OMRON

Confocal Fiber Displacement Sensor
ZW-8000/7000 Series

Outer diameter 12 mm

Transparent object thickness from 15 µm*

Measure anything from anywhere
The most reliable in-line measurements

NEW
ZW-7000   ZW-8000

White light confocal principle

Angle characteristic	Linearity
±25°	±0.3 µm

Sampling period	Min. spot diameter
20 µs	4 µm

* Typical values

Square-shaped straight type   **NEW**
Pen-shaped straight type   **NEW**
Pen-shaped right angle type

sysmac
always in control

Unsurpassed stable in-line measurement

Since first realizing stable in-line measurement,
the ZW Series has continued to evolve in line with customer manufacturing.

● **Evolving controller lineup**

Linearity

±0.3 µm

±0.45 µm

Industry first *1
Adoption of white light
confocal principle

±0.8 µm

First ZW
(2012)

Standard type
ZW-5000

500 µs   60 µs   20 µs

Ultra high-precision type
ZW-8000 ······ P.4

Best in class *2

Linearity **±0.3 µm** *3

Angle characteristic **±25°** *4

Non-contact, precise measurement of thin film sheet thickness


Coaxial measurement based on color

White light confocal principle

Omron is among the first in the industry to adopt the white light confocal principle when it introduced the ZW Series. This principle allows a stable moving measurement of objects in any mixed conditions such as coarse, curved, inclined or narrow areas.

*7. OCFL: Omron Chromatic Focus Lens. Refer to page 15 for details.

Principle

White light produced by the light source ((1)) is focused at different points for each color (wavelength) ((2)) using an OCFL *7 created using Omron's unique compact optical design technology. Only the light that is focused on the object is received as reflected light ((3)), and this wavelength information is converted to distance with a spectrometer ((4)), and the height is then measured. Unlike triangulation systems, as the emitted light and received light are positioned along the same axis, the measurement point remains the same at any position in the measuring range so that precise measurements can always be achieved.
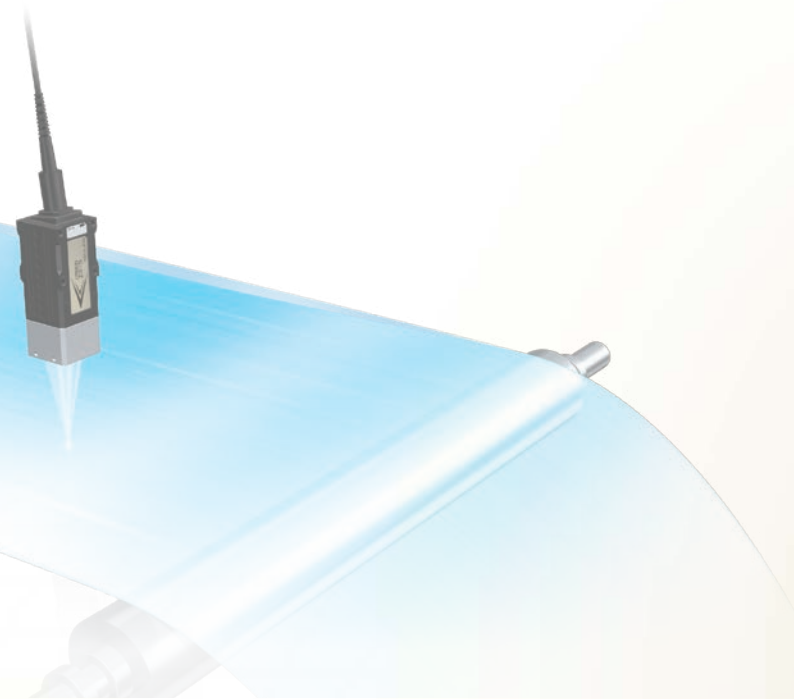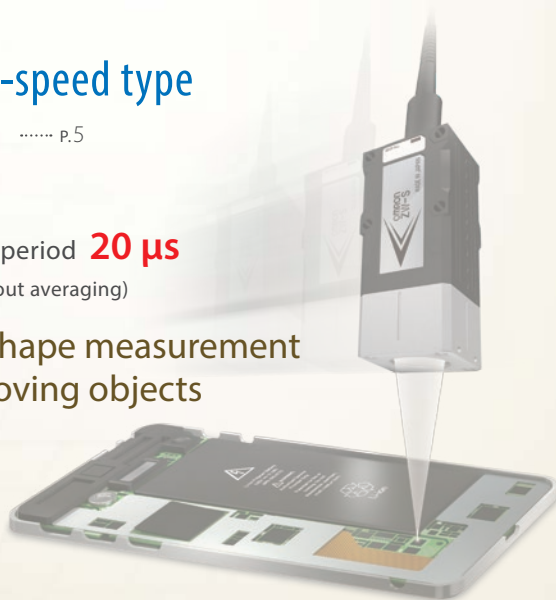
Ultra high-speed type
ZW-7000 ⋯⋯ P.5

Best in class *5

Measurement period **20 μs**
(stable even without averaging)

Accurate shape measurement even of moving objects

→ *Measurement cycle*
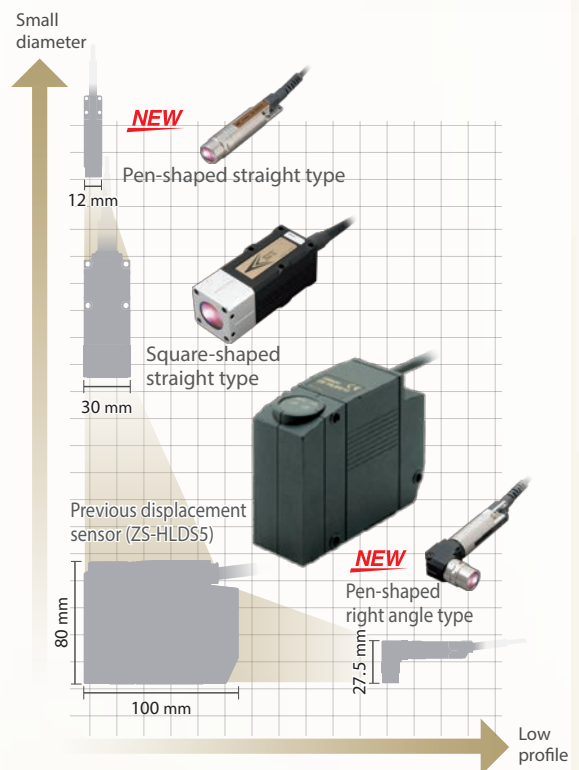
Smallest in class *6

Ultra-small head

Integration with incredible ease
⋯⋯ P.6

One-shot synchronous measurement of multiple points on small parts through close installation

● **Evolving head lineup**

Small diameter

NEW

12 mm
Pen-shaped straight type

30 mm
Square-shaped straight type

Previous displacement sensor (ZS-HLDS5)

80 mm

100 mm

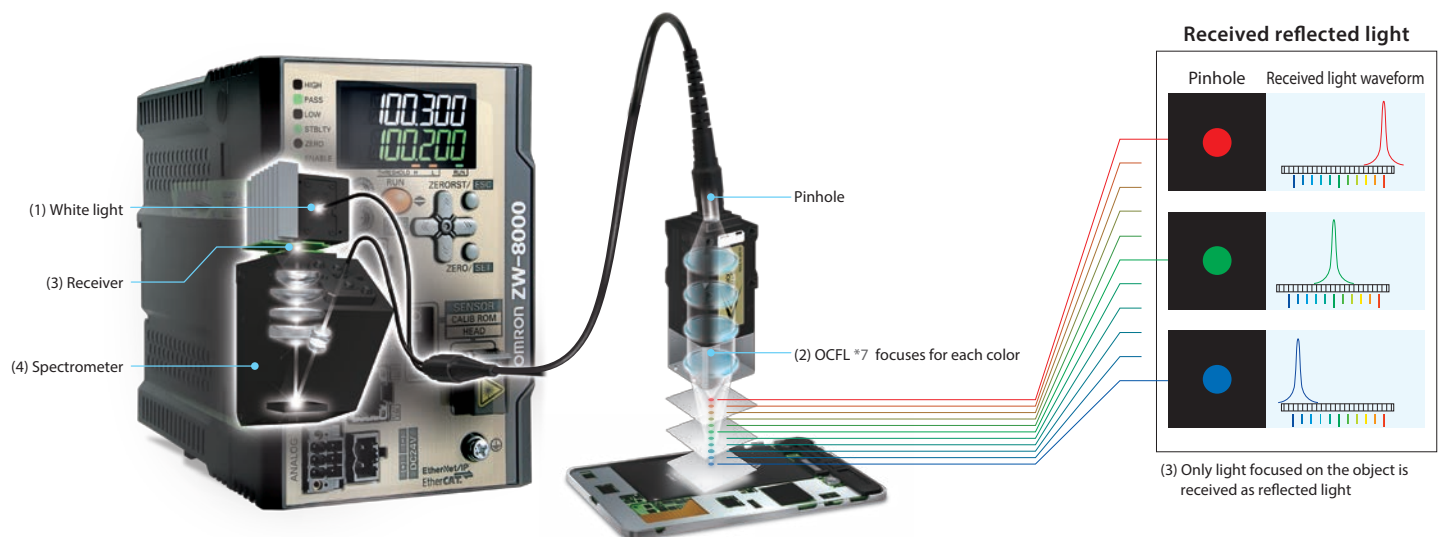*NEW*
Pen-shaped right angle type

27.5 mm

Low profile

*1/*2/*5/*6. Based on Omron investigation in July 2018.
*3. Material setting for the Omron standard mirror surface target:
Error from an ideal straight line when measuring on mirror surface.
*4. Typical value of the ZW-S8010/ZW-S7010/ZW-S5010 Sensor Heads.

(1) White light

(3) Receiver

(4) Spectrometer

Pinhole

(2) OCFL *7 focuses for each color

Received reflected light

Pinhole　Received light waveform

(3) Only light focused on the object is received as reflected light

Two options for evolving in-line

For measurement of **rattling or inclined "transparent objects or mirror surfaces"**
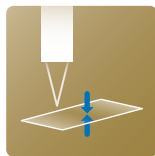
NEW Ultra high-precision type **ZW-8000**

High-precision in-line measurement of rattling or inclined shiny, thin, or minute parts
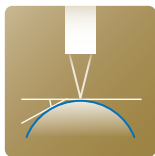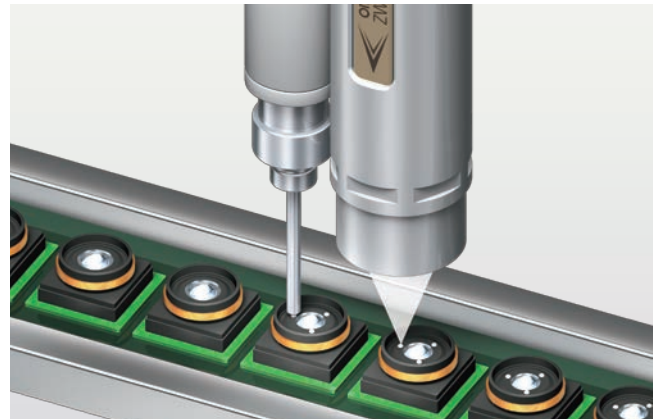
Curved surfaces | Transparent objects | Minute objects
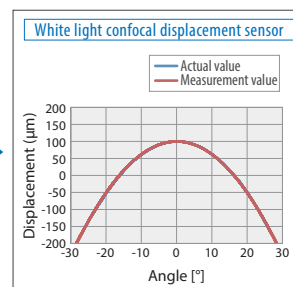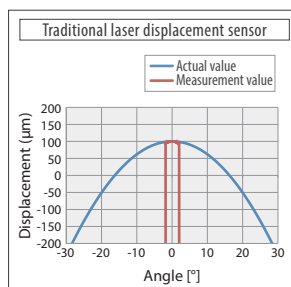
0201

Measurement of coated plastic height

Mirror surfaces (inclined or curved surfaces)

Omron's, unique, white light confocal displacement sensor provides higher resolution measurements of angled or curved and shiny surfaces than traditional laser displacement sensors.
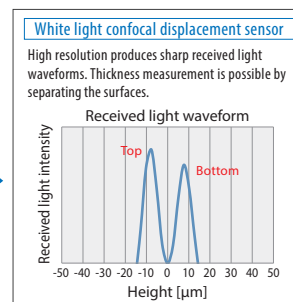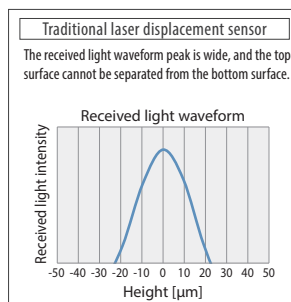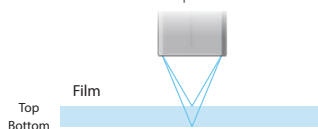
>> Mechanism
P.17 High angle characteristic

Traditional laser displacement sensor
— Actual value
— Measurement value
Displacement (μm)
200 / 150 / 100 / 50 / 0 / -50 / -100 / -150 / -200
-30 -20 -10 0 10 20 30
Angle [°]

White light confocal displacement sensor
— Actual value
— Measurement value
Displacement (μm)
200 / 150 / 100 / 50 / 0 / -50 / -100 / -150 / -200
-30 -20 -10 0 10 20 30
Angle [°]
(ZW-S8010)

Angle characteristic
±25°
for shiny surfaces
*1

Transparent objects

The ZW-8000 Series can measure the top and bottom surfaces of a thin transparent sheet or film by separating the light reflected from both surfaces, which is difficult with conventional laser displacement sensors.

Film
Top
Bottom

Traditional laser displacement sensor
The received light waveform peak is wide, and the top surface cannot be separated from the bottom surface.

Received light waveform
Received light intensity
-50 -40 -30 -20 -10 0 10 20 30 40 50
Height [μm]

White light confocal displacement sensor
High resolution produces sharp received light waveforms. Thickness measurement is possible by separating the surfaces.

Received light waveform
Received light intensity
Top   Bottom
-50 -40 -30 -20 -10 0 10 20 30 40 50
Height [μm]
(ZW-S8010)

Transparent object thickness from
15 μm
*2

Minute objects

Thanks to its very small spot diameter, the ZW-8000 Series can measure targets on minute objects extremely precisely, which is impossible with a conventional laser displacement sensor with a large spot diameter.

Traditional laser displacement sensor
Large spot diameter
Laser beam

White light confocal displacement sensor
Small spot diameter
ZW-8000
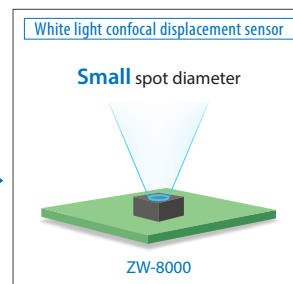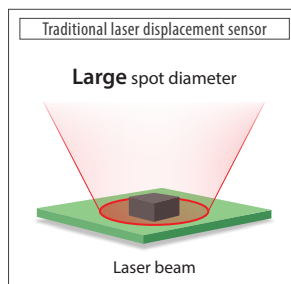
Min. spot diamete
4 μm
*3

*1. Typical value of the ZW-S8010/ZW-S7010/ZW-S5010 Sensor Heads.
*2. Typical value of the ZW-S8010 Sensor Heads when transparent objects with refractive index of 1.5 are measured.
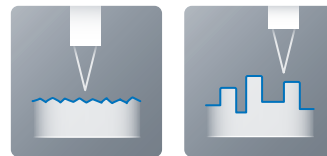*3. Typical value of the ZW-S8010 Sensor Heads

measurement

Measurement of "Coarse surfaces" moving at high speed

Ultra high-speed type ZW-7000

Ultra high-speed, stable measurement of diffuse reflective objects during movement

Coarse surfaces   Shape
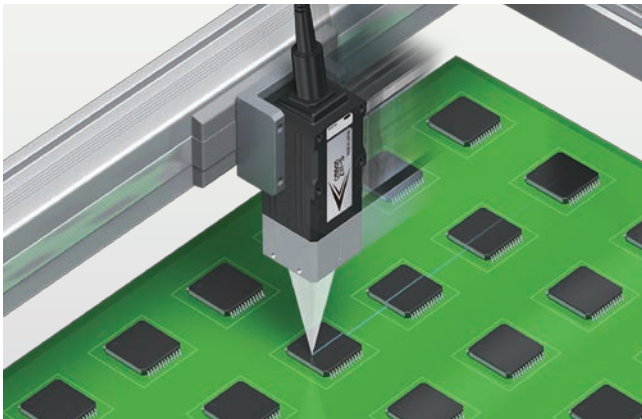
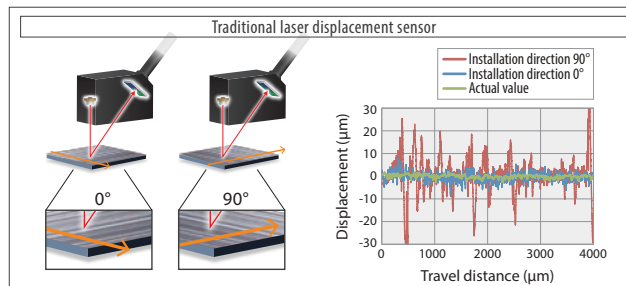Measurement of height of chips on substrate during movement

Flatness of coarse surfaces *4

Our white light confocal displacement sensors can provide accurate flatness measurement by tracing an object once without being affected by its excessive reflection, the sensor head direction, nor the material hairline direction, which are difficult to track with a conventional laser displacement sensor.

>> Mechanism
P.16 Stable measurements of coarse surfaces

Traditional laser displacement sensor

- Installation direction 90°
- Installation direction 0°
- Actual value

0°   90°

White light confocal displacement sensor

- Installation direction 90°
- Installation direction 0°
- Actual value

0°   90°

(ZW-S7020) *6

Moving resolution
1/5
(compared to previous principle)
*5

Shape

Using conventional sensors, the measurement accuracy can be achieved by increasing the averaging times, but downside is that this lowers the profile reproduction accuracy. The ZW-7000 acquires a sharp profile by sampling as fast as 20 μs without averaging, solving this issue.

- Averaged
- Not averaged
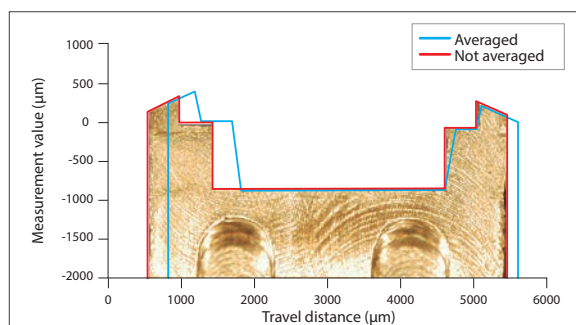
(ZW-S7030) *7

Minimum sampling period
20 μs

*4. Objects with machining marks or hairline pattern   *5. ZW-S7020.   *6. Please ask Omron sales representative for product data for other than the ZW-S7020.
*7. Please ask Omron sales representative for product data for other than the ZW-S7030.
Note: All measurement graphs represent typical examples. Measurement may be affected by the shape or material of the object being measured.
      Before final installation, test the sensor required for the application to validate that the desired measurements have been obtained.

Sensor head

Head variation for integration into a diverse

New ultra-small sensor heads make integration more flexible

The continued evolution of products as they have become thinner, more curved, and more compact has meant that the inspection process has also become more difficult, and this has necessitated visualization and assembly control in the upstream assembly process.

In response to this, Omron has developed a lineup including both square-shaped type sensor heads with long measurement distance, and ultra-small pen-shaped type (straight or right angle) sensor heads that can be installed in narrow spaces.

