PHOTOSWITCH® Light Arrays

Allen-Bradley

Detect or Measure Targets Anywhere in a Two Dimensional Area – Even if the Parts Are Irregularly Shaped, Sized, or Positioned

Overview

Traditional photoelectric transmitted beam sensors detect in a single line from the emitter to the receiver. Light array sensors combine multiple emitter or receiver elements into a single housing to create a "sensing field" instead of a single "sensing beam". Therefore, this type of sensor is capable of detecting targets over a wider area. This makes the arrays ideal for detecting oddly shaped parts, products with gaps or spaces, or inconsistently positioned targets, at a fraction of the cost of using multiple sensor pairs. Some types of arrays can utilize the multiple beam pairs to detect product height, width, or position. The Allen-Bradley family of light arrays offers a range of functions and sensing heights to solve a wide variety of application challenges.

Features

- Discrete and Measurement models for use in a broad range of applications
- Detect oddly shaped or non-uniform objects regardless of position in sensing field
- Detect targets with gaps or spaces
- Slim housing profiles
- Detection over a larger area than traditional photoelectric sensors
- Long sensing ranges
- Discrete models are optically synchronized — no need to electrically connect the emitter to the receiver
- Discrete models have internal controls — no external controller required
- Measure heights or identify which beams are broken (to determine the position of spaces in the target product)
- Sort products by size with a single pair of light arrays

Light Array Concept

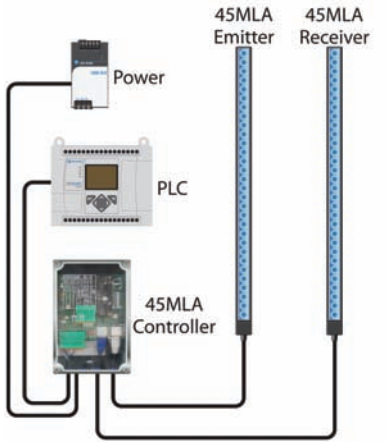
Traditional Photoelectric Transmitted Beam Sensor — Single Sensing Beam

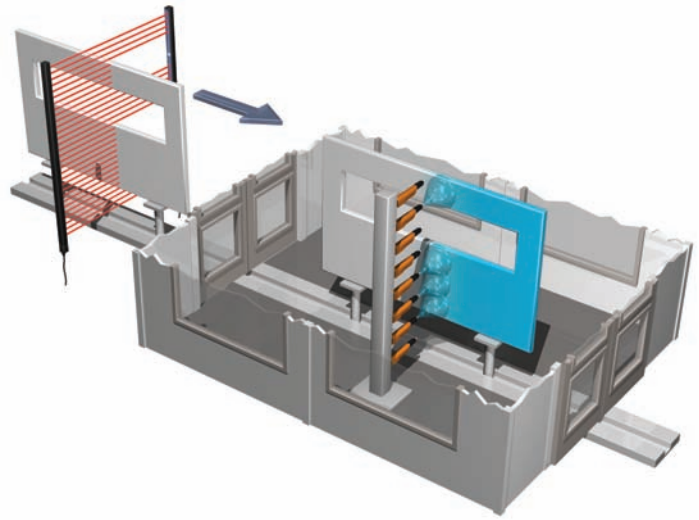
Light Array Sensor — Multiple Sensing Beams

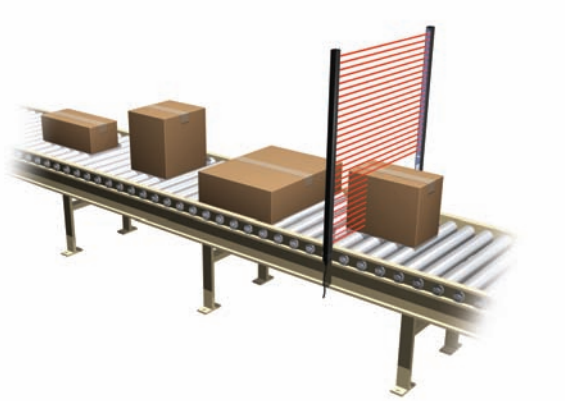
LISTEN. THINK. SOLVE.®

45MLA Measuring Light Array

- Measure product height with different size models — sensing heights from 300 mm (11.8 in) to 1200 mm (47.2 in)
- Sensing range of up to 4 m (13 ft)
- Slim profile (15 x 20 mm/0.6 in x 0.8 in)
- "Three Box System" — the emitter and receiver arrays are connected to a separate controller
- Connection options include analog output; multiple, configurable discrete outputs; or communication via ASCII messaging over RS485 or CAN
- Individual beam status can also be transmitted, allowing the unit to detect the position of spaces, gaps, or holes (greater than 18 mm/0.7 in) in the product





