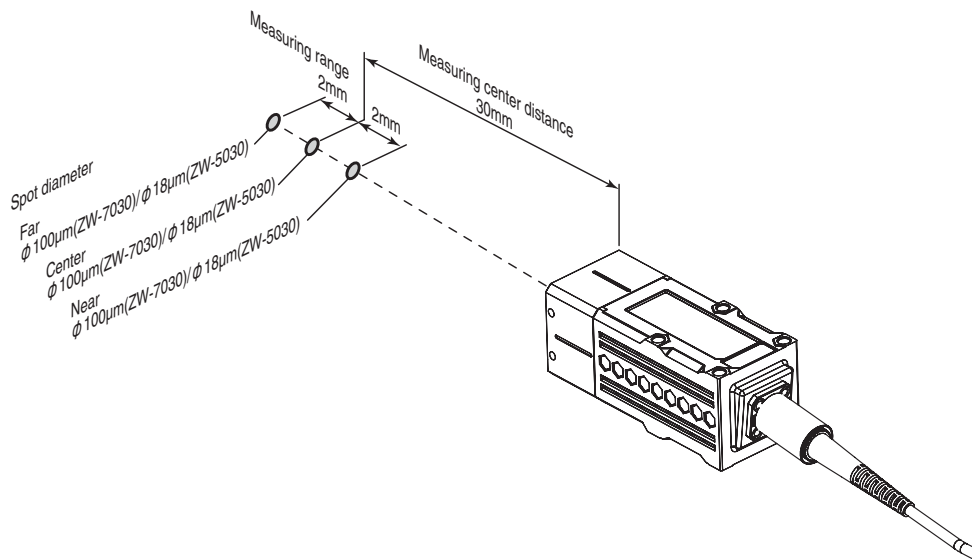
● ZW-S7010/S5010



● ZW-S7020/S5020



● ZW-S7030/S5030



Sensor controller

Specifications

Item		Specifications	
		ZW-7000□	ZW-5000□
Input/output type		NPN/PNP dual type	
Number of connected sensor heads		1	
Sensor head compatibility		ZW-S70□□	ZW-S50□□
Light source for measurement		White LED	
LED Safety		Risk Group 3 (IEC62471)	
Segment Display	Main display	11-segment white 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 indicator	ECAT RUN (green), L/A IN (Link/Activity IN) (green), L/A OUT (Link/Activity OUT) (green), ECAT ERR (red)	

Item		Specifications		
		ZW-7000□	ZW-5000□	
External I/F	Ethernet		100BASE-TX/10BASE-T, Non-procedure (TCP/UDP), EtherNet/IP	
	EtherCAT		EtherCAT exclusive protocol 100BASE-TX	
	RS-232C		Max. 115,200 bps	
	Analog output terminal block	Analog voltage output (OUT V)	-10 V to +10 V, output impedance: 100 Ω	
		Analog current output (OUT A)	4 mA to 20 mA, max. load resistance: 300 Ω	
	32-pole expansion connector	Judgment output (HIGH/PASS/LOW)	Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA or less Residual voltage when turning ON: 2 V or less Leakage voltage when turning OFF: 0.1 mA or less	
		Busy output (BUSY)		
		Alarm output (ALARM)		
		Enable output (ENABLE)		
		Sync flag output (SYNFLG)		
		Trigger busy output (TRIGBUSY)		
		Logging state output (LOGSTAT)		
		Logging error output (LOGERR)		
		Stability output (STABILITY)		
		Task state output (TASKSTAT)		
		LIGHT OFF input (LIGHT OFF)		DC input system Input voltage: 24 VDC ± 10% (21.6 to 26.4 VDC) Input current: 7 mA Type. (24 VDC) ON voltage/ON current: 19 V/3 mA or less ON voltage/ON current: 5 V/1 mA or less
		Zero reset input (ZERO)		
		Timing input (TIMING)		
		Reset input (RESET)		
	Sync input (SYNC)			
Trigger input (TRIG)				
Logging input (LOGGING)				
Bank	Currently 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: 2 V or less Leakage voltage when turning OFF: 0.1 mA or less		
	Bank Selection input (BANK_SEL 1 to 3)		DC input system Input voltage: 24 VDC ± 10% (21.6 to 26.4 VDC) Input current: 7 mA Type. (24 VDC) ON voltage/ON current: 19 V/3 mA or more OFF voltage/OFF current: 5 V/1 mA or less	

Item		Specifications	
		ZW-7000□	ZW-5000□
Main functions	Exposure time	Automatic/Fixed	
	Measuring cycle *1	20 μs to 400 μs	80 μs to 1600 μs
	Material setting	Standard/Mirror/Rough surfaces	
	Measurement item	Height/Thickness of transparent object/Calculation	
	Filtering	Median/Average/Differentiation/High pass/Low pass/Band pass	
	Output	Scaling/Different holds/Zero reset/Logging for a measured value	
	Display	Measured value/Threshold value/Analog output voltage or current value/ Judgment result/Resolution/Light power/Internal logging condition /Peak amount of received light	
	Number of configurable banks	Max. 8 banks	
	Task process	Multi-task (up to 4 tasks per bank)	
	System	Save/Initialization/Display measured information/Communication settings/ Sensor head calibration/Key-lock/Zero reset memory/Timing input	
Rating	Power supply voltage	21.6 to 26.4 VDC (including ripple)	
	Current consumption	800 mA max.	
	Insulation resistance	Across all lead wires and FG terminal: 20 MΩ (by 250 VDC)	
	Dielectric strength	Between all lead wires and FG terminal: 500 VAC, 50/60 Hz, 1 minute	
Environmental resistance	Degree of protection	IP20 (IEC60529)	
	Vibration resistance (destructive)	10 to 55 Hz (half amplitude 0.35 mm), 50 mins in each of X/Y/Z directions	
	Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)	
	Ambient temperature range	Operation: 0 to 40°C, Storage: -15 to +60°C (No freezing and condensation)	
	Ambient humidity range	Operation/storage: 35 to 85% RH (No condensation)	
Grounding	D-type grounding (grounding resistance of 100 Ω or less) Note: For conventional Class D grounding		
Material	Chassis: PC		
Weight	Approx. 900g (main unit only), Approx. 150 g (Parallel cable)		
Accessories	Parallel cable (ZW-XCP2E) 10 Fiber cleaners (ZW-XCL) Instruction Manual Member registration sheet	Parallel cable (ZW-XCP2E) 10 Fiber cleaners (ZW-XCL) Fiber adapter cap Strap Instruction Manual Member registration sheet	