Machining

Assembly
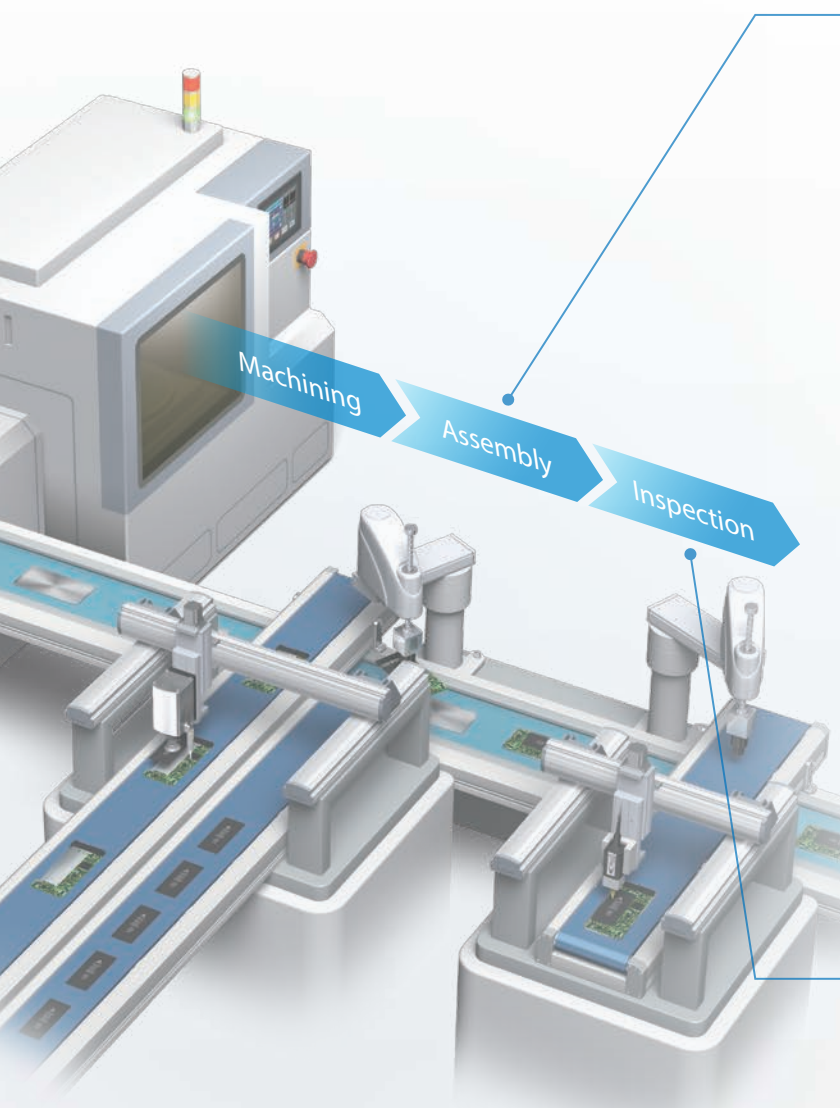
Inspection

Ideal for assembly process

Unlikely to interfere with structures, robots, or stages

NEW

Pen-shaped straight type

Measuring range
7±0.3 mm/10±0.7 mm

12-mm dia.

Full-scale image

NEW

Pen-shaped right angle type

Measuring range
7±0.3 mm/10±0.7 mm

Full-scale image

27.5 mm

Ideal for inspection process

Perfect solution for strict inspection accuracy

Square-shaped straight type

Measuring range
10±0.5 mm/20±1 mm/
30±2 mm/
40±3 mm *

Full-scale image

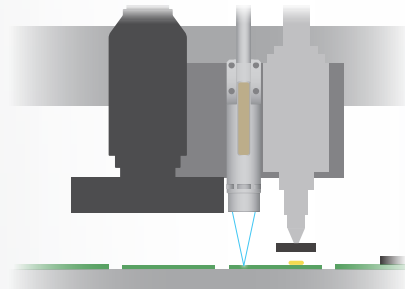* The 40 mm type is only available for the ZW7000 Series.
* The photo shows the ZW-8000 Series. This size is the same for the ZW-7000 Series.

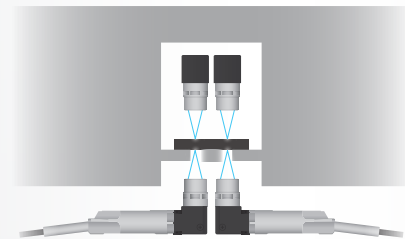# range of processes and equipment

Installation in narrow spaces

Installation is also possible in places with limited space with pick-up nozzles, positioning cameras, or jigs.

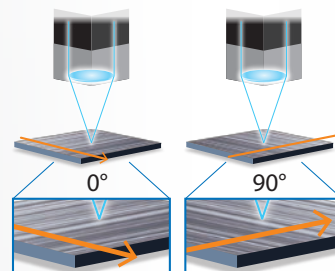## Low-profile, space-saving installation

High-precision control is possible by installing a low-profile head, even in places with strict height restrictions.

Flatness measurement of cases

As the heads have no orientation, there is no need to change the angle.

0°   90°

Usability

The white light confocal principle reduces prod through efficient arrangement and movement

Save Time and Money: No need to rotate the sensor

A conventional laser displacement sensor measures the height of an object based on the position of the spot on the receiver.
The machine requires an extra step to rotate the sensor according to the object shape or moving direction.
Our white light confocal displacement sensor can measure from the same installation position while moving in any direction, with no restriction on installation direction.

Traditional laser displacement sensor

White light confocal displacement sensor

Measurement cycle time reduced by up to 25 % *1
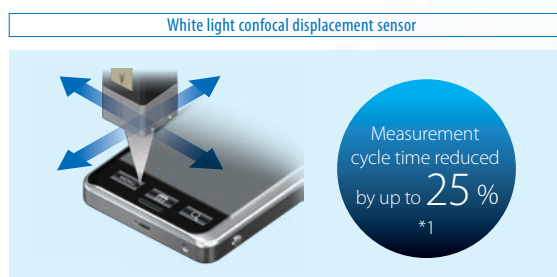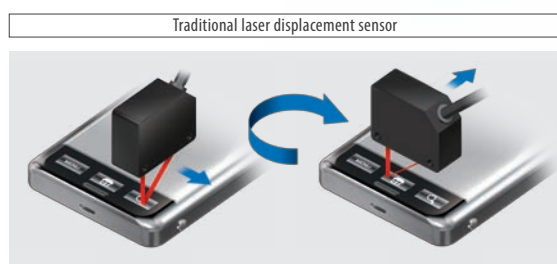
*1. Calculated when an object with irregular surface was measured in both the vertical and horizontal directions.

>> Mechanism
P.17 Direction free

Flexible fiber cable for easy installation

The controller connects to the sensor head through a 3 mm diameter flexible fiber cable.
The cable has cleared a bending test consisting of 3,000,000 repetitions*2 for reliable application on moving parts.

*2. Omron's bending test condition: 3,000,000 bends to a 20 mm bending radius
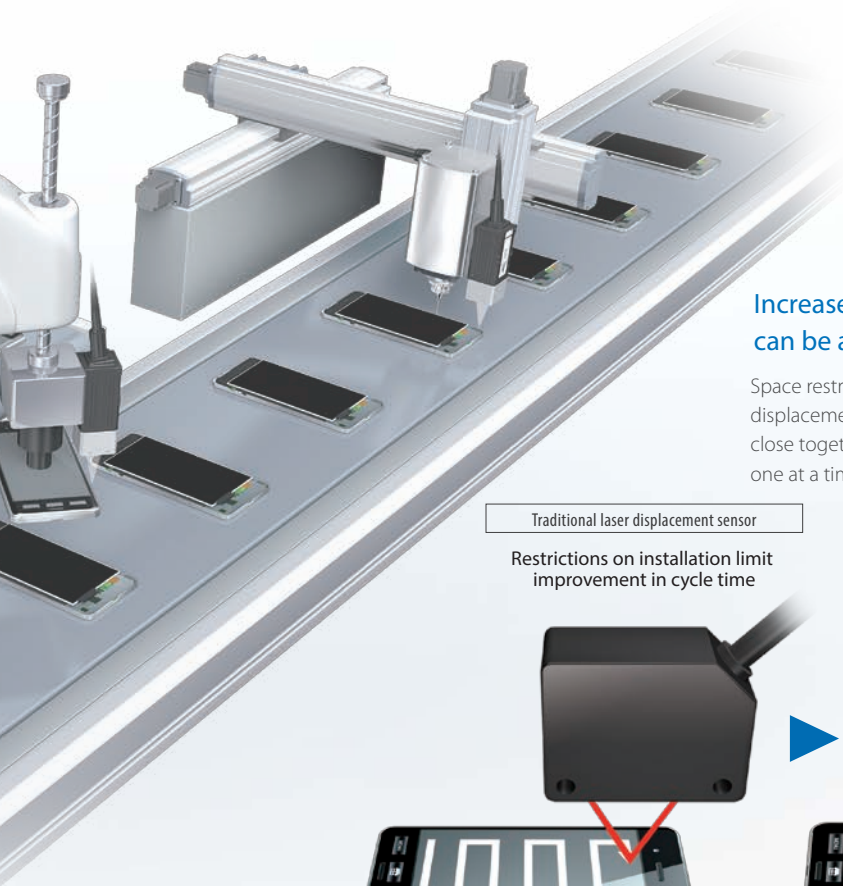
R
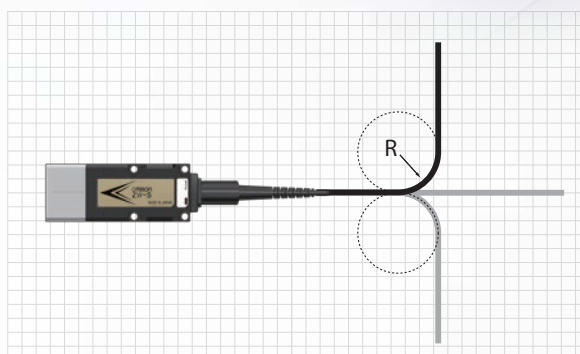
Extension cables for large machines

A 30-m extension fiber cable can be used to extend the distance to up to 32 m, supporting a flexible wiring in a large machine.

Standard fiber cable
0.3 m/2 m

Extension fiber cable
2 m/5 m/10 m/20 m/30 m

Sensor head

Connecting adapter

Controller
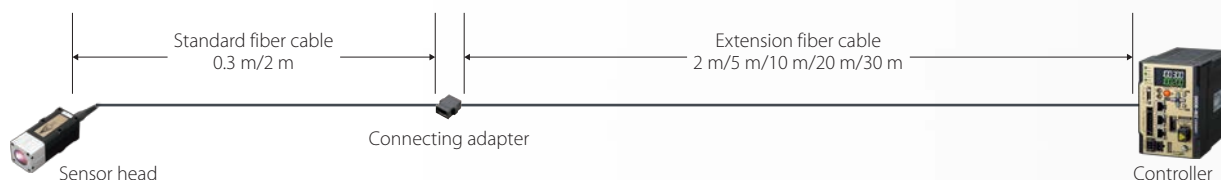
>> Extension fiber cable lineup
P.26 "Order Information Cable"

uction cycle times

Increase throughput: Simultaneous measurements can be achieved using multiple sensor heads

Space restrictions prevent side-by-side installation of many traditional laser displacement sensors. The pen-shaped straight sensor heads can be installed close together to obtain multiple measurements at once, instead of measuring one at a time, thus reducing measurement time.

Traditional laser displacement sensor	White light confocal displacement sensor
Restrictions on installation limit improvement in cycle time	Close installation reduces measurement time

Measurement cycle time reduced by 80 % or more *3

*3. Performance comparison with previous Omron products

Heads can be installed close together using the dedicated installation plate provided.

Further Benefits of White Light Confocal

● **No discrepancy in the measurement point**

With a traditional laser displacement sensor, the measurement position and spot size vary with the height. This means there are times when the position cannot be measured with high resolution due to warping and inclination. With a white light confocal displacement sensor, the measurement point remains the same at any position in the measuring range so that precise measurements can always be made.

● **Measurement in narrow area and by the wall**

When a traditional laser displacement sensor measures the inside of a narrow tube or the height of a small depression, the wall often obstructs the reflected light, and the orientation of the sensor and object must be adjusted many times. A white light confocal displacement sensor can measure the points in narrow spaces or small objects, without changing its installation orientation, because the emitted light and reflected light are positioned along the same axis.
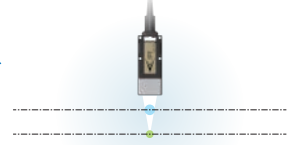
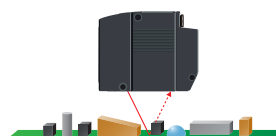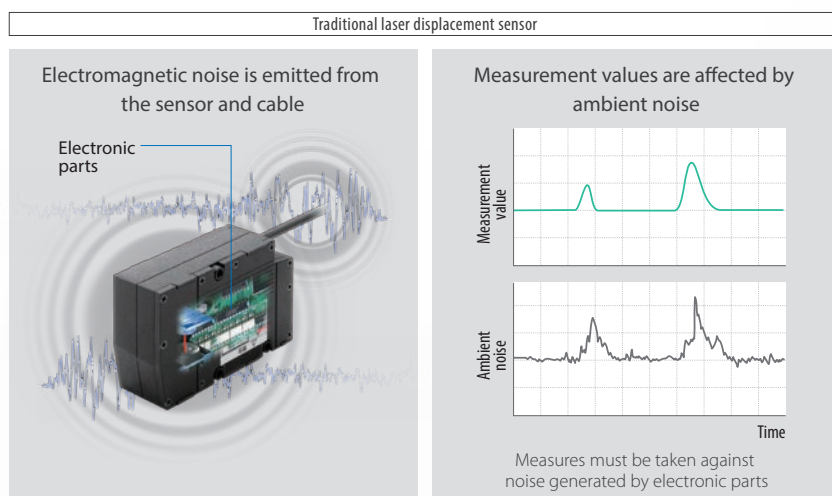| Traditional laser displacement sensor	White light confocal displacement sensor
Measurement position varies with the height	No discrepancy in the measurement position
Failure to measure due to obstruction of the reflected light by the wall.	The reflected light is not obstructed by the wall.
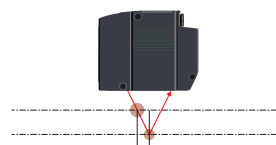
Usability

The white light confocal principle reduces to implement measures, design, and adjust

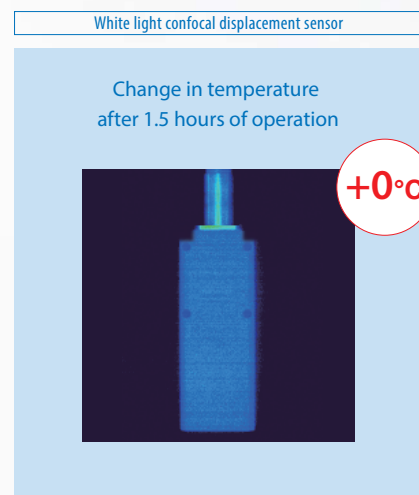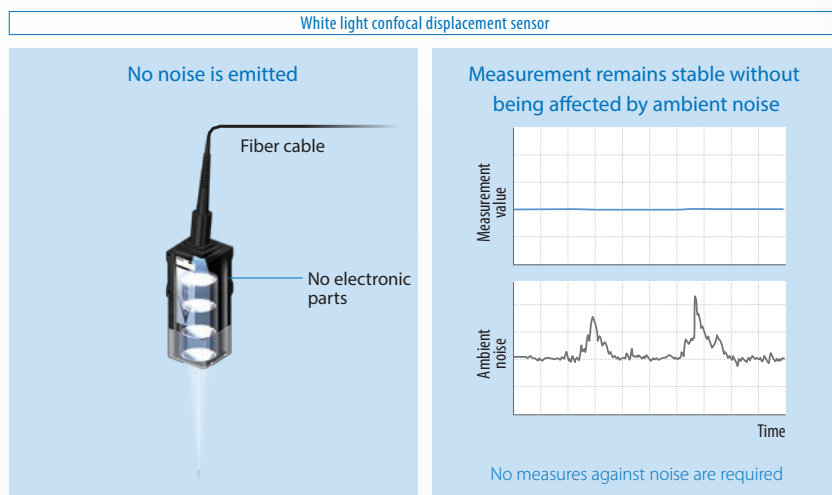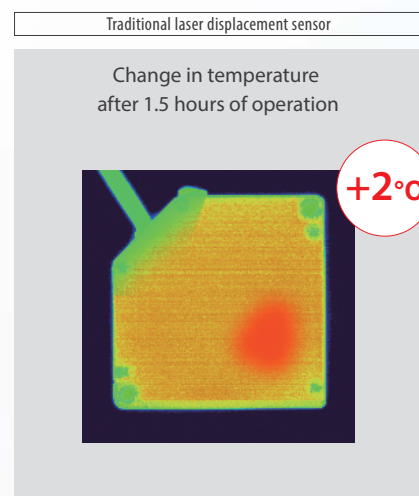## Reduced work - EMC measures and thermal design are not required

The sensor head design maintains stable operation in installations with electronic or magnetic noise.

Devices in close proximity and measurement values are not affected by noise or heat from the sensor head.

EMC measures

| Traditional laser displacement sensor |

Electromagnetic noise is emitted from the sensor and cable

Electronic parts

Measurement values are affected by ambient noise

Measurement value

Ambient noise

Time

Measures must be taken against noise generated by electronic parts

▼

| White light confocal displacement sensor |

No noise is emitted

Fiber cable

No electronic parts

Measurement remains stable without being affected by ambient noise

Measurement value

Ambient noise

Time

No measures against noise are required

Thermal design

| Traditional laser displacement sensor |

Change in temperature after 1.5 hours of operation

+2°c

▼

| White light confocal displacement sensor |

Change in temperature after 1.5 hours of operation

+0°c

No laser safety measures required

A white light source [1] eliminates the need for safety measures around the machine and safe use training for workers that are required for a laser light source.
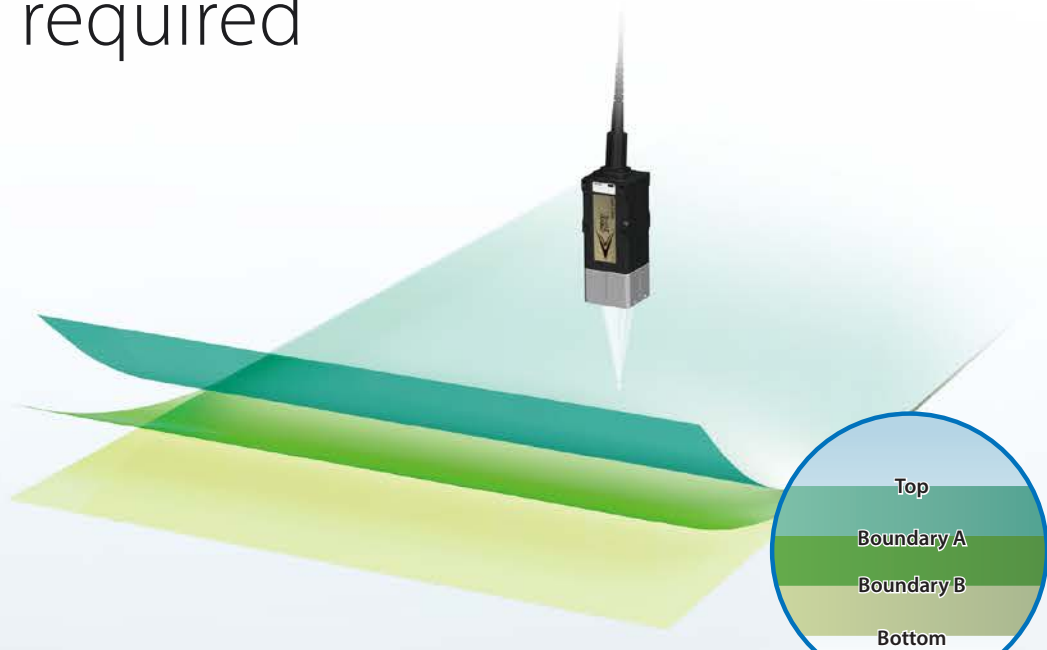
Previously safety measures for laser were required

When a laser displacement sensor was used, a shield around the machine for safety was required and workers had to be trained for safe use.

