

## Presence Sensing Safety Devices

### Safety Light Curtains

#### Perimeter Access Control



#### Description

Multi-beam safety light curtains from Rockwell Automation are infrared protection devices with 1 to 4 infrared beams. They operate on the through-beam principle, consisting of a sender and receiver unit and are suitable for access control and perimeter guarding.

The PAC fulfils the pr EN 50100 requirements, safety category 4, in that it is a self monitoring device.

- Integrated evaluation with state-of-the-art electronics and especially developed ICs (ASICs)
- Beam coding for high interference immunity
- Actively monitored semiconductor outputs
- Mini style quick disconnect connectors
- Fast response time
- Large signal reserve (factor 2)
- Optical synchronization of sender and receiver units
- Multiple safeguarding by means of corner mirrors and columns
- Operating modes:
  - Electronic Device Monitoring (EDM)
  - Restart Interlock
- Muting configuration available

The devices were designed for industrial applications and offer the following advantages:

- Beam coding for optimal interference immunity
- Adaptability for safe PLC
- Robust modular construction
- Universal application possibilities
- Simple installation

|                        |         |
|------------------------|---------|
| Maximum scanning range | 70m     |
| Maximum beam gap       | 500mm   |
| Minimum beam count     | 1 beam  |
| Maximum beam count     | 4 beams |
| Minimum housing length | 320mm   |
| Maximum housing length | 1800mm  |

#### Specifications

|                                                 |                                                                                                                                          |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Standards                                       | EN 50100                                                                                                                                 |
| Approvals                                       | BG and CE marked for all applicable directives                                                                                           |
| Protected Height                                | Depends on product selection                                                                                                             |
| Scanning Range                                  | 70m (225ft), single beam PAC 7.5m                                                                                                        |
| Beam Gap                                        | Depends on product selection                                                                                                             |
| Enclosure Rating                                | IP 65                                                                                                                                    |
| Connection Type                                 | 7-pin mini style on transmitter and 8-pin on receiver                                                                                    |
| Supply Voltage $U_v$<br>Maximum Residual Ripple | 24V DC $\pm 20\%$<br>5 Vss                                                                                                               |
| Power Consumption                               | 7 watts—Transmitter<br>6 watts—Receiver                                                                                                  |
| Synchronization                                 | Optical, without separate synchronization channel                                                                                        |
| Outputs<br>Minimum output voltage               | 2 x PNP, 0.5 A, short circuit protected<br>$U_v - 2V$                                                                                    |
| Response Time                                   | $\leq 20ms$                                                                                                                              |
| Protection                                      | Short circuit and overload                                                                                                               |
| Connection<br>Max. wire cross section           | 1.0mm <sup>2</sup> with jacket<br>1.5mm <sup>2</sup> without jacket                                                                      |
| Cable length                                    | 60m (196.8ft) maximum<br>Protection against over-voltage ( $\geq 1kV$ ) from Level 3 or higher (IEC 801 part 5; 2 kV) between PE and +V. |
| Mode of Operation                               | Guard-only with manual restart                                                                                                           |
| Safety Category                                 | Type 4 (self-checking)                                                                                                                   |
| Requirement                                     | According to EN 50100                                                                                                                    |
| Operating Ambient Temp.                         | 0°C to 55°C (32°F to 131°F)                                                                                                              |
| Air Humidity                                    | 15%...95% (not condensing)                                                                                                               |
| Storage Temperature                             | -25°C to 70°C (-13°F to 158°F)                                                                                                           |
| Approximate Dimensions<br>Height                | Length dependent upon protected height; (see dimensional drawings)                                                                       |
| Housing Cross Section                           | 52 mm x 55 mm (2.05in x 2.17in)                                                                                                          |

## Product Selection

### 1a. Multiple-Beam PAC

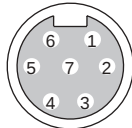
The Allen-Bradley Guardmaster PAC multiple beam safety light curtains are ordered as pairs—transmitter and receiver—and shipped under one part number. After selecting the appropriate light curtain pair, ensure that required interfaces and accessories are ordered as well. The single-beam PAC can be ordered with a passive mirror column (**440L-AMIRSTDZ500**) or two right angle mirrors (**440L-AMIRR2**).

| Non muting Models |                 |                 |                       | Muting Models    |                 |                 |                        |
|-------------------|-----------------|-----------------|-----------------------|------------------|-----------------|-----------------|------------------------|
| Size mm (inches)  | Beam Spacing mm | Number of Beams | Catalogue Number      | Size mm (inches) | Beam Spacing mm | Number of Beams | Catalogue Number       |
| 684 (27)          | 500             | 2               | <b>440L-P4H2500-N</b> | 684 (27)         | 500             | 2               | <b>440L-P4H2500M-N</b> |
| 600 (24)          | 220             | 3               | <b>440L-P4H3220-N</b> | 600 (24)         | 220             | 3               | <b>440L-P4H3220M-N</b> |
| 1000 (40)         | 400             | 3               | <b>440L-P4H3400-N</b> | 1000 (40)        | 400             | 3               | <b>440L-P4H3400M-N</b> |
| 534 (21)          | 120             | 4               | <b>440L-P4H4120-N</b> |                  |                 |                 |                        |

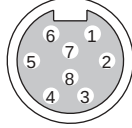
### 1b. Single-Beam PAC (Note: Maximum scanning range is 7.5 meters.)

