# Installation Instructions
## 45MLA Measuring Light Array Sensors

**Description**
The Allen-Bradley 45MLA measuring light array is a measurement sensor that utilizes an array of transmitted beam photoelectric sensor pairs to detect and measure objects. The array housing is extremely compact, allowing for easy installation in a range of applications.

The 45MLA are packaged as transmitted beam pairs—the emitter and receiver arrays are both included. The system requires an Allen-Bradley 45MLA controller, which must be ordered separately.

The controller drives the photoelectric elements in the emitter and reads out the receiver beam information. Use of one of these external controllers allows the flexibility to:
- Output an analog signal (4…20 mA or 0…10V)
- Configure up to four separate sensing zones with independent outputs, or
- Communicate individual beam status via serial protocols.

Additionally, the 45MLA can also be customized for application specific overhang and over-height detection.

## Features
- Height measuring capability
- Slim profile array (16 x 20 mm (0.6 x 0.8 in.))
- Beam spacing (pitch) of 10 mm (0.4 in.) or 25 mm (1.2 in.)
- Minimum detectable object is 18 mm (0.7 in.) or 33 mm (1.3 in.)
- Long operating range—4 m (13 ft)
- Fast reaction time and measurement speed
- Sensing array height of 300…1200 mm (11.8…47.2 in.)
- IP54
- Individual beam status available via controller (serial communication models only)
- Same housing as Allen-Bradley GuardShield™ Micro 400

## Specifications
### Environmental
- **Certifications**: cULus and CE Marked for all applicable directives
- **Operating Environment**: IP54
- **Operating Temperature (C (F))**: 0…+55° (+32…+131°)
- **Storage Temperature (C (F))**: −20…+70° (−4…+158°)
- **Vibration**: 10…55 Hz; amplitude 0.35 mm (0.01 in.); meets or exceeds IEC 60068-2-6

### Shock
- **Acceleration**: 10 g, pulse duration 16 ms;10…55 Hz; amplitude 0.35 mm (0.01 in.); meets or exceeds IEC 60068-2-29

### Relative Humidity
- 15…95%

### Optical
- **Sensing Modes**: Transmitted beam pair
- **Sensing Range**: 0…4 m (0…13 ft)
- **Field of View**: 3.2°
- **Light Source**: 940 nm
- **Beam Spacing (pitch)**: 10 mm (0.4 in.) or 25 mm (1.2 in.)
- **Minimum Detectable Object Height**: 18 mm (0.7 in.) or 33 mm (0.3 in.)
- **LED Indicators**: Red: Status Green: Alignment

### Mechanical
- **Housing Material**: Aluminum
- **Lens Material**: Polycarbonate
- **Cover Material**: Polycarbonate
- **Connection Types**: 8-pin DC micro (M12) female QD on 500 mm (20 in.) cable pigtail (for connection to 45MLA controller only)

### Accessories
- **Supplied Accessories**: Adjustable mounting kit (44SL-AF6143)
- **Required Accessories (Controller)**
  - Controller Analog Model: 45MLA-CTRL-ALG
  - Controller Basic Model: 45MLA-CTRL-BSC
  - Controller I/O Model: 45MLA-CTRL
  - Controller RS485: 45MLA-CTRL-485
  - Controller CAN: 45MLA-CTRL-CAN
- **Required Accessories (Light array to controller connecting cable)**
  - 3 m M12—RJ45: 44SL-AC8RJ3
  - 5 m M12—RJ45: 44SL-AC8RJ5
  - 8 m M12—RJ45: 44SL-AC8RJ8
  - Max. system length cannot exceed 10 m (32.8 ft)
- **Optional Accessories**: Adjustable flat mounting bracket: 44SL-AF6149

### Attention
These devices are intended for object recognition only and may not be used for protection of humans (access protection).
Mounting Instructions
1. Both the emitter and receiver profiles are lined with continuous grooves to attach to the mounting brackets, allowing these brackets to be attached at any position along the length of the housing. **Note:** A flat mounting kit is also available for purchase separately.