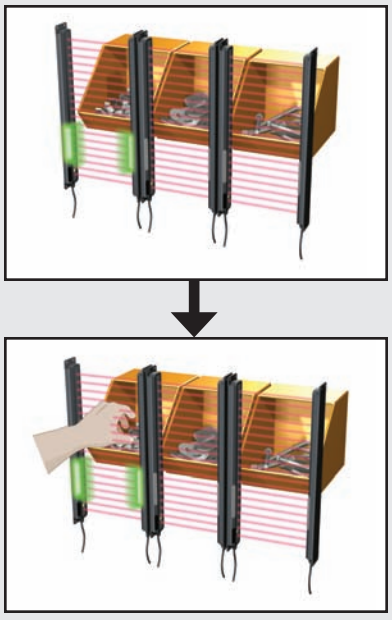


Example Application — Using Individual Beam Results

- The 45MLA Controller RS-485 is capable of communicating individual beam results via RS-485
- Beam status information can be collected with a MicroLogix™ PLC
- Light array determines the level of the top and bottom of the part along with the position of any gaps
- System turns the corresponding paint nozzles on or off to save paint and energy

Example Application — Box Height Measurement

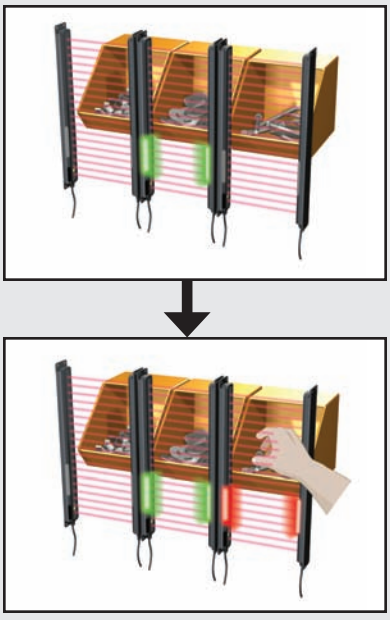
- The 45MLA detects the height of boxes moving down a conveyor line
- Four different box heights correspond to four different sensing zones which can be individually taught by the user (I/O controller model)
- Each detection zone has its own individual discrete output, which can be connected to a PLC to sort the different box sizes



45PVA Parts Verification Array

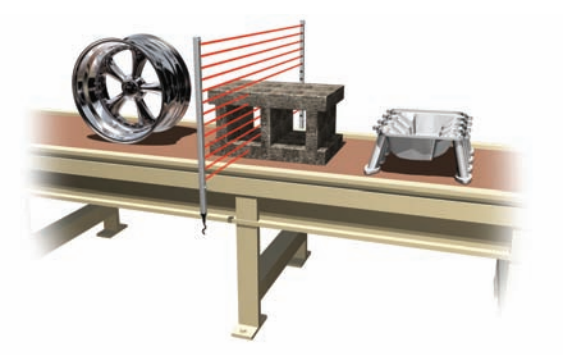
The 45PVA Parts Verification Array is a special purpose light array for bin picking applications. By mounting the sensors on parts bins and wiring them into a controller programmed with the necessary logic, a virtually error-free bin-picking process can be achieved.

- Bin picking sensors — "Pick-to-Light" with automatic feedback
- Green "Job Light" indicates proper bin
- Red "Warning Indicator" automatically indicates incorrect bin pick
- Reduce risk of missing components or incorrect assembly!
- For more information on this product, see Product Profile pub. number 45PVA-PP001B-EN-P



Discrete Light Arrays

The 45DLA and 45AST are discrete light arrays with simple on/off outputs. These products are capable of detecting a product anywhere within the detection area of the array.