The use of eye protection is required
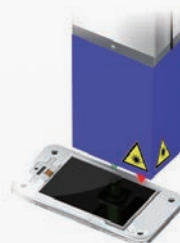
*1. The ZW-8000 Series is categorized as Class 1.

the time required

Top
Boundary A
Boundary B
Bottom

Edges of object

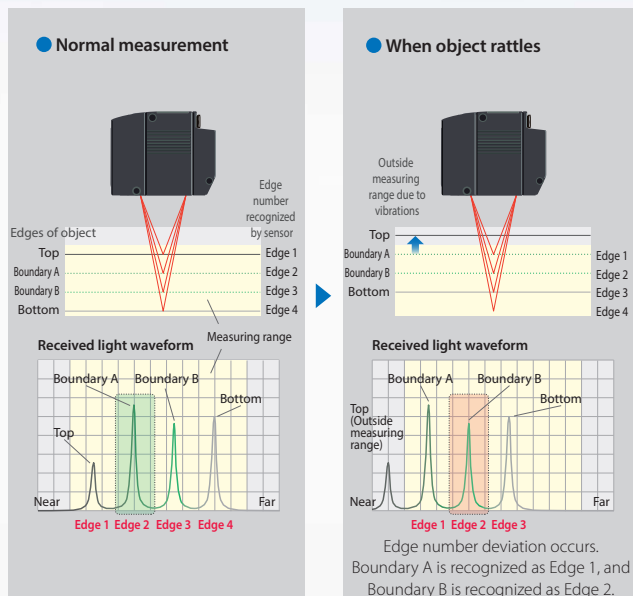## Stable measurement of multi-layer objects possible with advanced function "EdgeTracks" *2

Patent pending

When measuring objects with multiple layers, the white light confocal displacement sensor can stably measure target edges even if the object rattles and certain of the edges cannot be measured.
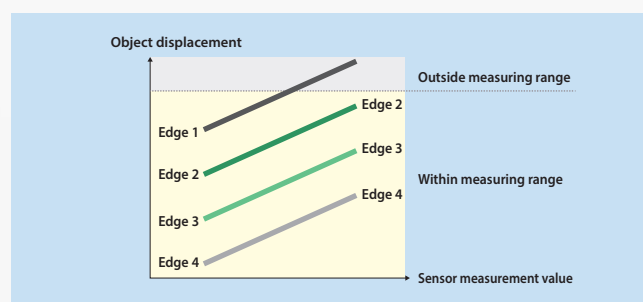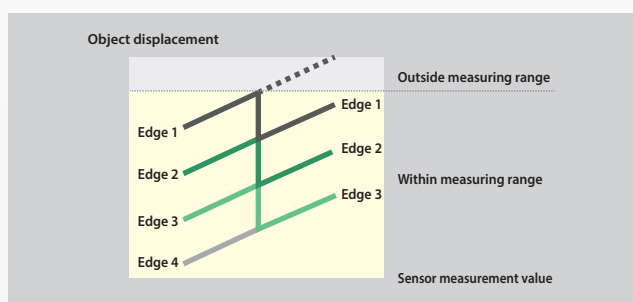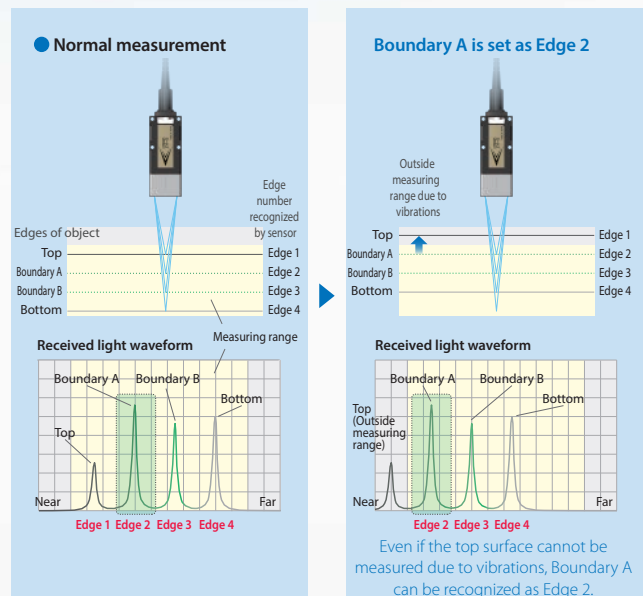
Traditional laser displacement sensor

If certain of the edges are outside the measuring range (cannot be measured) due to vibrations of the object, the other edges are numbered incorrectly.

● **Normal measurement**

Edge number recognized by sensor

Edges of object
Top — Edge 1
Boundary A — Edge 2
Boundary B — Edge 3
Bottom — Edge 4

Measuring range

Received light waveform

Boundary A Boundary B
Bottom
Top
Near Far
Edge 1 Edge 2 Edge 3 Edge 4

● **When object rattles**

Outside measuring range due to vibrations

Top
Boundary A — Edge 1
Boundary B — Edge 2
Bottom — Edge 3

Received light waveform

Boundary A Boundary B
Bottom
Top (Outside measuring range)
Near Far
Edge 1 Edge 2 Edge 3

Edge number deviation occurs. Boundary A is recognized as Edge 1, and Boundary B is recognized as Edge 2.

Object displacement

Outside measuring range

Edge 1
Edge 2
Within measuring range
Edge 3
Edge 4

Edge 1
Edge 2
Edge 3

Sensor measurement value

White light confocal displacement sensor

The EdgeTracks function can take stable measurements with no edge number deviation, even if certain of the edges cannot be measured.

● **Normal measurement**

Edge number recognized by sensor

Edges of object
Top — Edge 1
Boundary A — Edge 2
Boundary B — Edge 3
Bottom — Edge 4

Measuring range

Received light waveform

Boundary A Boundary B
Bottom
Top
Near Far
Edge 1 Edge 2 Edge 3 Edge 4

Boundary A is set as Edge 2

Outside measuring range due to vibrations

Top — Edge 1
Boundary A — Edge 2
Boundary B — Edge 3
Bottom — Edge 4

Received light waveform

Boundary A Boundary B
Bottom
Top (Outside measuring range)
Near Far
Edge 2 Edge 3 Edge 4

Even if the top surface cannot be measured due to vibrations, Boundary A can be recognized as Edge 2.

Object displacement

Outside measuring range
Edge 2

Edge 1
Edge 3
Edge 2
Within measuring range
Edge 4
Edge 3
Edge 4

Sensor measurement value

*2. Supported only on ZW-8000 Series

System

Precise measurement of "target positions" on through synchronous measurement with ext

To eliminate measurement errors due to a position offset during moving measurement, the ZW Series provides the functionality to link moving parts with measurement timing (external synchronous measurement mode).

## Movement measurement linked to stage position information [1]

Linking stage information (X, Y) with the sensor measurement value (Z) allows accurate shape measurement without being affected by acceleration/deceleration of the stage.

Linking between glass height and XY coordinates

[1]. This functionality is available on the firmware version 2.10 or later.
If you register as a member after purchasing the product, the latest firmware for the controller is available for free.
Refer to the member registration sheet that is enclosed with the product for details.
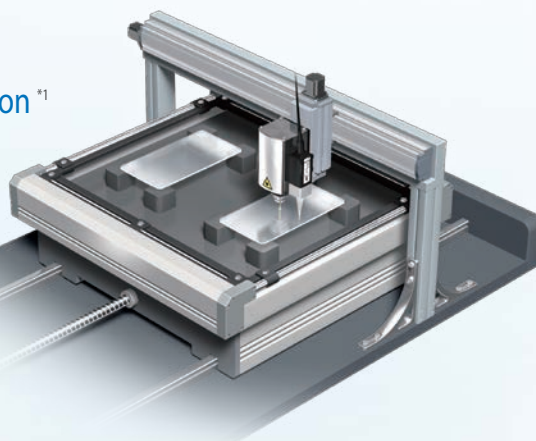
Previous system	ZW Series
Sensors perform measurement within the same cycle, regardless of stage acceleration and deceleration.	**Sensors perform measurement based on encoder timing (External synchronous measurement mode)**

Pulse output from encoder

Time

Different timings

Sensor measurement timing

Time

Pulse output from encoder

Time

Synchronized measurement timing

Sensor measurement timing

Time

Height information (Z)

- Object shape
- Measurement value
- Measured and calculated shape

Position information (XY)

Height information (Z)

- Object shape
- Measurement value
- Measured and calculated shape

Position information (XY)

As the measurement position (XY) is not synchronized with the measurement value (Z), an accurate object shape cannot be obtained if the stage accelerates or decelerates.

Each sensor synchronizes with pulse output from the encoder, enabling high-precision measurement linked to the XY position, regardless of stage acceleration and deceleration.

DLL Quick integration into machine HMI

DLL files are provided to easily display ZW Series setting screens and measurement results on a Windows/Mac OS PC used as a machine HMI.

Provided DLL	· Settings and measurement conditions reference · Acquiring measurement values	· Acquiring light received waveforms · Logging control

[2]. If you register as a member after purchasing the product, you can download DLL for free.
Refer to the member registration sheet that is enclosed with the product for details.
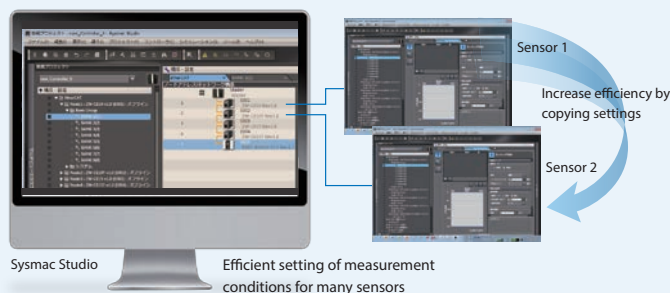
moving objects
ernal devices

More features Sysmac makes moving measurement easy

Easy setting and measurement through synchronization with EtherCAT

EtherCAT.

1S
AC Servomotor

NJ/NX
Machine Automation Controller
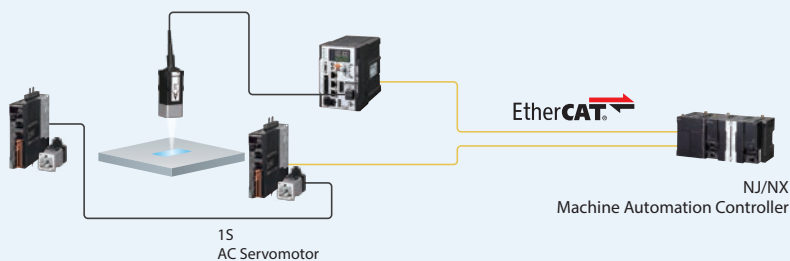
The sensors begin measurement automatically by synchronizing with periodic EtherCAT communication. This system ensures accurate synchronisation between devices with 1 μs jitter.

Operations integrated within Sysmac Studio

Sysmac Studio

Efficient setting of measurement conditions for many sensors

Sensor 1

Increase efficiency by copying settings

Sensor 2

Efficient setting of multiple ZW Sensors

You can make settings for all of devices that are connected via EtherCAT with the Automation Software Sysmac Studio. Even when using many sensors, you can copy the setting data to effectively integrate several sensors and easily program the processing between the sensors.

Easy set-up with Function Blocks

Sysmac Library

Omron offers Function Blocks (FBs) to make programming for system link applications easier.
Rapid set-up without any programming know-how is possible with an FB which tracks object shapes, FBs used to generate 2D shape data and calculate characteristic point dimensions, and HMI screens used to specify settings and perform measurement.

For details, refer to the SYSMAC-XR014 Dimension Measurement Library on the following URL: **www.ia.omron.com/sysmac_xr014**

Tracer Control

This method is suitable for measuring shapes whose height varies gradually.
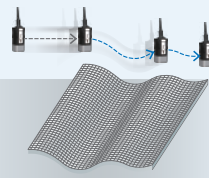
Surface Search

This method is suitable for measuring shapes whose height varies greatly and sharply. When the height of the measurement surface changes and it goes outside the measurement range of the displacement sensor, the height of the displacement sensor is readjusted and the measurement is continued.
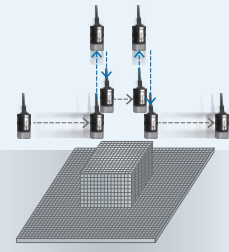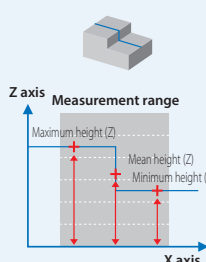
| Height | Edge position | Inflection point | Angle | Sectional area | Shape comparison |
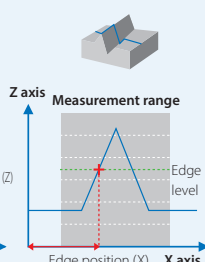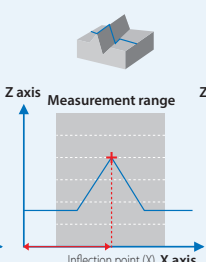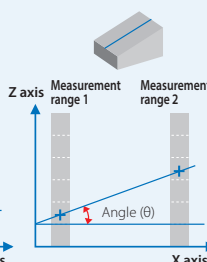
Height
Z axis — Measurement range
Maximum height (Z)
Mean height (Z)
Minimum height (Z)
X axis

Edge position
Z axis — Measurement range
Edge level
Edge position (X) — X axis

Inflection point
Z axis — Measurement range
Inflection point (X) — X axis

Angle
Z axis — Measurement range 1 — Measurement range 2
Angle (θ)
X axis

Sectional area
Z axis — Measurement range
Sectional area
X axis

Shape comparison
Z axis — Measurement range
Positive difference (Z) — Master shape
Negative difference (Z) — Measured shape
X axis

Technical explanation

New technology enabling ultra-high-precision, ultra

● **New technology in ZW-8000 Series offering unsurpassed ultra-high precision**

Ultra-high precision

Ultra High Power White Light

NEW

The long-term stable, high power white light source was adopted for the ZW-7000 Series to provide fast responses and stable measurements of low-reflective objects.
The ZW-8000 Series incorporates a newly-designed white laser for stable measurement of thin transparent sheets and minute shapes.
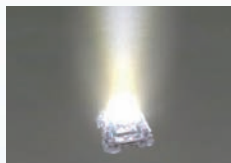
* Conceptual illustration

Ultra-high photoconductivity

Precise Core Fiber

NEW

The fibers specially designed separately for the ZW-7000 and ZW-8000 Series transmit white light to the sensor head even more efficiently and deliver the lights reflected from other layers to the controller ultra-sensitively, enabling more precise measurement.

High resolution

Advanced Spectrograph I/II

NEW

The spectroscope Advanced Spectrograph, which converts the color wavelength into the distance, offers increased waveform resolution. The ZW-8000 Series with the new Advanced Spectrograph II enables ultra-high-precision measurements.

● **Common technology throughout the entire series offering unsurpassed usability**

25 times faster data processing speed

High Speed Processor

The new processor was designed to increase processing speed for high precision measurements, from white light emission through sensing and processing to data logging.
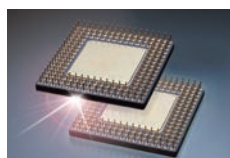
* Conceptual illustration

Large logging capacity (up to 2 million values)

Mega Logging Memory

The memory capacity was greatly increased to log, process and store up to 2,000,000 values[1] obtained by high-speed sampling.

[1]. Measurement values, emitted light amounts, or received light amounts can be logged.

-high-speed in-line measurements

High sensitivity
High Sensitivity High Speed CMOS

The CMOS for the ZW-8000/7000 Series were optimized to measure any object more precisely, sensitively, and stably.
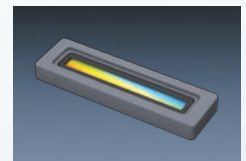
* Conceptual illustration

Low aberration
Advanced OCFL Module
OCFL

The OCFL[2] module that controls the focal point for each wavelength of white light was further developed. Its multi-lens structure reduces aberration to 1/4[3] to provide stable, high-resolution measurements, without compromising its compact design.

*2. OCFL: Omron Chromatic Focus Lens
*3. Compared to the ZW-S07/-S20/-S30/-S40.

* Conceptual illustration

● Head technology

Ultraprecise   NEW
Ultra-precision machining and mechanical design

The ultra-precision machining technology and ultra-precision mechanical design minimize the housing while giving a lens diameter sufficient for high-precision measurements.

* Conceptual illustration

Technical explanation

White light confocal principle to achieve stable

White light confocal principle is a breakthrough mechanism to enable a stable measurement even in high-speed transfer process using robots and stages. This new principle allows a continuous measurement of object in any mixed conditions such as coarse, curved, inclined or narrow areas while moving. Its characteristic mechanism is detailed below, compared to the traditional triangulation principle.

* Conceptual illustration

White light confocal displacement sensor

Traditional laser displacement sensor

Errors when measuring between different materials

Error when measuring a slope

Error when measuring a coarse surface

Impossible to measure narrow areas

Error when measuring a coarse surface

Impossible to measure a curved surface

* This graph represents a result of measurement under specific conditions. Before final installation, test the sensor required for the application to validate the desired measurements are obtained.

Profile obtained by moving measurement of various materials and shapes

Stable measurements of coarse surfaces

Only the light reflected from the measurement point enters the pinhole even if excessive light reflected from the object changes during movement. This enables stable and precise measurement without being affected by multiple reflection light.

Pinhole

White light

OCFL module

Multiple reflections on coarse surface

Received light waveform

The waveform is not distorted, which means that only the color of the measurement point is received.

>> Solutions

P.5 Flatness of coarse surfaces
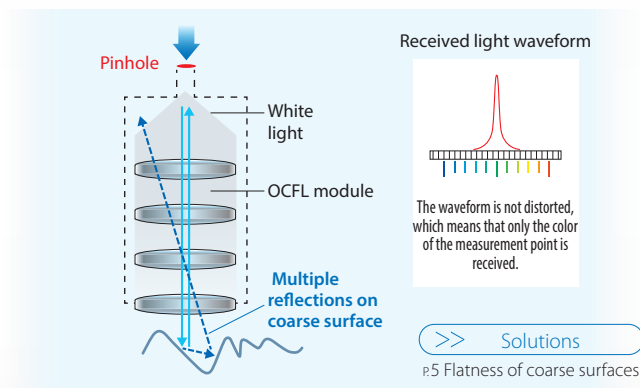
Laser triangulation principle

Reflected light is received on a receiver, and height is measured from the waveform of light received on the receiver. The waveform is distorted due to the effect of excessive reflection, resulting in a measurement error. The effect of excessive reflection changes during movement, which causes unstable measurements.

Laser diode

Lens

Receiver

Far

Near

Lens

Excessively reflected light

Light received from measurement point

Height detected by sensor
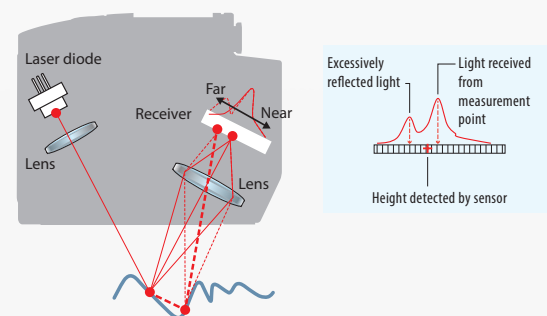
measurements during movement

High angle characteristic

Because light is emitted directly from above, the reflected light is not widely diffused. The sensor can measure by stably receiving a part of the reflected light.