2. Align the emitter and receiver such that the two units are parallel to each other and the sides with the photosensor elements (and the clear plastic lenses) are facing each other.

3. Please note that the receiver (blue connector) can be sensitive to interference light. No other source of external light, including the emitters of any photoelectric sensor, array, or reflective surface, should be directed towards the receiver housing. Although the 45MLA is tolerant of bright sunlight, it is better practice to mount the receiver housing such that no sun light shines directly into the curved front area of the receiver lens.

In addition, the connectors cables are offered with both blue and white rings attached to each end of each cable. Remove the blue markers from the emitter’s cable and the white ones from the receiver’s cable so that the cables are marked appropriately for future use.

The individual light arrays are powered through this connection to the controller. Please refer to the Installation Instructions corresponding to the specific controller that you are using for further details on wiring and connecting the controller.

Alignment
This is a crucial step in the setup since sensor operation is dependent on correct alignment of the emitter and receiver. This process is simplified by using the green LED on the receiver unit to serve as an indication of proper alignment.

<table>
<thead>
<tr>
<th>Array LED</th>
<th>Description</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Light array alignment</td>
<td>Off</td>
<td>Target present or arrays not aligned</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Target not present, arrays aligned and within range</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green (flashing)</td>
<td>Light intensity inadequate</td>
</tr>
<tr>
<td>Red</td>
<td>Light array status</td>
<td>Off</td>
<td>Target not present (and arrays aligned)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
<td>Target present (or arrays not aligned)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red (flashing)</td>
<td>Height measurement error</td>
</tr>
</tbody>
</table>

Electrical Installation
Both light arrays must be connected to the controller through the RJ45 connectors. For ease of connection, the pigtail connector for the emitter has a white marker, and the receiver has a blue marker. Be sure to connect the emitter to the plug connection on the controller with the white marker, and the receiver to the plug connection with a blue marker.

Horizontal Alignment
1. Aim the receiver 90° away from the emitter (light source) and verify that the red status LEDs on both the receiver and emitter are ON.

2. Slowly rotate the receiver to face the emitter and note the point at which these red LEDs turn OFF and the green alignment LED turns ON.

3. Continue to rotate the receiver away from the emitter until the green LED turns OFF again, and the red LEDs turn ON. Note the point at which this happens.

4. For horizontal centering, rotate the array halfway between the two points at which the red LEDs turn OFF.
Vertical Alignment

1. Beginning with the two arrays parallel to each other, slide the receiver down and note the point at which the red LEDs turn ON on both arrays. This indicates that the receiver is no longer in line with the emitter.

2. Slide the receiver back upwards until the red LEDs turn OFF and the green LED on the receiver turns ON. This indicates that the two arrays are aligned.

3. Continue to slide the receiver upwards, noting the point at which the green LED turns OFF, and the two red LEDs turn ON, again indicating misalignment.

4. For vertical centering, position the receiver halfway between the two points at which the red LEDs turn OFF.

Wiring Diagram

The 45MLA is a “Three Box System”—every setup consists of an emitter array, a receiver array, and an external controller. All electrical connections are made via the 45MLA-CTRL controller.

Note: Cascading light array systems can consist of two or three light array pairs. The last pair must be a standard array pair and the first (and middle) pairs must be cascadable. A total system can be no more than 10 m (32.8 ft) in length from the controller to the end of the last array and cannot exceed 254 total beams.

IMPORTANT For use in NFPA 79 applications only.

Adjustable Bracket 445L-AF6143
(4 pieces included) [mm (in.)]

Flat Bracket 445L-AF6145 (sold separately) [mm (in.)]

