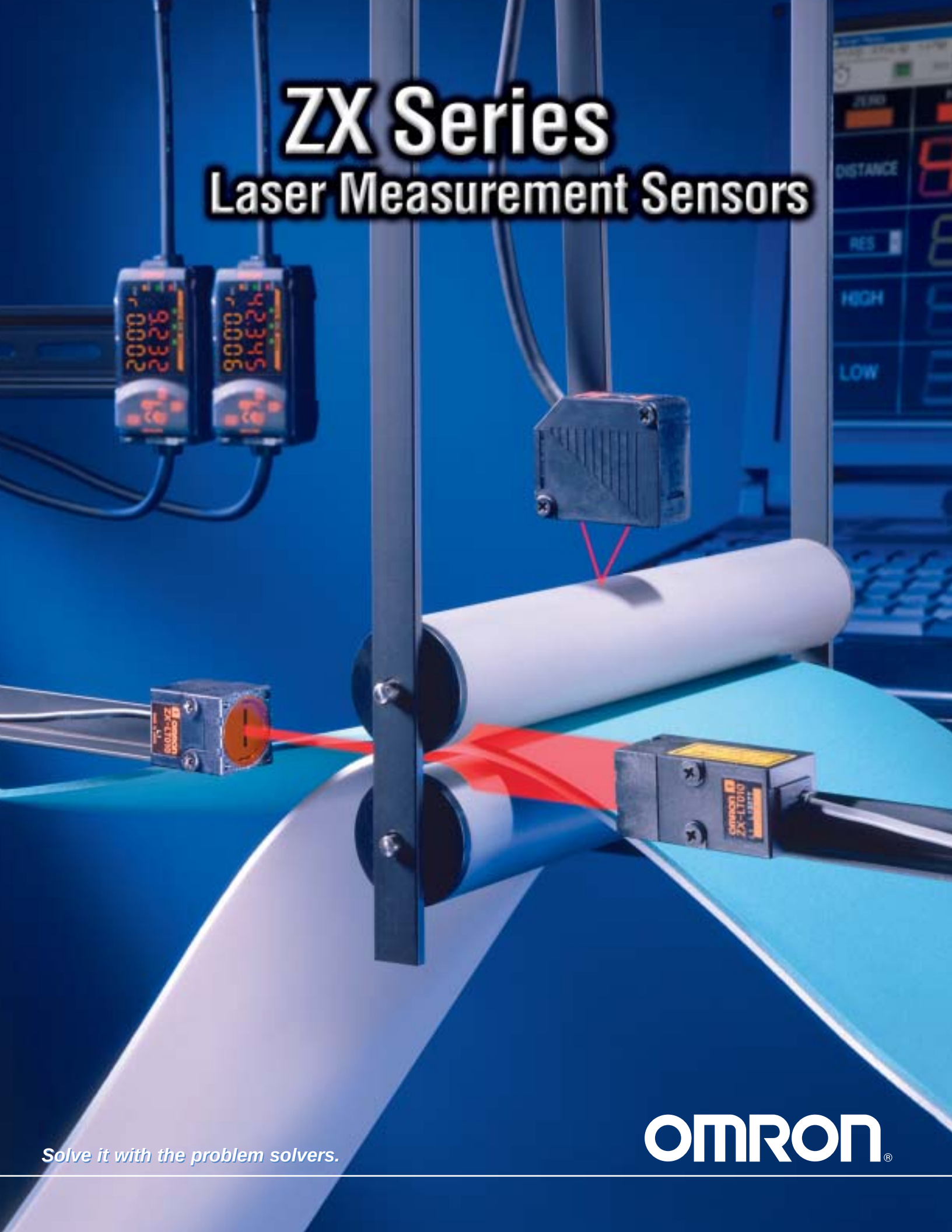

ZX Series
Laser Measurement Sensors
DISTANCE
RES
HIGH
LOW
Solve it with the problem solvers.
OMRON

This new generation of high-performance laser measurement sensors delivers three major advances

- Space-efficient modular sensor/amplifier design
- Easy-to-program amplifier
- Advanced PC control for setup, monitoring and data acquisition

Why choose a measurement sensor?

