



# TL70 Pro Modular Tower Light with IO-Link Product Manual

Original Instructions

p/n: 244498 Rev. B

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# Chapter 1 Features



Banner's TL70 Pro Modular Tower Light with IO-Link is a 70 mm, modular LED indicator with bright and uniform light. The modularity gives the user flexibility to customize tower lights as needed and change the number of segments in the field. It is also available preassembled for easy installation.

- IO-Link control allows access to full color, flashing, and dimming settings, as well as advanced animations and audible tones
- Up to five LED segments, or five LED segments plus one audible segment, in one device
- Rugged, water-resistant IP65 and IP66 housing with UV-stabilized material
- Bright, uniform indicator segments appear gray when off to eliminate false indications from ambient light
- Simple and fast connection with M12 quick-disconnect connector

## Models

*Model Key: Base Module*

| Housing   | - | Connection                                             |
|-----------|---|--------------------------------------------------------|
| B-TL70PSK | - | Q                                                      |
|           |   | Q = Integral 4-pin M12 male quick-disconnect connector |

*Model Key: Segment Modules*

| Housing  | - | Segment                              |
|----------|---|--------------------------------------|
| SG-TL70P | - | L                                    |
|          |   | L = LED module<br>A = Audible module |

*TL70 Pro with IO-Link Pre-Assembled Model Key*

| Housing | Number of Segments                                                                    | Audible                           | Control     | Connection                                             |
|---------|---------------------------------------------------------------------------------------|-----------------------------------|-------------|--------------------------------------------------------|
| TL70PS  | 3                                                                                     | A                                 | K           | Q                                                      |
|         | 1 = 1 segment<br>2 = 2 segments<br>3 = 3 segments<br>4 = 4 segments<br>5 = 5 segments | Blank = No audible<br>A = Audible | K = IO-Link | Q = Integral 4-pin M12 male quick-disconnect connector |

# Chapter 2

## IO-Link Data Map

### TL70 Pro Modular Tower Light with IO-Link

|                      |                                                                                          |
|----------------------|------------------------------------------------------------------------------------------|
| <b>Vendor ID</b>     | 451 (0x01c3)                                                                             |
| <b>Vendor Name</b>   | Banner Engineering Corporation                                                           |
| <b>Vendor Text</b>   | More Sensors. More Solutions.                                                            |
| <b>Vendor URL</b>    | <a href="http://www.bannerengineering.com/io-link">www.bannerengineering.com/io-link</a> |
| <b>Device ID</b>     | 393244 (0x06001c)                                                                        |
| <b>Device Family</b> | Tower Light                                                                              |

### Features

|                               |                                                                                               |
|-------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Block Parameter</b>        | Yes                                                                                           |
| <b>Data Storage</b>           | Yes                                                                                           |
| <b>Supported Access Locks</b> | Parameter: Yes<br>Data Storage: Yes<br>Local Parameterization: No<br>Local User Interface: No |

### Communication

|                              |                                                                                                                       |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>IO-Link Revision</b>      | V1.1                                                                                                                  |
| <b>Transmission Rate</b>     | 38400 bit/s (COM2)                                                                                                    |
| <b>Minimum Cycle Time</b>    | 11.2 ms                                                                                                               |
| <b>SIO Mode Supported</b>    | No                                                                                                                    |
| <b>M-Sequence Capability</b> | PREOPERATE = TYPE_0 with 1 octet on-request data<br>OPERATE = TYPE_2_V with 1 octet on-request data<br>ISDU supported |

### Device Variant

|                        |                  |
|------------------------|------------------|
| <b>Description</b>     | TL70 Pro IO-Link |
| <b>Product ID</b>      | TL70PS*K*Q       |
| <b>Connection Type</b> | 4-pin M12 male   |
| <b>- Pin 1</b>         | Brown: L+        |
| <b>- Pin 2</b>         | White: Not used  |
| <b>- Pin 3</b>         | (light) Blue: L- |
| <b>- Pin 4</b>         | Black: C/Q       |

## Tower Light Segment Modes

### Basic Segment Mode

Use process data to set each segment to off, solid on, flash, or animation mode. Use parameter data to change color, intensity, flash speed, and select animation type.

## Advanced Segment Mode

Use process data to activate each segment and control color, intensity, flash, and other animation types. Use parameter data to create custom colors, intensity, and flash speeds.

### LED Segment Control

| Animation       | Description                                                                                                                                                     |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off             | The segment is off.                                                                                                                                             |
| Steady          | Color 1 is solid on at the defined intensity.                                                                                                                   |
| Flash           | Color 1 flashes at the defined speed, color intensity, and pattern.                                                                                             |
| Two Color Flash | Color 1 and Color 2 flash alternately at defined speed, color intensities, and pattern.                                                                         |
| 50/50           | Color 1 is displayed on 50% of the segment, and Color 2 is displayed on the other 50% of the segment at the defined color intensities.                          |
| 50/50 Rotate    | Color 1 is displayed on 50% of the segment, and Color 2 is displayed on the other 50% of the segment while rotating at the defined speed and color intensities. |
| Chase           | Color 1 is displayed as a single spot against the background of Color 2 while rotating at the defined speed, color intensities, and rotational direction.       |
| Intensity Sweep | Color 1 repeatedly increases and decreases intensity between 0% to 100% at the defined speed and color intensity.                                               |