Curved surface

Measures by receiving part of the light

Received light waveform

Stably receives light

Emitted light   Reflected light
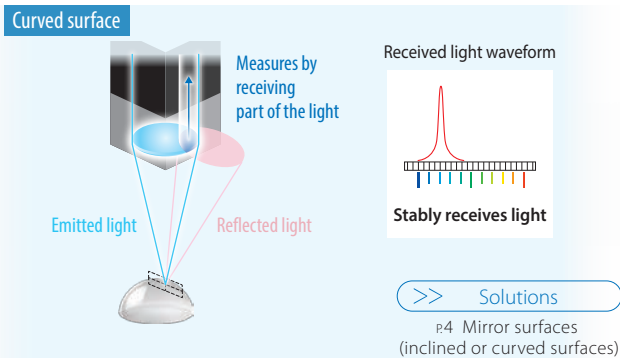
The wavelength (position) can be obtained from a part of the received light even if the reflected light amount is reduced. This enables stable height measurements.

Inclined surface

Measures by receiving part of the light

Received light waveform

Stably receives light

Emitted light   Reflected light
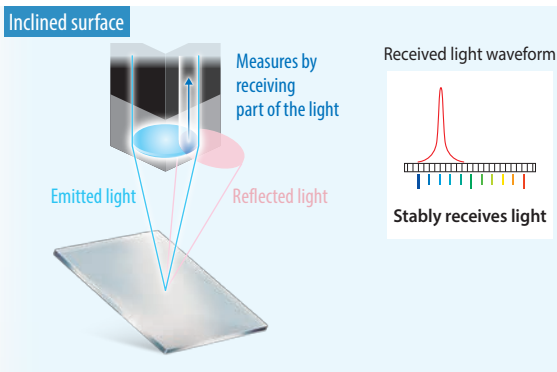
Laser triangulation principle

A laser spot beam is emitted obliquely from above. When the position of a glossy, regular-reflective object, where the beams are reflected in one direction, is shifted, the light reflected from the curved surface cannot be received.

Curved surface

No light received
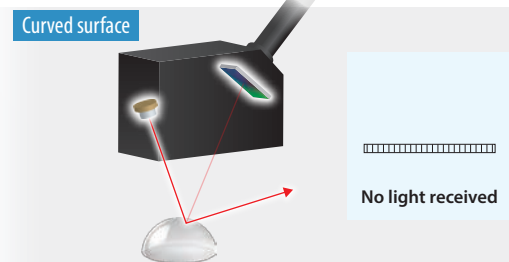
Even if the light can be received, the received light waveform is distorted due to lens aberration as a result the measurement becomes unstable.

Inclined surface
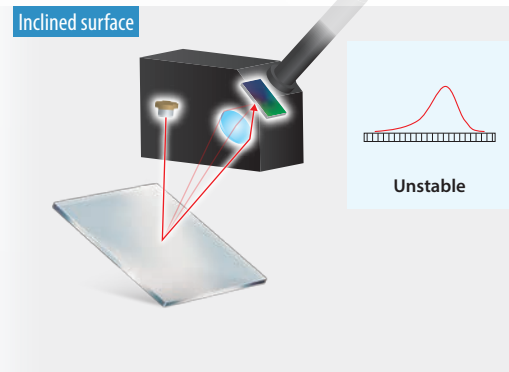
Unstable

Direction free

Stable measurement is not affected by the movement direction of objects or the sensor. This is achieved by emitting and receiving a cone-shaped beam of white light. This slim beam is also suitable for measurements in narrow areas.
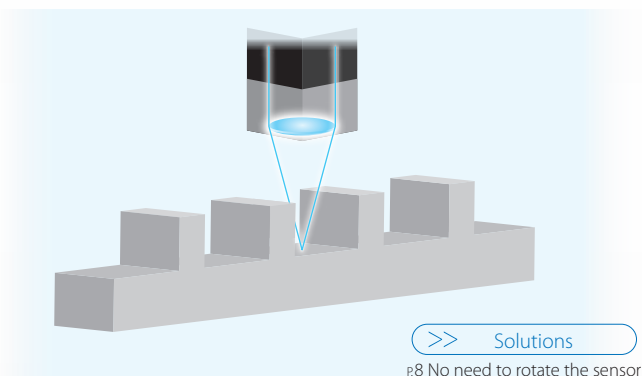
Laser triangulation principle

The reflected light is detected obliquely from above. Depending on the installation direction, the sensor cannot measure the object because the reflected light is blocked.
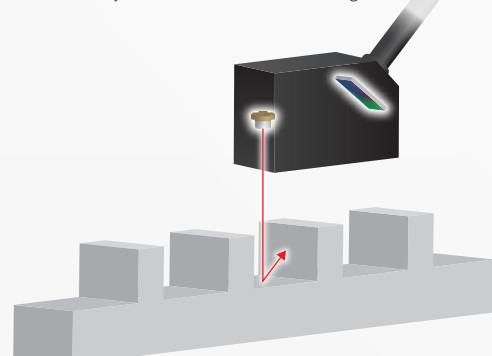
Selection

A simple 3 step process to help you find the

STEP1   **Select controller based on measurement object and situation**

Measure rattling or inclined "transparent objects or mirror surfaces" such as thin film sheets or glass

▶

Ultra high-precision type
ZW-8000 Series

Sensor Controller
ZW-8000T

Measure accurate shapes of "coarse surfaces" while the sensor head is moving

▶

Ultra high-speed type
ZW-7000 Series

Sensor Controller
ZW-7000T

Bring the benefits of the white light confocal principle to production lines

▶

Standard type
ZW-5000 Series

Sensor Controller
ZW-5000T

right controller and sensor head

STEP2	Select head based on installation space

STEP3	Select model based on distance

Width is limited	12-mm dia.	Pen-shaped straight type **ZW-SP80□□**	
Height is limited	27.5 mm	Pen-shaped right angle type **ZW-SPR80□□**	
Precision is more important than space	76.25 mm / 30 mm	Square-shaped straight type **ZW-S80□□**	

		Measuring range	Static resolution
Short	ZW-SP8007	7±0.3 mm	
Long	ZW-SP8010	10±0.7 mm	
Short	ZW-SPR8007	7±0.3 mm	
Long	ZW-SPR8010	10±0.7 mm	0.25 µm
Short	ZW-S8010	10±0.5 mm	
↕	ZW-S8020	20±1 mm	
Long	ZW-S8030	30±2 mm	

Width is limited	12-mm dia.	Pen-shaped straight type **ZW-SP70□□**	
Height is limited	27.5 mm	Pen-shaped right angle type **ZW-SPR70□□**	
Precision is more important than space	76.25 mm / 30 mm	Square-shaped straight type **ZW-S70□□**	

		Measuring range	Static resolution
Short	ZW-SP7007	7±0.3 mm	
Long	ZW-SP7010	10±0.7 mm	
Short	ZW-SPR7007	7±0.3 mm	
Long	ZW-SPR7010	10±0.7 mm	0.25 µm
Short	ZW-S7010	10±0.5 mm	
↕	ZW-S7020	20±1 mm	
	ZW-S7030	30±2 mm	
Long	ZW-S7040	40±3 mm	

Width is limited	12-mm dia.	Pen-shaped straight type **ZW-SP50□□**	
Height is limited	27.5 mm	Pen-shaped right angle type **ZW-SPR50□□**	
Precision is more important than space	76.25 mm / 30 mm	Square-shaped straight type **ZW-S50□□**	

		Measuring range	Static resolution
Short	ZW-SP5007	7±0.3 mm	
Long	ZW-SP5010	10±0.7 mm	
Short	ZW-SPR5007	7±0.3 mm	
Long	ZW-SPR5010	10±0.7 mm	0.25 µm
Short	ZW-S5010	10±0.5 mm	
↕	ZW-S5020	20±1 mm	
Long	ZW-S5030	30±2 mm	

Application

ZW Series for a variety of applications

Smart phone (component process)

Parallelism measurement between parts before module part assembly

ZW-8000 ZW-7000 ZW-5000

Parallelism measurement between parts before module part assembly

ZW-8000 ZW-7000 ZW-5000

Groove measurement of camera modules

ZW-8000 ZW-7000

Nozzle gap inspection during resin application

ZW-5000

Gap inspection after module part assembly

Cover glass

CMOS   Substrate

ZW-8000 ZW-5000
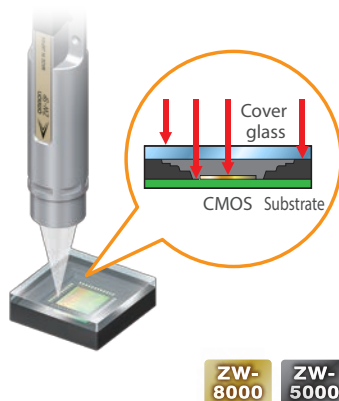
Flatness measurement of cover glass

ZW-7000 ZW-5000
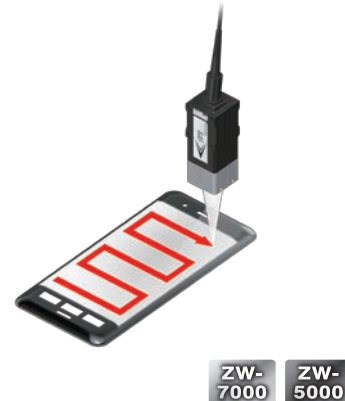
Smart phone (assembly process)

Height measurement of assembled parts

ZW-7000

Case width measurement

ZW-7000
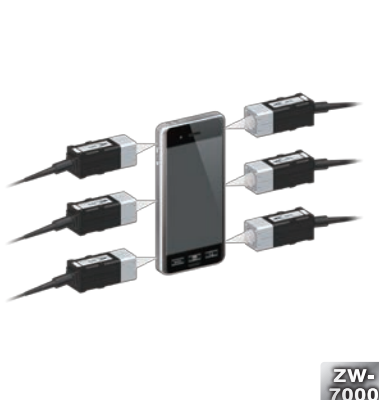
Level difference measurement between buttons and case

ZW-7000 ZW-5000
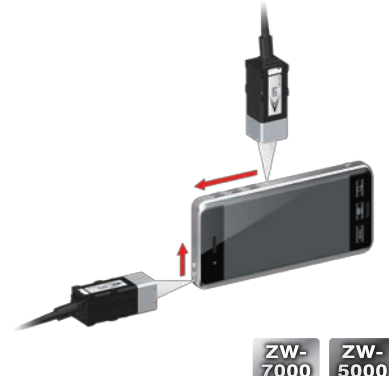
Note: The most suitable model will vary depending on the object material and surface.
Before final installation, test the sensor required for the application to validate the desired measurements are obtained.

Level measurement of cases

ZW-7000
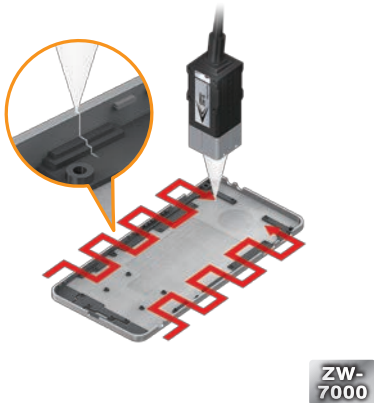
Thickness measurement of battery sheets

ZW-7000

LED potting shape measurement

ZW-8000 ZW-5000
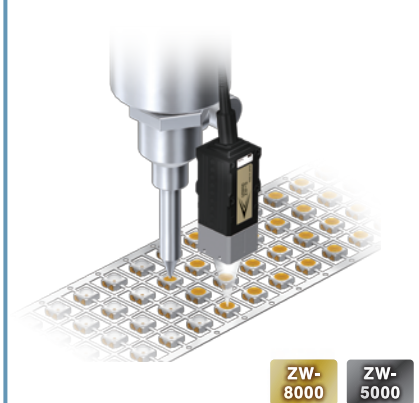
Flatness measurement of cases
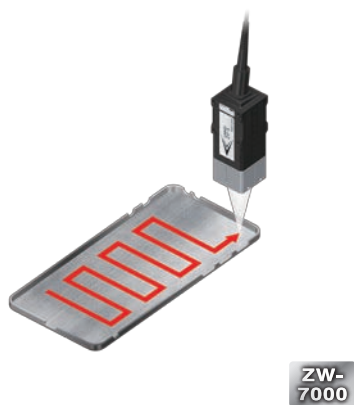
ZW-7000

Flatness measurement of batteries

ZW-7000

Coplanarity measurement of connector pins

ZW-8000 ZW-7000 ZW-5000
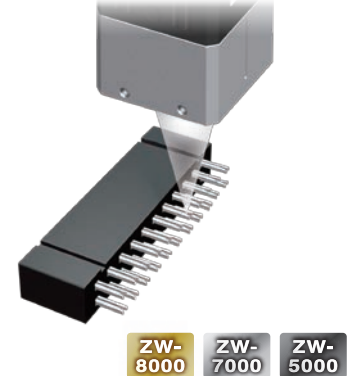
Level difference measurement of logos

ZW-7000 ZW-5000

SEMI/FPD

Abrasion profile measurement of target material
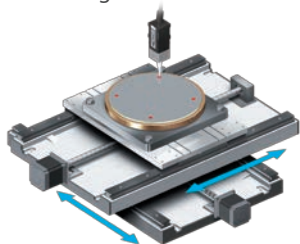
ZW-7000

Height measurement of wafers
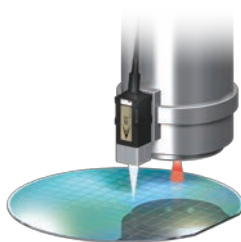
ZW-8000 ZW-5000

Gap measurement of electronic chips
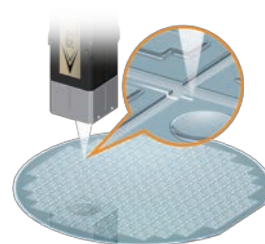
ZW-8000 ZW-5000

Z axis adjustment of chip mounter

ZW-7000

Profile measurement of solder on substrates
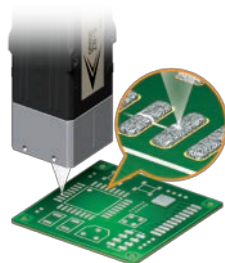
ZW-8000 ZW-5000

Profile measurement of silicon
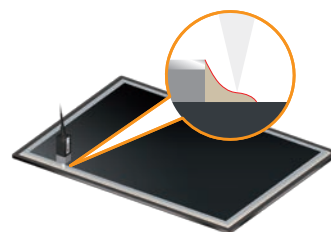
ZW-8000 ZW-5000

Automotive parts

Inner diameter measurement

ZW-7000

Profile inspection of sealing materials for assembled parts
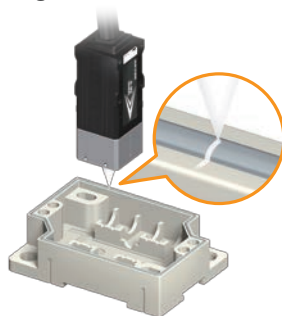
ZW-5000

Operation inspection of relay contacts

ZW-7000 ZW-5000

Surface deflection and flatness measurement of rotary parts

ZW-7000

Depth measurement of holes on metal components
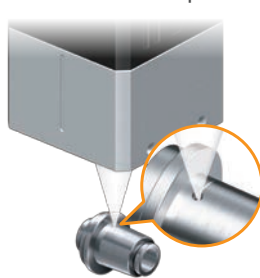
ZW-7000

Profile inspection of friction materials for clutches
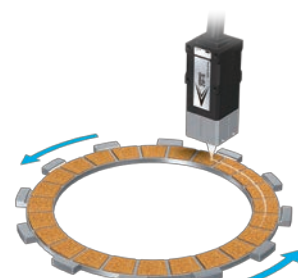
ZW-7000

Pharmaceuticals

Curvature measurement of rolled glass
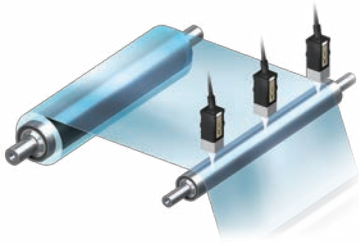
ZW-8000 ZW-5000

Thickness measurement of lenses
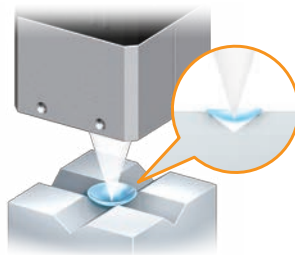
ZW-8000 ZW-5000

Liquid level measurement in small-diameter vessels
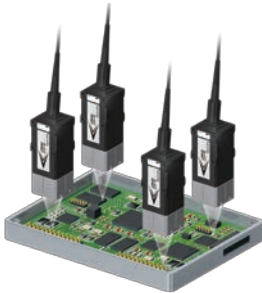

ZW-5000

Position inspection of film lamination
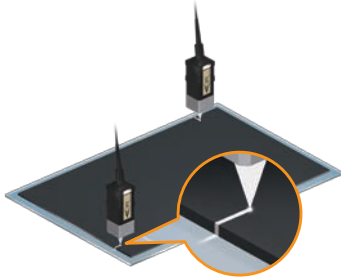
ZW-8000 ZW-5000

Assembly measurement of ECU boards

ZW-7000

Curvature measurement of glass surfaces

ZW-7000

Thickness measurement of motor cores

ZW-7000

Eccentricity measurement of motors

ZW-7000

MEMO

OMRON

Confocal Fiber Displacement Sensor
ZW-8000/7000/5000 Series

Reliable measurements for any material and surface types

- Measuring shiny objects with an inclination of ±25°
- ±0.3 µm or less linearity for various materials
- Sampling rate as fast as 20 µs
- Small spot diameter of 4 µm or less

Note: Angle characteristic, linearity, sampling period and spot diameter given in the cover differ among models. Please ask OMRON sales representative for details.
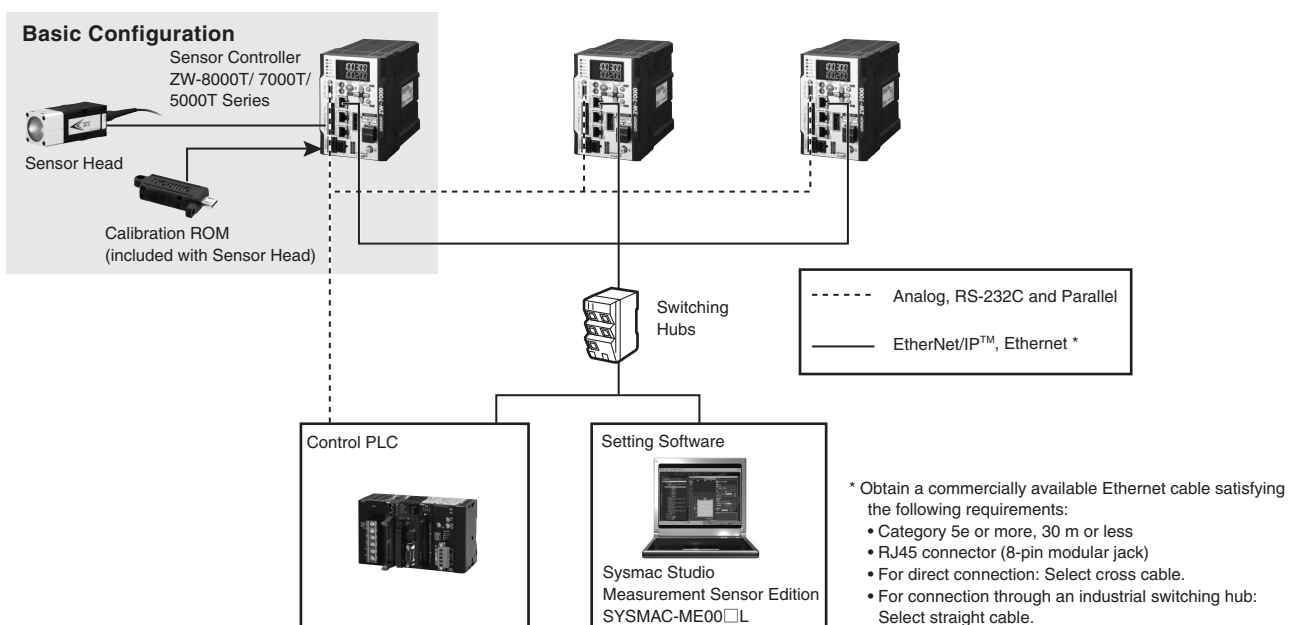
CE

System Configuration

EtherCAT connections

Basic Configuration

Sensor Controller ZW-8000T/ 7000T/ 5000T Series

Sensor Head

Calibration ROM (included with Sensor Head)

EtherCAT Cable (RJ45/RJ45)

EtherCAT Cable (RJ45/RJ45)

EtherCAT Cable (RJ45/RJ45)

EtherCAT Cable (Select the cable that matches the Slave's connector.)