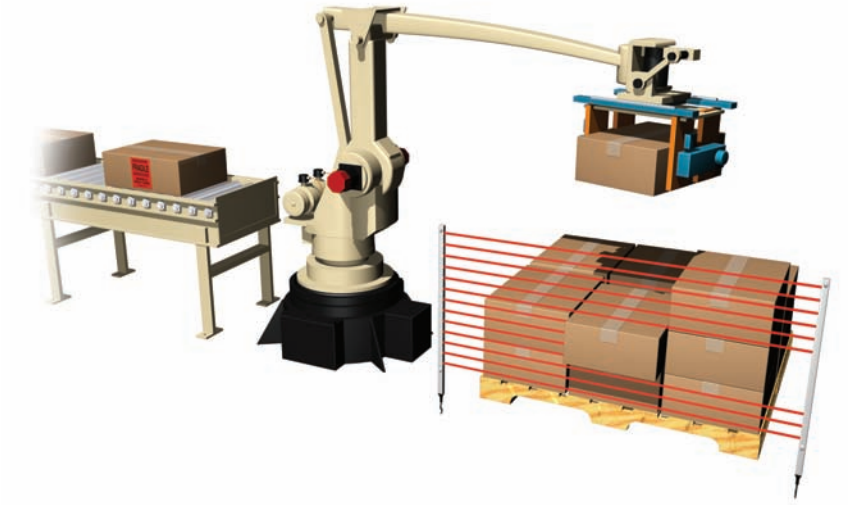


Example Application — Detect Product with Gaps or Spaces

The multiple beams allow the arrays to detect irregularly shaped targets or parts with gaps or spaces.

45DLA Discrete Light Array

- Larger sizes (up to a sensing height of 730 mm/28.9 in)
- Very slim profile (12 x 16 mm/0.5 x 0.6 in)
- The most cost effective arrays in the portfolio
- Sensing range of up to 8 m (26.2 ft)



Example Application — Pallet Overhang in Palletizer

In this application, a robot is placing products on a pallet. The 45DLA checks to confirm that no product is hanging over the edge of the pallet before the machine shrink wraps the parts.

45AST Discrete Light Array

- Tight resolution (down to 11 mm/0.43 in)
- Fast response times (down to 4 ms)
- Diagonal detection beams enable the 45AST to detect an object perpendicular to the arrays
- Housing profile of 34 x 14.5 mm (1.3 x 0.6 in).

Example Application — Detection of Envelope

Diagonal detection beams give the product the capability of detecting very slim objects, such as a piece of paper or an envelope, perpendicular to the arrays.

Example Application — Detection of Ejected Parts

A wider detection area than standard photoelectric sensors and a tight resolution enable the 45AST to detect small parts being ejected from a machine.

General Ordering Information for Light Array Sensors

Note: Light Array Transmitted Beam Pair catalog numbers include both emitter and receiver arrays.

45MLA Measuring Light Array

Housing Height mm (in)	Sensing Height mm (in)	Beam Spacing mm (in)	Number of Beams	Catalog Number
322 (12.7)	300 (11.8)	25 (0.98)	12	**45MLA-AT0300P25**
622 (24.5)	600 (23.6)	25 (0.98)	24	**45MLA-AT0600P25**
922 (36.3)	900 (35.4)	25 (0.98)	36	**45MLA-AT0900P25**
1222 (48.1)	1200 (47.2)	25 (0.98)	48	**45MLA-AT1200P25**
322 (12.7)	300 (11.8)	10 (0.39)	30	**45MLA-AT0300P10**
622 (24.5)	600 (23.6)	10 (0.39)	60	**45MLA-AT0600P10**
922 (36.3)	900 (35.4)	10 (0.39)	90	**45MLA-AT0900P10**
1222 (48.1)	1200 (47.2)	10 (0.39)	120	**45MLA-AT1200P10**

Note: For cascadable 45MLA arrays, substitute"C" for "A" in the catalog number. For example, 45MLA-CT0300P10.

