

Premium stability detection and optimal usability for Laser Displacement Sensors



For engineers who don't have time for the hassle

We at OMRON believe that we are now at a time where laser displacement sensors should be selected for their usability.

Our new ZP-L Series products are equipped with a carefully designed user interface, as well as detection accuracy.

They're packed with creative features that allow engineers to cut back on time and effort unknowingly spent when working with displacement sensors.



For inspection/detection of around 10 μm to 1 mm

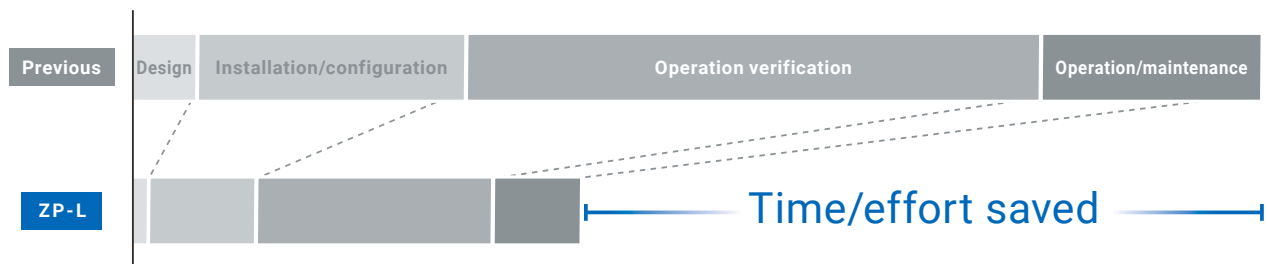
Detecting material remaining on roll



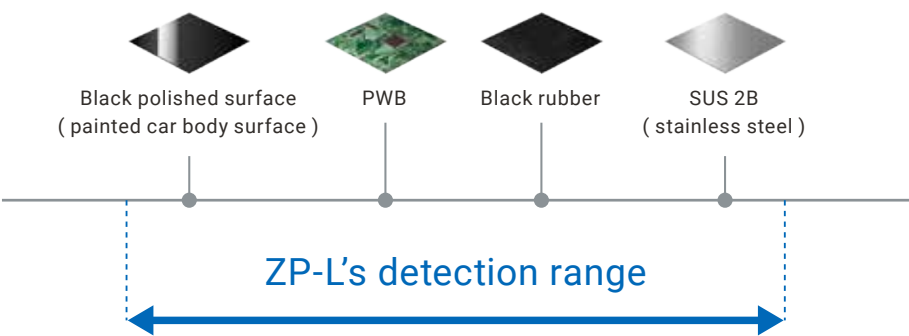
Checking for doubled-up boards



Using displacement sensors is now easier with dramatically less effort



Sensing performance delivering stable detection with initial configuration left intact ----- P.4



User interface requiring no manuals for easy understanding ----- P.6



Support software allowing quick test without loggers ----- P.8

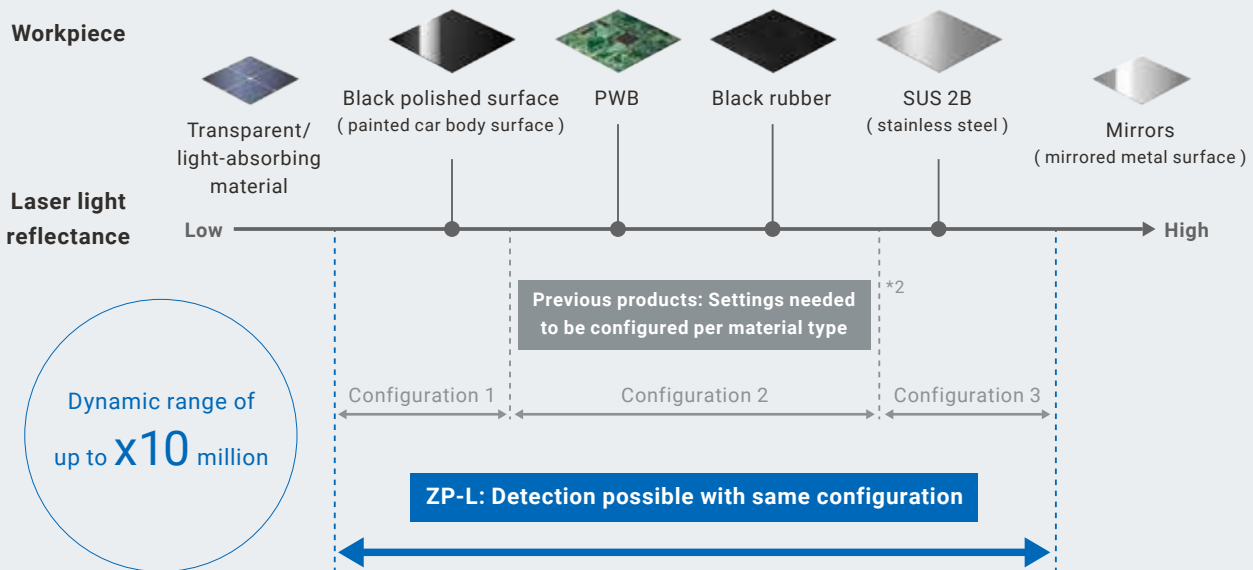
Support software Wave Inspire ZP



Sensing performance delivering stable detection with initial configuration left intact