The Export Trade Control Order compatible Controller (ZW-7000T/5000T) is available.

When using this Controller, the minimum resolution is 0.25 μm regardless of the connected Sensor Head and setting conditions.

*1: When an extension fiber cable of 5 m or longer is connected, the setting range of the measurement cycle (exposure time) changes. For details, refer to "Setting Measurement Cycle" in this manual.

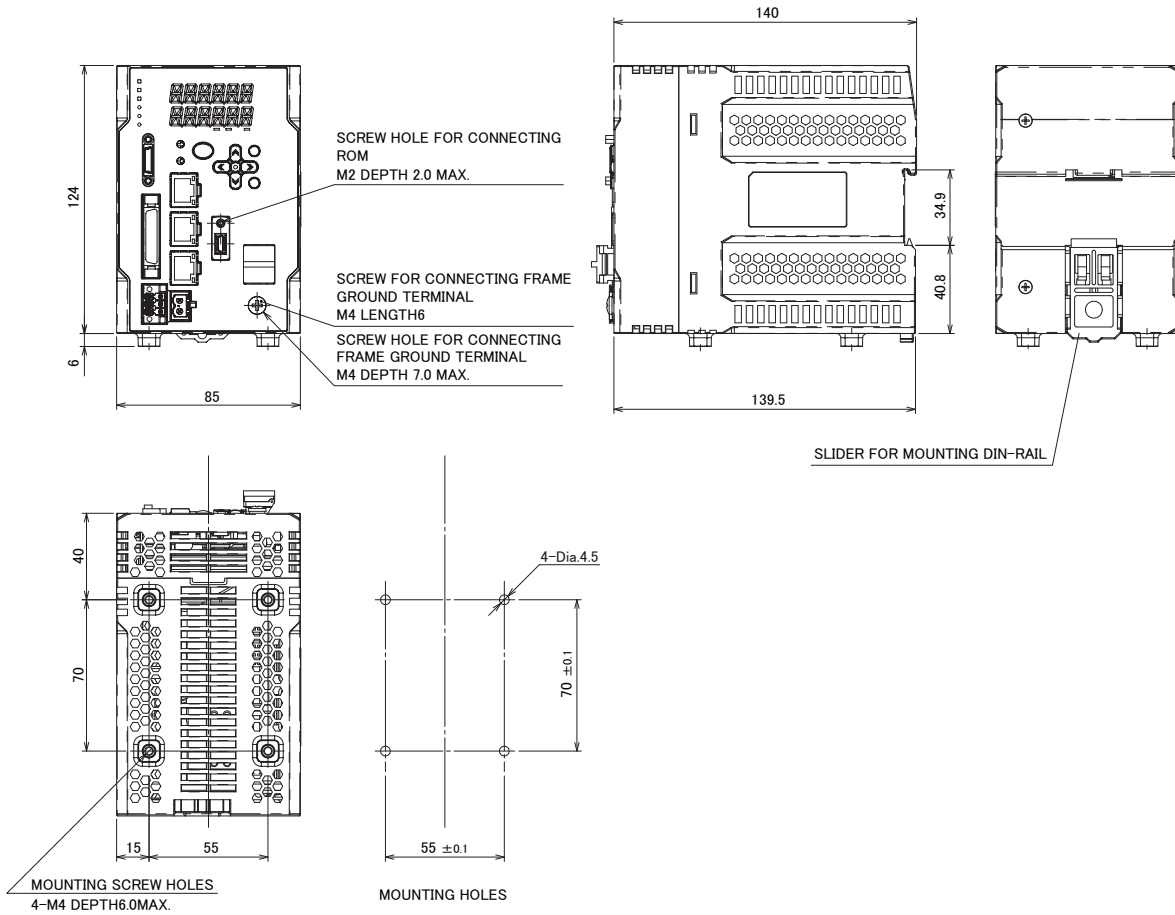
Status indicators

Mode	Status		Display	Output		Input		RS-232C/ Ethernet
			11-segment display	ANALOG Output	Judgment output (HIGH/PASS/LOW)	LIGHT OFF	Zero reset	
RUN	Normal measurement		Measurement result	Output according to measurement result	Judgment result	Enabled	Enabled	Enabled
	Non-measurement	KEEP	Previous value					
		CLAMP	–	Output at clamp level (approx. -10.8 V)	Output OFF			
FUN	–		Display according to menu					Disabled
System error	–		“SYS.ERR” blinks	Voltage: 0 V output Current: 12 mA output		Disabled		Enabled Commands are accepted but not executed.
When starting	–		“START”	Output at clamp level (approx. -10.8 V)				Invalid