| Non muting Models    |                 |                 |                         | Muting Models        |                 |                 |                         |
|----------------------|-----------------|-----------------|-------------------------|----------------------|-----------------|-----------------|-------------------------|
| Size mm (inches)     | Beam Spacing mm | Number of Beams | Catalogue Number        | Size mm (inches)     | Beam Spacing mm | Number of Beams | Catalogue Number        |
| 684 (27)             | 500             | 1               | <b>440L-P4G1500-N</b>   | 684 (27)             | 500             | 1               | <b>440L-P4G1500M-N</b>  |
| Required mirror unit |                 |                 | <b>440L-AMIRSTDZ500</b> | Required mirror unit |                 |                 | <b>440L-AMIRSTDZ500</b> |

### 2a. Cordsets—Required—PAC Transmitter

| Female Connector                                                                                       |                 | Cable                                                                    |                                     |               | Catalogue Number    |
|--------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------|-------------------------------------|---------------|---------------------|
| Face View of Female                                                                                    | Connector Style | Pin Wire Colour                                                          | Wire Rating                         | Length—m (ft) |                     |
| PAC Transmitter<br> | Straight        | 1 Black<br>2 White<br>3 Blue<br>4 Brown<br>5 Grey<br>6 Yellow<br>7 Green | (5)/18AWG<br>(2)20AWG<br>300V<br>3A | 2 (6.5)       | <b>889N-F7AG-2</b>  |
|                                                                                                        |                 |                                                                          |                                     | 5 (16.4)      | <b>889N-F7AG-5</b>  |
|                                                                                                        |                 |                                                                          |                                     | 10 (32.8)     | <b>889N-F7AG-10</b> |
|                                                                                                        |                 |                                                                          |                                     | 15 (49.2)     | <b>889N-F7AG-15</b> |
|                                                                                                        |                 |                                                                          |                                     | 20 (65.6)     | <b>889N-F7AG-20</b> |
|                                                                                                        |                 |                                                                          |                                     | 30 (98.4)     | <b>889N-F7AG-30</b> |

### 2b. Cordsets—PAC Receiver and PAC Single Beam

| Female Connector                                                                                                        |                 | Cable                                                                            |                     |               | Catalogue Number    |
|-------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------|---------------------|---------------|---------------------|
| Face View of Female                                                                                                     | Connector Style | Pin Wire Colour                                                                  | Wire Rating         | Length—m (ft) |                     |
| PAC Single Beam and PAC Receiver<br> | Straight        | 1 Red<br>2 White<br>3 Blue<br>4 Brown<br>5 Grey<br>6 Yellow<br>7 Green<br>8 Pink | 18AWG<br>300V<br>3A | 2 (6.5)       | <b>889N-F8AE-2</b>  |
|                                                                                                                         |                 |                                                                                  |                     | 5 (16.4)      | <b>889N-F8AE-5</b>  |
|                                                                                                                         |                 |                                                                                  |                     | 10 (32.8)     | <b>889N-F8AE-10</b> |
|                                                                                                                         |                 |                                                                                  |                     | 15 (49.2)     | <b>889N-F8AE-15</b> |
|                                                                                                                         |                 |                                                                                  |                     | 20 (65.6)     | <b>889N-F8AE-20</b> |
|                                                                                                                         |                 |                                                                                  |                     | 30 (98.4)     | <b>889N-F8AE-30</b> |

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##### 3a. Safety Relay Interfaces—Required

|                                                                                   | Input Voltage | Reset                | Floating Blanking | Fixed Blanking | PSDI | Muting | Outputs                                     | More Details | Catalogue Number  |
|-----------------------------------------------------------------------------------|---------------|----------------------|-------------------|----------------|------|--------|---------------------------------------------|--------------|-------------------|
|  | 24V DC        | Manual/<br>Automatic | no                | no             | no   | no     | 4 amp<br>2 N.O.<br>Safety<br>1 N.C.<br>Aux. | 58           | <b>440L-M8200</b> |