Other EtherCAT Slaves

EtherCAT Cable (RJ45/RJ45)

EtherCAT Master

Machine Automation Controller NJ/NX/NY series

Ethernet * /USB

Setting Software

Sysmac Studio Standard Edition SYSMAC-SE20□□

Analog, EtherNet/IP, Ethernet, RS-232C and Parallel connections

Basic Configuration

Sensor Controller ZW-8000T/ 7000T/ 5000T Series

Sensor Head

Calibration ROM (included with Sensor Head)

Switching Hubs

- - - - - Analog, RS-232C and Parallel

――――― EtherNet/IP™, Ethernet *

Control PLC

Setting Software

Sysmac Studio Measurement Sensor Edition SYSMAC-ME00□L

* Obtain a commercially available Ethernet cable satisfying the following requirements:
- Category 5e or more, 30 m or less
- RJ45 connector (8-pin modular jack)
- For direct connection: Select cross cable.
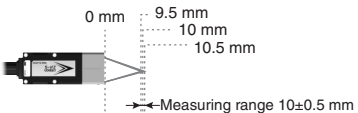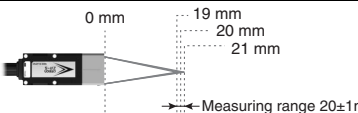- For connection through an industrial switching hub: Select straight cable.
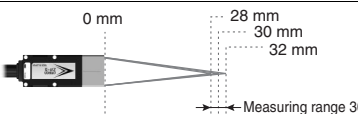
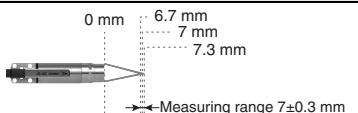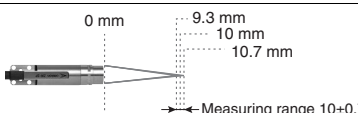# ZW-8000/7000/5000 Series

Order Information

ZW-8000
●Sensor Head
Square-shaped straight type

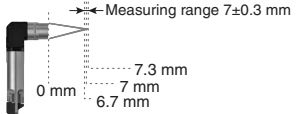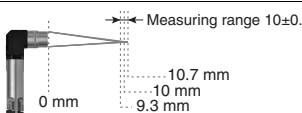| Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm / 9.5 mm / 10 mm / 10.5 mm / Measuring range 10±0.5 mm	4 μm dia.	0.25 μm	2 m	ZW-S8010 2M
				0.3 m	ZW-S8010 0.3M
	0 mm / 19 mm / 20 mm / 21 mm / Measuring range 20±1mm	7 μm dia.	0.25 μm	2 m	ZW-S8020 2M
				0.3 m	ZW-S8020 0.3M
	0 mm / 28 mm / 30 mm / 32 mm / Measuring range 30±2mm	10 μm dia.	0.25 μm	2 m	ZW-S8030 2M
				0.3 m	ZW-S8030 0.3M

* Values when the Sensor Controller ZW-8000T is used.

Pen-shaped straight type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm / 6.7 mm / 7 mm / 7.3 mm / Measuring range 7±0.3 mm	7 μm dia.	0.25 μm	2 m	ZW-SP8007 2M
				0.3 m	ZW-SP8007 0.3M
	0 mm / 9.3 mm / 10 mm / 10.7 mm / Measuring range 10±0.7mm	10 μm dia.	0.25 μm	2 m	ZW-SP8010 2M
				0.3 m	ZW-SP8010 0.3M

* Values when the Sensor Controller ZW-8000T is used.

Pen-shaped right angle type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	Measuring range 7±0.3 mm / 7.3 mm / 0 mm / 7 mm / 6.7 mm	8 μm dia.	0.25 μm	2 m	ZW-SPR8007 2M
				0.3 m	ZW-SPR8007 0.3M
	Measuring range 10±0.7mm / 10.7 mm / 10 mm / 0 mm / 9.3 mm	11 μm dia.	0.25 μm	2 m	ZW-SPR8010 2M
				0.3 m	ZW-SPR8010 0.3M

* Values when the Sensor Controller ZW-8000T is used.

●Sensor Controller with EtherCAT

Appearance	Power supply	Output type	Model
	24 VDC	NPN/PNP	ZW-8000T

●Cable
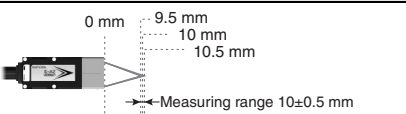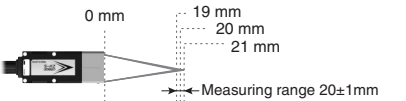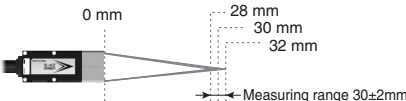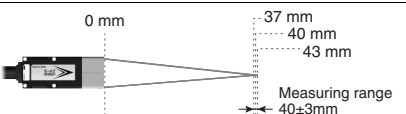
Appearance	Item	Cable length	Model
	Extension Fiber Cable (from Sensor Head to Sensor Controller), (Fiber Adapter ZW-XFCS is included)	2 m	ZW-XF8002R
		5 m	ZW-XF8005R
		10 m	ZW-XF8010R
		20 m	ZW-XF8020R
		30 m	ZW-XF8030R
	Fiber Adapter (used between Sensor Head pre-wired cable and Extension Fiber Cable)	—	ZW-XFCS

Note: Extension Fiber Cable ZW-XF80☐☐R can be used with the firmware version 3.000 or later. If you have an old version Sensor Controller, register as a Sysmac member and download the latest firmware and tools to update your Sensor Controller. Refer to the Sysmac member registration sheet that is enclosed with the Sensor Controller for details on member registration and firmware download.

ZW-7000
●Sensor Head
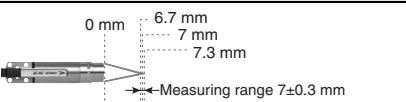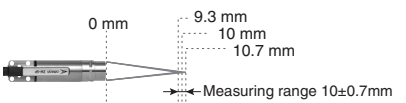**Square-shaped straight type**

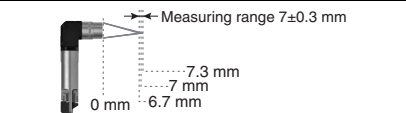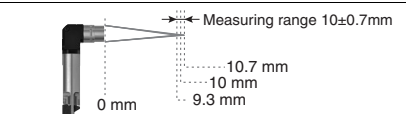| Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm — 9.5 mm / 10 mm / 10.5 mm — Measuring range 10±0.5 mm	50 μm dia.	0.25 μm	2 m	**ZW-S7010 2M**
				0.3 m	**ZW-S7010 0.3M**
	0 mm — 19 mm / 20 mm / 21 mm — Measuring range 20±1mm	70 μm dia.	0.25 μm	2 m	**ZW-S7020 2M**
				0.3 m	**ZW-S7020 0.3M**
	0 mm — 28 mm / 30 mm / 32 mm — Measuring range 30±2mm	100 μm dia.	0.25 μm	2 m	**ZW-S7030 2M**
				0.3 m	**ZW-S7030 0.3M**
	0 mm — 37 mm / 40 mm / 43 mm — Measuring range 40±3mm	120 μm dia.	0.25 μm	2m	**ZW-S7040 2M**
				0.3m	**ZW-S7040 0.3M**

* Values when the Sensor Controller ZW-7000T is used.

Pen-shaped straight type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm — 6.7 mm / 7 mm / 7.3 mm — Measuring range 7±0.3 mm	130 μm dia.	0.25 μm	2 m	**ZW-SP7007 2M**
				0.3 m	**ZW-SP7007 0.3M**
	0 mm — 9.3 mm / 10 mm / 10.7 mm — Measuring range 10±0.7mm	170 μm dia.	0.25 μm	2 m	**ZW-SP7010 2M**
				0.3 m	**ZW-SP7010 0.3M**

* Values when the Sensor Controller ZW-7000T is used.

Pen-shaped right angle type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	Measuring range 7±0.3 mm — 7.3 mm / 7 mm / 6.7 mm / 0 mm	150 μm dia.	0.25 μm	2 m	**ZW-SPR7007 2M**
				0.3 m	**ZW-SPR7007 0.3M**
	Measuring range 10±0.7mm — 10.7 mm / 10 mm / 9.3 mm / 0 mm	190 μm dia.	0.25 μm	2 m	**ZW-SPR7010 2M**
				0.3 m	**ZW-SPR7010 0.3M**

* Values when the Sensor Controller ZW-7000T is used.

●Sensor Controller with EtherCAT

Appearance	Power supply	Output type	Model
	24 VDC	NPN/PNP	**ZW-7000T**

●Cable

Appearance	Item	Cable length	Model
	Extension Fiber Cable (from Sensor Head to Sensor Controller), (Fiber Adapter ZW-XFCM is included)	2 m	**ZW-XF7002R**
		5 m	**ZW-XF7005R**
		10 m	**ZW-XF7010R**
		20 m	**ZW-XF7020R**
		30 m	**ZW-XF7030R**
	Fiber Adapter (used between Sensor Head pre-wired cable and Extension Fiber Cable)	—	**ZW-XFCM**

Note: Cables of 10, 20, and 30 m can be used with the firmware version 2.100 or later. If you have an old version Sensor Controller, register as a Sysmac member and download the latest firmware and tools to update your Sensor Controller. Refer to the Sysmac member registration sheet that is enclosed with the Sensor Controller for details on member registration and firmware download.

ZW-8000/7000/5000 Series

ZW-5000
●Sensor Head
Square-shaped straight type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm / 9.5 mm / 10 mm / 10.5 mm / Measuring range 10±0.5 mm	9 μm dia.	0.25 μm	2 m	**ZW-S5010 2M**
				0.3 m	**ZW-S5010 0.3M**
	0 mm / 19 mm / 20 mm / 21 mm / Measuring range 20±1mm	13 μm dia.	0.25 μm	2 m	**ZW-S5020 2M**
				0.3 m	**ZW-S5020 0.3M**
	0 mm / 28 mm / 30 mm / 32 mm / Measuring range 30±2mm	18 μm dia.	0.25 μm	2 m	**ZW-S5030 2M**
				0.3 m	**ZW-S5030 0.3M**
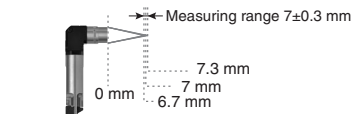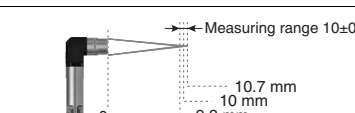
* Values when the Sensor Controller ZW-5000T is used.
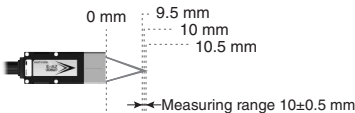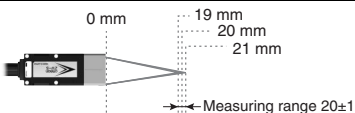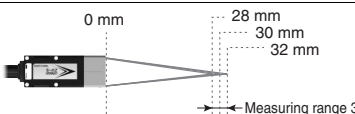
Pen-shaped straight type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm / 6.7 mm / 7 mm / 7.3 mm / Measuring range 7±0.3 mm	13 μm dia.	0.25 μm	2 m	**ZW-SP5007 2M**
				0.3 m	**ZW-SP5007 0.3M**
	0 mm / 9.3 mm / 10 mm / 10.7 mm / Measuring range 10±0.7mm	18 μm dia.	0.25 μm	2 m	**ZW-SP5010 2M**
				0.3 m	**ZW-SP5010 0.3M**

* Values when the Sensor Controller ZW-5000T is used.

Pen-shaped right angle type

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	Measuring range 7±0.3 mm / 7.3 mm / 7 mm / 6.7 mm / 0 mm	15 μm dia.	0.25 μm	2 m	**ZW-SPR5007 2M**
				0.3 m	**ZW-SPR5007 0.3M**
	Measuring range 10±0.7mm / 10.7 mm / 10 mm / 9.3 mm / 0 mm	20 μm dia.	0.25 μm	2 m	**ZW-SPR5010 2M**
				0.3 m	**ZW-SPR5010 0.3M**

* Values when the Sensor Controller ZW-5000T is used.

●Sensor Controller with EtherCAT

Appearance	Power supply	Output type	Model
	24 VDC	NPN/PNP	**ZW-5000T**

●Cable

Appearance	Item	Cable length	Model
	Extension Fiber Cable (from Sensor Head to Sensor Controller), (Fiber Adapter ZW-XFC2 is included)	2 m	**ZW-XF5002R**
		5 m	**ZW-XF5005R**
		10 m	**ZW-XF5010R**
		20 m	**ZW-XF5020R**
		30 m	**ZW-XF5030R**
	Fiber Adapter (used between Sensor Head pre-wired cable and Extension Fiber Cable)	—	**ZW-XFC2**

Note: Extension Fiber Cable ZW-XF50□□R can be used with the firmware version 2.100 or later. If you have an old version Sensor Controller, register as a Sysmac member and download the latest firmware and tools to update your Sensor Controller. Refer to the Sysmac member registration sheet that is enclosed with the Sensor Controller for details on member registration and firmware download.
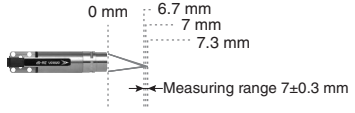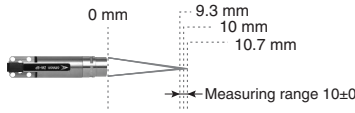
●Common cables

Appearance	Item	Cable length	Model
	Parallel caable for ZW-8000T/7000T/5000T 32-pole (included with Sensor Controller ZW-8000T/7000T/5000T)	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**

●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	Appearance	Recommended manufacturer	Cable length(m) *1	Model
Standard type Cable with Connectors on Both Ends (RJ45/RJ45) Wire Gauge and Number of Pairs: AWG26, 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**
			5	**XS6W-6LSZH8SS500CM-Y**
Rugged type Cable with Connectors on Both Ends (RJ45/RJ45) Wire Gauge and Number of Pairs: AWG22, 2-pair Cable		OMRON	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**
Rugged type Cable with Connectors on Both Ends (M12 Straight/RJ45) Wire Gauge and Number of Pairs: AWG22, 2-pair Cable		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**
Rugged type Cable with Connectors on Both Ends (M12 Right-angle/RJ45) Wire Gauge and Number of Pairs: AWG22, 2-pair Cable		OMRON	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**

Note: For details, refer to Cat.No.G019.
*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.
   Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15m are available.
*2. 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

●Cables / Connectors
Wire Gauge and Number of Pairs: AWG24, 4-pair Cable

Item	Appearance	Recommended manufacturer	Model
Cables	—	Hitachi Metals, Ltd.	NETSTAR-C5E SAB 0.5 × 4P *
	—	Kuramo Electric Co.	KETH-SB *
	—	SWCC Showa Cable Systems Co.	FAE-5004 *
RJ45 Connectors	—	Panduit Corporation	MPS588-C *

* We recommend to use above cable and connector together.

Wire Gauge and Number of Pairs: AWG22, 2-pair Cable

Item	Appearance	Recommended manufacturer	Model
Cables	—	Kuramo Electric Co.	KETH-PSB-OMR *
	—	JMACS Japan Co.,Ltd.	PNET/B *
RJ45 Assembly Connector		OMRON	XS6G-T421-1 *

Note: Connect both ends of cable shielded wires to the connector hoods.
* We recommend to use above cable and connector together.

ZW-8000/7000/5000 Series

●Industrial switching hubs for Ethernet

Appearance	Number of ports	Failure detection	Current consumption	Model
	3	None	0.22A	**W4S1-03B**
	5	None	0.22A	**W4S1-05B**
		Supported		**W4S1-05C**

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

●EtherCAT junction slaves

Appearance	Number of ports	Power supply voltage	Current consumption	Model
	3	20.4 to 28.8 VDC (24 VDC -15 to 20%)	0.08A	**GX-JC03**
	6		0.17A	**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.

●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 DVD.

Item	Specifications	Number of licenses	Media	Model	Standards
Sysmac Studio Standard Edition Ver.1□□ *2	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCat Slave, and the HMI. Sysmac Studio runs on the following OS. 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) This software provides functions of the Measurement Sensor Edition. Refer to your OMRON website for details.	— (Media only)	DVD	**SYSMAC-SE200D**	—
		1 license*1	—	**SYSMAC-SE201L**	—
Sysmac Studio Measurement Sensor Edition Ver.1.□□	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	—	**SYSMAC-ME001L**	—
		3 license	—	**SYSMAC-ME003L**	—

*1. Multiple licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).
*2. ZW-8000/7000/5000 is supported by Sysmac Studio version 1.22 or higher.