### Audible Segment Control

| Setting        | Description                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------------------|
| Audible State  | Sets the segment to off or on.                                                                                |
| Audible Volume | Defines the volume of the audible tone.                                                                       |
| Audible Type   | Sets the segment to follow the Audible Tone, to sync to the flash pattern of the last LED segment, or to off. |
| Audible Tone   | Defines the audible tone frequency.                                                                           |

## Run Mode

Use process data to control the entire tower light and select color, intensity, flash, and run mode animations. Use parameter data to create custom colors, intensity, and flash speeds.

| Animation       | Description                                                                                                                                                                                                                  |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off             | The tower is off.                                                                                                                                                                                                            |
| Steady          | Color 1 is solid on for every segment at the defined intensity.                                                                                                                                                              |
| Flash           | Color 1 flashes on every segment at the defined speed, color intensity, and pattern (normal, strobe, three pulse, SOS, or random).                                                                                           |
| Two Color Flash | Color 1 and Color 2 flash alternately on every segment at the defined speed, color intensities, and pattern (normal, strobe, three pulse, SOS, or random).                                                                   |
| Scroll          | Color 1 fills a defined number of segments, and those segments move in one direction up or down against the background of Color 2 at the defined speed, color intensities, and rotational direction.                         |
| Bounce          | Color 1 fills a defined number of segments, and those segments move up and down between the top and bottom of the tower against the background of Color 2 at the defined speed, color intensities, and rotational direction. |

## Level Mode

Use process data to set the level value. Use parameter data to set range, thresholds, colors, intensities, flash speeds, and animation types.

| Animation            | Description                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------------------|
| Level Mode Value     | Value of the level of the tower (between 0 to 65,535).                                                            |
| Full Scale Value     | Set the upper limit of the Level Mode Value (between 0 to 65535).                                                 |
| Threshold Type: None | Level Mode Values are displayed on the tower as defined by Base color, intensity, and state (steady or flashing). |

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| Animation                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Threshold Type: Low                                 | Level Mode Values below Low Threshold Value are displayed on segments defined by Low Threshold color, intensity, and state (steady or flashing). Level Mode Values above the Low Threshold Value are displayed on segments defined by Base color, intensity, and state (steady or flashing).                                                                                                                                                            |
| Threshold Type: High                                | Level Mode Values below High Threshold Value are displayed on segments defined by Base color, intensity, and state (steady or flashing). Level Mode Values above High Threshold Value are displayed on segments defined by High Threshold color, intensity, and state (steady or flashing).                                                                                                                                                             |
| Threshold Type: High and Low                        | Level Mode Values below Low Threshold Value are displayed on segments defined by Low Threshold color, intensity, and state (steady or flashing). Level Mode Values between Low and High Threshold Values are displayed on segments defined by Base color, intensity, and state (steady or flashing). Level Mode Values above High Threshold Value are displayed on segments defined by High Threshold color, intensity, and state (steady or flashing). |
| Base, Low Threshold, High Threshold, and Background | Colors, Intensities, and States - Set the colors, intensities, and states (steady or flash) the tower will display if the Level Mode Value conforms to the defined threshold type.                                                                                                                                                                                                                                                                      |
| Dominance                                           | If Non-Dominant is defined, segments display their defined threshold color. If Dominant is defined, all segments display the active threshold color.                                                                                                                                                                                                                                                                                                    |
| Segment Style                                       | If the Level Mode Value is a partial percentage of a segment, select if the segment will be on steady, flashing, or analog dimmed to the partial percentage.                                                                                                                                                                                                                                                                                            |

## Process Data Out: Segment Mode

Bit Length: 136

Data Type: 136-bit record

| Subindex | Bit Offset | Data Type      | Allowed Values                                  | Default Value | Name          | Description                                                                         |
|----------|------------|----------------|-------------------------------------------------|---------------|---------------|-------------------------------------------------------------------------------------|
| 1        | 88         | 8-bit UInteger | 0 = Off<br>1 = On<br>2 = Flash<br>3 = Animation | 0             | Segment 1     | The state of the segment. Related parameters are defined in Segment Parameter Data. |
| 2        | 96         | 8-bit UInteger | 0 = Off<br>1 = On<br>2 = Flash<br>3 = Animation | 0             | Segment 2     | The state of the segment. Related parameters are defined in Segment Parameter Data. |
| 3        | 104        | 8-bit UInteger | 0 = Off<br>1 = On<br>2 = Flash<br>3 = Animation | 0             | Segment 3     | The state of the segment. Related parameters are defined in Segment Parameter Data. |
| 4        | 112        | 8-bit UInteger | 0 = Off<br>1 = On<br>2 = Flash<br>3 = Animation | 0             | Segment 4     | The state of the segment. Related parameters are defined in Segment Parameter Data. |
| 5        | 120        | 8-bit UInteger | 0 = Off<br>1 = On<br>2 = Flash<br>3 = Animation | 0             | Segment 5     | The state of the segment. Related parameters are defined in Segment Parameter Data. |
| 6        | 128        | 8-bit UInteger | 0 = Off<br>1 = On                               | 0             | Audible State | The state of the audible segment.                                                   |