##### 3b. Safety Relay Interfaces—Optional

| Relay                                                                                                   | Input                                           | Safety Outputs | Auxiliary Outputs              | Terminals | Power Supply       | Reset                                      | Catalogue Number   |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------|--------------------------------|-----------|--------------------|--------------------------------------------|--------------------|
| <br><i>MSR127RP</i>    | 1NC,<br>2NC, or<br>Light Curtain                | 3 N.O.         | 1 N.C.                         | Removable | 24V AC/DC          | Automatic/Manual                           | <b>440R-N23132</b> |
|                                                                                                         |                                                 |                |                                |           |                    | Monitored Manual                           | <b>440R-N23135</b> |
|                                                                                                         |                                                 |                |                                |           | 115V AC            | Automatic/Manual                           | <b>440R-N23131</b> |
|                                                                                                         |                                                 |                |                                |           |                    | Monitored Manual                           | <b>440R-N23134</b> |
|                                                                                                         |                                                 |                |                                |           | 230V AC            | Automatic/Manual                           | <b>440R-N23130</b> |
|                                                                                                         |                                                 |                |                                |           | Monitored Manual   | <b>440R-N23133</b>                         |                    |
| <br><i>MSR126</i>     | Light Curtain or<br>Single Channel<br>(MSR126T) | 2 N.O.         | None                           | Fixed     | 24V AC/DC          | Automatic/Manual                           | <b>440R-N23117</b> |
|                                                                                                         |                                                 |                |                                |           | 115V AC            |                                            | <b>440R-N23116</b> |
|                                                                                                         |                                                 |                |                                |           | 230V AC            |                                            | <b>440R-N23115</b> |
|                                                                                                         | 24V AC/DC                                       |                |                                |           | <b>440R-N23114</b> |                                            |                    |
|                                                                                                         | 115V AC                                         |                |                                |           | <b>440R-N23113</b> |                                            |                    |
|                                                                                                         | 230V AC                                         |                |                                |           | <b>440R-N23112</b> |                                            |                    |
|                                                                                                         | Light Curtain or<br>Single Channel<br>(MSR126R) |                |                                |           | 24V AC/DC          | Monitored Manual                           | <b>440R-N23123</b> |
|                                                                                                         |                                                 |                |                                |           | 115V AC            |                                            | <b>440R-N23122</b> |
|                                                                                                         |                                                 |                |                                |           | 230V AC            |                                            | <b>440R-N23121</b> |
|                                                                                                         | 24V AC/DC                                       |                |                                |           | <b>440R-N23120</b> |                                            |                    |
|                                                                                                         | 115V AC                                         |                |                                |           | <b>440R-N23119</b> |                                            |                    |
|                                                                                                         | 230V AC                                         |                |                                |           | <b>440R-N23118</b> |                                            |                    |
| <br><i>MSR131RTP</i> | Light Curtain<br>or<br>Safety Mat               | 3 N.O.         | 2 N.C.<br>2 PNP Solid<br>State | Removable | 24V AC/DC          | Automatic/Manual<br>or<br>Monitored Manual | <b>440R-C23139</b> |
|                                                                                                         |                                                 |                |                                |           | 115V AC            |                                            | <b>440R-C23137</b> |
|                                                                                                         |                                                 |                |                                |           | 230V AC            |                                            | <b>440R-C23136</b> |

## Product Selection

### 4. Safety Relay Interfaces—Optional (Used for muting applications)

| Relay                                                                                        | Input Voltage | Reset  | Floating Blanking | Fixed Blanking | PSDI | Muting | Outputs                      | More Details | Catalogue Number   |
|----------------------------------------------------------------------------------------------|---------------|--------|-------------------|----------------|------|--------|------------------------------|--------------|--------------------|
| <br>MSR22LM | 24V DC        | Manual | no                | no             | yes  | yes    | 2 N.O. Safety<br>1 N.C. Aux. | 4-21         | <b>440R-P23071</b> |

### 5. Power Supply

|                                                                                   | Description                                                  | Catalogue Number |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------|------------------|
|  | Power supply:<br>Input—93...265V AC<br>Output—24V DC, 3 Amps | <b>1794-PS3</b>  |

### 6. Accessories—Optional

|                                                                                     | Description                                                   | Catalogue Number                             |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|
|    | L-Mounting bracket, fixed (4 per package)                     | <b>440L-AF6102</b><br>(1 package per system) |
|   | Mounting bracket, adjustable (4 per package)                  | <b>440L-AF6103</b><br>(1 package per system) |
|  | Mounting bracket, adjustable with shock mount (4 per package) | <b>440L-AF6104</b><br>(1 package per system) |
|  | Laser alignment aid                                           | <b>440L-ALAT</b>                             |
|                                                                                     | SafeShield adaptor for laser alignment aid                    | <b>440L-ALBRK</b>                            |
|  | Sliding nut kit (4 included)—Supplied with PAC                | <b>440L-AF6105</b>                           |
|  | Muting lamp with 2m cable                                     | <b>440L-AMUTLP2M</b>                         |
|                                                                                     | Muting lamp with 10m cable                                    | <b>440L-AMUTLP10M</b>                        |

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#### 7. Accessories—Mirrors and Mounting Columns

##### Corner Mirror

Specially constructed mirrors for 2 and 3 sided safeguarding applications. **NOTE:** Each mirror reduces maximum scan range by 10% per mirror.

|                                                                                   | For PAC Models               | Catalogue Number      |
|-----------------------------------------------------------------------------------|------------------------------|-----------------------|
|  | 2 Beam<br>500mm beam spacing | <b>440L-A2MIRSTND</b> |
|                                                                                   | 3 Beam<br>400mm beam spacing | <b>440L-A3MIRSTND</b> |
| Mirror mounting shims                                                             |                              | <b>440L-ASHIM</b>     |

