NEW

OMRON

N-Smart
Presence Detection Measurement

Smart Fiber Amplifier Units (2-channel models)
E3NX-MA

Greater Flexibility in Equipment Design

Same size as the 1-ch model:
10 mm



2-channel Amplifier reduces installation space by **1/2**

Space-saving and High Performance

Downsized Equipment and Control Panels



Only OMRON provides a 2-ch amplifier that connects to two fiber units.*

EtherCAT®

CC-Link V2

* Based on November 2017 OMRON investigation.

Downsized Equipment and Control Panels

This new 2-ch fiber amplifier unit has two-unit functions in the dimensions of the general one-unit. You need only half the number of units, substantially contributing to downsizing your equipment and control panels. More over, you can substantially reduce the purchase cost, wiring work, and power consumption.



Actual size

General fiber amplifier units

Same number of fiber amplifiers as fiber units are required. Increased installation space prevents design flexibility.



E3NX-MA 2-ch model

Space required for installation reduced by **50%**

Larger space enhances design flexibility.

Additionally

Downsizing

Downsizing the power supply is also possible.

The reduction of power consumption by half* also enables the downsizing of the power supply.

* Compared with E3NX-FA.

Stable detection

From transparent objects to low-reflective workpieces

Performance with Highly Stable Detection even with Two Channels



High Performance

Sensing Distance	Minimum Sensing Object
4 m	**0.6 μm dia.**
For E32-LT11 Fiber Unit with a fiber length of 3.5 m	For E32-D11R Fiber Unit

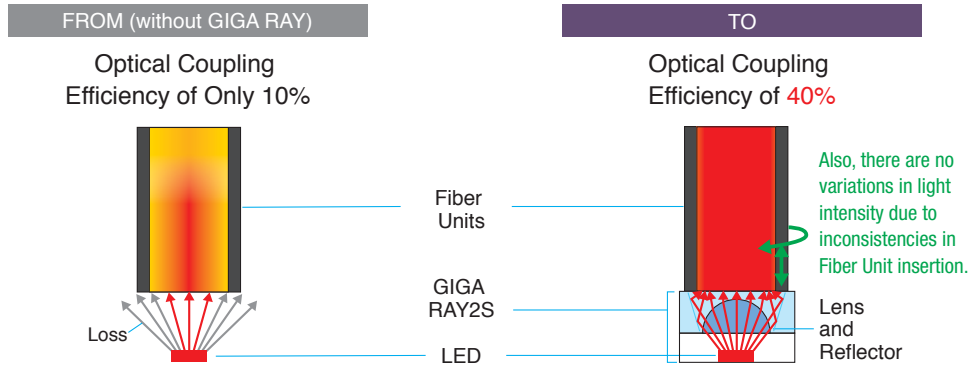
Technologies That Realize Basic Performance

Powerful and Uniform Emission without Lost Light

HIGH-EFFECIENCY COUPLING ELEMENT **GIGA RAY2S** PAT

Optical Coupling Efficiency of **40%**

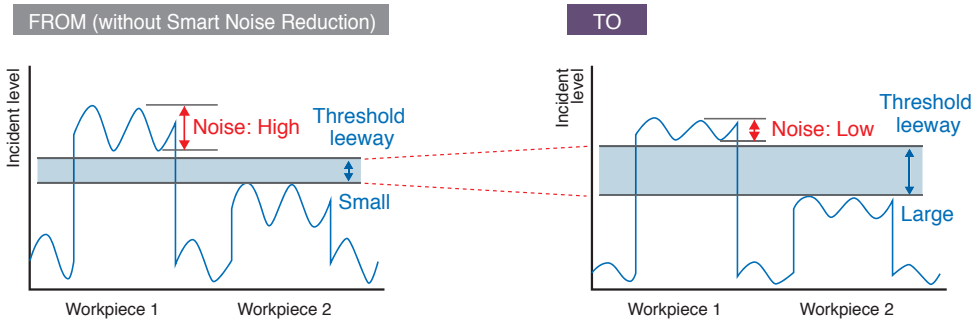
Since the distance between the fiber and the LED is short, light is transmitted without loss.
The lens and reflector emit powerful, uniform emission.



Low Noise to Accurately Capture Signals

LIGHT RECEPTION ALGORITHM **Smart Noise Reduction**

The influences of noise are reduced to achieve stable incident light levels by increasing the number of samples taken.
This increases the margin for threshold values to achieve stable detection.



Easy operation

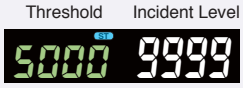
With the Press of a Single Button

Anyone can Easily Set the Light Intensity and Threshold Automatically

Consistent Settings for All Users **Smart Tuning Settings** PAT



Automatically set the light intensity and threshold to optimum values in **1 Step**.