# Process Data Out: Run Mode

Bit Length: 136

Data Type: 136-bit record

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name              | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------|--------------------------------------------------------------------------|
| 1        | 72         | 8-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Scroll<br>5 = Bounce                                                                                                                 | 0             | Animation         | The Animation type.                                                      |
| 2        | 80         | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Color 1           | The main color of the animation.                                         |
| 3        | 88         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 4        | 96         | 8-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             | Speed             | The speed of the Animation. Custom Speed is defined in Parameter Data.   |
| 5        | 104        | 8-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = 3 Pulse<br>3 = SOS<br>4 = Random                                                                                                                                       | 0             | Pattern           | The pattern of Animation.                                                |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|--------------------------------------------------------------------------|
| 6        | 112        | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Color 2             | The secondary color of the animation.                                    |
| 7        | 120        | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Color 2 Intensity   | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 8        | 128        | 8-bit UInteger | 0 = Up<br>1 = Down                                                                                                                                                                                    | 0             | Animation Direction | The direction of the Scroll and Bounce Animation.                        |
| 9        | 64         | 8-bit UInteger | 0 = Off<br>1 = On                                                                                                                                                                                     | 0             | Audible State       | The state of the audible segment.                                        |

## Process Data Out: Advanced Mode

Bit Length: 136

Data Type: 136-bit record

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                         | Default Value | Name                     | Description        |
|----------|------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------|--------------------|
| 1        | 128        | 3-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep | 0             | Segment 1 Animation Type | The Animation type |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 2        | 131        | 2-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             | Segment 1 Speed             | The speed of the Animation                                               |
| 3        | 133        | 3-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             | Segment 1 Pattern           | The pattern of Animation                                                 |
| 4        | 120        | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 1 Color 1           | The main color of the animation.                                         |
| 5        | 125        | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 1 Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 6        | 112        | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 1 Color 2           | The secondary color of the animation.                                    |
| 7        | 117        | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 1 Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 8        | 104        | 3-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep                                                                | 0             | Segment 2 Animation Type    | The Animation type                                                       |
| 9        | 107        | 2-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             | Segment 2 Speed             | The speed of the Animation                                               |
| 10       | 109        | 3-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             | Segment 2 Pattern           | The pattern of Animation                                                 |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 11       | 96         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 2 Color 1           | The main color of the animation.                                         |
| 12       | 101        | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 2 Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 13       | 88         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 2 Color 2           | The secondary color of the animation.                                    |
| 14       | 93         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 2 Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 15       | 80         | 3-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep                                                                | 0             | Segment 3 Animation Type    | The Animation type                                                       |
| 16       | 83         | 2-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             | Segment 3 Speed             | The speed of the Animation                                               |
| 17       | 85         | 3-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             | Segment 3 Pattern           | The pattern of Animation                                                 |
| 18       | 72         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 3 Color 1           | The main color of the animation.                                         |
| 19       | 77         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 3 Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 20       | 64         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 3 Color 2           | The secondary color of the animation.                                    |
| 21       | 69         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 3 Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 22       | 56         | 3-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep                                                                | 0             | Segment 4 Animation Type    | The Animation type                                                       |
| 23       | 59         | 2-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             | Segment 4 Speed             | The speed of the Animation                                               |
| 24       | 61         | 3-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             | Segment 4 Pattern           | The pattern of Animation                                                 |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 25       | 48         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 4 Color 1           | The main color of the animation.                                         |
| 26       | 53         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 4 Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 27       | 40         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 4 Color 2           | The secondary color of the animation.                                    |
| 28       | 45         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 4 Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 29       | 32         | 3-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep                                                                | 0             | Segment 5 Animation Type    | The Animation type                                                       |
| 30       | 35         | 2-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             | Segment 5 Speed             | The speed of the Animation                                               |
| 31       | 37         | 3-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             | Segment 5 Pattern           | The pattern of Animation                                                 |
| 32       | 24         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 5 Color 1           | The main color of the animation.                                         |
| 33       | 29         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 5 Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Name                        | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------|
| 34       | 16         | 5-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             | Segment 5 Color 2           | The secondary color of the animation.                                    |
| 35       | 21         | 3-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             | Segment 5 Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 36       | 2          | 2-bit UInteger | 0 = Off<br>1 = On                                                                                                                                                                                     | 0             | Audible State               | The state of the audible segment.                                        |
| 37       | 4          | 2-bit UInteger | 0 = Freq<br>1 = Sync<br>2 = Off                                                                                                                                                                       | 0             | Audible Type                | The type of the audible output.                                          |
| 38       | 6          | 2-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off                                                                                                                                                          | 0             | Audible Volume              | The volume of the audible output.                                        |
| 39       | 8          | 4-bit UInteger | 0 = Freq 3<br>1 = Freq 2<br>2 = Freq 1<br>3 = Off                                                                                                                                                     | 0             | Audible Tone 1              | The frequency of the audible output.                                     |
| 40       | 12         | 4-bit UInteger | 0 = Freq 3<br>1 = Freq 2<br>2 = Freq 1<br>3 = Off                                                                                                                                                     | 0             | Audible Tone 2              | The secondary frequency of the audible output.                           |

## Process Data Out: Level Mode

Bit Length: 136

Data Type: 136-bit record

| Subindex | Bit Offset | Data Type       | Allowed Values    | Default Value | Name          | Description                       |
|----------|------------|-----------------|-------------------|---------------|---------------|-----------------------------------|
| 1        | 112        | 16-bit UInteger | 0..65535          | 0             | Process Level | The current level value.          |
| 2        | 128        | 8-bit UInteger  | 0 = Off<br>1 = On | 0             | Audible State | The state of the audible segment. |