##### Mounting Columns

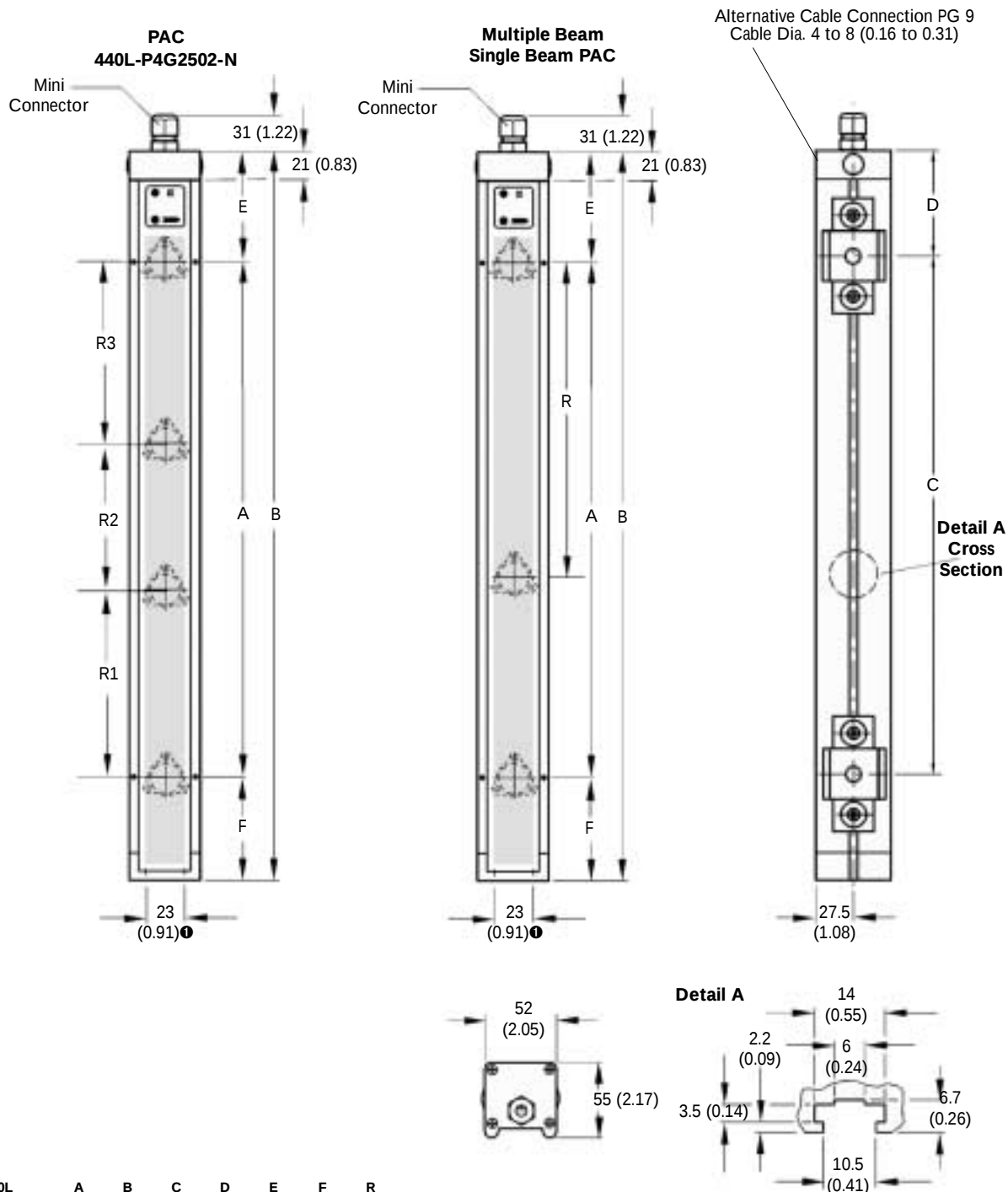
|                                                                                    | Description                                                                          | Catalogue Number        |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------|
|  | Floor mounted column for 2 beam PAC<br>500mm beam spacing                            | <b>440L-AMTSTND2B</b>   |
|                                                                                    | Floor mounted column for 3 beam PAC<br>400mm beam spacing                            | <b>440L-AMTSTND3B</b>   |
|                                                                                    | Floor mounted column for 2 beam PAC column<br>with muting lamp<br>500mm beam spacing | <b>440L-AMUTSTDLP2B</b> |
|                                                                                    | Floor mounted column for 3 beam PAC column<br>with muting lamp<br>400mm beam spacing | <b>440L-AMUTSTDLP3B</b> |

##### Muting Sensors

| Sensor                                                                                                                                                                                            | Connection Location                                        | Type           | Catalogue Number       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------|------------------------|
| Transmitted Beam                                                                                                                                                                                  | Transmitter (powered from an external supply)              | Dark Switching | <b>42GRL-9000-QD②</b>  |
|                                                                                                                                                                                                   | Receiver (connected directly to the muting module or 8100) |                | <b>42GRR-9000-QD①②</b> |
| Retroreflective                                                                                                                                                                                   | Connected directly to muting module or 8100                |                | <b>42GRU-9000-QD①②</b> |
|                                                                                                                                                                                                   | 3 inch standard reflector                                  |                | <b>92-39</b>           |
| Polarized Retroreflective                                                                                                                                                                         | Connected directly to muting module or 8100                |                | <b>42GRU-9200-QD①②</b> |
|                                                                                                                                                                                                   | 3 inch standard reflector                                  |                | <b>92-39</b>           |
| Mechanical Limit Switch                                                                                                                                                                           | Connected directly to muting module or 8100                |                | <b>802M-NX10①②</b>     |
|                                                                                                                                                                                                   | (Operating Lever must be selected separately.)             |                |                        |
| ① Use with 4-pin, 3-wire DC Micro patchcord when connecting to muting module (5m length shown). 1m, 2m, 3m, and 5m lengths available, catalogue number 889D-F3ACDM-*. Where * = length in meters. |                                                            |                | <b>889D-F3ACDM-5</b>   |
| ② Recommended cordset. when connecting to the <b>440L-M8100</b> . Five meter length shown, other lengths available, see page 15-10 of this catalogue.                                             |                                                            |                | <b>889D-F4AC-5</b>     |

### Approximate Dimensions—mm (inches)

Approximate Dimensions are not intended to be used for installation purposes.