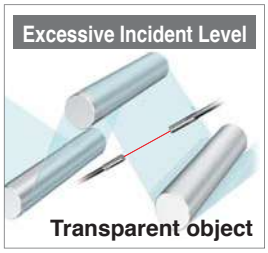


Set to the intermediate value between the incident levels with and without a workpiece.

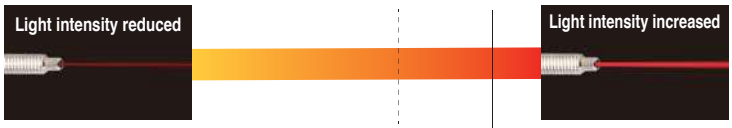
Incident level adjustment with and without a workpiece.

Automatic Adjustment to Optimum Incident Level

Wide Light Intensity Adjustment Range from Transparent Objects to Black Workpieces







×1/2000 ← Conventional Models* (×1/100) (Light intensity adjustment range) → ×1 → ×20

Wider light intensity adjustment range of 40,000 times (Conventional models*: 2,000 times)
You can automatically adjust the light intensity to an optimum value for stable detection even with saturated or insufficient incident light.

*. E3X-HD

Reliable function

Two Decision Support Functions to Help You

Visual Displays of the Passing Time and Difference in Incident Levels. **Solution Viewer** PAT

Selecting Fiber Units

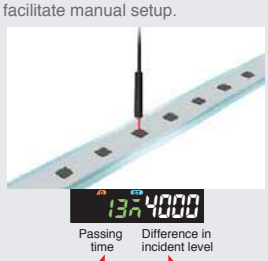
Just about anyone can make a quantitative decision without special skills.



The difference in incident level is large, so use B.

Setting Optimum Thresholds and Modes

You can see the passing time and difference in incident levels to facilitate manual setup.

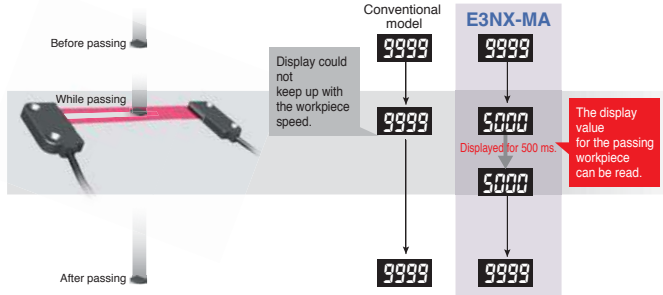


The passing time is "13 ms", so it is OK with Standard Mode.

The incident light level difference is 4,000 when the level is 5,000 with a workpiece, so a threshold of 3,000 is OK.

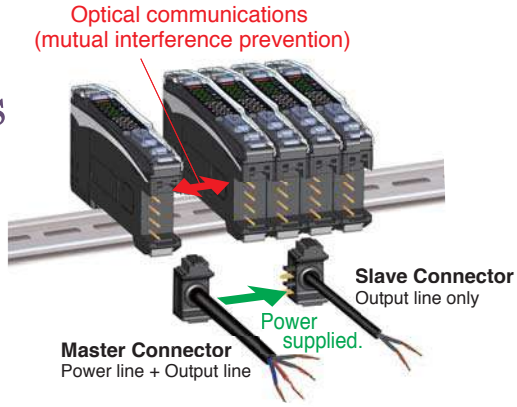
Visual Information for Fast Workpieces **Change Finder** PAT

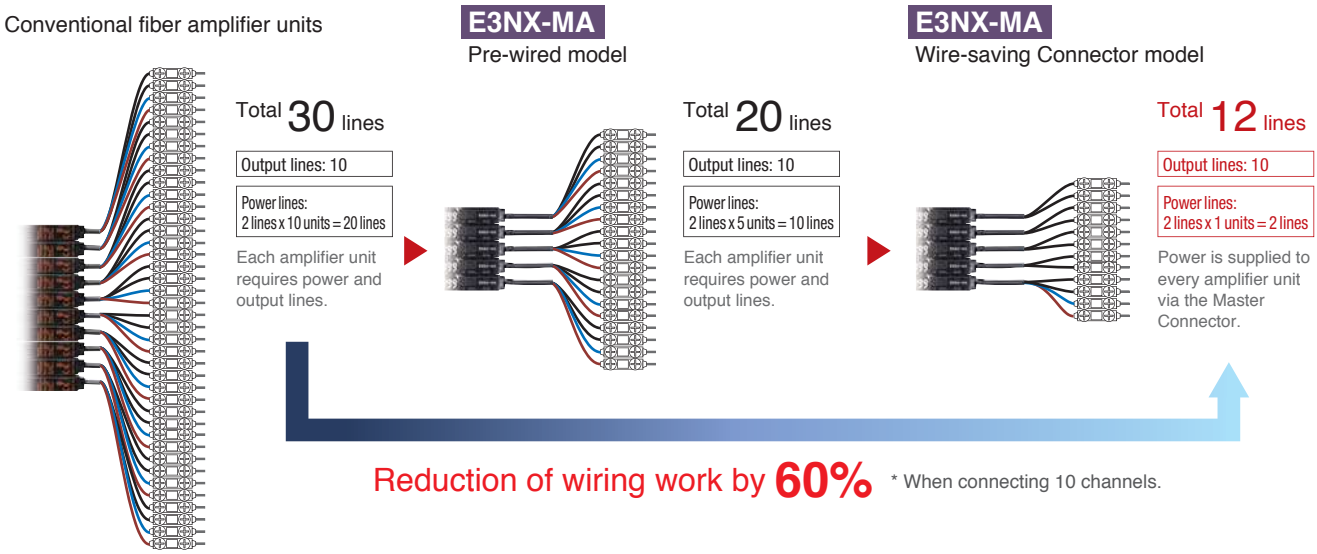
You can confirm changes in displayed values for fast workpieces to accurately set the threshold.