●Fiber Cleaner

Item	Recommended manufacturer	Model	Applicable Model			Contacts
			ZW-8000	ZW-7000	ZW-5000	
Fiber Connector Cleaner *1	OMRON	ZW-XCL	Yes	Yes	Yes	OMRON
NEOCLEAN-M	NTT Advanced Technology Corporation	ATC-NE-M1	No	Yes	No	*2
OPTIPOP R1		ATC-RE-01	Yes (Sensor Head only)	No	Yes (Sensor Head only)	

*1. Place orders in units of boxes (contacting 10 units).
*2. Contacts
Japan: NTT Advanced Technology Corporation TEL: 0422-47-7888
China: GUANGZHOU LI CHENG OPTOELECTRONIC CO.,LTD. TEL: 020-8165 0508
Hong Kong: ComStar Communications Ltd. TEL: +852 2536 9737
Taiwan: Global Science Instruments Co., Ltd. TEL: +886-2-8913-2737 Ext. 33
India: Aishwarya Telecom Ltd. TEL: +91 40 2753 1324
Singapore: Masstron Pte Ltd TEL: (65) 6763 0309
Malaysia: Masstron Communication Solutions Sdn Bhd TEL: (603) 8061 0309
Thailand: Masstron (Thailand) Co.,Ltd TEL: (66-2) 319-9375/6
Vietnam: Masstron Pte Ltd (Singapore) TEL: (65) 6763 0309
Germany: AMS Technologies AG TEL: +49 (0)89 895 77 0
France: AMS Technologies S.A.R.L. TEL: +33 (0)1 64 86 46 00
Italy: AMS Technologies S.r.l. TEL: +39 0331 596 693
Spain: AMS Technologies S.L. TEL: +34 93 380 84 20
Netherlands: AMS Technologies AG (Germany) TEL: +49 (0)89 895 77 0
USA: AFL Telecommunications TEL: +1 (800) 235-3423

Specifications

●Sensor Head
ZW-S8010/S8020/S8030/SP8007/SP8010/SPR8007/SPR8010

Item	Specifications						
	ZW-S8010	ZW-S8020	ZW-S8030	ZW-SP8007	ZW-SP8010	ZW-SPR8007	ZW-SPR8010
Sensor controller	ZW-8000T						
Sensor head type	Square-shaped straight type			Pen-shaped straight type		Pen-shaped right angle type	
Measurement center distance *1	10 mm	20 mm	30 mm	7 mm	10 mm	7 mm	10 mm
Measuring range *2	±0.5 mm	±1mm	±2mm	±0.3 mm	±0.7 mm	±0.3 mm	±0.7 mm
Static resolution *3	0.25 µm						
Linearity *4	±0.3 µm	±0.6 µm	±1.3 µm	±0.3 µm	±0.45 µm	±0.45 µm	±0.7 µm
Spot diameter (Total measurent range) *5	4 µm dia.	7 µm dia.	10 µm dia.	7 µm dia.	10 µm dia.	8 µm dia.	11 µm dia.
Measurement cycle *6	60 µs to 7,500 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/s², 6 direction, 3 times each (up/down, left/right, forward/backward)						
Temperature characteristic *7	0.6 µm/°C (0.2 µm/°C)	1.1 µm/°C (0.5 µm/°C)	1.8 µm/°C (1.0 µm/°C)	0.8 µm/°C (0.4 mm/°C)	0.8 µm/°C (0.4 mm/°C)	0.8 µm/°C (0.4 mm/°C)	0.8 µm/°C (0.4 mm/°C)
LED Safety	Risk Group 3 (IEC62471)						
Material	Chassis: aluminum die cast Fiber cable sheath: PVC Calibration ROM: PC			Chassis: SUS Fiber cable sheath: PVC Calibration ROM: PC Mounting Plate: Aluminum		Chassis: SUS, aluminum Fiber cable sheath: PVC Calibration ROM: PC Mounting Plate: Aluminum	
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			Fiber cable length 0.3m Approx. 27 g Fiber cable length 2m Approx. 37 g		Fiber cable length 0.3m Approx. 31 g Fiber cable length 2m Approx. 41 g	
Accessories	Calibration ROM fixing screw (M2×5mm) × 1, Fiber cable protective cap × 1, Strap × 1, Instruction Manual, Precautions			Installation plate × 1, Unit fixing screws (M2 × 10 mm) × 4, Calibration ROM fixing screw (M2 × 5 mm) × 1, Fiber cable protective cap × 1, Strap × 1, Instruction Manual, Precautions			

*1. Indicates the distance from the front of the sensor head. The pen-shaped right angle type has a maximum individual difference of ±0.15 mm in the distance from the front of the sensor head.

*2. The measurement range is higher 100 µs than measurement cycle.

*3. Capacity value when OMRON standard mirror surface target is measured at the measurement center distance as the average of 16,384 times. The value when the Sensor Controller ZW-8000T is connected.

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

*5. Capacity value defined by 1/e² (13.5%) of the peak optical intensity of the measurement wavelength.

*6. When an extension fiber cable of 2 m or longer is connected, the setting rage of the measurement cycle (exposure time) changes. For details, refer to *Setting Measurement Cycle* in the *ZW-8000/7000/5000 User's Manual (Cat. No. Z362)*.

*7. Actual value of the change in measurement value at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target, and with the Sensor Head and the Sensor Controller set in the same temperature environment. The value in parentheses is the actual value when using an SUS304 jig. When measuring the thickness, the value is calculated from the difference between the heights of the surface and rear surface, so there is no effect on the temperature change.

ZW-S7010/S7020/S7030/S7040/SP7007/SP7010/SPR7007/SPR7010

Item	Specifications							
	ZW-S7010	ZW-S7020	ZW-S7030	ZW-S7040	ZW-SP7007	ZW-SP7010	ZW-SPR7007	ZW-SPR7010
Sensor controller	ZW-7000T							
Sensor head type	Square-shaped straight type				Pen-shaped straight type		Pen-shaped right angle type	
Measurement center distance *1	10 mm	20 mm	30 mm	40 mm	7 mm	10 mm	7 mm	10 mm
Measuring range *2	±0.5 mm	±1 mm	±2 mm	±3 mm	±0.3 mm	±0.7 mm	±0.3 mm	±0.7 mm
Static resolution *3	0.25 µm							
Linearity *4	±0.45 µm	±0.9 µm	±2.0 µm	±3.0 µm	±0.45 µm	±0.7 µm	±0.7 µm	±1.1 µm
Spot diameter (Total measurent range) *5	50 µm dia.	70 µm dia.	100 µm dia.	120 µm dia.	130 µm dia.	170 µm dia.	150 µm dia.	190 µm dia.
Measurement cycle *6	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/s², 6 direction, 3 times each (up/down, left/right, forward/backward)							
Temperature characteristic *7	0.6 µm/°C (0.2 µm/°C)	1.1 µm/°C (0.5 µm/°C)	1.8 µm/°C (1.0 µm/°C)	2.1 µm/°C (1.2 µm/°C)	0.8 µm/°C (0.4 µm/°C)	0.8 µm/°C (0.4 µm/°C)	0.8 µm/°C (0.4 µm/°C)	0.8 µm/°C (0.4 µm/°C)
LED Safety	Risk Group 3 (IEC62471)							
Material	Chassis: aluminum die cast Fiber cable sheath: PVC Calibration ROM: PC				Chassis: SUS Fiber cable sheath: PVC Calibration ROM: PC Mounting Plate: Aluminum		Chassis: SUS, aluminum Fiber cable sheath: PVC Calibration ROM: PC Mounting Plate: Aluminum	
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				Fiber cable length 0.3m Approx. 27 g Fiber cable length 2m Approx. 37 g		Fiber cable length 0.3m Approx. 31 g Fiber cable length 2m Approx. 41 g	
Accessories	Calibration ROM fixing screw (M2×5mm) × 1, Fiber cable protective cap × 1, Strap × 2, Instruction Manual, Precautions				Installation plate × 1, Unit fixing screws (M2 × 10 mm) × 4, Calibration ROM fixing screw (M2 × 5 mm) × 1, Fiber cable protective cap × 1, Strap × 2, Instruction Manual, Precautions			

*1. Indicates the distance from the front of the sensor head. The pen-shaped right angle type has a maximum individual difference of ±0.15 mm in the distance from the front of the sensor head.
*2. The measurement range is higher 28 µs than measurement cycle.
*3. Capacity value when OMRON standard mirror surface target is measured at the measurement center distance as the average of 16,384 times.
    The value when the Sensor Controller ZW-7000T is connected.
*4. Material setting for the OMRON standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.
*5. Capacity value defined by 1/e² (13.5%) of the peak optical intensity of the measurement wavelength.
*6. When an extension fiber cable of 10 m or longer is connected, the setting rage of the measurement cycle (exposure time) changes. For details, refer to *Setting Measurement Cycle* in the *ZW-8000/7000/5000 User's Manual (Cat. No. Z362)*.
*7. Actual value of the change in measurement value at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target, and with the Sensor Head and the Sensor Controller set in the same temperature environment.
    The value in parentheses is the actual value when using an SUS304 jig.
    When measuring the thickness, the value is calculated from the difference between the heights of the surface and rear surface, so there is no effect on the temperature change.

ZW-S5010/S5020/S5030/SP5007/SP5010/SPR5007/SPR5010

Item	Specifications						
	ZW-S5010	ZW-S5020	ZW-S5030	ZW-SP5007	ZW-SP5010	ZW-SPR5007	ZW-SPR5010
Sensor controller	ZW-5000T						
Sensor head type	Square-shaped straight type			Pen-shaped straight type		Pen-shaped right angle type	
Measurement center distance *1	10 mm	20 mm	30 mm	7 mm	10 mm	7 mm	10 mm
Measuring range	±0.5 mm	±1 mm	±2 mm	±0.3 mm	±0.7 mm	±0.3 mm	±0.7 mm
Static resolution *2	0.25 μm						
Linearity *3	±0.45 μm	±0.9 μm	±2.0 μm	±0.45 μm	±0.7 μm	±0.7 μm	±1.1 μm
Spot diameter (Total measurent range) *4	9 μm dia.	13 μm dia.	18 μm dia.	13 μm dia.	18 μm dia.	15 μm dia.	20 μm dia.
Measurement cycle *5	80 μs to 1,600 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/s², 6 direction, 3 times each (up/down, left/right, forward/backward)						
Temperature characteristic *6	0.6 μm/°C (0.2 μm/°C)	1.1 μm/°C (0.5 μm/°C)	1.8 μm/°C (1.0 μm/°C)	0.8 μm/°C (0.4 μm/°C)	0.8 μm/°C (0.4 μm/°C)	0.8 μm/°C (0.4 μm/°C)	0.8 μm/°C (0.4 μm/°C)
LED Safety	Risk Group 3 (IEC62471)						
Material	Chassis: aluminum die cast Fiber cable sheath: PVC Calibration ROM: PC			Chassis: SUS Fiber cable sheath: PVC Calibration ROM: PC Mounting Plate: Aluminum		Chassis: SUS, aluminum Fiber cable sheath: PVC Calibration ROM: PC Mounting Plate: Aluminum	
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			Fiber cable length 0.3m Approx. 29 g Fiber cable length 2m Approx. 39 g		Fiber cable length 0.3m Approx. 33g Fiber cable length 2m Approx. 43g	
Accessories	Calibration ROM fixing screw (M2×5mm) × 1, Fiber cable protective cap × 1, Strap × 1, Instruction Manual, Precautions			Installation plate × 1, Unit fixing screws (M2 × 10 mm) × 4, Calibration ROM fixing screw (M2 × 5 mm) × 1, Fiber cable protective cap × 1, Strap × 1, Instruction Manual, Precautions			

*1. Indicates the distance from the front of the sensor head. The pen-shaped right angle type has a maximum individual difference of ±0.15 mm in the distance from the front of the sensor head.

*2. Capacity value when OMRON standard mirror surface target is measured at the measurement center distance as the average of 16,384 times. The value when the Sensor Controller ZW-5000T is connected.

*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/e2 (13.5%) of the peak optical intensity of the measurement wavelength.

*5. When an extension fiber cable of 5 m or longer is connected, the setting rage of the measurement cycle (exposure time) changes. For details, refer to *Setting Measurement Cycle* in the *ZW-8000/7000/5000 User's Manual (Cat. No. Z362)*.

*6. Actual value of the change in measurement value at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target, and with the Sensor Head and the Sensor Controller set in the same temperature environment. The value in parentheses is the actual value when using an SUS304 jig. When measuring the thickness, the value is calculated from the difference between the heights of the surface and rear surface, so there is no effect on the temperature change.

●Sensor Controller

Item			Specifications		
			ZW-8000T	ZW-7000T	ZW-5000T
Input/output type			NPN/PNP dual type		
Number of connected sensor heads			1		
Sensor head compatibility			ZW-S80□□/ ZW-SP80□□/ ZW-SPR80□□	ZW-S70□□/ ZW-SP70□□/ ZW-SPR70□□	ZW-S50□□/ ZW-SP50□□/ ZW-SPR50□□
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)		
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 — 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-8000T	**ZW-7000T**	**ZW-5000T**
Main functions	Exposure time	Automatic/Fixed		
	Measuring cycle *1	60 µs to 7,500 µs	20 µs to 400 µs	80 µs to 1,600 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/Keep, Clamp		
	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	NORMAL mode: Max. 8 banks JUDGMENT mode: Max. 32 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	700 mA or less	800 mA or less	
	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/s², 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. 950g (main unit only), Approx. 150 g (Parallel cable)	Approx. 900g (main unit only), Approx. 150 g (Parallel cable)	
Accessories		Parallel cable (ZW-XCP2E) × 1 10 Fiber cleaners (ZW-XCL) × 1 Instruction Manual Member registration sheet Precautions	Parallel cable (ZW-XCP2E) × 1 10 Fiber cleaners (ZW-XCL) × 1 Fiber adapter cap × 1 Strap × 1 Instruction Manual Member registration sheet Precautions	

Note: The Export Trade Control Order compatible Sensor Controller (ZW-8000T/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 2 m or longer (on the ZW-8000 series), 10 m or longer (on the ZW-7000 series) or 5 m or longer (on the ZW-5000 series) is connected, the setting rage of the measurement cycle (exposure time) changes. For details, refer to *Setting Measurement Cycle* in the *ZW-8000/7000/5000 User's Manual (Cat. No. Z362)*.

ZW-8000/7000/5000 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

●Automation Software Sysmac Studio

Item	Operating environment *3
Operating system (OS) *1	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
Communications ports	USB port corresponded to USB 2.0, 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 details on 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.

●Version Information

Sensor Head/Cable, Sensor Controller, and Sysmac Studio

The applicable version of the Sensor Controller varies depending on the Sensor Head or Cable. The versions are listed below.
Use the latest version of Sysmac Studio Standard Edition/Measurement Sensor Edition.

Sensor head/Cable		ZW Series	Version of Sensor Controller	Corresponding version of Sysmac Studio Standard Edition/Measurement Sensor Edition
Type	Model			
Square-shaped straight type	ZW-S80□0 □M	ZW-8000□	Version 3.000 or later	Version 1.22 or higher
Pen-shaped straight type	ZW-SP8007 □M ZW-SP8010 □M			
Pen-shaped right-angle type	ZW-SPR8007 □M ZW-SPR8010 □M			
Extension Fiber Cable	ZW-XF80□□R			
Square-shaped straight type	ZW-S70□0 □M	ZW-7000□	Version 2.030 or later	Version 1.15 or higher
Pen-shaped straight type	ZW-SP7007 □M ZW-SP7010 □M		Version 2.110 or later	
Pen-shaped right-angle type	ZW-SPR7007 □M ZW-SPR7010 □M			
Extension Fiber Cable	ZW-XF7002R ZW-XF7005R		Version 2.030 or later	
	ZW-XF7010R ZW-XF7020R ZW-XF7030R		Version 2.100 or later	
Square-shaped straight type	ZW-S50□0 □M	ZW-5000□	Version 2.100 or later	Version 1.18 or higher
Pen-shaped straight type	ZW-SP5007 □M ZW-SP5010 □M		Version 2.110 or later	
Pen-shaped right-angle type	ZW-SPR5007 □M ZW-SPR5010 □M			
Extension Fiber Cable	ZW-XF50□□R		Version 2.100 or later	

Note: Refer to the *Firmware Update* in the *ZW-8000/7000/5000 User's Manual* (Cat. No. Z362) for how to update the Sensor Controller.

OMRON

External Dimensions

Sensor Head

Square-shaped straight type
ZW-S8010 □M/S8020 □M/S8030 □M

MOUNTING SCREW HOLES

(STANDARD SURFACE)
(STANDARD SURFACE)
4-M3
2.75±0.1
24.5±0.1
46.7±0.1
26.8±0.1

4-3.5 dia. (MOUNTING HOLES)
STANDARD SURFACE
2.75
STANDARD SURFACE
46.7
26.8
24.5
(7.4)
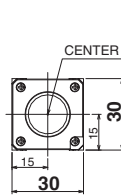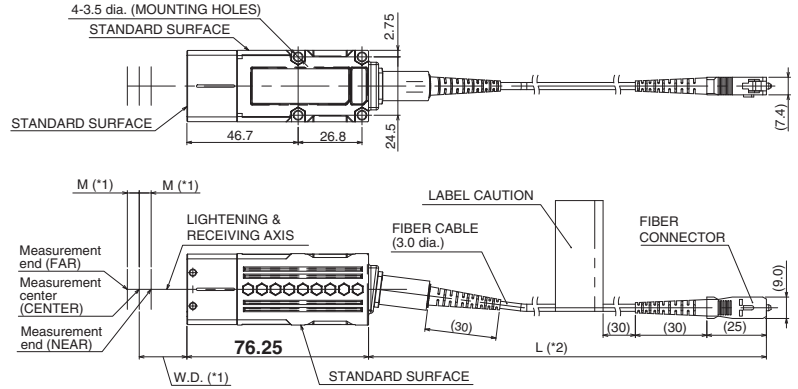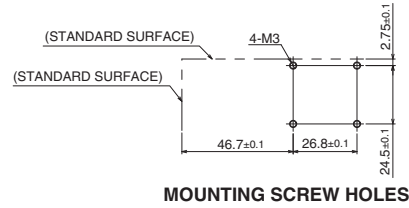
*1.

Type	W.D.	M
ZW-S8010	10	0.5
ZW-S8020	20	1
ZW-S8030	30	2

*2.

Length	L
0.3 m	(300)
2 m	(2000)

CENTER
30
15
15
30

M (*1)   M (*1)
LIGHTENING & RECEIVING AXIS
LABEL CAUTION
FIBER CABLE (3.0 dia.)
FIBER CONNECTOR
Measurement end (FAR)
Measurement center (CENTER)
Measurement end (NEAR)
(9.0)
W.D. (*1)
STANDARD SURFACE
76.25
(30)   (30)   (30)   (25)
L (*2)

Pen-shaped straight type
ZW-SP8007 □M

MOUNTING SCREW HOLES

4-M2
INSTALLATION STANDARD SURFACE
42.9±0.1   9±0.1
8.5±0.1

11Dia.±0.1
C0.2
C0.2
38.4
1.8
STANDARD SURFACE
6.5
42.9   9
8.5
4-2.2Dia. (MOUNTING HOLES)
5
(7.4)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

LIGHTENING & RECEIVING AXIS
CENTER
8.8Dia.
Measurement end (FAR)
Measurement center (CENTER)
Measurement end (NEAR)
12Dia. $^{0}_{-0.05}$
0.3   0.3
L (*1)
(30)   (30)   (25)
(9)
7   53.9   (22.4)   1.5
STANDARD SURFACE   FIBER CABLE (3.0Dia.)
LABEL SERIAL No.
LABEL CAUTION
FIBER CONNECTOR

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.9   4-SLOTTED HOLES PENETRATION
4-2.4
8.5   12
9
22
2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

ZW-SP8010 □M

MOUNTING SCREW HOLES

INSTALLATION STANDARD SURFACE

4-M2

43±0.1   9±0.1   8.5±0.1

11Dia.±0.1   C0.2   C0.2   38.5   5   1.8

STANDARD SURFACE

6.5   43   9   8.5   4-2.2Dia. (MOUNTING HOLES)   (7.4)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

L (*1)   (30)   (30)   (25)   (9)

CENTER   8.8Dia.   0.7 0.7   LIGHTENING & RECEIVING AXIS

Measurement end (FAR)

12Dia. 0 -0.05   Measurement center (CENTER)

Measurement end (NEAR)

10   **54**   (22.4)   1.5

STANDARD SURFACE   FIBER CABLE (3.0Dia.)   LABEL SERIAL No.   LABEL CAUTION   FIBER CONNECTOR

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.9   4-SLOTTED HOLES PENETRATION

4-2.4   8.5   12

9   22

2-C2   4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

Pen-shaped right angle type
ZW-SPR8007 □M

4-M2

48.9±0.1 9±0.1 8.5±0.1

MOUNTING SCREW HOLES

24.9 5 1.8
48.9 9 8.5

4-2.2Dia. (MOUNTING HOLES)

(7.4)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

59.9 L (*1) (9)

12 3.6 3.6
14 (22.4) 1.5
7 13.5 6.5
0.3 0.3
6

STANDARD SURFACE C0.2 C0.2 11Dia.±0.1

LIGHTENING & RECEIVING AXIS

Measurement end (NEAR)
Measurement center (CENTER)
Measurement end (FAR)

STANDARD SURFACE

LABEL SERIAL No.
LABEL CAUTION
FIBER CONNECTOR

(30) (30) (25)

FIBER CABLE (3.0Dia.)