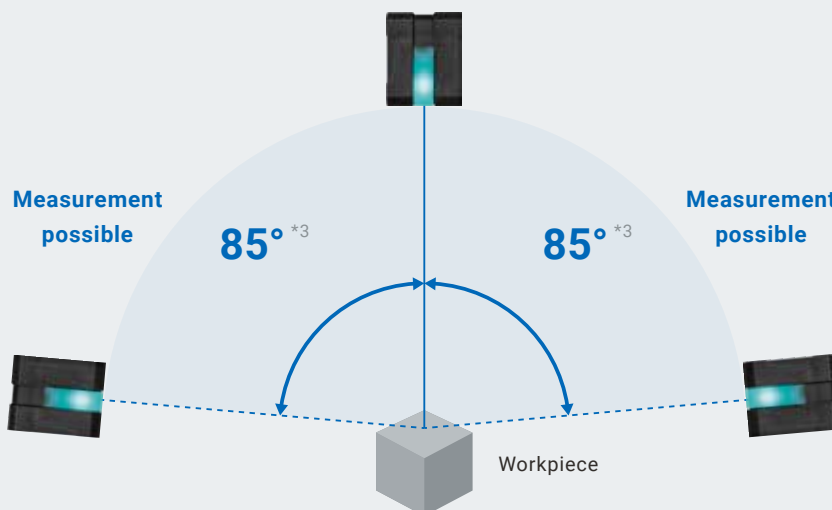
Different materials can be detected with the same configuration

ZP-L delivers a wide dynamic range^{*1} that delivers stable detection of a wide range of workpieces, from black polished workpieces (such as the painted surface of a car body), which reflect little light, to metal workpieces, which reflect a lot of light.



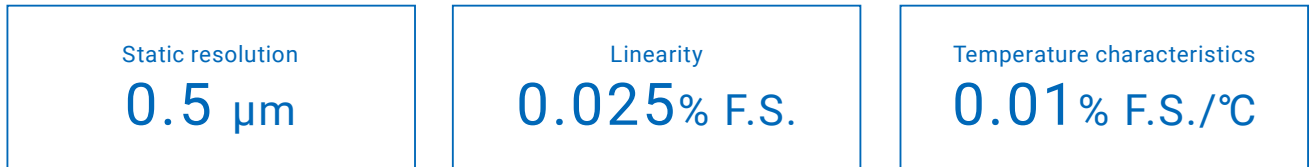
Wide angle characteristic enables flexible installation

ZP-L has a wide angle characteristic, powered by its wide dynamic range and OMRON's unique sensing algorithms. It can measure an area of up to approximately 85°^{*3}, allowing for flexible installation. For example, in cases where sensors cannot be installed directly above the target workpiece, ZP-L can be positioned diagonally and still deliver reliable measurement.



Reliable best-of-class^{*4} detection performance

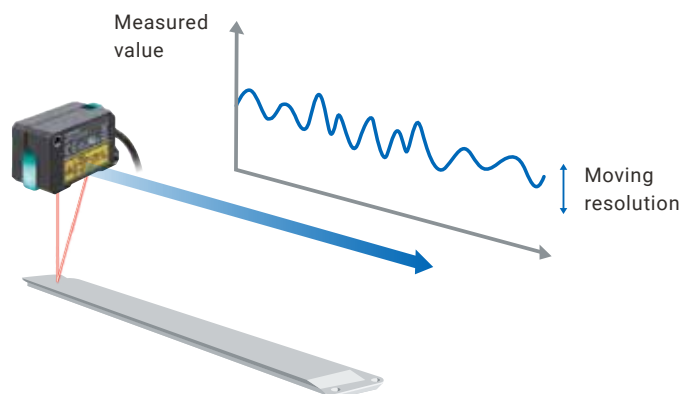
When selecting or replacing your laser displacement sensors, be sure to check the following three performance attributes.



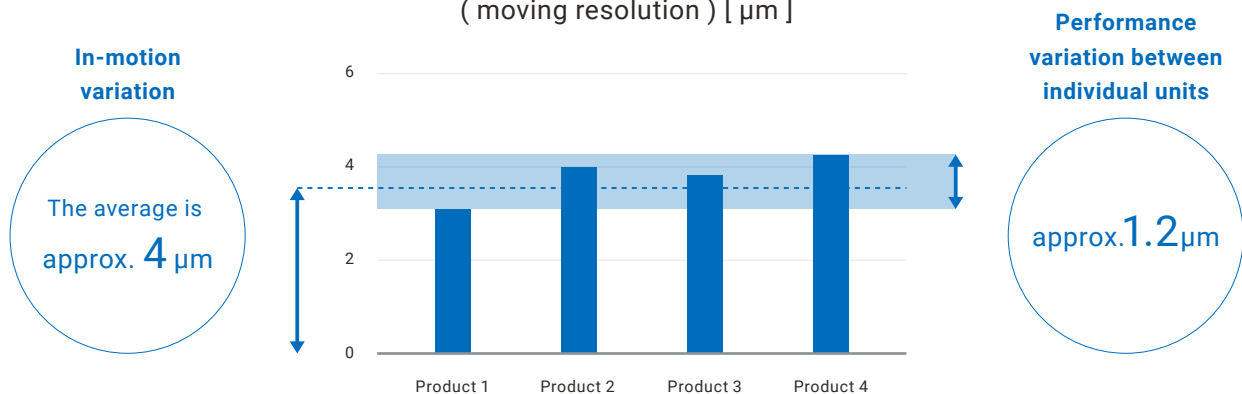
Note: Representative ZP-L Series performance values

Reduces two types of variations: those in measurements made in motion and between individual sensor units

When measuring moving workpieces, laser displacement sensors, by their nature, are impacted by workpiece surface conditions, and variations in measurement values may exceed the resolution set forth in their specifications.



Measurement value variations in measurements made in motion
(moving resolution) [μm]



*1. "Dynamic range" is a metric that indicates the range of detectable workpiece types, expressed as the ratio between the reflectance of the most reflective detectable workpiece and that of the least reflective detectable workpiece.

*2. Compared with OMRON's ZX2 Series.