To maintain a competitive edge, you now need to collect more useful information and make high-speed decisions right in-line with your manufacturing process without stopping the operations.

Measurement sensors fill the void between conventional photoelectric and proximity sensors, even those with analog outputs, and low-cost vision sensors. They provide multiple discrimination limits allowing several qualitative decisions instead of just accept or reject. Using conventional sensing techniques combined with advanced analytical tools preprogrammed into the amplifier, Omron's measurement sensors solve a wide range of application problems.

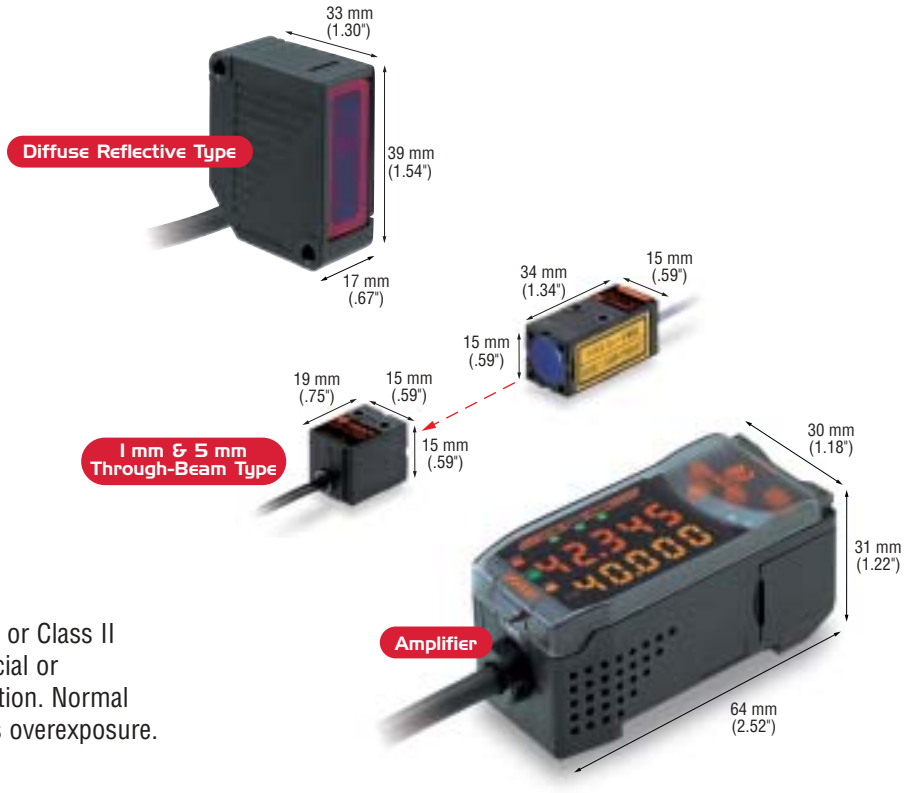
Major advances in Omron's ZX Series of measurement sensors include:

- ZX amplifier supports distance and width measurement applications
- Five analog output options including 4-20 mA and four DC voltage outputs, plus three discrimination outputs
- One-button teaching function or PC setup and monitoring software simplify start-up
- Operation monitoring and direct data logging capabilities
- Waveform monitoring eliminates oscilloscope use
- Resolution indicator displaying maximum application resolution

Small, versatile and safe sensing heads

Space-saving size

In addition to the small size, the ZX Series offers the world's lightest laser measurement sensors (as of October 2001). Approximately the same size as a photoelectric sensor, the compact ZX sensors meet space-saving requirements for production equipment. Response speed is also equivalent to that of a photoelectric sensor: high-speed sampling of 0.15 ms; response speed of 0.3 ms.



Safe laser types

The interchangeable sensing heads use FDA Class I or Class II visible red laser light sources. Neither requires special or supplemental laser safety equipment for safe operation. Normal blinking or human response to bright light prevents overexposure.