## Index 0: Direct Parameters 1

Data Type: 128-bit Record

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                 | Default Value | Acc. Restr. | Name                       | Description |
|----------|------------|----------------|--------------------------------|---------------|-------------|----------------------------|-------------|
| 1        | 120        | 8-bit UInteger |                                | 0             | RO          | Reserved                   |             |
| 2        | 112        | 8-bit UInteger |                                | 0             | RO          | Master Cycle Time          |             |
| 3        | 104        | 8-bit UInteger |                                | 0             | RO          | Min Cycle Time             |             |
| 4        | 96         | 8-bit UInteger |                                | 0             | RO          | M-Sequence Capability      |             |
| 5        | 88         | 8-bit UInteger |                                | 17            | RO          | IO-Link Version ID         |             |
| 6        | 80         | 8-bit UInteger |                                | 0             | RO          | Process Data Input Length  |             |
| 7        | 72         | 8-bit UInteger |                                | 0             | RO          | Process Data Output Length |             |
| 8        | 64         | 8-bit UInteger |                                | 0             | RO          | Vendor ID 1                |             |
| 9        | 56         | 8-bit UInteger |                                | 0             | RO          | Vendor ID 2                |             |
| 10       | 48         | 8-bit UInteger |                                | 0             | RO          | Device ID 1                |             |
| 11       | 40         | 8-bit UInteger |                                | 0             | RO          | Device ID 2                |             |
| 12       | 32         | 8-bit UInteger |                                | 0             | RO          | Device ID 3                |             |
| 13       | 24         | 8-bit UInteger |                                | 0             | RO          | Reserved                   |             |
| 14       | 16         | 8-bit UInteger |                                | 0             | RO          | Reserved                   |             |
| 15       | 8          | 8-bit UInteger |                                | 0             | RO          | Reserved                   |             |
| 16       | 0          | 8-bit UInteger | 130 = Restore Factory Settings | 0             | WO          | Standard Command           |             |

## Index 1: Direct Parameters 2

Data Type: 128-bit Record

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values | Default Value | Acc. Restr. | Name                        | Description |
|----------|------------|----------------|----------------|---------------|-------------|-----------------------------|-------------|
| 1        | 120        | 8-bit UInteger |                | 0             |             | Device Specific Parameter 1 |             |
| 2        | 112        | 8-bit UInteger |                | 0             |             | Device Specific Parameter 2 |             |
| 3        | 104        | 8-bit UInteger |                | 0             |             | Device Specific Parameter 3 |             |
| 4        | 96         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 4 |             |
| 5        | 88         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 5 |             |

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| Subindex | Bit Offset | Data Type      | Allowed Values | Default Value | Acc. Restr. | Name                         | Description |
|----------|------------|----------------|----------------|---------------|-------------|------------------------------|-------------|
| 6        | 80         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 6  |             |
| 7        | 72         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 7  |             |
| 8        | 64         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 8  |             |
| 9        | 56         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 9  |             |
| 10       | 48         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 10 |             |
| 11       | 40         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 11 |             |
| 12       | 32         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 12 |             |
| 13       | 24         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 13 |             |
| 14       | 16         | 8-bit UInteger |                | 0             |             | Device Specific Parameter 14 |             |
| 15       | 8          | 8-bit UInteger |                | 0             |             | Device Specific Parameter 15 |             |
| 16       | 0          | 8-bit UInteger |                | 0             |             | Device Specific Parameter 16 |             |

## Index 2: Standard Command

Data Type: 8-bit UInteger

Allowed Values: 130 = Restore Factory Settings

Access Rights: WO

Modifies other variables.

## Index 12: Device Access Locks

Data Type: 16-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type | Allowed Values | Default Value | Acc. Restr. | Name                          | Description |
|----------|------------|-----------|----------------|---------------|-------------|-------------------------------|-------------|
| 1        | 0          | Boolean   |                | FALSE         |             | Parameter (write) Access Lock |             |
| 2        | 1          | Boolean   |                | FALSE         |             | Data Storage Lock             |             |
| 3        | 2          | Boolean   |                |               |             | Local Parameterization Lock   |             |
| 4        | 3          | Boolean   |                |               |             | Local User Interface Lock     |             |

## Index 16: Vendor Name

Data Type: 64-octet String UTF-8

Default Value: "Banner Engineering Corporation"

Access Rights: RO

## Index 17: Vendor Text

Data Type: 64-octet String UTF-8

Default Value: "More Sensors. More Solutions."

Access Rights: RO

## Index 18: Product Name

Data Type: 64-octet String UTF-8

Access Rights: RO

## Index 19: Product ID

Data Type: 64-octet String UTF-8

Access Rights: RO

## Index 20: Product Text

Data Type: 64-octet String UTF-8

Access Rights: RO

## Index 21: Serial Numbers

Data Type: 16-octet String UTF-8

Access Rights: RO

## Index 22: Hardware Version

Data Type: 64-octet String UTF-8

Access Rights: RO

## Index 23: Firmware Version

Data Type: 64-octet String UTF-8

Access Rights: RO

## Index 24: Application Specific Tag

Data Type: 32-octet String UTF-8

Access Rights: RW

## Index 36: Device Status

Data Type: 8-bit UInteger

Allowed Values:

- 0 = Device is OK
- 1 = Maintenance required
- 2 = Out of specification
- 3 = Functional check
- 4 = Failure
- 5..255 = Reserved

Access Rights: RO

Dynamic

## Index 37: Detailed Device Status

Data Type: Array[6] of 3-octet OctetString (subindex access not supported)

Access Rights: RO

Dynamic

## Index 41: Process Data Output

Data Type: See ProcessDataOut!