External Dimensions

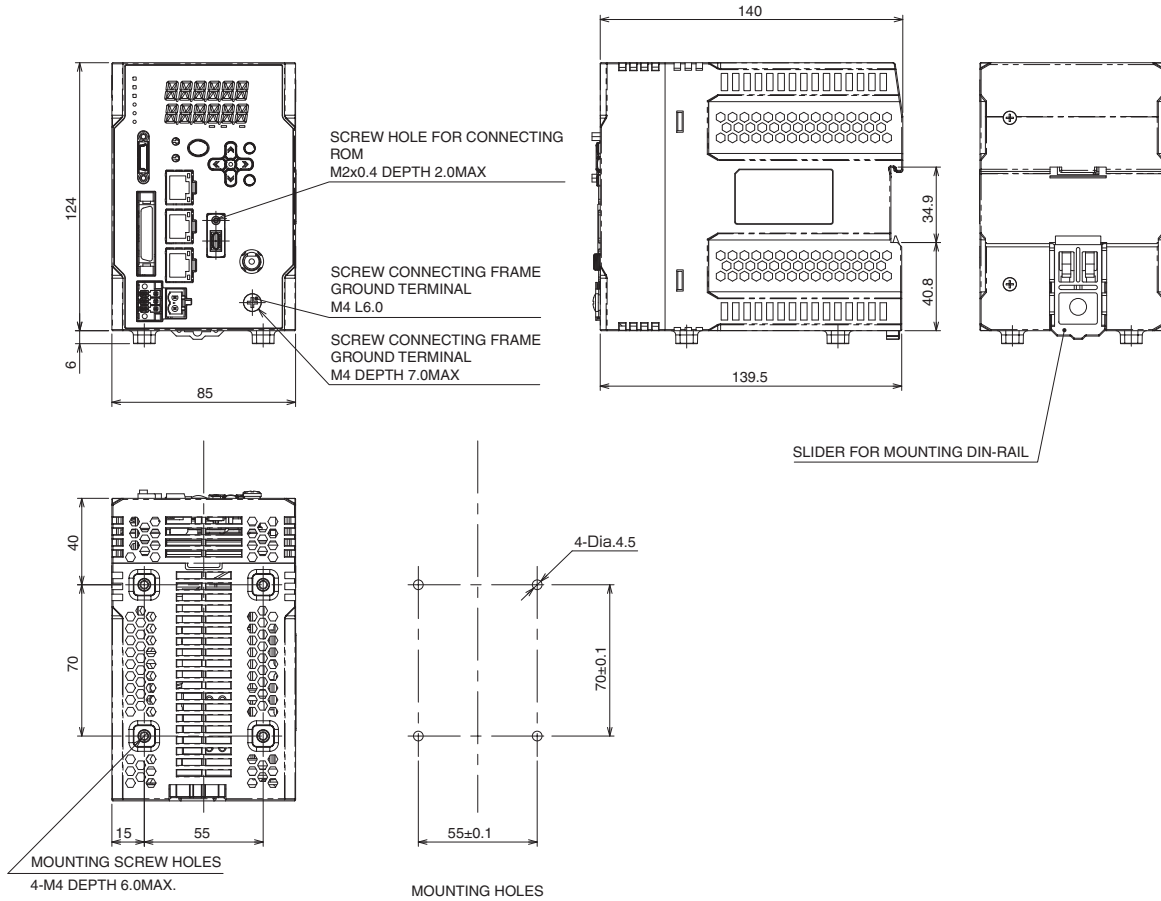
● ZW-7000

(Unit: mm)



● ZW-5000

(Unit:mm)



EtherCAT communications specifications

Item	Specifications
Communications standard	IEC 61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 × 2 EtherCAT IN: EtherCAT input EtherCAT OUT: EtherCAT output
Communications media	Twisted pair cable Category 5 or higher (Straight, double-shielded cable comprising aluminum tape and braid is recommended.)
Communications distance	Distance between nodes: 100 m max.
Process data	Variable PDO mapping
Mailbox (CoE)	Emergency message, SDO request, SDO response, SDO information
Distributed block	Synchronization by DC mode
LED display	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 ECAT RUN × 1 ECAT ERR × 1

PC tools (Sysmac Studio)

Item	Operating environment ^{(*)3}
Operating system (OS) ^{(*)1} Japanese or English	Windows 7 (32-bit/64-bit version) Windows 8 (32-bit/64-bit version) Windows 8.1 (32-bit/64-bit version) Windows 10 (32-bit/64-bit version)
CPU	Windows computers with Intel® Celeron® processor 540 (1.8 GHz) or faster CPU. Intel® Core™ i5 M520 processor (2.4 GHz) or equivalent or faster recommended.
Main memory	2 GB min. 4 GB min. recommended
Hard disk	Minimum 4.6 GB of Hard disk space is required to install. ^{(*)2}
Display	XGA 1024 × 768, 16,000,000 colors WXGA 1280 × 800 dots or higher resolution is recommended.
Disk drive	DVD-ROM drive
Communication port	USB2.0 compatible USB port or Ethernet port ^{(*)4}
Supported languages	Japanese, English, German, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean

*1: Note about Sysmac Studio compatible operating systems:

The required system and hard disk capacity differs according to the system environment.

*2: Separate logging memory is required to use the file logging function.

*3: Describes System Requirements and notes of Sysmac Studio Measurement Sensor Edition.

For detail of System Requirements and notes of Sysmac Studio Measurement Sensor Edition, refer to Sysmac Studio Version 1 Operation Manual.

*4: For information on how to connect a personal computer with the controller or other hardware and information on required cables, refer to manuals for each hardware.