Wide range of modular sensor heads and one powerful amplifier

For distance or width measurement, ZX Sensor heads use FDA Class 2 or Class 1 visible light lasers. Select the sensor head according to the required measurement distance and application. Measurement distances range from 28 to 500 mm. Use spot beams to measure minute objects or a line beam to measure larger areas for measurement averaging.

Diffuse reflection types

For Detection of All Target Types

Three sensing distances:

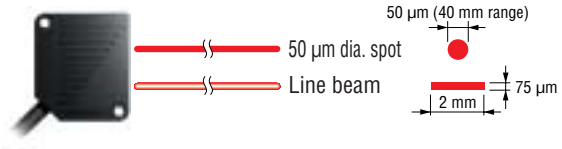
300 mm ±200 mm with 300 µm resolution

100 mm ±40 mm with 16 µm resolution

40 mm ±10 mm with 2 µm resolution

Two beam shapes available:

Spot beam and 2 mm wide x 75 µm line beam



Specular reflection types

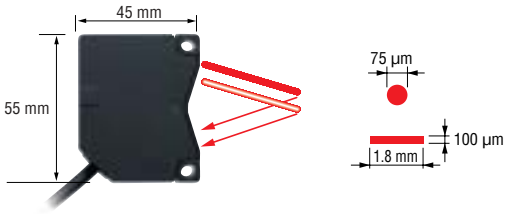
For Highly Reflective Targets or Precise, Sub-micron Resolution

One sensing distance:

30 mm ±2 mm with 0.25 µm resolution

Two beam shapes available:

75 µm dia. spot and 1.8 mm wide x 100 µm line beam



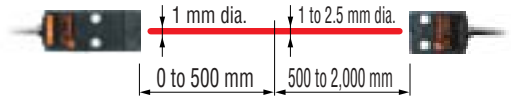
Through-beam types

For Area Detection

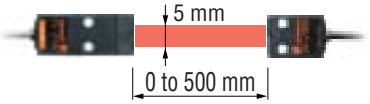
Using FDA Class 1 visible light lasers, ZX through-beam sensor heads have a 1 mm diameter beam for precise position, or a 5 mm or 10 mm wide beam for area detection. Measures width and distance range with 4 mm resolution.

Three measuring widths and distance ranges with 4 µm resolution

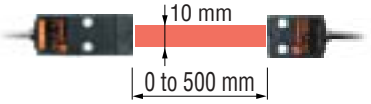
1 mm dia. spot



5 mm wide beam



10 mm wide beam

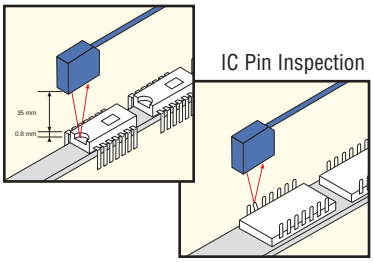


ZX application examples

Electronic Assembly

IC Orientation

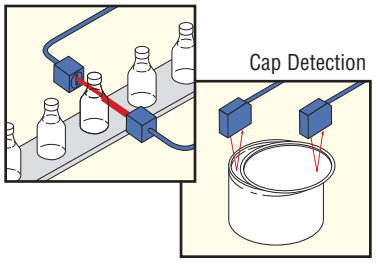
IC Pin Inspection



Food and Beverage

Liquid Level Detection

Cap Detection

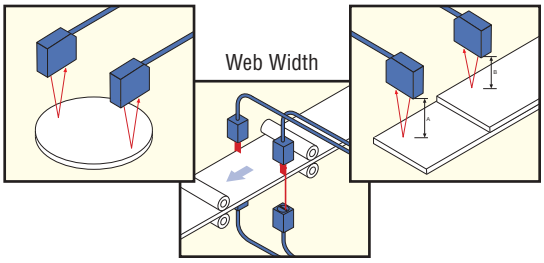


Metal Fabrication

Part Tolerance

Web Width

Thickness Detection



Advanced functions and capabilities to respond to your evolving needs

Advanced functionality; easy to operate

Top Priority Placed on Easy Operation

The ZX Series amplifier combines advanced functions and high performance with easy operation. Simple one-touch control allows for easy programming of three discrimination outputs, display of measurement values, analog output value and operating parameters.