Access Rights: RO

Dynamic

## Index 64: Operating Mode Selection

Description: Operating Mode Selection

Data Type: 8-bit UInteger

Allowed Values:

- 0 = Basic Segment Mode
- 1 = Run Mode
- 2 = Advanced Segment Mode
- 3 = Level Mode

Default Value: 1

Access Rights: RW

## Index 66: Segment 1 Configuration

Description: Segment 1 Configuration Data

Data Type: 56-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                     | Default Value | Acc. Restr. | Name      | Description         |
|----------|------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|---------------------|
| 1        | 0          | 8-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep<br>8 = Demo | 1             |             | Animation | The animation type. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name              | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-------------------|--------------------------------------------------------------------------|
| 2        | 8          | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 9             |             | Color 1           | The main color of the animation.                                         |
| 3        | 16         | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Color 2           | The secondary color of the animation.                                    |
| 4        | 24         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 5        | 32         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                      | Default Value | Acc. Restr. | Name    | Description                   |
|----------|------------|----------------|---------------------------------------------------------------------|---------------|-------------|---------|-------------------------------|
| 6        | 40         | 8-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                    | 0             |             | Speed   | The speed of the animation.   |
| 7        | 48         | 8-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random | 0             |             | Pattern | The pattern of the animation. |

## Index 67: Segment 2 Configuration

Description: Segment 2 Configuration Data

Data Type: 56-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name      | Description                      |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|----------------------------------|
| 1        | 0          | 8-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep<br>8 = Demo                                                    | 1             |             | Animation | The animation type.              |
| 2        | 8          | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Color 1   | The main color of the animation. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name              | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-------------------|--------------------------------------------------------------------------|
| 3        | 16         | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Color 2           | The secondary color of the animation.                                    |
| 4        | 24         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 5        | 32         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 6        | 40         | 8-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             |             | Speed             | The speed of the animation.                                              |
| 7        | 48         | 8-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             |             | Pattern           | The pattern of the animation.                                            |

## Index 68: Segment 3 Configuration

Description: Segment 3 Configuration Data

Data Type: 56-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name      | Description                           |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|---------------------------------------|
| 1        | 0          | 8-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep<br>8 = Demo                                                    | 1             |             | Animation | The animation type.                   |
| 2        | 8          | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 4             |             | Color 1   | The main color of the animation.      |
| 3        | 16         | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Color 2   | The secondary color of the animation. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                      | Default Value | Acc. Restr. | Name              | Description                                                              |
|----------|------------|----------------|---------------------------------------------------------------------|---------------|-------------|-------------------|--------------------------------------------------------------------------|
| 4        | 24         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom          | 0             |             | Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 5        | 32         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom          | 0             |             | Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 6        | 40         | 8-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                    | 0             |             | Speed             | The speed of the animation.                                              |
| 7        | 48         | 8-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random | 0             |             | Pattern           | The pattern of the animation.                                            |

## Index 69: Segment 4 Configuration

Description: Segment 4 Configuration Data

Data Type: 56-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                     | Default Value | Acc. Restr. | Name      | Description         |
|----------|------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|---------------------|
| 1        | 0          | 8-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep<br>8 = Demo | 1             |             | Animation | The animation type. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name              | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-------------------|--------------------------------------------------------------------------|
| 2        | 8          | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 1             |             | Color 1           | The main color of the animation.                                         |
| 3        | 16         | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Color 2           | The secondary color of the animation.                                    |
| 4        | 24         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 5        | 32         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                      | Default Value | Acc. Restr. | Name    | Description                   |
|----------|------------|----------------|---------------------------------------------------------------------|---------------|-------------|---------|-------------------------------|
| 6        | 40         | 8-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                    | 0             |             | Speed   | The speed of the animation.   |
| 7        | 48         | 8-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random | 0             |             | Pattern | The pattern of the animation. |

## Index 70: Segment 5 Configuration

Description: Segment 5 Configuration Data

Data Type: 56-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name      | Description                      |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|----------------------------------|
| 1        | 0          | 8-bit UInteger | 0 = Off<br>1 = Steady<br>2 = Flash<br>3 = Two Color Flash<br>4 = Half/Half<br>5 = Half/Half Rotate<br>6 = Chase<br>7 = Intensity Sweep<br>8 = Demo                                                    | 1             |             | Animation | The animation type.              |
| 2        | 8          | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 13            |             | Color 1   | The main color of the animation. |

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| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name              | Description                                                              |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-------------------|--------------------------------------------------------------------------|
| 3        | 16         | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Color 2           | The secondary color of the animation.                                    |
| 4        | 24         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 1 Intensity | The intensity of Color 1. Custom Intensity is defined in Parameter Data. |
| 5        | 32         | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Color 2 Intensity | The intensity of Color 2. Custom Intensity is defined in Parameter Data. |
| 6        | 40         | 8-bit UInteger | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             |             | Speed             | The speed of the animation.                                              |
| 7        | 48         | 8-bit UInteger | 0 = Flash<br>1 = Strobe<br>2 = Three Pulse<br>3 = SOS<br>4 = Random                                                                                                                                   | 0             |             | Pattern           | The pattern of the animation.                                            |