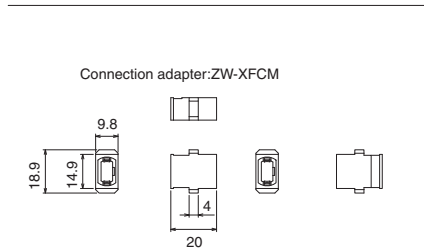
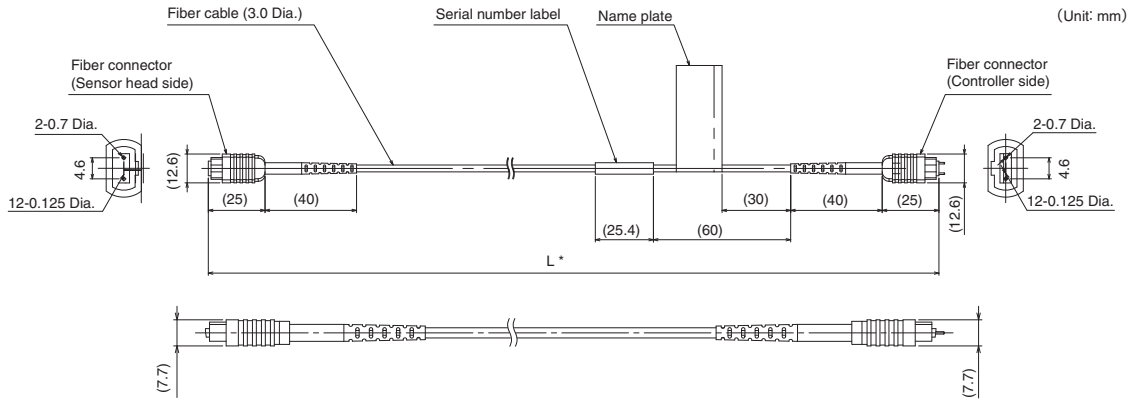
Features of each edition

Item	Standard Edition	Measurement sensors Edition
Connection target	NX/NJ series machine automation controllers NY series industrial PCs	ZW series measurement sensors
Connection I/F	Ethernet/USB	Ethernet
Control target	NX/NJ series machine automation controllers NY series industrial PCs and all connected EtherCAT devices (ZW series measurement sensors included)	ZW series measurement sensors
Firmware update	×	○
Calibration ROM data recovery	×	○
Offline debugging	○	×

Accessories

Extension fiber cable

● ZW-XF7002R/XF7005R/XF7010R/XF7020R/XF7030R



* The following table lists cable lengths per models.

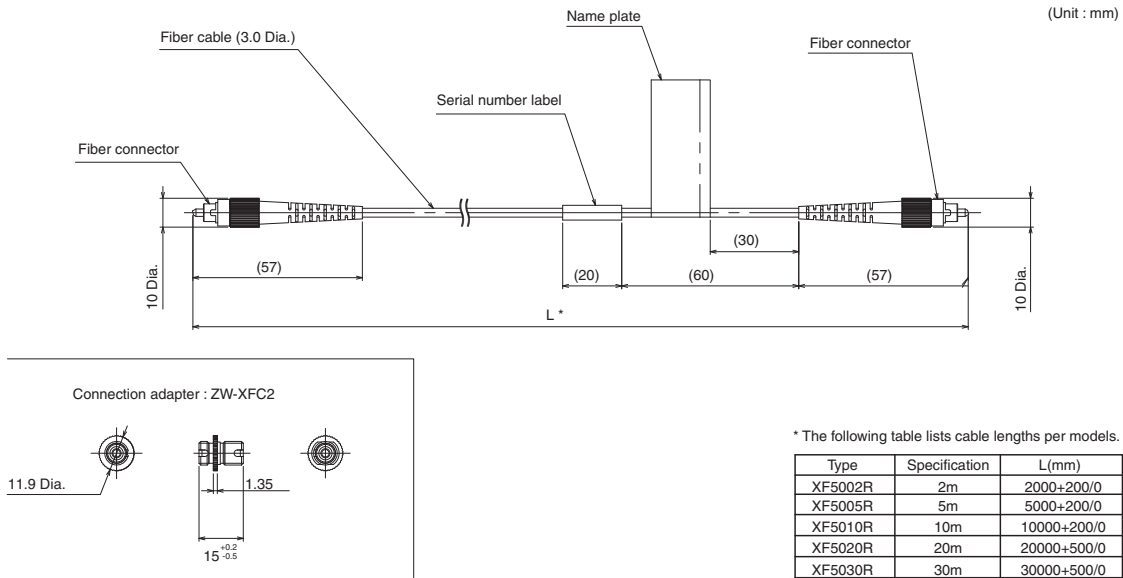
Type	Specification	L (mm)
ZW-XF7002R	2m	2000+40/0
ZW-XF7005R	5m	5000+100/0
ZW-XF7010R	10m	10000+200/0
ZW-XF7020R	20m	20000+400/0
ZW-XF7030R	30m	30000+600/0

Item	Specifications				
	ZW-XF7002R	ZW-XF7005R	ZW-XF7010R	ZW-XF7020R	ZW-XF7030R
Applicable Sensor Controller	ZW-7000□				
Applicable Sensor Head	ZW-S70□□				
Ambient temperature	Operation: 0 to 50°C, Storage: -15 to +60°C (with no icing or condensation)				
Ambient humidity	Operation, storage: 35 to 85%RH (with no icing or condensation)				
Vibration resistance (destructive)	10 to 55 Hz (half amplitude 0.35 mm), 50 mins in each of X/Y/Z directions				
Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)				
Fiber length	2 m	5 m	10 m	20 m	30 m
Material	Cable sheath: PVC, Connector: PBT, Connection adapter: PEI				
Fiber cable minimum bending radius	20 mm				
Weight	Approx. 25 g	Approx. 45 g	Approx. 70 g	Approx. 120 g	Approx. 160 g
Accessories	Connection adapter (ZW-XFCM), 2 Fiber cable protective cap, 2 straps. Instruction Sheet, Precautions				

Important

- Secure a minimum bending radius (R) for the fiber cable that is at least as large as the specification value. A bending radius smaller than the specification value could cause damage to the fiber cable.
- When an extension fiber cable of 5 m or longer is connected, the setting range of the measurement cycle (exposure time) changes. For details, refer to "Setting Measurement Cycle" in this manual.