Wire-saving Connector Models Reduce Wiring Work

Power is supplied from the Master Connector; the Slave Connectors have output lines only. Since there are no Master/Slave distinctions in amplifier units, you can unify the stock into one model type.





More Wire-saving and Improved Productivity with Network Communications

Use Sensor Communications Units to save more wiring and remotely control up to 15 amplifier units (total 30 channels). Full-view screen for 2-ch threshold and light intensity is available; Collective setting reduces equipment commissioning time. The system monitors equipment conditions for preventive maintenance, and reduces downtime in case of trouble, enabling safe and stable operation of equipment.



Sensor Communications Units E3NW

Cat. No. E428

Easy detection

Control outputs through numerical or logical operations are possible.

A Single Sensor can Handle a Wide Range of Applications

Discrimination through numerical operations

Mark detection by discriminating the gap between the sheet and the mark



1ch	2ch	Result
Sheet	Mark	There is a gap.
Sheet	Sheet	There is no gap.

One single fiber amplifier can perform a numerical operation (difference) between two light intensities and discriminate based on the figure.

Operation example

1ch	2ch	Operation result
1000	2000	-1000
5600	500	5100

Control output through logical operations

Output of the logical operation results between 1-ch and 2-ch sensing is possible.

AND discrimination

Inspection of lead frame feeding position

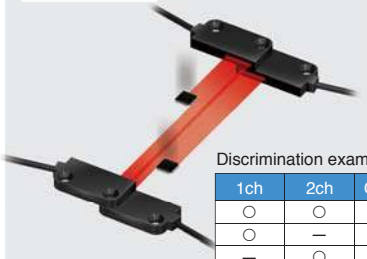


Discrimination example

1ch	2ch	Output
○	○	○
—	○	—
○	—	—
—	—	—

OR discrimination

Fall detection by using two area fiber units



Discrimination example

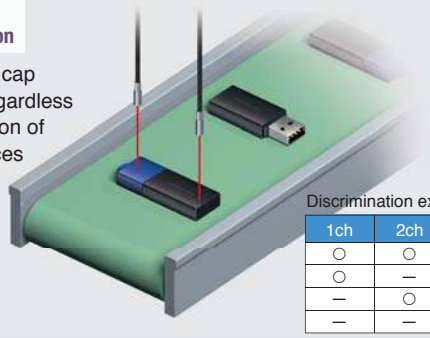
1ch	2ch	Output
○	○	○
○	—	○
—	○	○
—	—	—

One single fiber amplifier can provide control outputs based on AND operation or OR operation between two sensors, without using a PLC or a sensor controller.



XOR discrimination

Detection of cap presence regardless of the direction of the workpieces

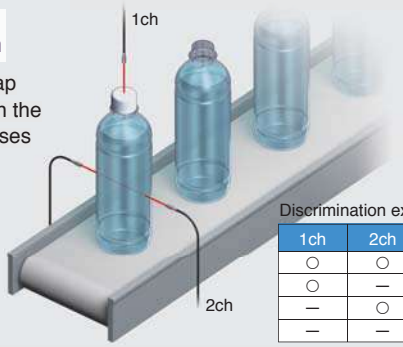


Discrimination example

1ch	2ch	Output
○	○	—
○	—	○
—	○	○
—	—	—

Rising synchronization

Detection of cap presence when the workpiece passes



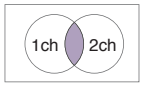
Discrimination example

1ch	2ch	Output
○	○	○
○	—	—
—	○	—
—	—	—

Reference

Output pattern of logical operations

Outputs discriminating the combination of operational results are possible: AND operation outputs when both 1ch and 2ch are turned ON, OR operation outputs when either 1ch or 2ch is turned ON, or when both 1ch and 2ch are turned ON, and XOR operation outputs when only either 1ch or 2ch is turned ON.