8.8Dia. 12

CENTER

12Dia. 0/-0.05

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.9 4-SLOTTED HOLES PENETRATION
4-2.4 8.5 12
9
22

2-C2 4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

OMRON

ZW-SPR8010 □M

4-M2

48.9±0.1   9±0.1   8.5±0.1

MOUNTING SCREW HOLES

24.9   5   1.8

48.9   9   8.5

4-2.2Dia. (MOUNTING HOLES)

59.9   L (*1)   (9)

3.6   3.6   (30) (30) (25)

14   13.6   6.5   (22.4)   1.5

12

C0.2
C0.2

STANDARD SURFACE

11Dia.±0.1

0.7 0.7 10 1.0

6

LIGHTENING & RECEIVING AXIS

Measurement end (NEAR)

Measurement center (CENTER)

Measurement end (FAR)

STANDARD SURFACE

LABEL SERIAL No.

LABEL CAUTION

FIBER CONNECTOR

FIBER CABLE (3.0Dia.)

(7.4)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

12

8.8Dia.

CENTER

12Dia. $_{-0.05}^{0}$

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION

8.5   12

9

22

2-C2

4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

Square-shaped straight type
ZW-S7010 □M/S7020 □M/S7030 □M/S7040 □M

(STANDARD SURFACE)   4-M3   2.75±0.1

(STANDARD SURFACE)

46.7±0.1   26.8±0.1   24.5±0.1
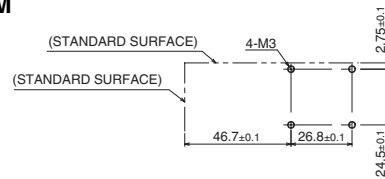
MOUNTING SCREW HOLES

*1.

Type	W.D.	M
ZW-S7010	10	0.5
ZW-S7020	20	1
ZW-S7030	30	2
ZW-S7040	40	3

*2.

Length	L
0.3 m	(300)
2 m	(2000)

4-3.5 dia. (MOUNTING HOLES)
STANDARD SURFACE
2.75
STANDARD SURFACE
46.7   26.8   24.5
(7.7)

M (*1)   M (*1)   LABEL CAUTION
CENTER   LIGHTENING & RECEIVING AXIS   FIBER CABLE (3.0 dia.)   FIBER CONNECTOR
Measurement end (FAR)   (12.6)
Measurement center (CENTER)   30   15
Measurement end (NEAR)
15   **76.25**   (40)   (30)   40   25
30
W.D. (*1)   STANDARD SURFACE   L (*2)

Pen-shaped straight type
ZW-SP7007 □M

4-M2
INSTALLATION STANDARD SURFACE
42.9±0.1   9±0.1   8.5±0.1

MOUNTING SCREW HOLES

11Dia.±0.1   C0.2   38.4   1.8
C0.2   5
8.5
STANDARD SURFACE   6.5
42.9   9   4-2.2Dia. (MOUNTING HOLES)   (7.7)

LIGHTENING & RECEIVING AXIS   L (*1)   (12.6)
Measurement end (FAR)   0.3   0.3   (30)   (40)   (25)
CENTER   8.8Dia.
Measurement center (CENTER)   12Dia.₋0.05⁰
Measurement end (NEAR)   7   **53.9**   (22.4)   1.5
STANDARD SURFACE   FIBER CABLE (3.0Dia.)   LABEL SERIAL No.   LABEL CAUTION   FIBER CONNECTOR

*1.

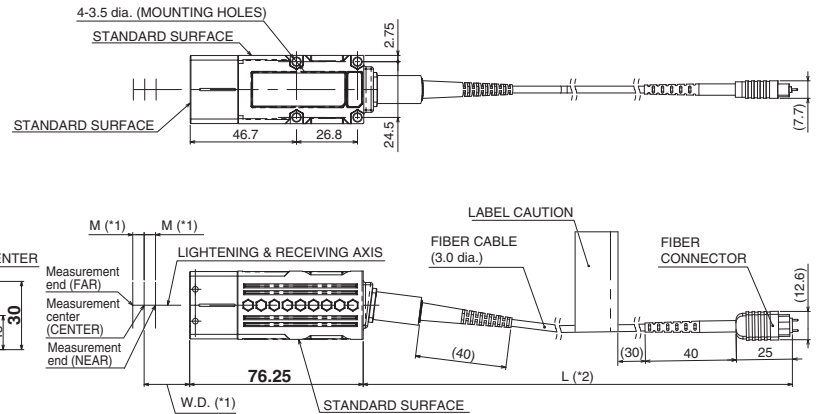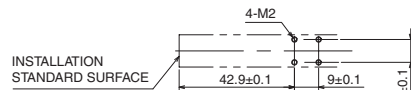| Length	L
0.3 m	(300)
2 m	(2000)

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION
8.5   12
9
22
2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

ZW-SP7010 □M

MOUNTING SCREW HOLES

INSTALLATION STANDARD SURFACE

4-M2

43±0.1   9±0.1

8.5±0.1

11Dia.±0.1
C0.2
C0.2
38.5
5
1.8
8.5

STANDARD SURFACE
6.5
43
9
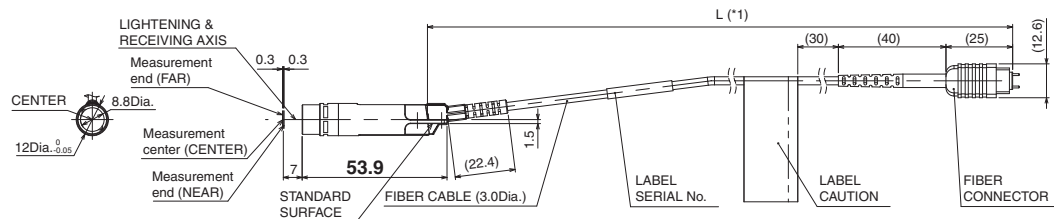4-2.2Dia. (MOUNTING HOLES)

(7.7)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

L (*1)
(30)   (40)   (25)
(12.6)

Measurement end (FAR)
0.7   0.7
LIGHTENING & RECEIVING AXIS

CENTER
8.8Dia.
12Dia. 0 -0.05

Measurement center (CENTER)
Measurement end (NEAR)

10
54
(22.4)
1.5

STANDARD SURFACE
FIBER CABLE (3.0Dia.)
LABEL SERIAL No.
LABEL CAUTION
FIBER CONNECTOR

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4
4-2.9   4-SLOTTED HOLES PENETRATION
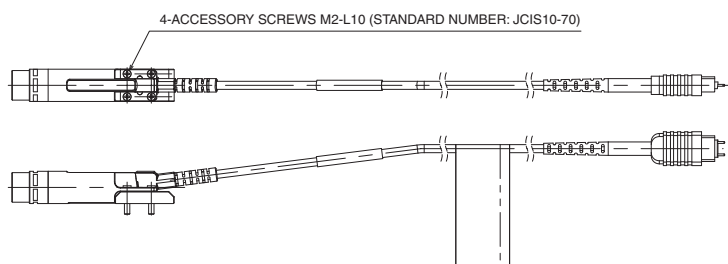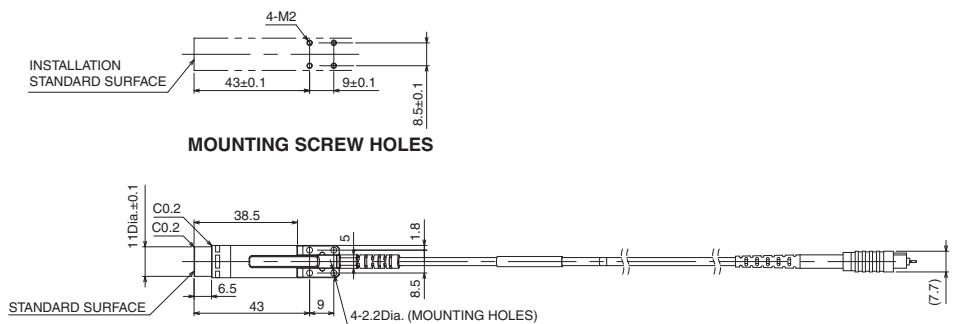8.5   12
9
22

2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

Pen-shaped right angle type
ZW-SPR7007 □M

4-M2

48.9±0.1   9±0.1   8.5±0.1

MOUNTING SCREW HOLES

24.9   5   1.8

48.9   9   8.5

4-2.2Dia. (MOUNTING HOLES)

59.9   L (*1)

3.6   3.6

14   13.5

7   6.5

0.3   0.3

6

(22.4)   1.5

(30)   (40)   (25)

(12.6)

(7.7)

LIGHTENING &
RECEIVING AXIS

STANDARD
SURFACE

Measurement
end (NEAR)

Measurement
center (CENTER)

Measurement
end (FAR)

LABEL
SERIAL No.

LABEL
CAUTION

FIBER
CONNECTOR

FIBER CABLE (3.0Dia.)

12

C0.2
C0.2

11Dia.±0.1

STANDARD
SURFACE

*1.

Length	L
0.3 m	(300)
2 m	(2000)

8.8Dia.   12

CENTER

12Dia. 0/-0.05

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION

8.5   12

9

22

2-C2

4.5

<USE SITUATION OF MOUNTING PLATE>
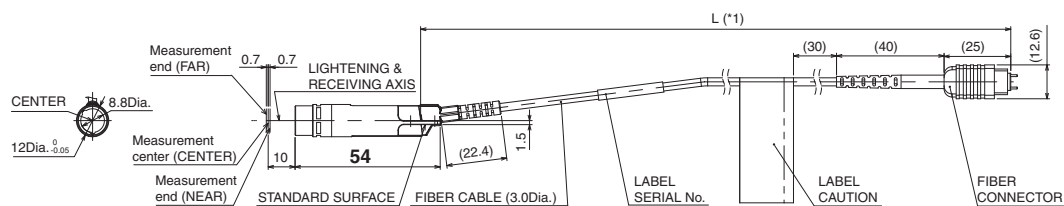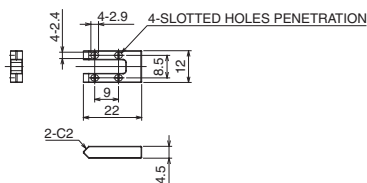SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

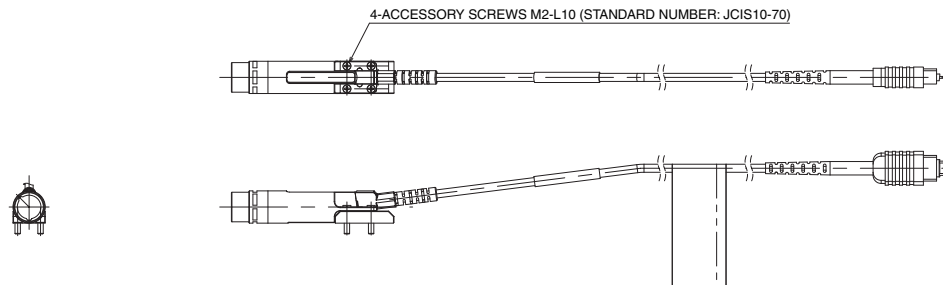4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

ZW-SPR7010 □M

*1.

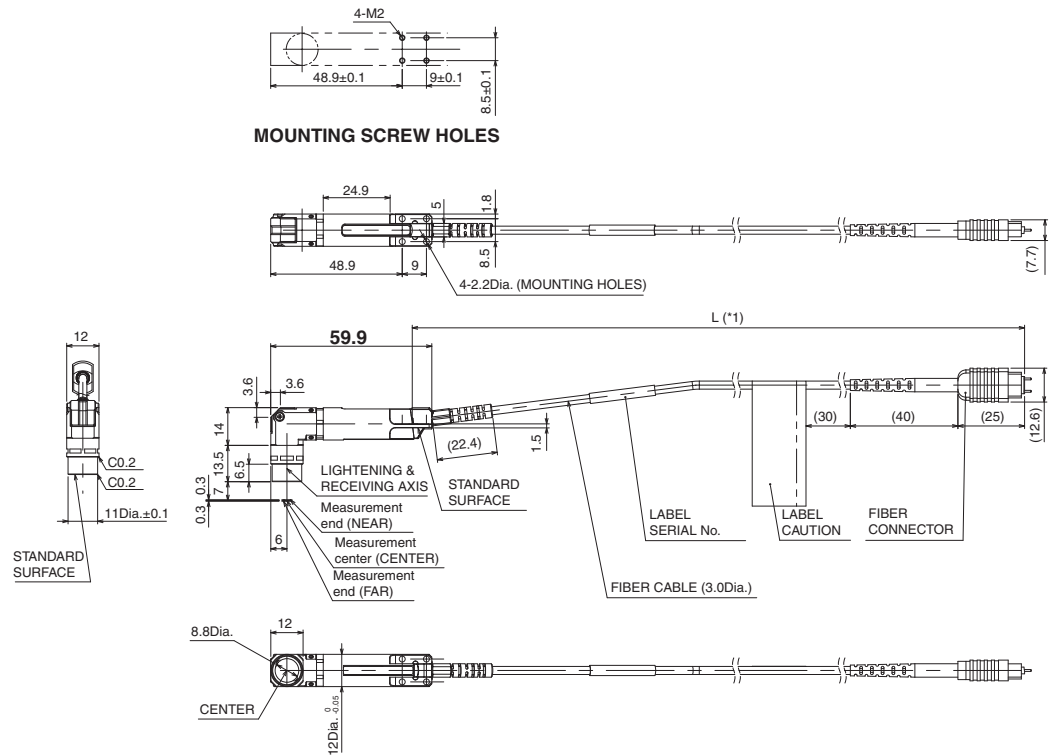| Length	L
0.3 m	(300)
2 m	(2000)

MOUNTING SCREW HOLES

4-M2

48.9±0.1   9±0.1   8.5±0.1

24.9   48.9   9

4-2.2Dia. (MOUNTING HOLES)

59.9   L (*1)

STANDARD SURFACE
C0.2
C0.2
11Dia.±0.1

LIGHTENING & RECEIVING AXIS
STANDARD SURFACE

Measurement end (NEAR)
Measurement center (CENTER)
Measurement end (FAR)

LABEL SERIAL No.
LABEL CAUTION
FIBER CONNECTOR

FIBER CABLE (3.0Dia.)

8.8Dia.
CENTER
12Dia.

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION
8.5   12
9
22

2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

Square-shaped straight type
ZW-S5010 □M/S5020 □M/S5030 □M

(STANDARD SURFACE)   4-M3
(STANDARD SURFACE)

2.75±0.1
24.5±0.1
46.7±0.1   26.8±0.1

MOUNTING SCREW HOLES

4-3.5 dia. (MOUNTING HOLES)
STANDARD SURFACE
STANDARD SURFACE
2.75
24.5
46.7   26.8
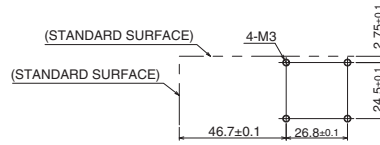
*1.

Type	W.D.	M
ZW-S5010	10	0.5
ZW-S5020	20	1
ZW-S5030	30	2

*2.

Length	L
0.3 m	(300)
2 m	(2000)

M (*1)   M (*1)
CENTER
LIGHTENING & RECEIVING AXIS
LABEL CAUTION
FIBER CABLE (3.0 dia.)
FIBER CONNECTOR
Measurement end (FAR)
Measurement center (CENTER)
Measurement end (NEAR)
30   15
15   30
76.25
(40)
(30)
(62)
(40)
L (*2)
(10dia.)
W.D. (*1)
STANDARD SURFACE

Pen-shaped straight type
ZW-SP5007 □M

4-M2
INSTALLATION STANDARD SURFACE
42.9±0.1   9±0.1
8.5±0.1

MOUNTING SCREW HOLES

11Dia.±0.1
C0.2
C0.2
38.4
1.8
5
8.5
STANDARD SURFACE
6.5
42.9   9
4-2.2Dia. (MOUNTING HOLES)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

LIGHTENING & RECEIVING AXIS   0.3   0.3
L (*1)
CENTER
8.8Dia.
Measurement end (FAR)
Measurement center (CENTER)
Measurement end (NEAR)
12Dia. 0 -0.05
7   **53.9**   (22.4)   1.5
STANDARD SURFACE
FIBER CABLE (3.0Dia.)
LABEL SERIAL No.
LABEL CAUTION
(30)   (40)
(62)
FIBER CONNECTOR
(10Dia.)

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION
8.5   12
9
22
2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

ZW-SP5010 □M

MOUNTING SCREW HOLES

4-M2

INSTALLATION STANDARD SURFACE
43±0.1   9±0.1   8.5±0.1

11Dia.±0.1
C0.2
C0.2
38.5
5
1.8
STANDARD SURFACE
6.5
43
9
8.5
4-2.2Dia. (MOUNTING HOLES)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

CENTER   8.8Dia.
12Dia. $^{0}_{-0.05}$
Measurement end (FAR)
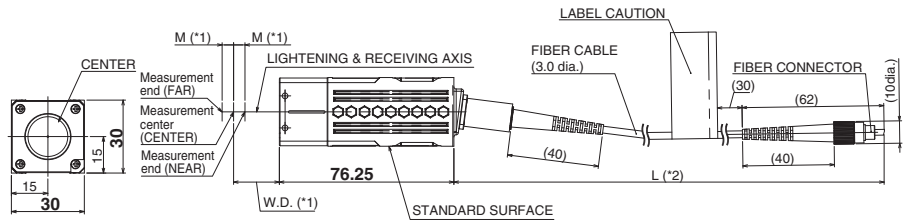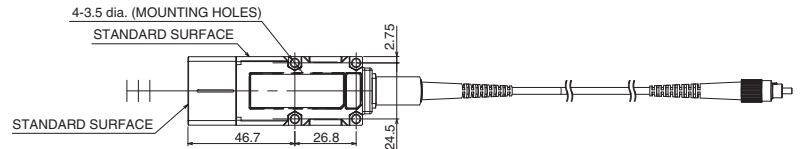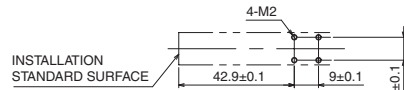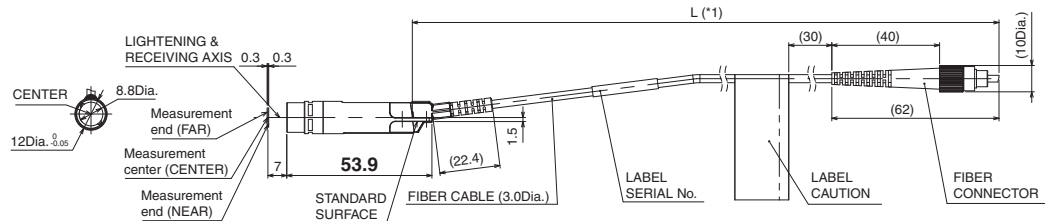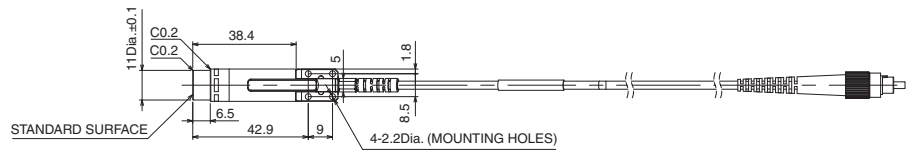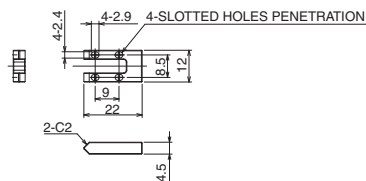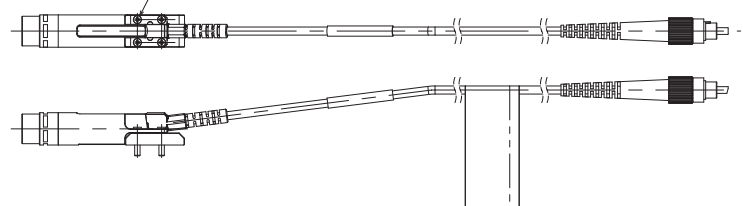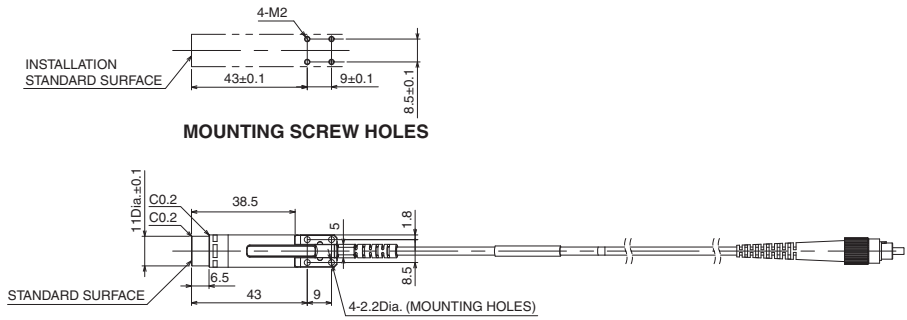Measurement center (CENTER)
Measurement end (NEAR)
0.7   0.7   LIGHTENING & RECEIVING AXIS
10   54   (22.4)   1.5
STANDARD SURFACE   FIBER CABLE (3.0Dia.)
L (*1)
(30)   (40)
(62)
(10Dia.)
LABEL SERIAL No.
LABEL CAUTION
FIBER CONNECTOR