● ZW-XF5002R/XF5005R/XF50010R/XF5020R/XF5030R



Item	Specifications				
	ZW-XF5002R	ZW-XF5005R	ZW-XF5010R	ZW-XF5020R	ZW-XF5030R
Applicable Sensor Controller	ZW-5000□				
Applicable Sensor Head	ZW-S50□□				
Ambient temperature	Operation: 0 to 50°C, Storage: -15 to +60°C (with no icing or condensation)				
Ambient humidity	Operation, storage: 35 to 85%RH (with no icing or condensation)				
Vibration resistance (destructive)	10 to 55 Hz (half amplitude 0.35 mm), 50 mins in each of X/Y/Z directions				
Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)				
Fiber length	2m	5m	10m	20m	30m
Material	Cable sheath: PVC, Connector: Bronze, Connecting adapter: Bronze				
Fiber cable minimum bending radius	20mm				
Weight	Approx. 25g	Approx. 35g	Approx. 55g	Approx. 100g	Approx. 140g
Accessories	Connection adapter (ZW-XFC2), 2Fiber cable protective cap, Instruction Sheet, Precautions				

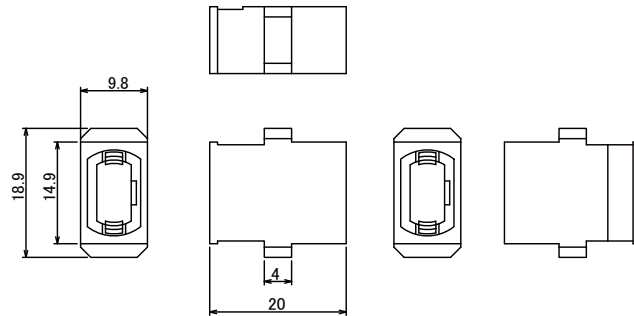
Important

- Secure a minimum bending radius (R) for the fiber cable that is at least as large as the specification value. A bending radius smaller than the specification value could cause damage to the fiber cable.
- When an extension fiber cable of 5 m or longer is connected, the setting range of the measurement cycle (exposure time) changes. For details, refer to "Setting Measurement Cycle" in this manual.


Connection adapter (for connecting fiber cable)

● ZW-XFCM

(Unit: mm)

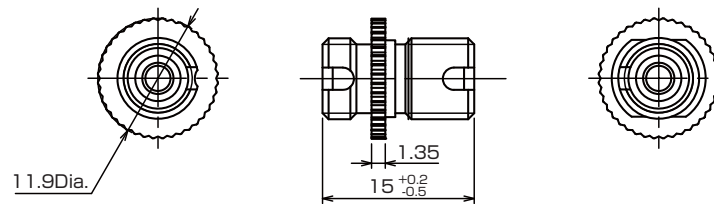


The connection adapter (ZW-XFCM) comes packed together with the extension fiber cable (ZW-XF70□□R), but the connection adapter alone can be purchased for maintenance.


 Extending fiber cable p.63.

● ZW-XFC2

(Unit: mm)

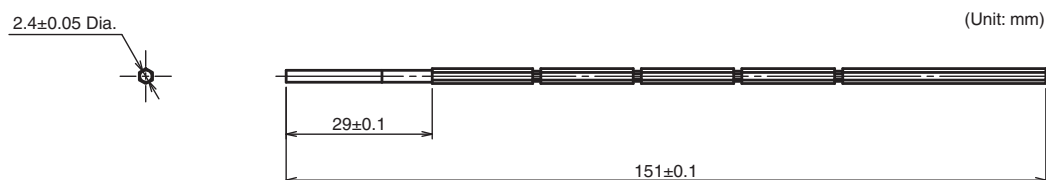


The connection adapter (ZW-XFC2) comes packed together with the extension fiber cable (ZW-XF50□□R), but the connection adapter alone can be purchased for maintenance.

 Extending fiber cable p.64.



Fiber connector cleaner


● ZW-XCL



Item	Specifications
Applicable item	<ul style="list-style-type: none"> Grooves of the Sensor Head (ZW-S70□□/ZW-S50□□) Fiber connector of Sensor Controller (ZW-7000□/5000□□) Grooves of the extension fiber cable (ZW-XF70□□R/XF50□□R)
Packed quantity	10 pcs/set
Number of times cleanable	Once
External size	Length 180 mm, 2.4 mm Dia.
Operating ambient temperature range	5 to 35°C
Operating ambient humidity range	40 to 80% RH
Storage ambient temperature range	5 to 35°C
Storage ambient humidity range	40 to 80% RH
Material	Nylon plastic, polyolefin plastic, polyester
Weight	20 g
Accessories	Note on use

EtherCAT cable

Product name	Manufacturer	Cable length (m)	Model	
Size/number of cores (number of pairs): AWG22 × 2P		0.3	XS5W-T421-AMD-K	
		0.5	XS5W-T421-BMD-K	
		1	XS5W-T421-CMD-K	
		2	XS5W-T421-DMD-K	
		5	XS5W-T421-GMD-K	
		10	XS5W-T421-JMD-K	
		OMRON	0.3	XS5W-T421-AMC-K
			0.5	XS5W-T421-BMC-K
			1	XS5W-T421-CMC-K
			2	XS5W-T421-DMC-K
		5	XS5W-T421-GMC-K	
		10	XS5W-T421-JMC-K	