*3. Representative example for workpieces with metal surfaces. Shape or material of measured object may impact measurement. Please check in advance using actual devices.

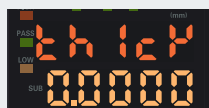
*4. Best-performing in class of laser displacement sensors for detecting around 10 μm to 1 mm (according to OMRON investigation in November 2024).

User interface requiring no manuals for easy understanding

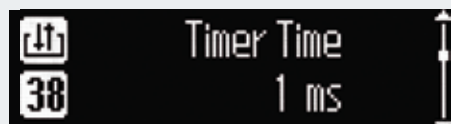
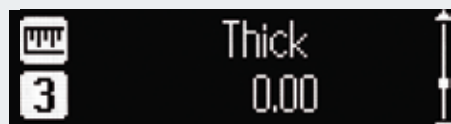
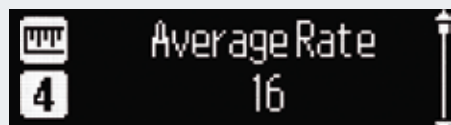
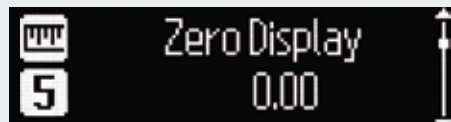
Easy-to-understand menu display

Amplifier units for previous laser displacement sensors used segment displays, which made it difficult for workers to know which item they were configuring without referencing their manuals. ZP-L amplifier units are equipped with OLED displays, which are capable of much richer presentation, allowing for easy-to-understand menu displays that save you the time of searching through your manuals for the right page.

Previous displays



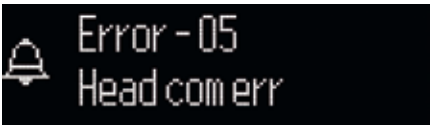
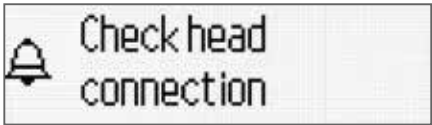
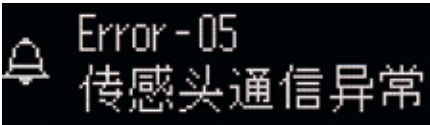
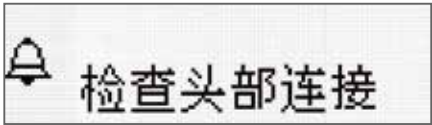
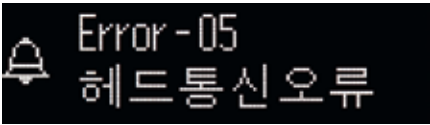
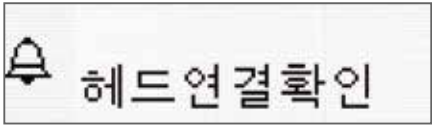
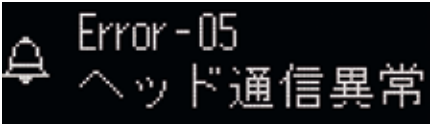
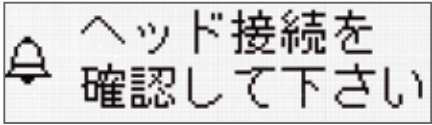
ZP-L display



Required action as well as error displayed in multiple languages

PATENT PENDING ^{*1}

ZP-L's display supports four languages, so that on-site workers at local factories can understand its configuration. Error displays have been carefully designed as well. The details of the error and the required action can be shown in different languages on the OLED display, allowing on-site first responders to take smooth action and enabling faster recovery.

	Error details	Required action
English		
Chinese		
Korean		
Japanese		

Intuitive screen design

PATENTED ^{*1}

The configuration screen is ingeniously designed to prevent users from losing track of where they are in their configuration process. Its layout, which works in coordination with button operation, allows for intuitive operation.



Shows where you are in configuration process

Configuration item group displayed using icon and number

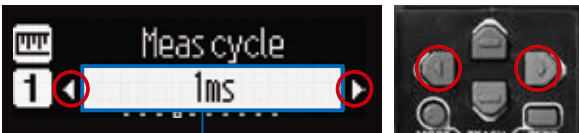


Pixel art icon indicates number of choices and which of them is currently displayed

Guide linked to button positions



Scrollbar



Field for setting value is highlighted

^{*1}. "Patent pending" and "Patented" refer to patent status in Japan (as of November 2024).

Support software allowing quick test without loggers

Operation/maintenance

Sensor conditions can be checked without stopping equipment

With ZP-L, you can check sensor conditions without impacting the equipment's control operations, just by connecting the PC with the support software Wave Inspire ZP installed to the switching hub. There's no need for data loggers, or to program PLCs for operation checks. The support software Wave Inspire ZP can be downloaded for free. Please refer to the system configuration page in the data sheet for details.