Discrimination Output Indicators
High/Pass/Low 3-color display

7 mm high LED characters

Main Display
Displays measurement distance in millimeters

Sub Display
Displays high and low set-point values, resolution or measurement value in optional mA or Volts DC

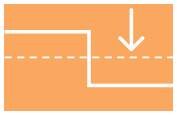
Arrow Keys
Provides one-touch programming of high/pass/low set-point values and operation parameters, including sampling rate, hysteresis, and display scaling values

Comprehensive teaching functions

Position/2-point/Automatic

Three teaching functions increase application flexibility and simplify setup of high, pass and low set-point values.

Position teaching
For high-precision positioning applications.

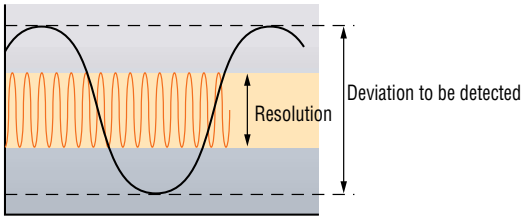


2-point teaching
For detecting ultra-small level differences between two points.

Automatic teaching
For teaching without stopping the workpiece.

Resolution indicator

The achieved resolution of the application is calculated and displayed in millimeters on the amplifier allowing for smart determination of acceptable High and Low measurement limits.



Equipped with a laser lifetime monitor

Self-Detection and Display of Laser Diode Lifetime

A self-detection circuit, for laser diode deterioration, continuously monitors laser diode lifetime. When significant deterioration is detected, a warning appears on the amplifier's sub-digital display. Early detection enables timely, trouble-free replacement of the sensor head before failure.

Displays an error code of "lddyn" (laser diode dying) in advance of complete failure.

Other easy-to-use functions

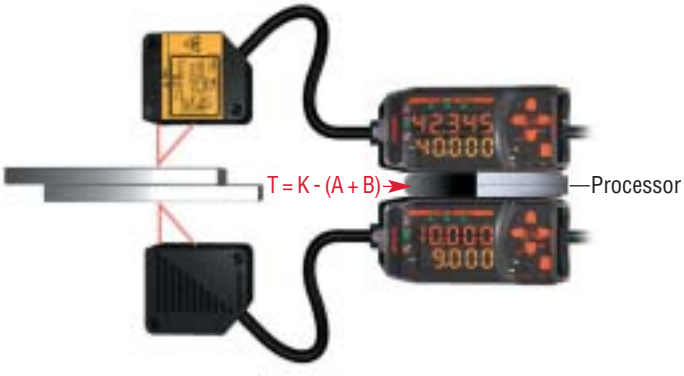
- Automatic or manual scaling of measurement display values
- Hold functions include peak hold, bottom hold, sample hold, peak to peak hold, self peak hold and self bottom hold
- Discrimination output timing functions include on-delay, off-delay and one-shot operation

Easy set up from the amplifier

A full complement of practical functions

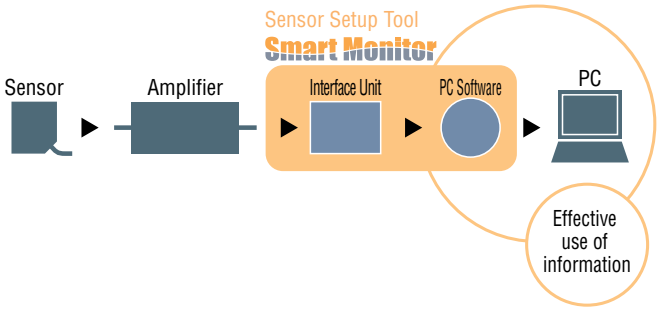
Operation Setting with No Need for a Digital Panel Meter

By simply fitting the optional Calculating Unit (ZX-CAL) between two amplifiers, the processing results of two sensors can be displayed on one amplifier for thickness measurement applications. Setting parameters only need to be input on one amplifier. This eliminates extra hardware and saves space formerly required to handle simple thickness comparisons.