Product name		Manufacturer	Cable length (m) *1	Model
Size/number of cores (number of pairs): AWG24 × 4P	Cable	Hitachi Metals, Ltd.		NETSTAR-C5E SAB 0.5 × 4P *2
		Kuramo Electric Co., LTD.		KETH-SB *2
		SWCC SHOWA CABLE SYSTEMS CO., LTD.		FAE-5004 *2
	RJ45 connector	Panduit Corp.		MPS588 *2
Size/number of cores (number of pairs): AWG22 × 2P	Cable	Kuramo Electric Co., LTD.		KETH-PSB-OMR *3
	RJ45 assembled type connector 	OMRON		XS6G-T421-1 *3

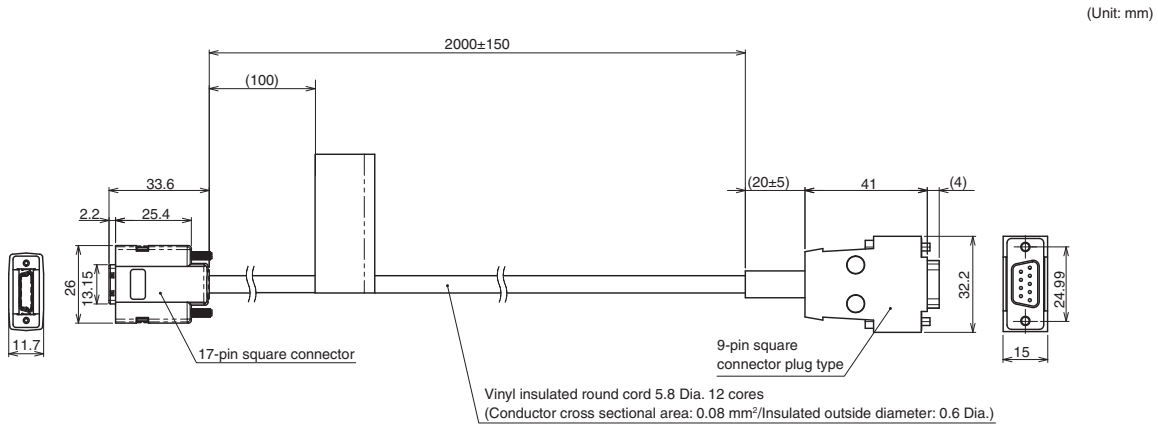
*1: This cable is available in 0.3, 0.5, 1, 2, 3, 5, 10, and 15 m lengths. For details, refer to the *industrial Ethernet connector catalog* (CDJC-006).

*2: Use of the above combinations of EtherCAT cables and RJ45 connector is recommended.

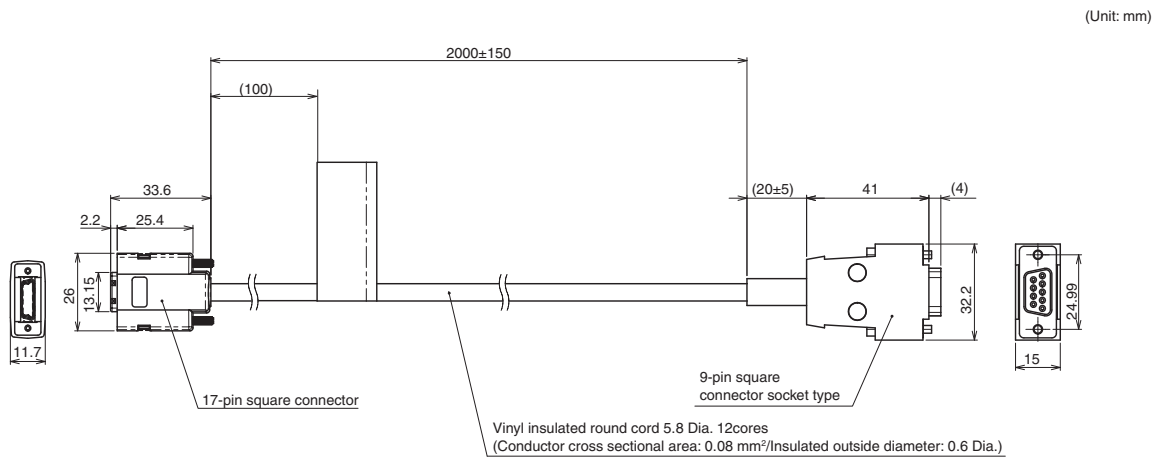
*3: Use of the above combinations of EtherCAT cables and RJ45 assembled type connector is recommended.

RS-232C cable

● ZW-XPT2 (for PLC/programmable terminal connection)



● ZW-XRS2 (for PC connection)