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION
8.5   12
9
22
2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

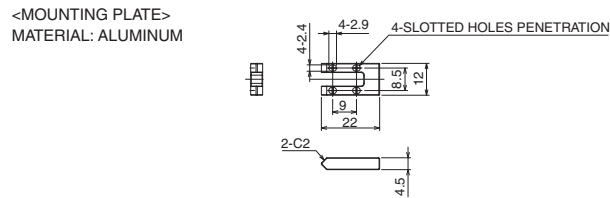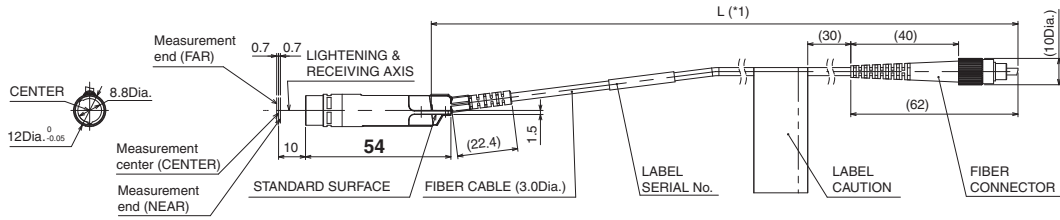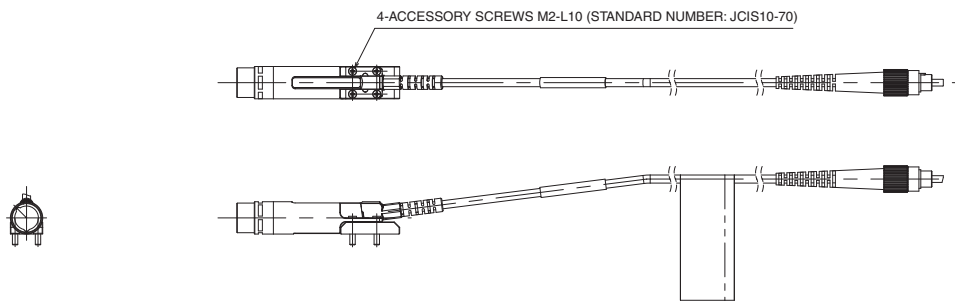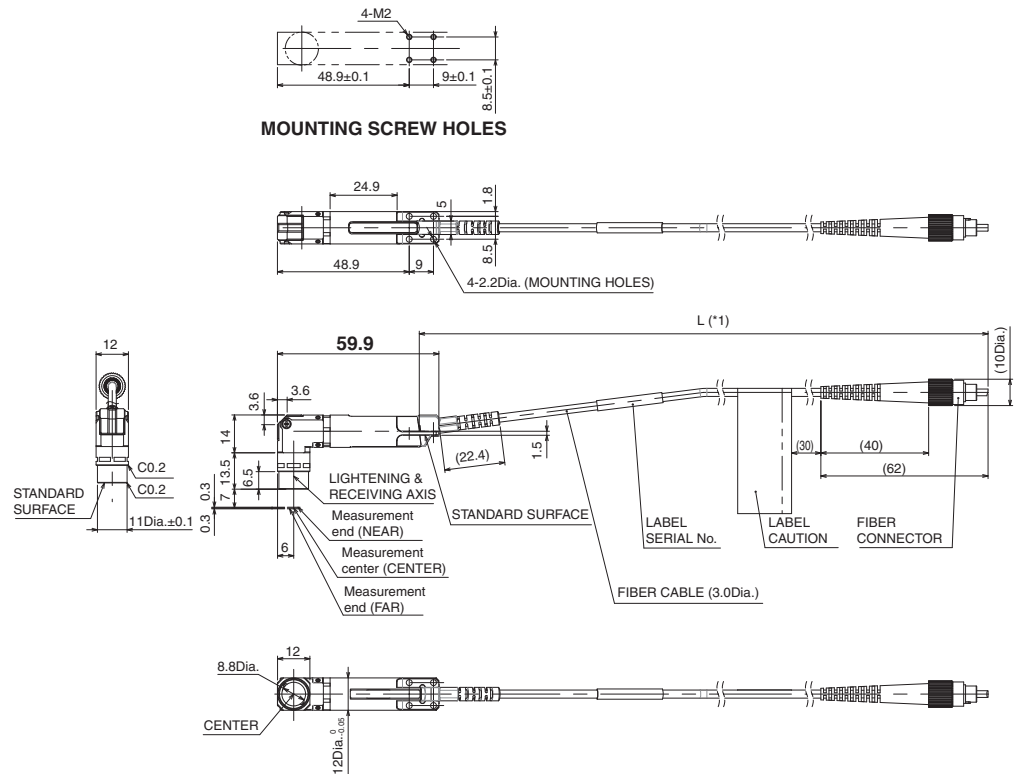**Pen-shaped right angle type**
ZW-SPR5007 □M

*1.

Length	L
0.3 m	(300)
2 m	(2000)
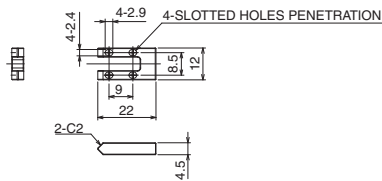
4-M2

48.9±0.1   9±0.1   8.5±0.1

MOUNTING SCREW HOLES

24.9   5   1.8
48.9   9   8.5
4-2.2Dia. (MOUNTING HOLES)

L (*1)   (10Dia.)

59.9

3.6   3.6
14
13.5   1.5
7   6.5
0.3   (22.4)
STANDARD SURFACE
C0.2
C0.2
0.3
STANDARD SURFACE
11Dia.±0.1
6
LIGHTENING & RECEIVING AXIS
Measurement end (NEAR)
Measurement center (CENTER)
Measurement end (FAR)

LABEL SERIAL No.
LABEL CAUTION
FIBER CONNECTOR

FIBER CABLE (3.0Dia.)

12
8.8Dia.
CENTER
12Dia.

(30)   (40)
(62)

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION
8.5   12
9
22
2-C2
4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

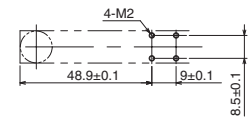4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)
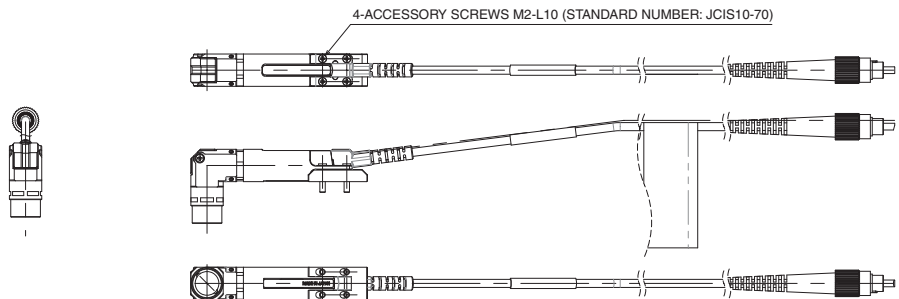
ZW-8000/7000/5000 Series

ZW-SPR5010 □M

4-M2

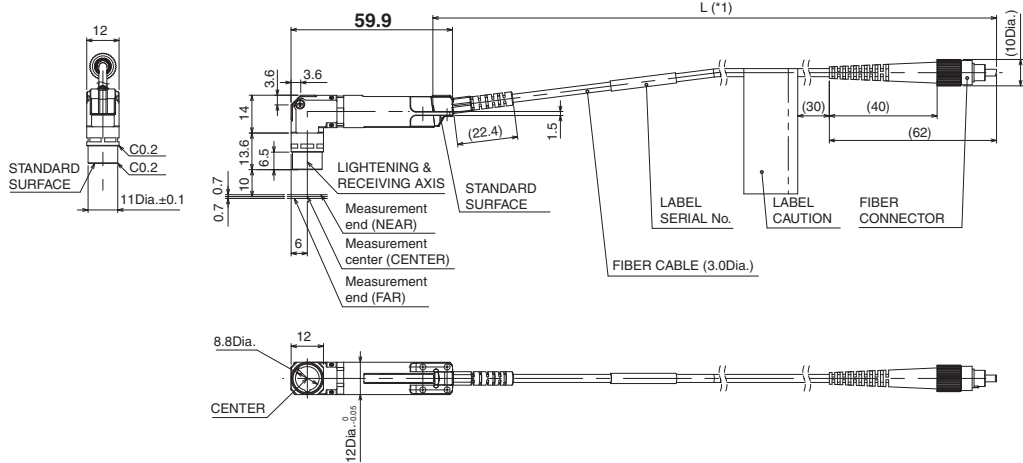48.9±0.1   9±0.1

8.5±0.1

MOUNTING SCREW HOLES

24.9

48.9   9

4-2.2Dia. (MOUNTING HOLES)

*1.

Length	L
0.3 m	(300)
2 m	(2000)

59.9

L (*1)

(10Dia.)

12

3.6   3.6

14

13.6

6.5

10

0.7 0.7

C0.2
C0.2

STANDARD
SURFACE

11Dia.±0.1

LIGHTENING &
RECEIVING AXIS

STANDARD
SURFACE

(22.4)

1.5

(30)   (40)

(62)

LABEL
SERIAL No.

LABEL
CAUTION

FIBER
CONNECTOR

Measurement
end (NEAR)

Measurement
center (CENTER)

Measurement
end (FAR)

6

FIBER CABLE (3.0Dia.)

8.8Dia.   12

CENTER

12Dia. 0/-0.05

<MOUNTING PLATE>
MATERIAL: ALUMINUM

4-2.4   4-2.9   4-SLOTTED HOLES PENETRATION

8.5   12

9
22

2-C2

4.5

<USE SITUATION OF MOUNTING PLATE>
SENSOR HEAD IS FASTENED WITH MOUNTING PLATE BY USING THE ACCESSORY SCREWS

4-ACCESSORY SCREWS M2-L10 (STANDARD NUMBER: JCIS10-70)

48   OMRON

Sensor Controller

ZW-8000T

SCREW HOLE FOR
CONNECTING ROM
M2 DEPTH 2.0MAX.

SCREW FOR CONNECTING
FRAME GROUND TERMINL
M4 LENGTH6.0

SCREW HOLE FOR CONNECTING
FRAME GROUND TERMINL
M4 DEPTH 7.0MAX.

124

6

85

140

34.9

40.8

139.5

SLIDER FOR
MOUNTING DIN-RAIL

40

70

15   55

MOUNTING SCREW HOLES
4-M4 DEPTH6.0MAX.

4-4.5 dia.

70±0.1

55±0.1

MOUNTING SCREW HOLES

ZW-7000T

SCREW HOLE FOR CONNECTING
ROM M2 DEPTH 2.0 MAX.

SCREW FOR CONNECTING FRAME
GROUND TERMINAL M4 LENGTH6

SCREW HOLE FOR CONNECTING
FRAME GROUND TERMINAL M4
DEPTH 7.0 MAX.

124

6

85

140

34.9

40.8

139.5

SLIDER FOR MOUNTING DIN-RAIL

40

70

15   55

MOUNTING SCREW HOLES
4-M4 DEPTH6.0MAX.

4-4.5 dia.

70±0.1

55±0.1

MOUNTING SCREW HOLES

ZW-8000/7000/5000 Series

ZW-5000T

SCREW HOLE FOR CONNECTING ROM
M2 DEPTH 2.0MAX.

SCREW FOR CONNECTING FRAME
GROUND TERMINL M4 LENGTH6.0

SCREW HOLE FOR CONNECTING FRAME
GROUND TERMINL M4 DEPTH 7.0MAX.

SLIDER FOR MOUNTING DIN-RAIL

MOUNTING SCREW HOLES
4-M4 DEPTH6.0MAX.

MOUNTING SCREW HOLES

Extension Fiber Cable

ZW-XF8002R/XF8005R/XF8010R/XF8020R/XF8030R

SERIAL NUMBER LABEL

FIBER CABLE
(3.0 dia.)

FIBER CONNECTOR

NAME PLATE

FIBER CONNECTOR

(ACCESSORIES)
FIBER ADAPTER:ZW-XFCS
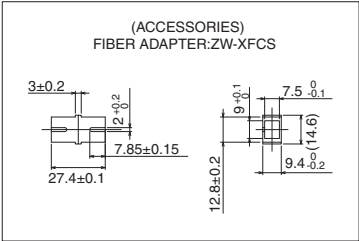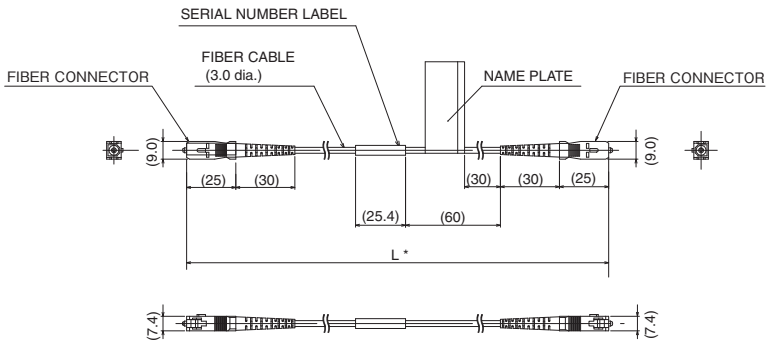
* The following table lists cable lengths per models.

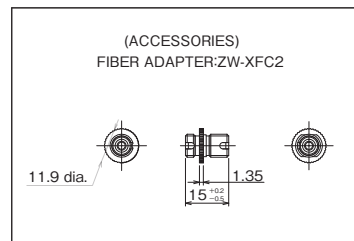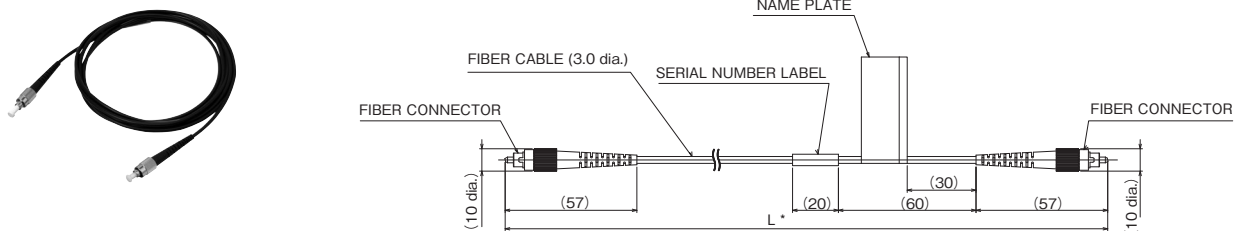| Type	Specification	L
ZW-XF8002R	2 m	2000+40/0
ZW-XF8005R	5 m	5000+100/0
ZW-XF8010R	10 m	10000+200/0
ZW-XF8020R	20 m	20000+400/0
ZW-XF8030R	30 m	30000+600/0

ZW-XF7002R/XF7005R/XF7010R/XF7020R/XF7030R

FIBER CABLE (3.0 dia.)
SERIAL NUMBER LABEL   NAME PLATE
FIBER CONNECTOR (SENSOR HEAD SIDE)
FIBER CONNECTOR (CONTROLLER SIDE)

(ACCESSORIES)
FIBER ADAPTER:ZW-XFCM
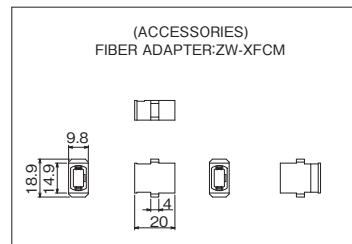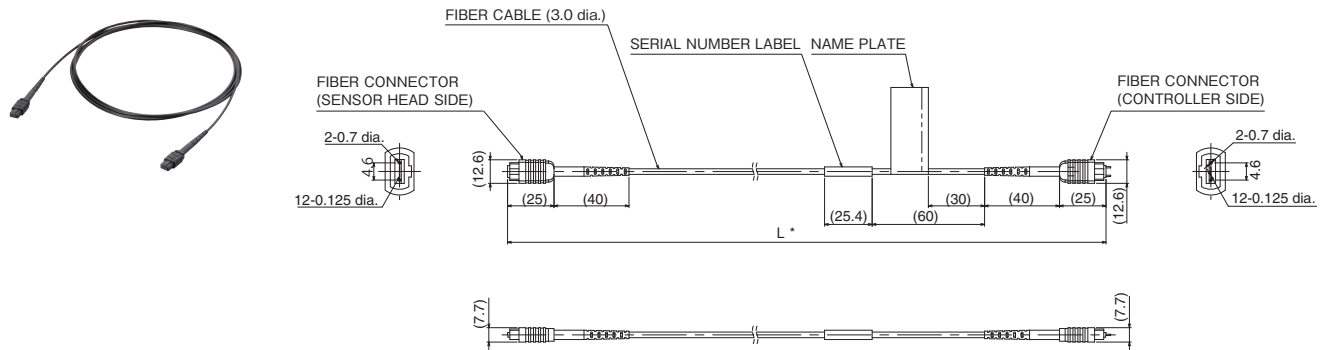
* The following table lists cable lengths per models.

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

ZW-XF5002R/XF5005R/XF5010R/XF5020R/XF5030R

NAME PLATE
FIBER CABLE (3.0 dia.)
SERIAL NUMBER LABEL
FIBER CONNECTOR
FIBER CONNECTOR

(ACCESSORIES)
FIBER ADAPTER:ZW-XFC2

* The following table lists cable lengths per models.

Type	Specification	L
ZW-XF5002R	2 m	2000+200/0
ZW-XF5005R	5 m	5000+200/0
ZW-XF5010R	10 m	10000+200/0
ZW-XF5020R	20 m	20000+500/0
ZW-XF5030R	30 m	30000+500/0

Related Manuals

Man.No.	Model number	Manual
Z362	ZW-8000□/7000□/5000□	Displacement Sensor ZW-8000/7000/5000 User's Manual
Z363	ZW-8000□/7000□/5000□	Displacement Sensor ZW-8000/7000/5000 User's Manual for Communications Settings
W504	SYSMAC-SE2	Sysmac Studio Version 1 Operation Manual

· The angle characteristic, linearity, sampling period and spot diameter given in the cover differ among models. Please ask Omron sales representative for details.

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