① With respect to centre of housing

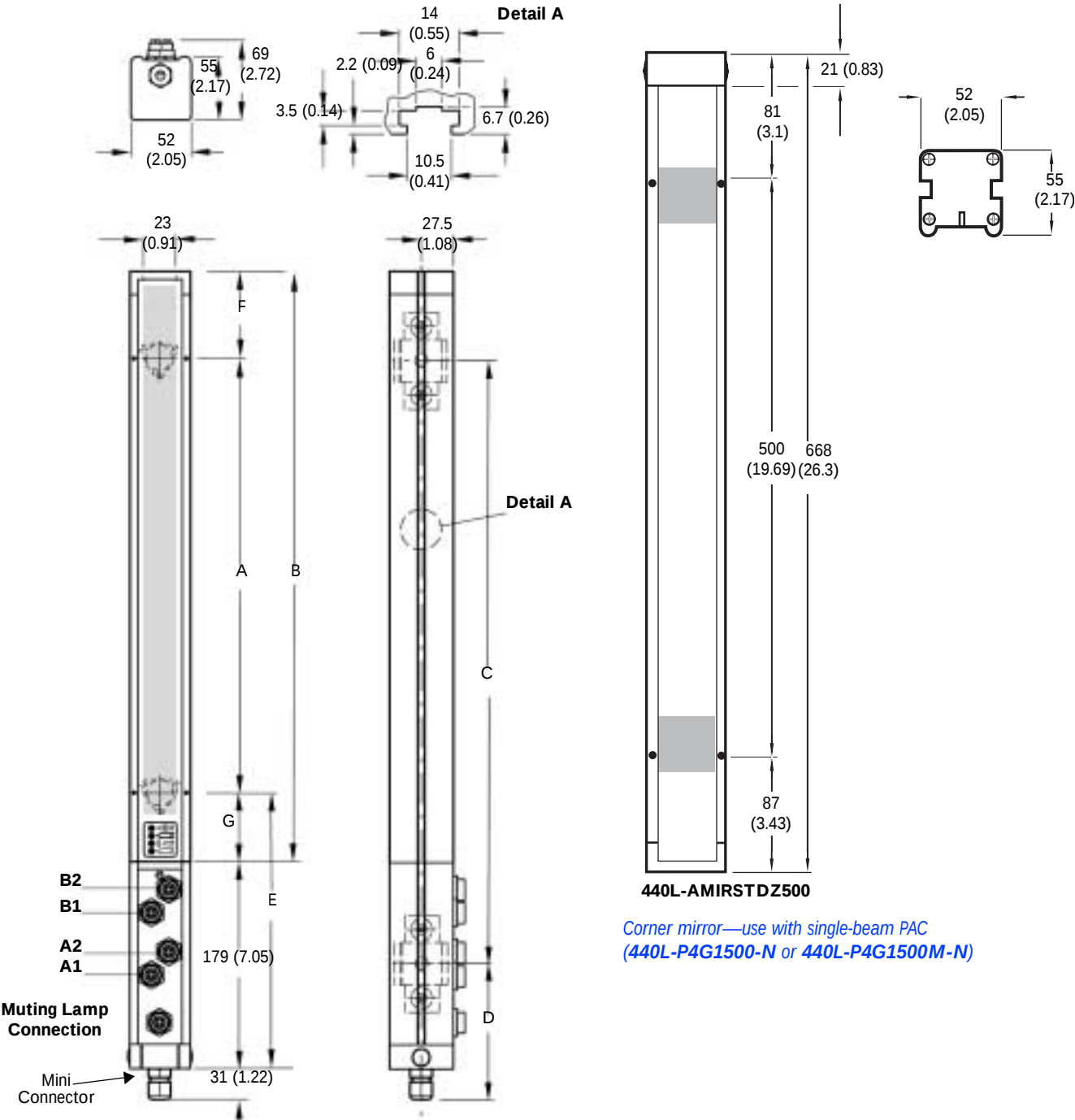
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Approximate Dimensions—mm (inches) (continued)