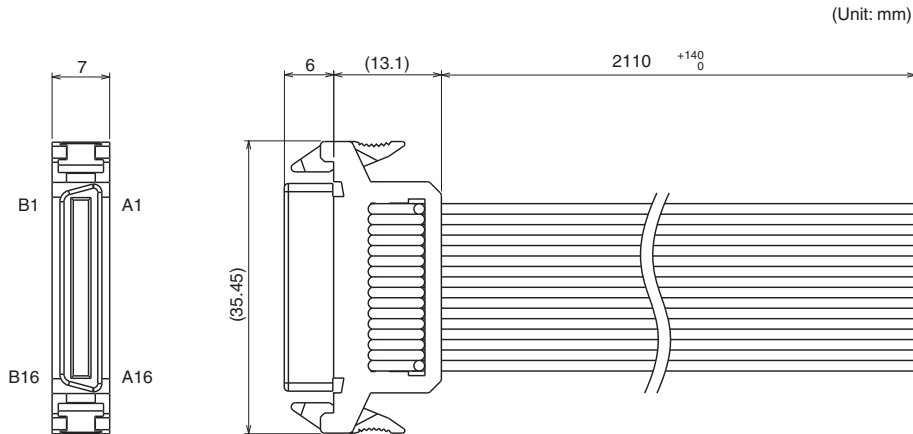
Item	Specifications	
	ZW-XPT2	ZW-XRS2
Applicable Controller	ZW-7000□/ZW-5000□	
Ambient temperature	Operation: 0 to 50°C, Storage: -15 to +60°C (No freezing and condensation)	
Ambient humidity	Operation/storage: 35 or 85% RH (No condensation)	
Dielectric strength	1000 VAC, 50/60 Hz, 1 min	
Insulation resistance	20 MΩ (by 250 VDC megger)	
Vibration resistance (destructive)	10 to 55 Hz (half amplitude 0.35 mm), 50 mins in each of X/Y/Z directions	
Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)	
Material	Cable sheath: PVC	
Cable minimum bending radius	35 mm	
Weight	Approx. 150 g	
Accessories	Instruction Manual	

Important

Secure a minimum bending radius (R) for the cable that is at least as large as the specification value. If the bending radius is smaller than the specification value, this can cause damage to the cable.

Parallel cable

● ZW-XCP2E



Item	Specifications
Applicable Controller	ZW-7000□/ZW-5000□
Ambient temperature	Operation: 0 to 50°C, Storage: -15 to +60°C (No freezing and condensation)
Ambient humidity	Operation/storage: 35 or 85% RH (No condensation)
Dielectric strength	1000 VAC, 50/60 Hz, 1 min
Insulation resistance	20 MΩ (by 250 VDC megger)
Vibration resistance (destructive)	10 to 55 Hz (half amplitude 0.35 mm), 50 mins in each of X/Y/Z directions
Shock resistance (destructive)	150 m/s ² , 6 direction, 3 times each (up/down, left/right, forward/backward)
Material	Cable sheath: PVC
Cross section of flat cable	AWG28
Core wire pitch	1.27 mm
Cable minimum bending radius	5.5 mm
Weight	Approx. 150 g
Accessories	Instruction Manual

Important

Secure a minimum bending radius (R) for the cable that is at least as large as the specification value. If the bending radius is smaller than the specification value, this can cause damage to the cable.

EMC Directive Conformity

CE Marking	Applicable directive		Safety category
	Low voltage directive	EMC directive	
Conformed	Not applicable	Conformed	B

9-2 Firmware Update

For information on how to obtain the latest version of the firmware, please contact your OMRON sales representative.

After obtaining the latest version of the firmware, follow the procedure below to update the firmware.

Important

Do not turn OFF the power supply to the Sensor Controller during updating. The Sensor Controller would no longer start up properly.

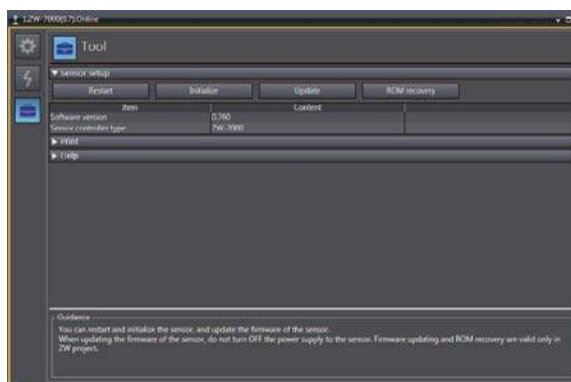
Use Sysmac Studio Measurement Sensor Edition to update.

► Multi View Explore : [Device Group] | [(Sensor Name)] (double click)

→ Edit pane : [Tools] icon ()

1 Click [Sensor setup] - [Update], and select the update file.

The update file extension is “.BIN”. When the file is selected, the [FirmwareWriteInWindow] popup is displayed.



Important

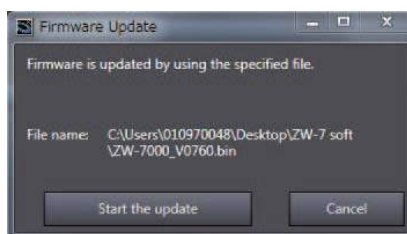
The current firmware version is displayed at [Sensor setup]. Be sure to check the version before updating the firmware.

2 Click [Start the update.].

A message to confirm to start the update appears.

Important

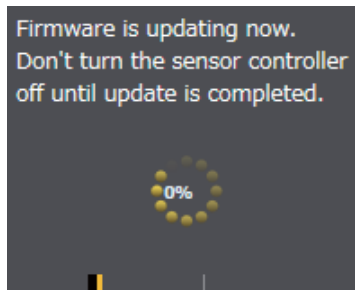
When you click [Start the update.], if the “Different format” message is displayed, this means that the format information for the connected Sensor Controller and the specified file do not match. If this happen, never continue with the firmware update. The Sensor Controller breaks down and no longer starts up properly.



3 Check the content of the message, and click [OK].

The firmware update is started.

A progress bar is displayed during update processing. Wait for the [Firmware Write Completed] popup to be displayed. (The update takes several minutes to complete.)