Cascadeable Array Extension Patchcord 445L-AC8PCx

The 45MLA arrays feature an M12, 8-pin female QD which connects to the connecting cable 445L-AC9RJx (x = 3, 5, or 8 meter length). The other end of the 445L connecting cable has an RJ45 connector which plugs into the ports on the controller. The emitter plugs into the top port, marked with the white dot. The receiver plugs into the lower port, marked with the blue dot. The 445L connecting cable comes with both blue and white markers at each end. It is recommended to remove the markers that do not correspond to the array pigtail marker.
### Dimensions [mm (in.)]

#### Standard Array

![Diagram of Standard Array]

<table>
<thead>
<tr>
<th>A</th>
<th>Sensing Height [mm (in.)]</th>
<th>C</th>
<th>Housing Height [mm (in.)]</th>
<th>Beam Spacing [mm (in.)]</th>
<th>No. of Beams</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 (11.8)</td>
<td>322 (12.7)</td>
<td>25 (0.98)</td>
<td>12</td>
<td>45MLA-AT0300P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 (23.6)</td>
<td>622 (24.5)</td>
<td>25 (0.98)</td>
<td>24</td>
<td>45MLA-AT0600P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 (35.4)</td>
<td>922 (36.3)</td>
<td>25 (0.98)</td>
<td>36</td>
<td>45MLA-AT0900P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200 (47.2)</td>
<td>1222 (48.1)</td>
<td>25 (0.98)</td>
<td>48</td>
<td>45MLA-AT1200P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 (11.8)</td>
<td>322 (12.7)</td>
<td>10 (0.39)</td>
<td>30</td>
<td>45MLA-AT0300P10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 (23.6)</td>
<td>622 (24.5)</td>
<td>10 (0.39)</td>
<td>60</td>
<td>45MLA-AT0600P10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 (35.4)</td>
<td>922 (36.3)</td>
<td>10 (0.39)</td>
<td>90</td>
<td>45MLA-AT0900P10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200 (47.2)</td>
<td>1222 (48.1)</td>
<td>10 (0.39)</td>
<td>120</td>
<td>45MLA-AT1200P10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Cascadable Array

![Diagram of Cascadable Array]

<table>
<thead>
<tr>
<th>A</th>
<th>Sensing Height [mm (in.)]</th>
<th>C</th>
<th>Housing Height [mm (in.)]</th>
<th>Beam Spacing [mm (in.)]</th>
<th>No. of Beams</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 (11.8)</td>
<td>339 (13.3)</td>
<td>25 (0.98)</td>
<td>12</td>
<td>45MLA-CT0300P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 (23.6)</td>
<td>639 (25.2)</td>
<td>25 (0.98)</td>
<td>24</td>
<td>45MLA-CT0600P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 (35.4)</td>
<td>939 (37.0)</td>
<td>25 (0.98)</td>
<td>36</td>
<td>45MLA-CT0900P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200 (47.2)</td>
<td>1239 (48.8)</td>
<td>25 (0.98)</td>
<td>48</td>
<td>45MLA-CT1200P25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 (11.8)</td>
<td>339 (13.3)</td>
<td>10 (0.39)</td>
<td>30</td>
<td>45MLA-CT0300P10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 (23.6)</td>
<td>639 (25.2)</td>
<td>10 (0.39)</td>
<td>60</td>
<td>45MLA-CT0600P10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 (35.4)</td>
<td>939 (37.0)</td>
<td>10 (0.39)</td>
<td>90</td>
<td>45MLA-CT0900P10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200 (47.2)</td>
<td>1239 (48.8)</td>
<td>10 (0.39)</td>
<td>120</td>
<td>45MLA-CT1200P10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The 45MLA ships as a transmitted beam pair—both the emitter and receiver arrays are in one package. The “T” in the cat. no. represents the transmitted beam pair. For individual parts, replace the “T” with an “E” for emitter or “R” for receiver, for example, 45MLA-AR0300P10.

---

### www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation, Voirles, Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0660
Asia Pacific: Rockwell Automation, Level 14, Cent E, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887-4788, Fax: (852) 2508 1846

10000035051
107 863
August 2010, Printed in Switzerland