45MLA Required Accessories

Description	Catalog Number
45MLA Controller – Analog	**45MLA-CTRL-ALG**
45MLA Controller – Basic	**45MLA-CTRL-BSC**
45MLA Controller – I/O	**45MLA-CTRL**
45MLA Controller – RS485	**45MLA-CTRL-485**
45MLA Controller – CAN	**45MLA-CTRL-CAN**
Controller to Array Cable – 3 m (9.8 ft)	**445L-AC8RJ3**
5 m (16.4 ft)	**445L-AC8RJ5**
8 m (26.2 ft)	**445L-AC8RJ8**

45PVA Parts Verification Arrays

Housing Height mm (in)	Sensing Height mm (in)	Response Time	Sensing Range m (ft)	Connection Type	Sensing Mode	Catalog Number
140 (5.5)	100 (3.9)	35 ms	2 (6.5)	2 x 4 pin micro (M12)	Transmitted Beam Pair	**45PVA-1LEB1-F4**
265 (10.0)	225 (8.6)	68 ms	2 (6.5)	2 x 4 pin micro (M12)	Transmitted Beam Pair	**45PVA-1LEB2-F4**
340 (13.4)	300 (11.8)	70 ms	2 (6.5)	2 x 4 pin micro (M12)	Transmitted Beam Pair	**45PVA-1LEB3-F4**
415 (16.3)	375 (14.7)	94 ms	2 (6.5)	2 x 4 pin micro (M12)	Transmitted Beam Pair	**45PVA-1LEB4-F4**
140 (5.5)	87 (3.4)	120 ms	Retro 2 (6.5); Diffuse 0.4 (1.3)	4 pin micro (M12)	Retroreflective/Diffuse	**45PVA-2LEA1-F4**
265 (10.0)	203 (8.0)	120 ms	Retro 2 (6.5); Diffuse 0.4 (1.3)	4 pin micro (M12)	Retroreflective/Diffuse	**45PVA-2LEA2-F4**

45DLA and 45AST Discrete Light Arrays

Housing Height mm (in)	Sensing Height mm (in)	Response Time	Sensing Range m (ft)	Resolution	Connection Type	Catalog Number
100 (3.9)	50 (2)	4 ms	0.5…2 (1.6…6.5)	15 (0.59)	2 x 4 pin micro (M12)	**45AST-1JPB1-F4**
150 (5.9)	100 (3.9)	8 ms	0.15…0.8 (0.5…2.6)	11 (0.43)	2 x 4 pin micro (M12)	**45AST-1JPB2-F4**
150 (5.9)	100 (3.9)	8 ms	0.5…2.5 (1.6…8.2)	13 (0.51)	2 x 4 pin micro (M12)	**45AST-1JPB3-F4**
200 (7.9)	150 (5.9)	8 ms	0.15…0.8 (0.5…2.6)	17 (0.66)	2 x 4 pin micro (M12)	**45AST-1JPB4-F4**
266 (10.5)	118 (4.65)	25 ms	0.2…8 (0.7…26.2)	30 (1.2)	2 x 4 pin micro (M12)	**45DLA-1LEB1T-F4**
354 (13.9)	206 (8.11)	45 ms	0.2…8 (0.7…26.2)	30 (1.2)	2 x 4 pin micro (M12)	**45DLA-1LEB2T-F4**
530 (20.9)	382 (15.04)	85 ms	0.2…8 (0.7…26.2)	30 (1.2)	2 x 4 pin micro (M12)	**45DLA-1LEB4T-F4**
706 (27.8)	558 (21.97)	125 ms	0.2…8 (0.7…26.2)	30 (1.2)	2 x 4 pin micro (M12)	**45DLA-1LEB6T-F4**
882 (34.7)	734 (28.9)	165 ms	0.2…8 (0.7…26.2)	30 (1.2)	2 x 4 pin micro (M12)	**45DLA-1LEB8T-F4**

45PVA, 45DLA, and 45AST Accessories

Description	Catalog Number
2 m (6.5 ft) DC micro (M12) QD cordset	**889D-F4AC-2**
DC micro (M12) QD Patchcord, 4-pin, 2 m (6.5 ft)	**889D-F4ACDM-2**
5-pin DC micro (M12) Splitter Tee for 45PVA	**1485P-RDR5**
DC micro (M12) Splitter Tee for 45DLA	**879D-F4DM**
Dual port distribution box (up to 8 TB pairs or Retro/Diffuse units)	**898D-58DT-B5**

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