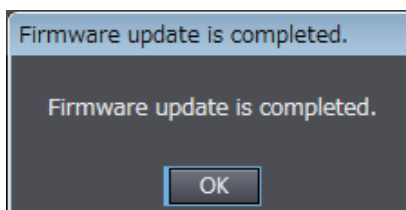


Important

- Errors may occur on the Sensor Controller during updating, but just wait for the update to complete.
- If the update progress bar stops midway or the update does not end even after ten minutes, there is the possibility that the update has failed. In this case, contact an OMRON branch or sales office about the firmware version before update and the firmware version in the write file.

4 Click [Close].

The firmware update is completed.



Performing the Update on Warp Engine ZW-7

The most recent version of the software and PC Tool can be downloaded from the following website for OMRON members. Refer to the Member Registration Sheet that is enclosed with the Sensor.

<http://www.fa.omron.co.jp/zw>

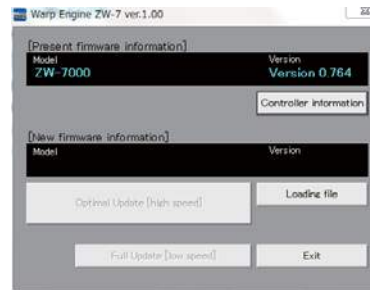
Connect the the PC which is installed Warp Engine ZW-7 to ZW via Ethernet before operating.

Important

- When using Warp Engine ZW-7 on the same PC as Sysmac Studio Measurement Sensor Edition 7, do not change the current IP address and subnet mask being used.
- Do not change the IP address and the subnet mask when use Warp Engine ZW-7 with a same PC is operated Sysmac Studio Measurement Sensor Edition. If you are using a different personal computer, refer to “5-1 Connecting by No-protocol Communications” described in Displacement Sensor ZW-7000/5000 series Confocal Fiber Type Displacement Sensor User’s Manual for Communications Settings (Z363) and change the IP address and the subnet mask of the Sensor Controller.

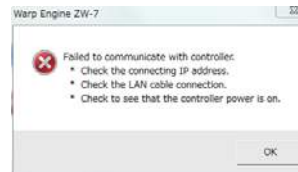
- 1 From the personal computer's Start menu, select [All Programs] - [OMRON] - [ZW] - [Warp Engine ZW-7].

The [Warp Engine ZW-7] screen is displayed.



If Warp Engine ZW-7 fails to start up, a message and then the following screen is displayed.

In this case, set the connection port.

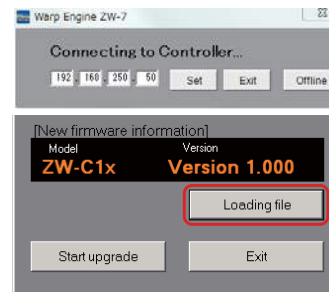


- 2 If necessary, click [Full Update(Low speed)].

The model name and version of the currently connected Sensor Controller are displayed.

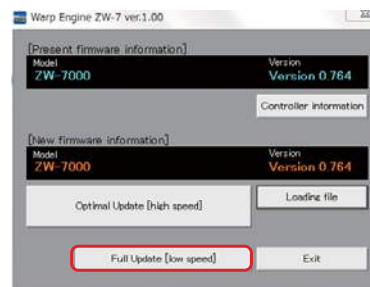
- 3 Click [Loading file], and select the file to write to.

The model name and version of the Sensor Controller held in the file are displayed.



- 4 Click [Optimal Update(High speed)].

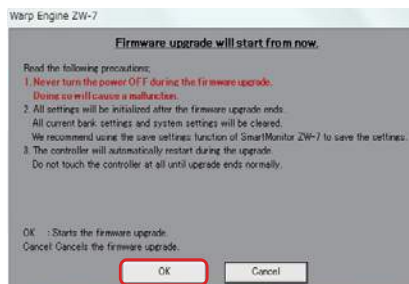
A message to confirm to start the update appears.



Important

- When you click [Full Update(Low speed)], if the “Different format” message is displayed, this means that the format information for the connected Sensor Controller and the specified file do not match. If this happens, never continue with the firmware update. The Sensor Controller breaks down and no longer starts up properly.
- The update time can be shortened by selecting [Optimal Update(High speed)], which will update only necessary items. If you select [Full Update(Low speed)], the update time will be longer because all files will be updated. Normally Optimal Update(High speed) is recommended.

5 Check the content of the message, and click [OK].



The firmware update is started.

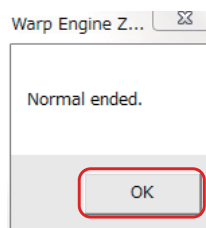
A progress bar is displayed during update processing. Wait for the successful end message box to be displayed. (The update takes several minutes to complete.)



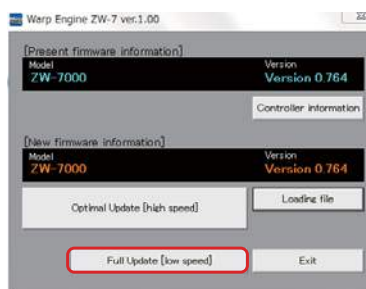
Important

- Errors may occur on the Sensor Controller during updating, but just wait for the update to complete.
- If the update progress bar stops midway or the update does not end even after ten minutes, there is the possibility that the update has failed. In this case, contact an OMRON branch or sales office about the firmware version before the update and the one in the write file.

6 When the update is successfully completed, a message appears. Click [OK].



7 Click [Finish] and exit Warp Engine ZW-7.



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Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and back covers of this manual.

Cat. No. Z362-E1-05

↑
Revision code

Revision code	Date	Revision Contents
01	April 2016	First edition.
02	July 2016	Add the PDO synchronization mode and correct error sentences.
03	April 2017	Compatible with ZW-5000 series and correct error descriptions.
04	May 2017	Correct error descriptions.
05	September 2017	Add the Area mode.

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