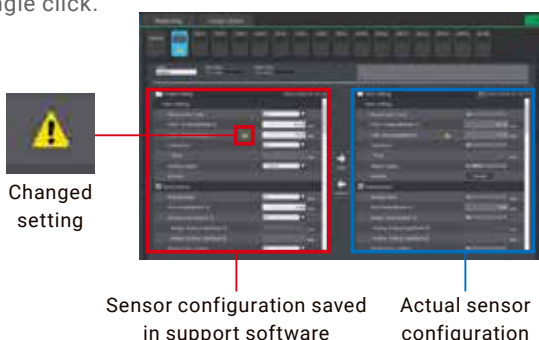
Support software
Wave Inspire ZP



Changes in configuration can be found and reversed quickly

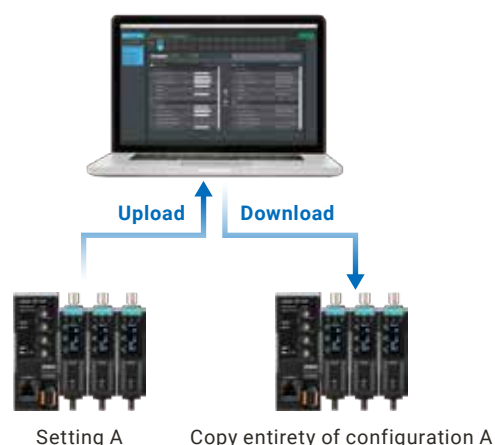
PATENT PENDING *2

Sensor configurations can be saved to the support software Wave Inspire ZP, which means you can compare your current sensor configuration with that at the time of setup. It also means that you can quickly find any changes that may have been made to your usual sensor configuration. Once you find the changes, you can reverse them with just a single click.



No need to set the same configuration over and over again

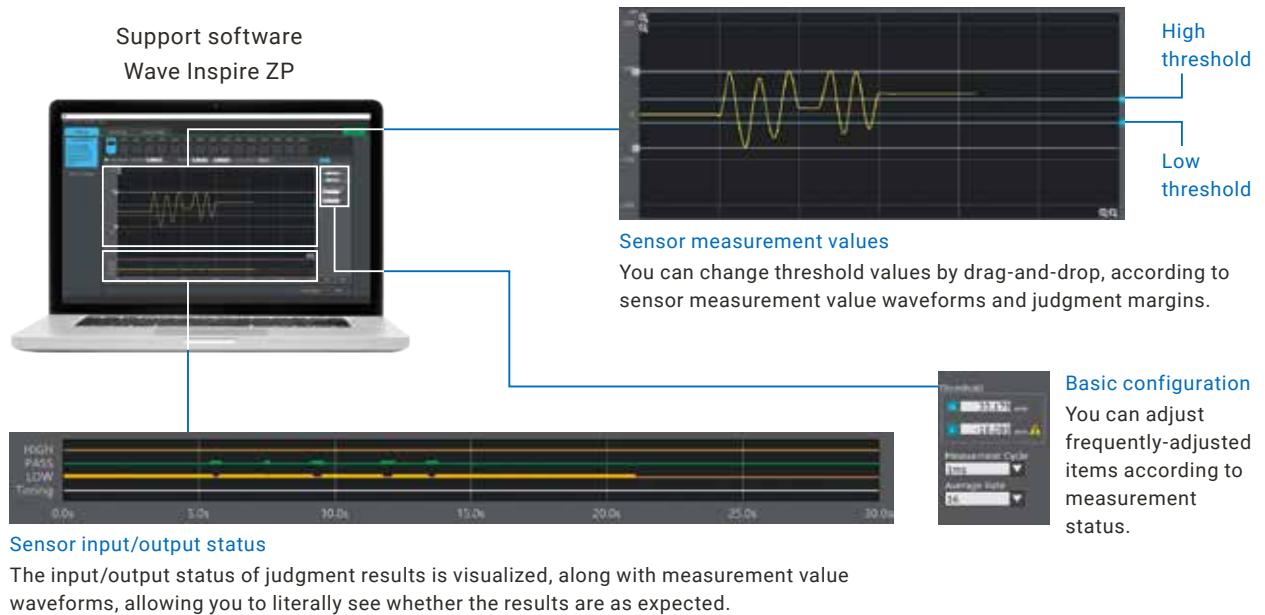
You can copy the saved settings when replacing or expanding the amplifier unit at once.



Testing upon setup

Measurement data can be visualized in just three minutes

Previously, testing upon setup required that measurement values be monitored using upper-level systems such as PLCs or tools such as data loggers, which took time and effort. With ZP-L, you can complete configuration and monitoring in just three minutes after connecting the sensor to the support software Wave Inspire ZP.



Retrieved data is high-quality as well

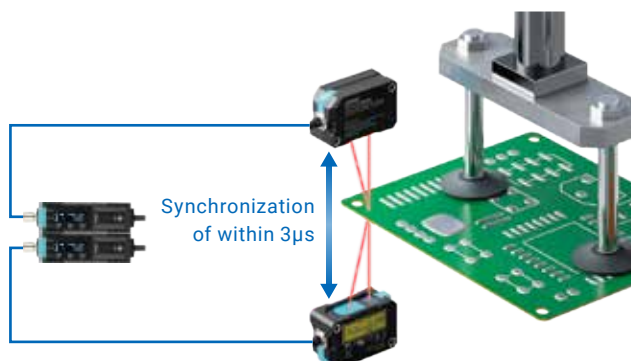
Data for testing must be of high simultaneity and retrieved in high speed. ZP-L is equipped with a system that is meticulously designed to deliver high sensing simultaneity (3 μ s) and high-speed (1 ms) data retrieval.

Simultaneity

PATENT PENDING

*2

ZP-L delivers high-quality data verification, even in cases using multiple sensor units. The timing of data measurement for all sensors connected to amplifiers is synchronized to within 3 μ s, allowing you to conduct verifications without worrying about timing deviations.

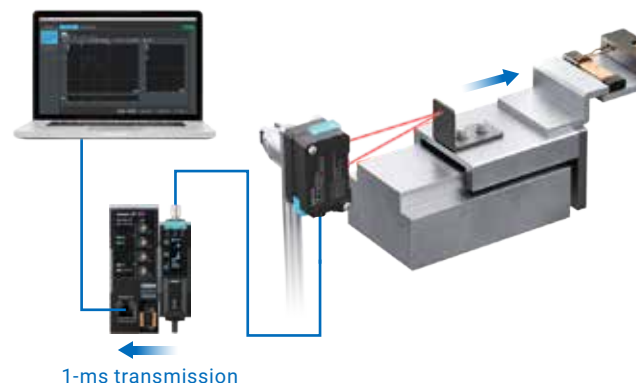


Speed

PATENT PENDING

*2

ZP-L can also be used to verify high-velocity events. It can retrieve measurement values in 1-ms intervals, which can then be used to draw charts on your PC screen that closely depict actual equipment behavior.