Software setup tool saves time

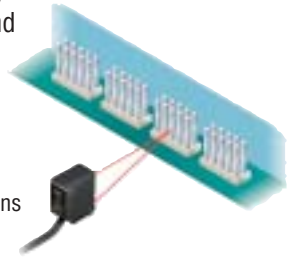
The SmartMonitor ZX Series Sensor Setup Tool enables connection with a PC. An advanced new approach for digital measurement sensing, this software simplifies start-up by stepping the user through teaching functions, limit settings and other parameters to fine-tune operation. The optional Communication Unit plugs into the amplifier to provide serial connection to the PC.

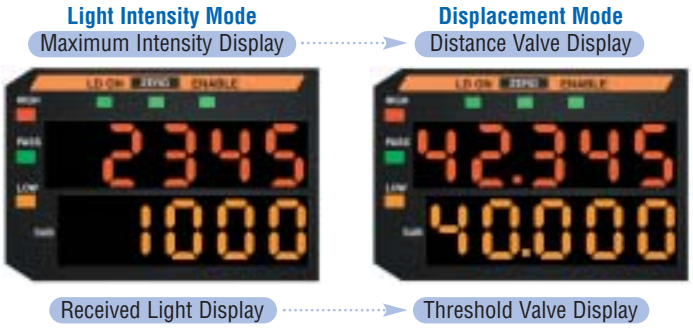


Light intensity mode's alternate functions

Diffuse Reflection

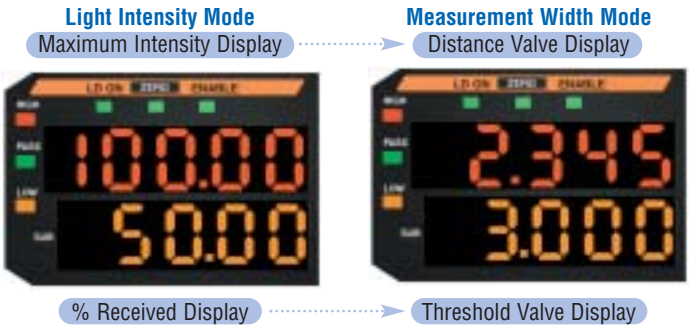
Light intensity can be detected by the ultra-small spot of the laser beam. By operating as a high-precision laser photoelectric sensor, rather than a displacement meter, this enables detection of small items with backgrounds, as well as color detection. Ideal function settings are possible by using both the displacement mode and the light-intensity mode to meet multiple application needs.





Through-Beam

The light intensity/% mode can provide measurement width displays.



New SmartMonitor software for efficient ZX Series sensor setup

Tap into full sensor performance with a PC

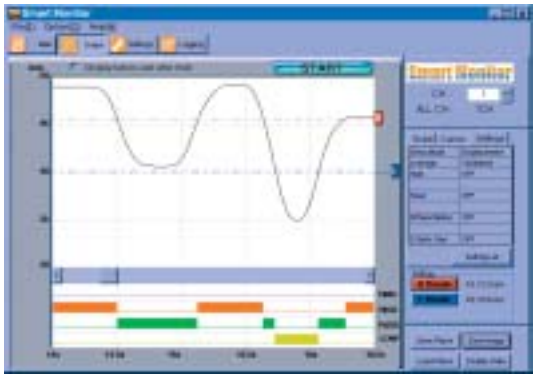
Using a PC greatly enhances the amplifier display. Unlike conventional systems, the detection results from applications such as waveform monitoring and data logging can also be easily processed.

Simplifies setup

Complicated settings can be easily made while referring to PC software function menus. Settings can also be imported and exported as text data.

Waveform monitoring

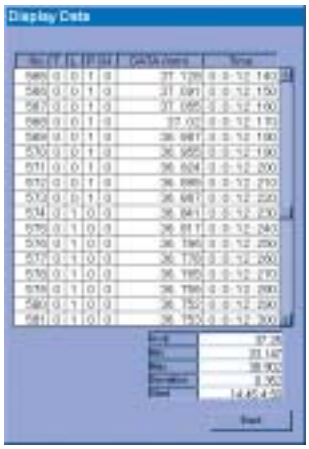
Easy waveform monitoring replaces the conventional oscilloscope. Drag and drop threshold setting and other easy-to-use functions further enhance operation.