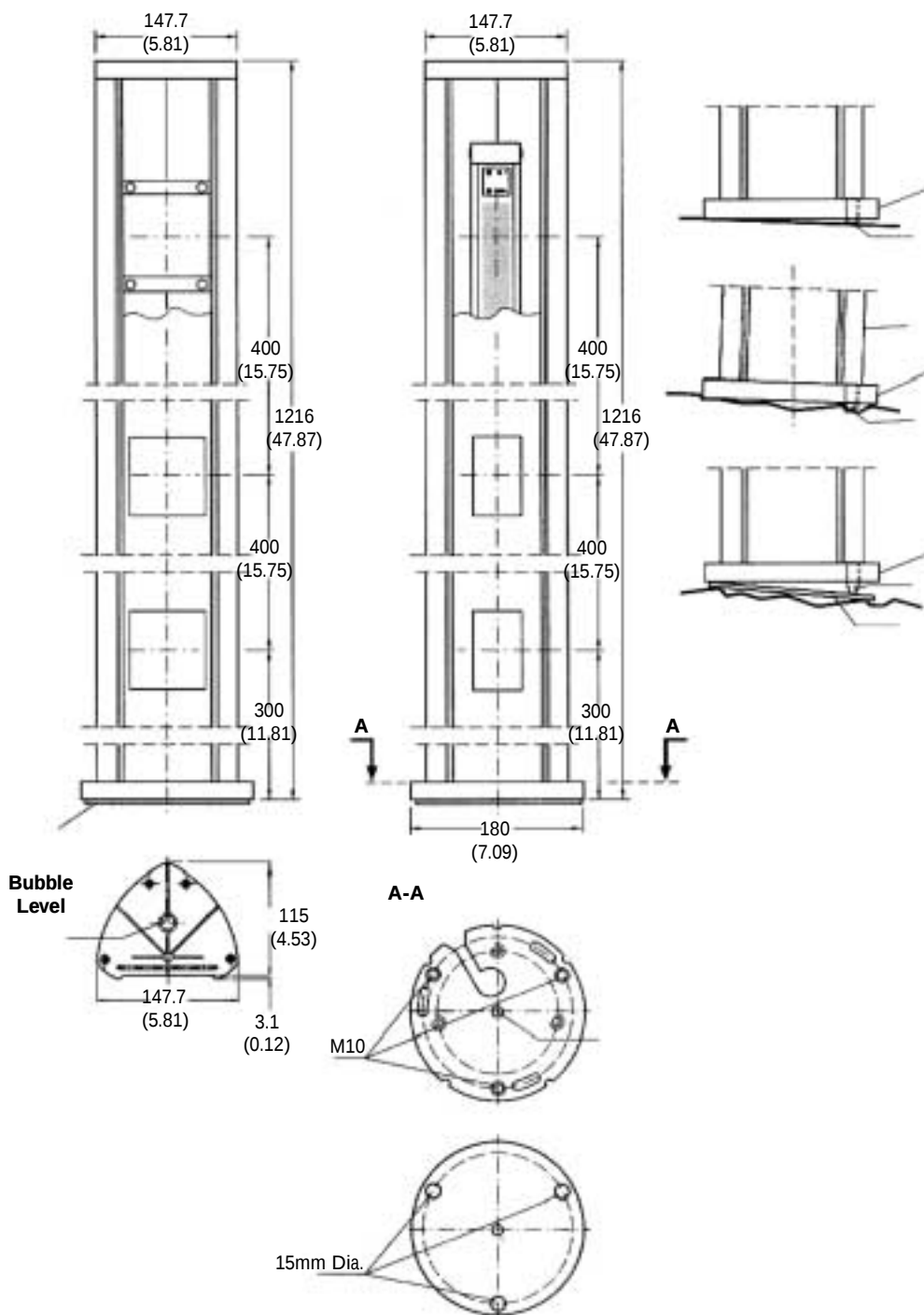
Approximate Dimensions are not intended to be used for installation purposes.



|                  | A   | B   | C   | D  | E   | F  | G  |
|------------------|-----|-----|-----|----|-----|----|----|
| 440L-R4H 2500M-N | 500 | 663 | 524 | 80 | 265 | 77 | 86 |
| 440L-R4H 3220M-N | 440 | 576 | 437 | 80 | 265 | 50 | 86 |
| 440L-R4H 3400M-N | 800 | 964 | 825 | 80 | 265 | 78 | 86 |
| 440L-R4H 1500M-N | 500 | 663 | 524 | 80 | 255 | 87 | 76 |

**Approximate Dimensions—mm (inches) (continued)**

*Approximate Dimensions are not intended to be used for installation purposes.*



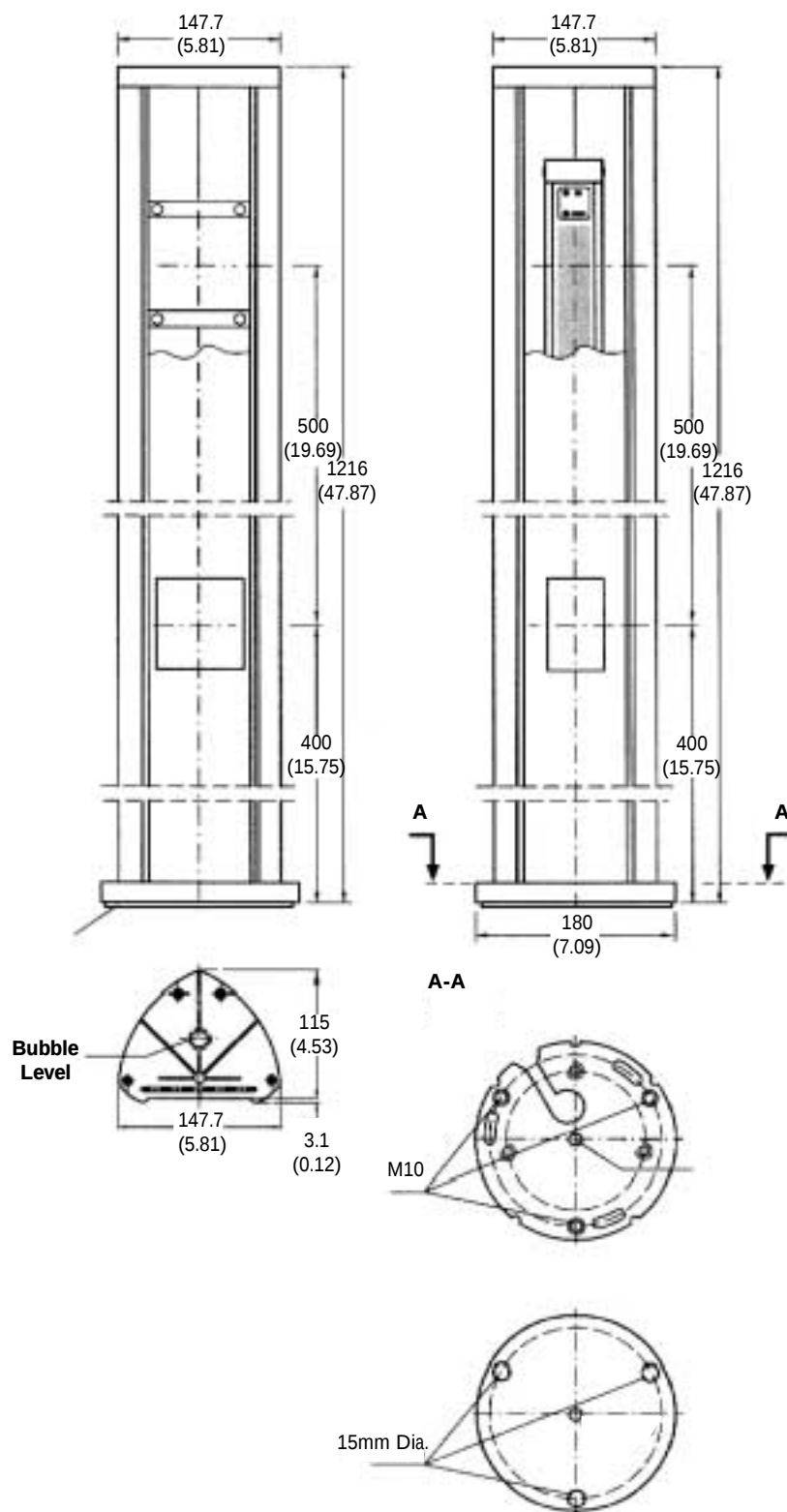
*Mounting the mirror columns—column 400*