## Index 76: General Configuration for Level Mode

Description: General Config. for Level Mode

Data Type: 176-bit Record

Access Rights: RW

| Subindex | Bit Offset | Data Type       | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name                 | Description                             |
|----------|------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|----------------------|-----------------------------------------|
| 1        | 0          | 16-bit UInteger | 0..65535                                                                                                                                                                                              | 100           |             | Full Scale           | The number representing the Full Scale. |
| 2        | 16         | 8-bit UInteger  | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Base Color           | The color of the base.                  |
| 3        | 24         | 8-bit UInteger  | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Base Color Intensity | The intensity of the Base Color.        |
| 4        | 32         | 8-bit UInteger  | 0 = Steady<br>1 = Flashing                                                                                                                                                                            | 0             |             | Base State           | The state of the base.                  |
| 5        | 40         | 16-bit UInteger | 0..65535                                                                                                                                                                                              | 20            |             | Low Threshold        | Low Threshold                           |
| 6        | 56         | 8-bit UInteger  | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Low Threshold Color  | The color of the Low Threshold.         |

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| Subindex | Bit Offset | Data Type       | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name                     | Description                                |
|----------|------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|--------------------------|--------------------------------------------|
| 7        | 64         | 8-bit UInteger  | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | Low Threshold Intensity  | The intensity of the Low Threshold Color.  |
| 8        | 72         | 8-bit UInteger  | 0 = Steady<br>1 = Flashing                                                                                                                                                                            | 0             |             | Low Threshold State      | The state of the low threshold.            |
| 9        | 80         | 16-bit UInteger | 0..65535                                                                                                                                                                                              | 80            |             | High Threshold           | High Threshold                             |
| 10       | 96         | 8-bit UInteger  | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | High Threshold Color     | The color of the High Threshold.           |
| 11       | 104        | 8-bit UInteger  | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 0             |             | High Threshold Intensity | The intensity of the High Threshold Color. |
| 12       | 112        | 8-bit UInteger  | 0 = Steady<br>1 = Flashing                                                                                                                                                                            | 0             |             | High Threshold State     | The state of the high threshold.           |
| 13       | 120        | 8-bit UInteger  | 0 = None<br>1 = Low<br>2 = High<br>3 = Low and High                                                                                                                                                   | 0             |             | Threshold Type           | Threshold Type                             |
| 14       | 128        | 8-bit UInteger  | 0 = Medium<br>1 = Slow<br>2 = Fast<br>3 = Custom                                                                                                                                                      | 0             |             | Flash Rate               | Flash Rate                                 |
| 15       | 136        | 8-bit UInteger  | 0 = NonDominant<br>1 = Dominant                                                                                                                                                                       | 0             |             | Dominance                | Dominance                                  |

Continued on page 31

Continued from page 30

| Subindex | Bit Offset | Data Type      | Allowed Values                                                                                                                                                                                        | Default Value | Acc. Restr. | Name                       | Description                            |
|----------|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|----------------------------|----------------------------------------|
| 16       | 144        | 8-bit UInteger | 0 = Steady<br>1 = Flashing<br>2 = Analog                                                                                                                                                              | 2             |             | SubSegment Style           | SubSegment Style                       |
| 17       | 152        | 8-bit UInteger | 0 = Green<br>1 = Red<br>2 = Orange<br>3 = Amber<br>4 = Yellow<br>5 = Lime Green<br>6 = Spring Green<br>7 = Cyan<br>8 = Sky Blue<br>9 = Blue<br>10 = Violet<br>11 = Magenta<br>12 = Rose<br>13 = White | 0             |             | Background Color           | The color of the background.           |
| 18       | 160        | 8-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off<br>4 = Custom                                                                                                                                            | 3             |             | Background Color Intensity | The intensity of the Background Color. |
| 19       | 168        | 8-bit UInteger | 0 = Standard<br>1 = Upside Down                                                                                                                                                                       | 0             |             | Orientation                | The direction of the animation.        |

## Index 83: Custom Configuration

Description: Custom Config.

Data Type: 16-bit Record (subindex access not supported)

Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values | Default Value | Acc. Restr. | Name                         | Description                                                       |
|----------|------------|----------------|----------------|---------------|-------------|------------------------------|-------------------------------------------------------------------|
| 1        | 0          | 8-bit UInteger | 1..255         | 100           |             | Custom Color Intensity (%)   | The customizable intensity of the color, defined as a percentage. |
| 2        | 8          | 8-bit UInteger | 1..255         | 10            |             | Custom Animation Speed (dHz) | The customizable speed of the animation, defined in dHz.          |