Flexible quality control

Data Logging

The ability of log measurement data to manage the system history enables efficient and effective quality control, and aids in determining necessary corrective action.



PC software specifications

Monitoring/Setting Digital Values

- Setting direct threshold and operational values
- Teach setting of threshold values; auto or manual

Waveform Monitoring

- Waveform collection, observation and editing
- Waveform saving and loading

Data Logging

- Compilation settings
- Microsoft® Excel compatible

Configurator Functions

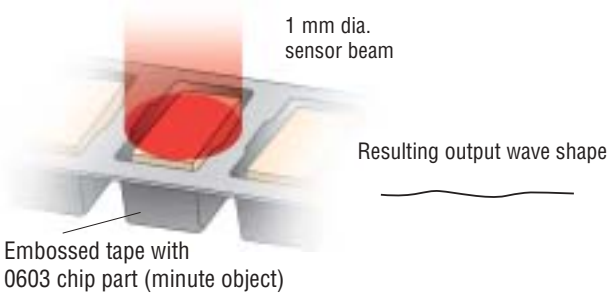
- Setting amplifier functions (actual measurement scaling, input scaling, etc.)
- Saving and loading amplifier setting conditions

ZX reliable measurements solve the toughest application problems

Detect tiny parts in embossed tape

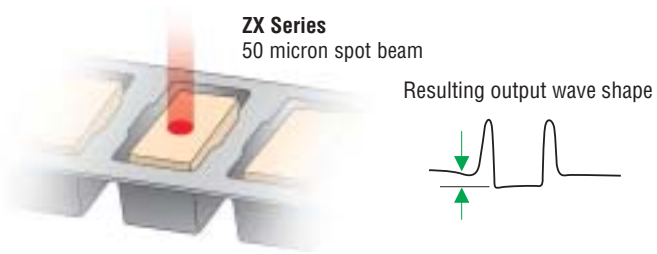
Problem:

In chip packaging and insertion applications, how can you tell if there's a chip in every cell of embossed tape? Conventional narrow-beam sensors with 1 mm spot diameter can barely detect the chip as shown in the sensor's output signal.



ZX Solution: 50 Micron Spot Beam

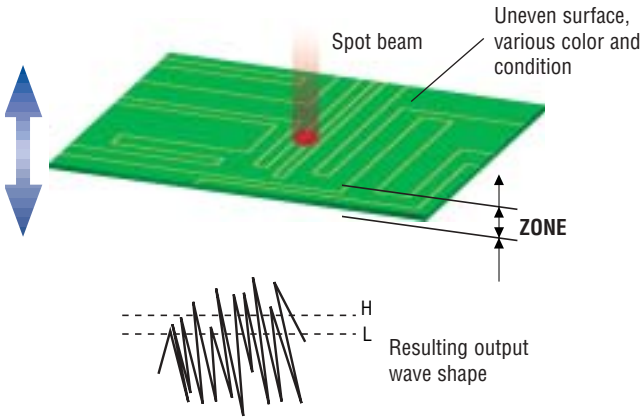
The ultra-narrow visible laser beam clearly detects the chip's leading and trailing edges within the embossed tape, as shown by the ZX amplifier's output. This increases reliability for outbound and incoming inspection of small parts.



Detect PCB height for positioning

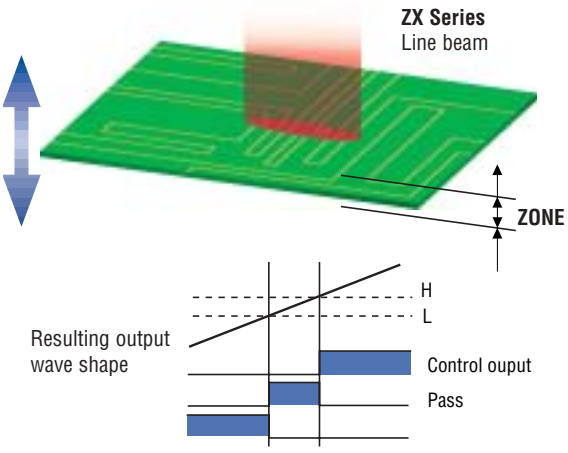
Problem:

Printed circuit boards are raised or lowered within a processing station before work begins. It is hard to detect the right height zone for PCBs using a spot beam sensor due to uneven surface, color differences and surface conditions caused by traces. Even using high-speed averaging calculations on the sensor output makes it tough to find the zone.