## Safety Light Curtains

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#### Approximate Dimensions—mm (inches) (continued)

Approximate Dimensions are not intended to be used for installation purposes.

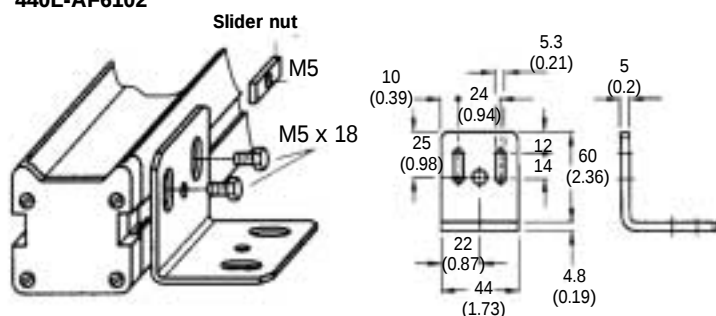


Mounting the mirror columns—column 500

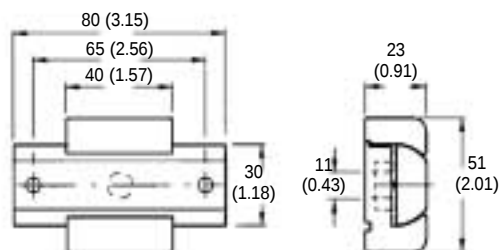
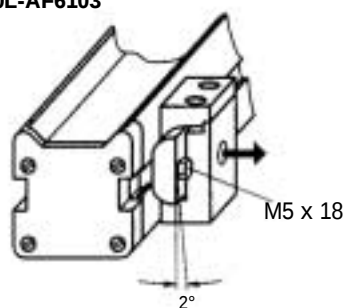
**Approximate Dimensions—mm [inches] (continued)**

*Approximate Dimensions are not intended to be used for installation purposes.*

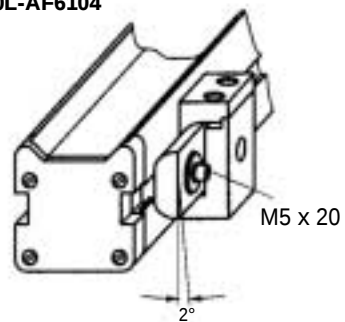
**440L-AF6102**



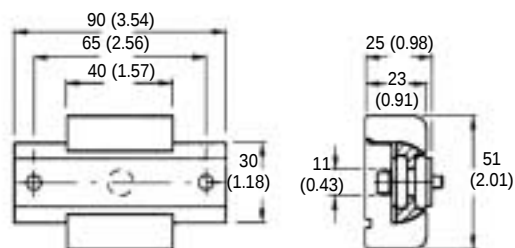
**440L-AF6103**



**440L-AF6104**



**Adjustable mounting bracket**



**Attachment to machine**

**Adjustable bracket with shock mount 4 required**

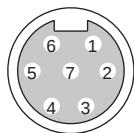
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Typical Wiring Diagrams

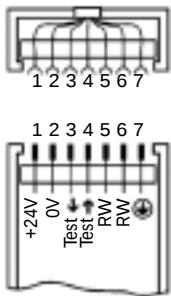
7-pin connector



| Pin | Color  |
|-----|--------|
| 1   | Black  |
| 2   | White  |
| 3   | Blue   |
| 4   | Brown  |
| 5   | Grey   |
| 6   | Yellow |
| 7   | Green  |