## Index 90: Audible Configuration

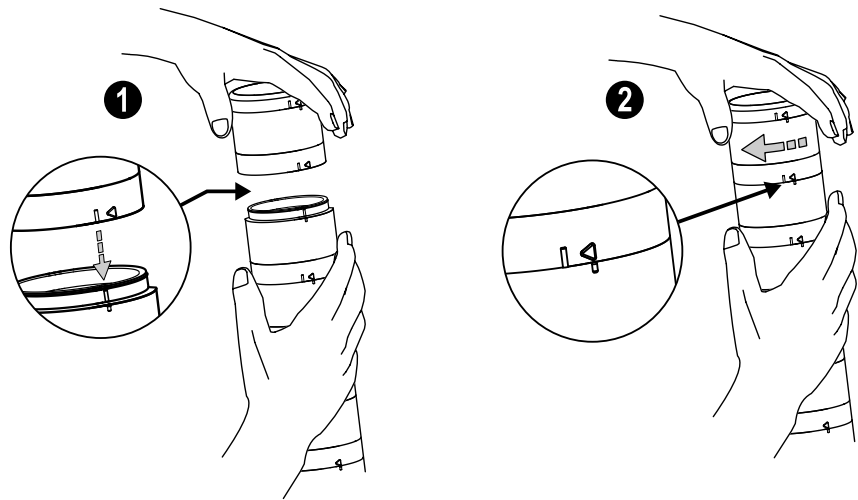
Description: Configuration Used For Audible

Data Type: 16-bit Record (subindex access not supported)

## Access Rights: RW

| Subindex | Bit Offset | Data Type      | Allowed Values                                    | Default Value | Acc. Restr. | Name         | Description                                                         |
|----------|------------|----------------|---------------------------------------------------|---------------|-------------|--------------|---------------------------------------------------------------------|
| 1        | 0          | 4-bit UInteger | 0 = Freq<br>1 = Sync<br>2 = Off                   | 0             |             | Audible Type | The type of the audible output.                                     |
| 2        | 4          | 4-bit UInteger | 0 = High<br>1 = Medium<br>2 = Low<br>3 = Off      | 0             |             | Volume       | The volume of the audible output.                                   |
| 3        | 8          | 4-bit UInteger | 0 = Freq 3<br>1 = Freq 2<br>2 = Freq 1<br>3 = Off | 0             |             | Tone 1       | The frequency of the audible output.                                |
| 4        | 12         | 4-bit UInteger | 0 = Freq 3<br>1 = Freq 2<br>2 = Freq 1<br>3 = Off | 0             |             | Tone 2       | The secondary frequency of the audible output (for Sync Mode only). |

# Chapter 3      Assembling the Modules



- IMPORTANT:**
- Do not assemble or swap segments while the unit is powered on.
  - Ensure power is off when assembling or swapping segments.

- To assemble the modules:
1. Align the notches on each module and press together.
  2. Rotate the top module clockwise to lock into place (notches shown in the locked position).

## Wiring

| Wiring Diagram                                                                                       | 4-pin M12 Male Pinout                                                         |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <p>bu (3) — -<br/>bn (1) — + 18-30 V DC<br/>bk (4) — IO-Link Communication<br/>wh (2) — Not used</p> | <p>1 = Brown (bn)<br/>2 = White (wh)<br/>3 = Blue (bu)<br/>4 = Black (bk)</p> |

# Chapter 4 Specifications

## Supply Voltage

18 V DC to 30 V DC

## Supply Current

| Device                    | Typical Current (mA) per Device |         |         | Max Current (mA) |
|---------------------------|---------------------------------|---------|---------|------------------|
|                           | 18 V DC                         | 24 V DC | 30 V DC |                  |
| Base                      | 60                              | 45      | 40      | 75               |
| Light and Audible segment | 110                             | 85      | 75      | 125              |

## Supply Protection Circuitry

Protected against reverse polarity and transient voltages

## Indicators

RGB: 14 colors

## Connections

Integral 4-pin M12 male quick-disconnect connector

## Operating Conditions

−40 °C to +50 °C (−40 °F to +122 °F)

95% at +50 °C maximum relative humidity (non-condensing)

## Environmental Rating

IP65 and IP66

## Audible Alarm Settings

**Freq 1:** 1.7 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 81 dB at 1 m (3.3 ft)

**Freq 2:** 2.2 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 100 dB at 1 m (3.3 ft)

**Freq 3:** 2.7 kHz ± 250 Hz oscillation frequency; maximum intensity (typical) 104 dB at 1 m (3.3 ft)

## Audible Intensity

|        | Intensity at 1 m (dB) |                 |                 |
|--------|-----------------------|-----------------|-----------------|
|        | Freq 1: 1.7 kHz       | Freq 2: 2.2 kHz | Freq 3: 2.7 kHz |
| Low    | 75                    | 94              | 99              |
| Medium | 78                    | 97              | 102             |
| High   | 81                    | 100             | 105             |

## Construction

**Bases, Segments, Covers:** polycarbonate

## Vibration and Mechanical Shock

Vibration: 10 Hz to 55 Hz, 0.5 mm peak-to-peak amplitude per IEC 60068-2-6

Shock: 15G 11 ms duration, half sine wave per IEC 60068-2-27

## Required Overcurrent Protection



**WARNING:** Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to [www.bannerengineering.com](http://www.bannerengineering.com).

| Supply Wiring (AWG) | Required Overcurrent Protection (A) | Supply Wiring (AWG) | Required Overcurrent Protection (A) |
|---------------------|-------------------------------------|---------------------|-------------------------------------|
| 20                  | 5.0                                 | 26                  | 1.0                                 |
| 22                  | 3.0                                 | 28                  | 0.8                                 |
| 24                  | 2.0                                 | 30                  | 0.5                                 |