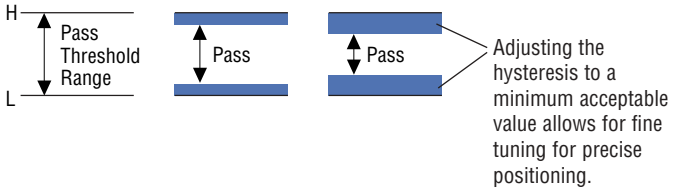
ZX Solution: Line Beam Sensing Head

The line beam provides a wider view that allows the amplifier to average out differences and provide the smooth, linear distance measurement to clearly identify the proper work zone height.



Even Greater Precision with Adjustable Hysteresis

Improve the precision of circuit board positioning by narrowing the acceptable range of hysteresis around the threshold level. The tighter tolerance in board positioning assures more accurate component placement.



Ordering Information

Amplifiers

Description	Part number
Smart Sensor Amplifier, NPN output, 2 m cable	ZX-LDA11 2M
Smart Sensor Amplifier, PNP output, 2 m cable	ZX-LDA41 2M
Calculating unit; attaches between two amplifiers	ZX-CAL
Communications interface unit for sensor setup software	ZX-SF11

ZX Series Amplifier
actual size

Sensing Heads

Description	Part number
Diffuse reflective, Spot beam, 40 +/-10 mm sensing distance	ZX-LD40
Diffuse reflective, Spot beam, 100 +/-40 mm sensing distance	ZX-LD100
Diffuse reflective, Spot beam, 300 +/-200 mm sensing distance	ZX-LD300
Diffuse reflective, Line beam, 40 +/-10 mm sensing distance	ZX-LD40L
Diffuse reflective, Line beam, 100 +/-40 mm sensing distance	ZX-LD100L
Diffuse reflective, Line beam, 300 +/-200 mm sensing distance	ZX-LD300L
Specular reflective, Spot beam, 30 +/-2 mm sensing distance	ZX-LD30V
Specular reflective, Line beam, 30 +/-2 mm sensing distance	ZX-LD30VL
Through-beam, 1 mm dia. measuring width, 0 to 2000 mm sensing distance	ZX-LT001
Through-beam, 5 mm dia. measuring width, 0 to 500 mm sensing distance	ZX-LT005
Through-beam, 10 mm dia. measuring width, 0 to 500 mm sensing distance	ZX-LT010

Accessories

Description	Part number
Extension cable, 1 m cable length	ZX-XC1A 1M
Extension cable, 4 m cable length	ZX-XC4A 4M
Extension cable, 8 m cable length	ZX-XC8A 8M
Extension cable, 9 m cable length	ZX-XC9A 9M
Side-view attachment for ZX-LT001 and ZX-LT005	ZX-XF12
Side-view attachment for ZX-LT0101	ZX-XF22
Sensor Setup Software, English edition	ZX-SW11E

Dimensions

Millimeters (W x H x D)	Inches (W x H x D)	Type or part number
30 x 31.5 x 64.3	1.18 x 1.24 x 2.53	Diffuse reflective sensor heads
17 x 39 x 33	0.67 x 1.54 x 1.30	Specular reflective sensor heads
25 x 55 x 45	0.98 x 2.17 x 1.77	ZX-LT001, ZX-LT005 emitter
15 x 15 x 34	0.59 x 0.59 x 1.34	ZX-LT001, ZX-LT005 receiver
20 x 20 x 42	0.79 x 0.79 x 1.65	ZX-LT010 emitter
20 x 20 x 25	0.79 x 0.79 x 0.98	ZX-LT010, receiver

OMRON

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