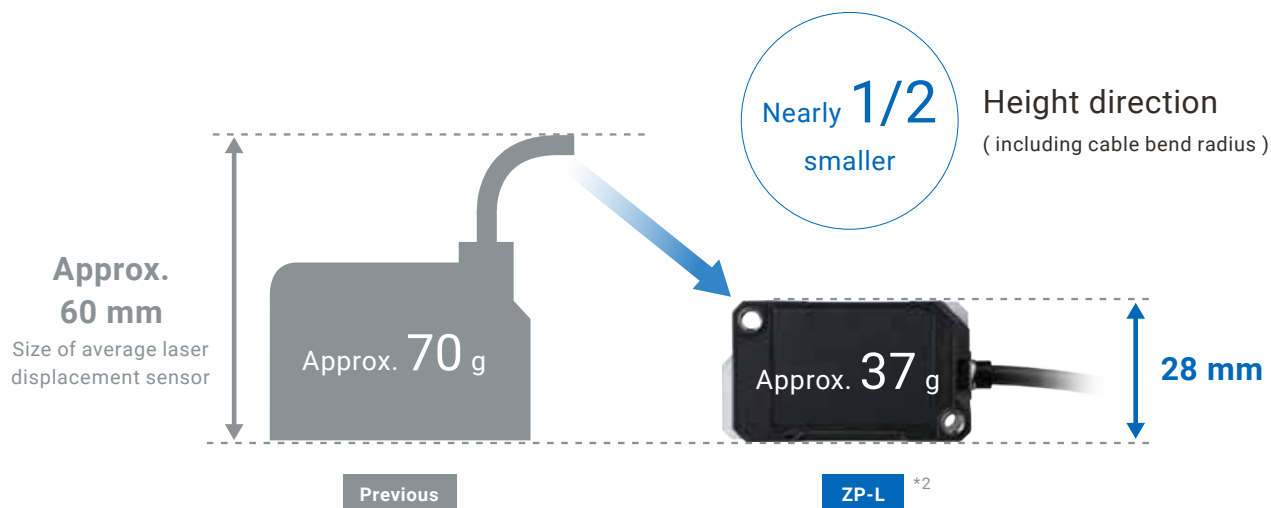
*1. Communication unit ZP-EIP required for connection with PC.

*2. "Patent pending" and "Patented" refer to patent status in Japan (as of November 2024).

Carefully designed for on-site usability

Smallest and lightest in its class,^{*1} and therefore easy to embed

Equipment is getting smaller, which means less space inside the equipment for sensor installation. With ZP-L, we were able to achieve our ambition to create a product that delivers both advanced accuracy and compact size, especially in the height direction, where space tends to be more restricted. The sensor head is also lighter, allowing for easier equipment rigidity design.



Indicator lights easily visible from all directions

Large indicator lights in two locations (at top and back of sensor head) easily visible from all directions.



Find Me function for identifying sensor paired with amplifier unit

When an amplifier unit is switched to configuration mode, the indicator lights on the sensor head connected to it blinks in blue, making it easy to find, without the tedious task of tracing the cable.



*1. Best-performing in class of laser displacement sensors for detecting around 10 μm to 1 mm (according to OMRON investigation in November 2024).

*2. In case of ZP-LS025/-LS050/-LS100.

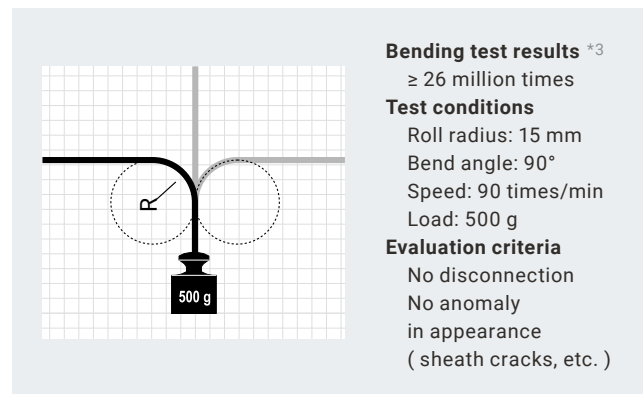
Flexible mounting brackets that can be adjusted in three directions

Previous products required the effort-consuming task of designing and preparing brackets for mounting your sensors, and making fine optical axis adjustments when installing them. The ZP-L Series offers mounting brackets that allow you to easily make optical axis adjustments in three directions: height, horizontal, and angular.



Robot cables for moving parts

We offer highly bend-resistant extension robot cables for customers who need cables with high bend resistance. Our robot cables are perfect for moving parts of common machines such as cableveyors and loaders.



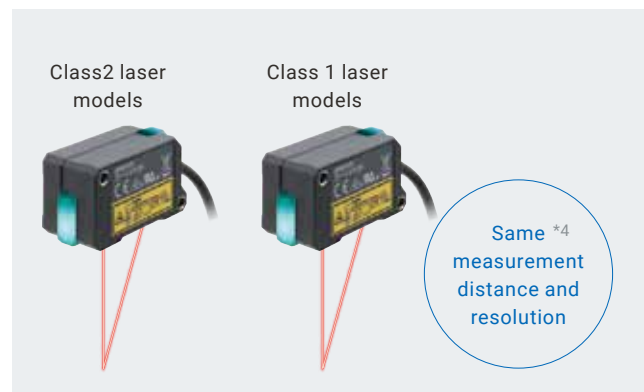
Third-party certified for compliance with laser standards

ZP-L sensor heads have CB certification, a standard for lasers, which means that when you use them in your equipment, it doesn't need to be applied for laser certification.