Discrimination		Output		
1ch	2ch	AND	OR	XOR
○	○	○	○	×
○	×	×	○	○
×	○	×	○	○
×	×	×	×	×
				

Ordering Information

Fiber Amplifier Units

Type		Connecting method	Appearance	Inputs/outputs	Model	
					NPN output	PNP output
2-channel models ✻2	Standard Type	Pre-wired (2 m)		2 outputs	**E3NX-MA11**	**E3NX-MA41**
		Wire-saving Connector		2 outputs	**E3NX-MA6**	**E3NX-MA8**
	Model for Sensor Communications Unit ✻1	Connector for Sensor Communications Unit		---	**E3NX-MA0**	

✻1. A Sensor Communications Unit is required if you want to use the Fiber Amplifier Unit on a network.
✻2. Two Fiber Units can be connected to one Fiber Amplifier Unit.

Accessories (Sold Separately)

Wire-saving Connectors (Required for models for Wire-saving Connectors.)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. Note: Protective stickers are attached. Cable length is 2 m.

Type	No. of conductors	Model	Applicable Fiber Amplifier Units
Master Connector	4	**E3X-CN21**	E3NX-MA6 E3NX-MA8
Slave Connector	2	**E3X-CN22**	

Related Products

Sensor Communications Units

Type	Model
Sensor Communications Unit for EtherCAT	**E3NW-ECT**
Sensor Communications Unit for CC-Link	**E3NW-CCL**
Distributed Sensor Unit ✻	**E3NW-DS**

Refer to your OMRON website for details.
✻ The Distributed Sensor Unit can be connected to any of the Sensor Communications Units.

Ratings and Specifications

Item		Type	Standard Type		Model for Sensor Communications Unit
		NPN output	E3NX-MA11	E3NX-MA6	E3NX-MA0
		PNP output	E3NX-MA41	E3NX-MA8	
		Connecting method	Pre-wired	Wire-saving Connector	Connector for Sensor Communications Unit
Inputs/outputs	Outputs		2 outputs		---
	External inputs		---	---	
Light source (wavelength)			Red, 4-element LED (625 nm)		
Power supply voltage			10 to 30 VDC, including 10% ripple (p-p)		Supplied from the connector through the Sensor Communications Unit
Power consumption			At Power supply voltage of 24 VDC Normal mode : 960 mW max. (Current consumption at 40 mA max.) Eco function ON: 770 mW max. (Current consumption at 32 mA max.) Eco function LO : 870 mW max. (Current consumption at 36 mA max.)		
Control output			Load power supply voltage: 30 VDC max., open-collector output (depends on the NPN/PNP output format) Load current: Groups of 1 to 3 Amplifier Units: 100 mA max., Groups of 4 to 30 Amplifier Units: 20 mA max. (Residual voltage: At load current of less than 10 mA: 1 V max. At load current of 10 to 100 mA: 2 V max.) OFF current: 0.1 mA max.		---
Response time	Super-high-speed mode (SHS)		Operate or reset: 100 µs		
	High-speed mode (HS)		Operate or reset: 450 µs		
	Standard mode (Stnd)		Operate or reset: 1ms		
	Giga-power mode (GIGA)		Operate or reset: 16ms		
No. of Units for mutual interference prevention			9 Note: The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.		
Functions			Auto power control (APC), dynamic power control (DPC), timer, zero reset, resetting settings, eco mode, bank switching, power tuning, and hysteresis width		

Note: For details, refer to the Smart Fiber Amplifier Units E3NX-MA Datasheet (Cat No.E467)

N-Smart

Introduction to the N-Smart Series

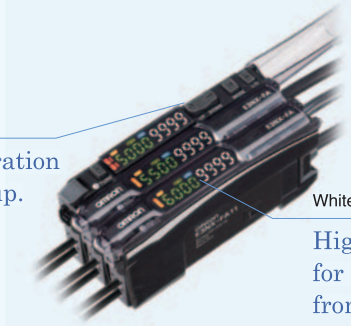
The IoT platform that enables you to see, complete a lineup, and deliver

Winner of the Good Design Award



* For performance (sensing distance and minimum sensing object) based on November 2017 OMRON investigation.

Common Features and Models in the N-Smart Series



Common Buttons

Intuitive Operation and Easy Setup.

White Characters on a Black background

High-contrast displays for easy visibility from a distance.

For the Fiber Sensor lineup, see

Fiber Sensor Best Selection Catalog

With this one you can select the optimum Fiber Unit and Fiber Amplifier Unit!



Cat. No. E418

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