Transmitter unit

Connection Terminal

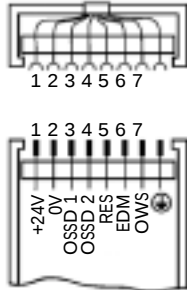


NC = No Connection

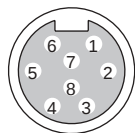
Receiver unit and single-beam PAC

Connection Terminal

- 1 Red
- 2 White
- 3 Blue
- 4 Brown
- 5 Grey
- 6 Yellow
- 7 Green
- 8 Pink

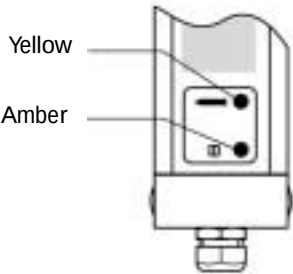


8-pin connector

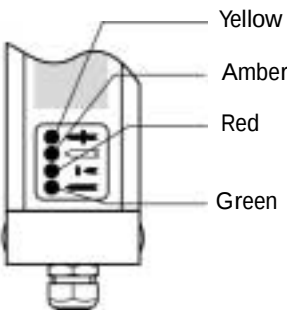


| Pin | Color  |
|-----|--------|
| 1   | Red    |
| 2   | White  |
| 3   | Blue   |
| 4   | Brown  |
| 5   | Grey   |
| 6   | Yellow |
| 7   | Green  |
| 8   | Pink   |

Transmitter



Receiver

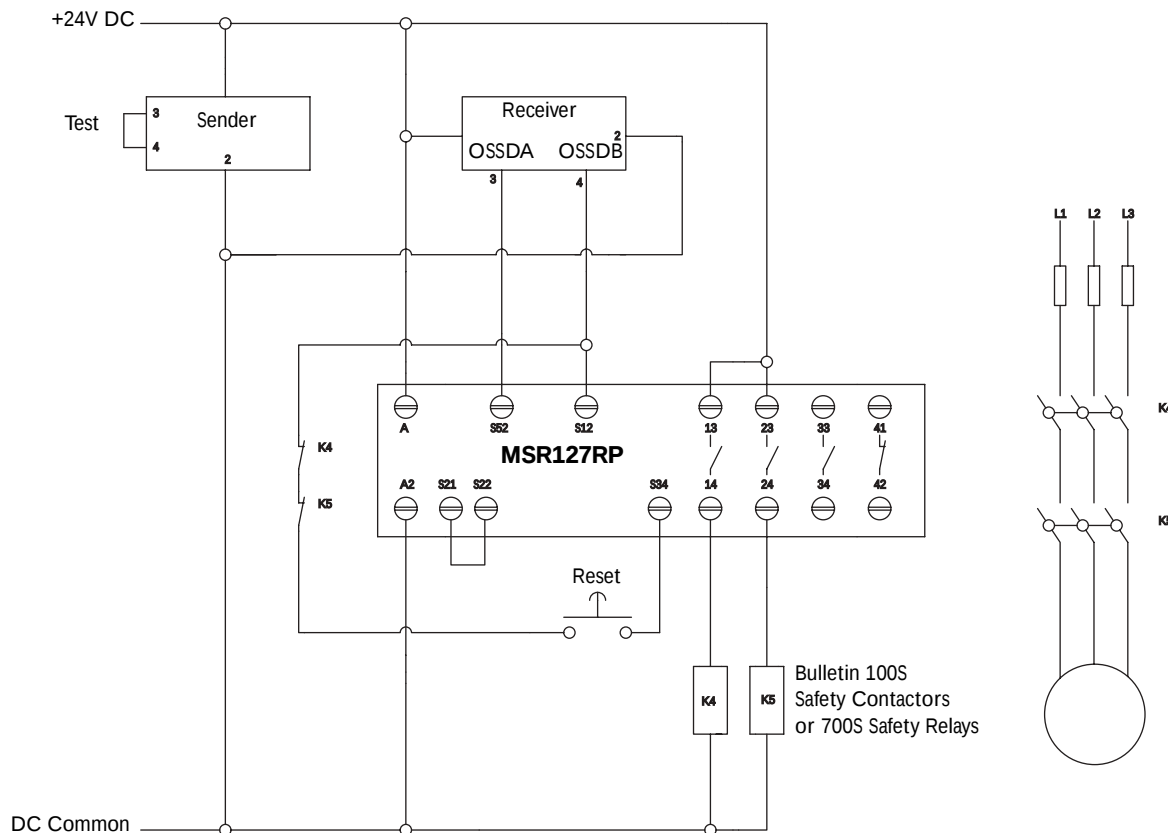


LED indicator

| Transmitter |                                 | Receiver |                                         |
|-------------|---------------------------------|----------|-----------------------------------------|
| Yellow      | sender range: high/low MCC test | Yellow   | press restart switch                    |
| Amber       | operating voltage is applied    | Amber    | contamination                           |
|             |                                 | Red      | outputs inactive                        |
|             |                                 | Green    | light beam unobstructed, outputs active |

## Typical Wiring Diagram

### 440L Light Curtain to 440R-N23135 (MSR127RP)



**Note:** For the 440L PAC unit, set the dip switches as follows:

SW 1, 5, 6, 7, 8 to "B"

SW 2, 3, 4 to "A"

The dip switches are accessed by removing the connection cap of the receiver unit. The sender unit will not need dip switch configuration if these receiver settings are used.