Class 1 laser lineup across all distance ranges

In addition to Class 2 laser models, Class 1 laser models are available for every measurement distance and beam shape. Meets diverse machine requirements, including workpiece conditions and equipment safety.



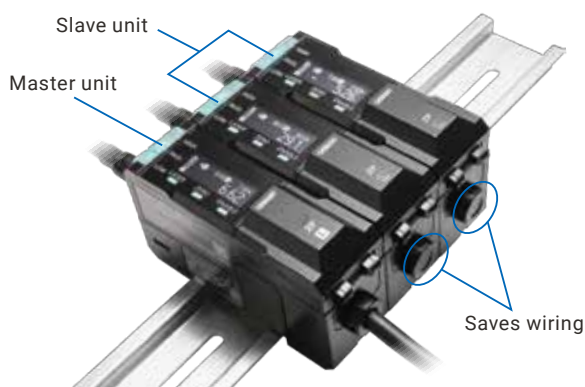
*3. Test results are from tests conducted by OMRON and should be used only as reference information, not as guaranteed values when using products in actual customer settings and conditions thereof.

*4. Class 1 laser models deliver the same performance as Class 2 laser models when used on workpieces that reflect a large amount of light, with no change in ratings or specifications. However, for workpieces that do not easily reflect light, Class 1 laser models may not detect properly. Please verify with the actual device in advance before use.

Lineup to simplify machine design

Slave amplifier units that reduce wiring

We offer slave amplifier units that help you reduce wiring when using multiple sensors. Power can be supplied from the master unit, which means slave units don't need to be wired for power. You can also save cable termination effort by using slave units without cables for units that don't output judgment.



Versatile communications interfaces for existing networks

Beyond sensor heads and amplifier units, a wide range of communications units connects to various networks. Use user-friendly support software to visualize data and perform batch setting writes.



EtherNet/IP™
Communication
Unit



RS-232C
Communication
Unit*1



IO-Link
Compatible
Amplifier Unit

*1. The RS-232C communications unit is not compatible with the support software.

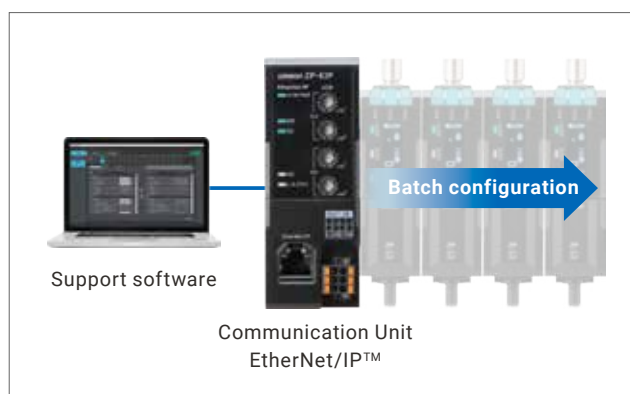
Slave amplifier units with analog output for multi-point measurement

For high-speed lines using multiple sensors, choose slave amplifier units with high-speed analog output. For multi-point measurement, identical settings across multiple units can be written easily in batch using the support software with the communications unit.

Height measurement on high-speed multi-row conveyor lines



Batch configuration using the support software



IO-Link Master Unit GD Series

Combine with various sensors easily

With GD series, connecting to devices from other manufacturers is effortless.



Discover
Omron IO-Link
in 3 Minutes

Use sensor data seamlessly with PLCs from different manufacturers



EtherNet/IP[®] CC-Link IETSN
Modbus[®] CC-Link IEF[®]
EtherCAT[®] *2 CC-Link IEF[®] Basic
PROFINET[®] *2

Just connect and go

Instantly see
sensor status

Configure easily
from your PC



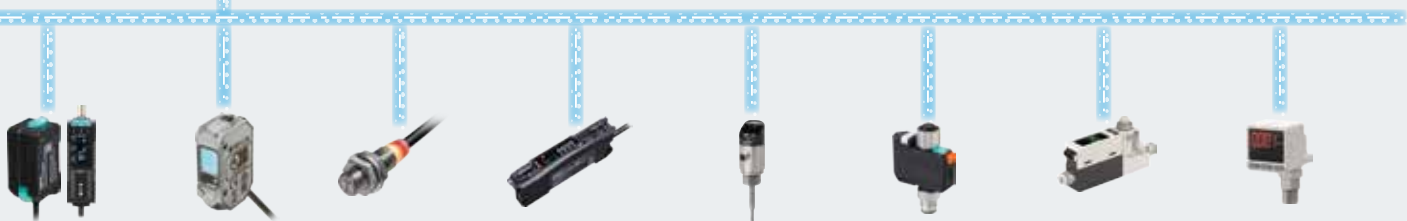
IO-Link Master Unit
GD Series



Support Software
Wave Inspire HUB

 **IO-Link**

Automatically connect to over 100 IO-Link devices.



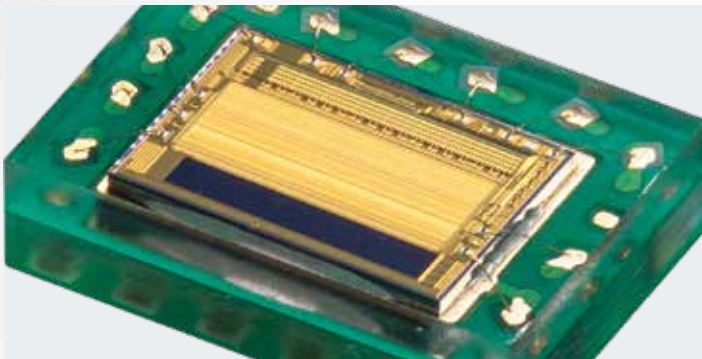
Omron devices

Devices from other
manufacturers

*2. These will be supported in a future version upgrade.

4 technologies powering ZP-L's best-in-class performance^{*1}

Custom CMOS image sensor designed to deliver maximum sensing performance



In developing ZP-L, OMRON took a deep dive into the internal structure and production process of CMOS image sensors to custom-develop high-speed, high-sensitivity, low-noise CMOS image sensors that maximize performance.

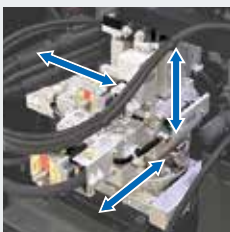
Custom CMOS
image sensor



1 μ m-level lens
positioning

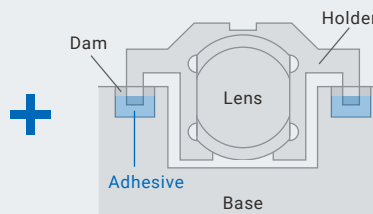
Unique manufacturing methods that reduce variations between individual units **PATENTED**^{*2}

Automatic three-axis
adjustment mechanism



Technology for
accurate adjustment

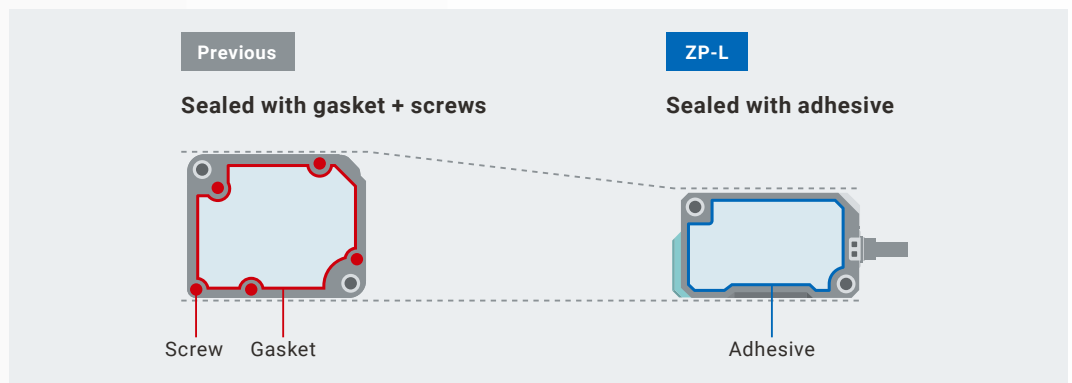
Flexible fixing mechanism
using dam structure



Technology for
accurate component fixing

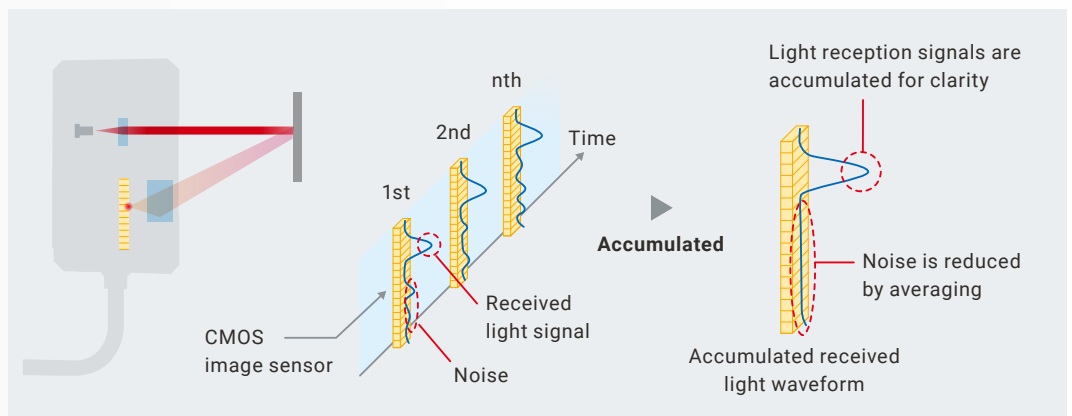
OMRON successfully developed and applied unique technologies that deliver micrometer-level automatic lens adjustment and nanometer-level fixing in the ZP-L production process. Together, these technologies minimize variations in adjustment and assembly, thereby reducing variations in performance between individual sensor units.

Unique adhesive sealing technology that enables downsizing



As a general rule, improving sensor accuracy means using larger optical components, such as lenses and CMOS image sensors. This creates a trade-off between improving accuracy and reducing size. To resolve this dilemma, ZP-L uses a sealing technology using adhesives, which, compared to more conventional sealing methods using screws and gaskets, allows for more efficient use of chassis space. It is thanks to this technology that ZP-L is able to deliver high accuracy while having the smallest chassis in its class.

Sensing algorithm for stable sensing, of different materials and in tilted positions



ZP-L delivers significantly higher sensitivity compared to previous products, through its unique process of integrating received light waveforms. This process amplifies the slightest light, allowing for stable detection even when the head is installed in a tilted position.

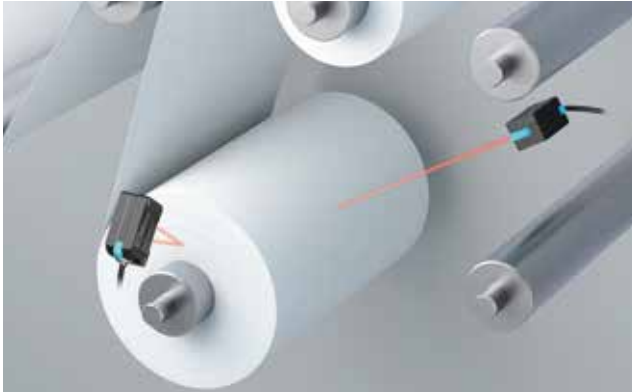
*1. Best-performing in class of laser displacement sensors for detecting around 10 μm to 1 mm (according to OMRON investigation in November 2024).

*2. "Patent pending" and "Patented" refer to patent status in Japan (as of November 2024).

ZP-L can be used to determine positions and to measure heights/thicknesses of around 10 μm to 1 mm

Height/Thickness

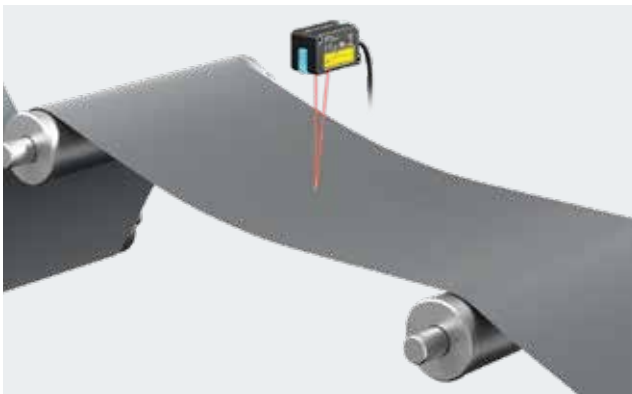
Detecting material remaining on roll



Measuring component heights



Monitoring trends in warp amount

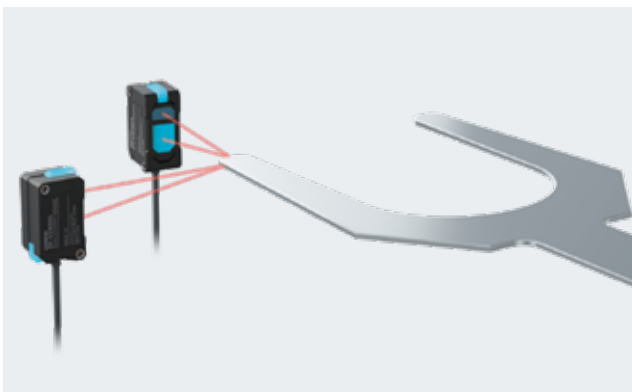


Determining whether part is present



Positioning/Control

Robot hand positioning



Nozzle height control

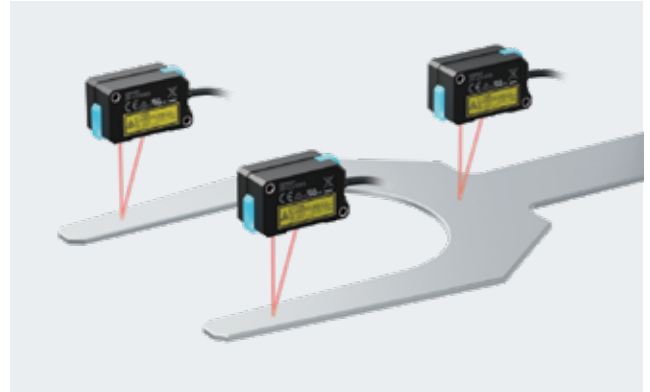


Shape/Curves

Shape inspection of metal part



Flatness measurement/inspection



Stroke/Deflection

Press stroke management

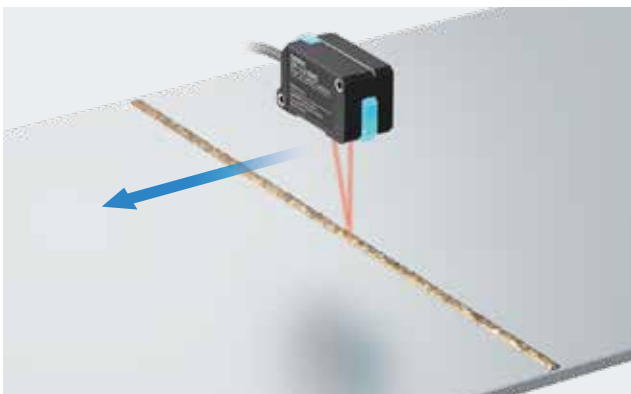


Tire eccentricity inspection

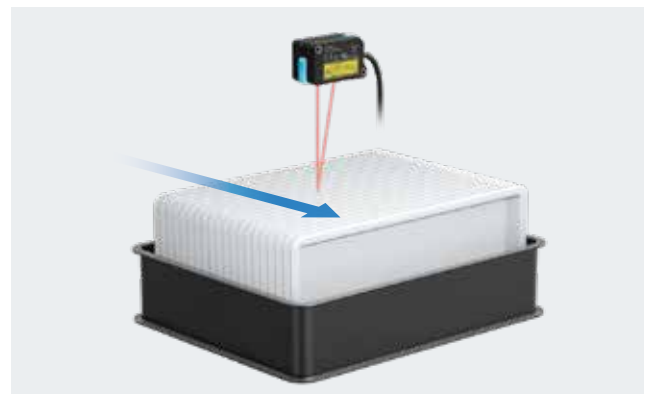


Joints/Counting

Detecting joints in welding



Counting number of trays



Sensors for distance measurement

We offer an array of products for a wide range of detection distances and accuracies.

For detection level difference of around 1 mm	Photoelectric sensor E3AS-HL series	
For resolution of 0.5 µm	Displacement sensor ZP-L series	
For resolution of 0.002 µm	Displacement sensor ZW series	

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