## Certifications



Banner Engineering BV  
Park Lane, Culliganlaan 2F bus 3  
1831 Diegem, BELGIUM



## Default Light Segment Characteristics

| Color        | Dominant Wavelength (nm) or Color Temperature (CCT) | Color Coordinates <sup>(1)</sup> |       | Lumen Output Per Segment<br>(Typical at 25 °C) |
|--------------|-----------------------------------------------------|----------------------------------|-------|------------------------------------------------|
|              |                                                     | X                                | Y     |                                                |
| Green        | 532                                                 | 0.181                            | 0.735 | 34.8                                           |
| Red          | 621                                                 | 0.691                            | 0.308 | 15.4                                           |
| Yellow       | 578                                                 | 0.473                            | 0.474 | 21                                             |
| Blue         | 467                                                 | 0.137                            | 0.056 | 27.6                                           |
| White        | 5700K                                               | 0.328                            | 0.337 | 29.7                                           |
| Cyan         | 492                                                 | 0.150                            | 0.334 | 20.9                                           |
| Magenta      | -                                                   | 0.379                            | 0.177 | 18.7                                           |
| Amber        | 590                                                 | 0.552                            | 0.414 | 6.6                                            |
| Rose         | -                                                   | 0.508                            | 0.230 | 9.3                                            |
| Lime Green   | 565                                                 | 0.393                            | 0.535 | 23.8                                           |
| Sky Blue     | 485                                                 | 0.146                            | 0.241 | 14.1                                           |
| Orange       | 600                                                 | 0.611                            | 0.370 | 24.1                                           |
| Violet       | -                                                   | 0.212                            | 0.091 | 19.6                                           |
| Spring Green | 509                                                 | 0.157                            | 0.553 | 12.7                                           |

## FCC Part 15 Class B for Unintentional Radiators

(Part 15.105(b)) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

## Industry Canada ICES-003(B)

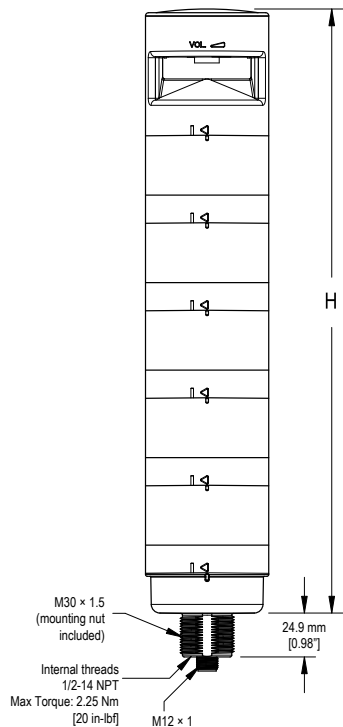
This device complies with CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(B). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.

<sup>(1)</sup> Refer to CIE 1931 chromaticity diagram or color chart to show equivalent color with indicated color coordinates. Actual coordinates may differ by 10%.

# Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.



| Model                             | Height (H)          |
|-----------------------------------|---------------------|
| 1 light module                    | 87.6 mm (3.45 in)   |
| 1 light module, 1 audible module  | 144.3 mm (5.68 in)  |
| 2 light modules                   | 137.3 mm (5.41 in)  |
| 2 light modules, 1 audible module | 194 mm (7.64 in)    |
| 3 light modules                   | 187 mm (7.36 in)    |
| 3 light modules, 1 audible module | 243.7 mm (9.59 in)  |
| 4 light modules                   | 236.7 mm (9.32 in)  |
| 4 light modules, 1 audible module | 293.4 mm (11.55 in) |
| 5 light modules                   | 286.4 mm (11.28 in) |
| 5 light modules, 1 audible module | 343.1 mm (13.5 in)  |

# Chapter 5 Accessories

## Cordsets

| 4-Pin A-Code Double-Ended M12 Female to M12 Male Cordsets (datasheet p/n <a href="#">236186</a> ) |                 |                 |                           |                                                                                                 |
|---------------------------------------------------------------------------------------------------|-----------------|-----------------|---------------------------|-------------------------------------------------------------------------------------------------|
| Model                                                                                             | Length          | Dimensions (mm) | Pinouts                   |                                                                                                 |
| BC-M12F4-M12M4-22-1                                                                               | 1 m (3.28 ft)   |                 | <p>Female</p> <p>Male</p> | <p>1 = Brown<br/>2 = White<br/>3 = Blue<br/>4 = Black<br/>5 = Unused</p> <p> c UL US LISTED</p> |
| BC-M12F4-M12M4-22-2                                                                               | 2 m (6.56 ft)   |                 |                           |                                                                                                 |
| BC-M12F4-M12M4-22-3                                                                               | 3 m (9.84 ft)   |                 |                           |                                                                                                 |
| BC-M12F4-M12M4-22-4                                                                               | 4 m (13.12 ft)  |                 |                           |                                                                                                 |
| BC-M12F4-M12M4-22-5                                                                               | 5 m (16.4 ft)   |                 |                           |                                                                                                 |
| BC-M12F4-M12M4-22-10                                                                              | 10 m (30.81 ft) |                 |                           |                                                                                                 |
| BC-M12F4-M12M4-22-15                                                                              | 15 m (49.2 ft)  |                 |                           |                                                                                                 |

| 4-Pin A-Code Double-Ended M12 Female to M12 Male Right-Angle Cordsets (datasheet p/n <a href="#">236186</a> ) |                 |                 |                           |                                                                                                 |
|---------------------------------------------------------------------------------------------------------------|-----------------|-----------------|---------------------------|-------------------------------------------------------------------------------------------------|
| Model                                                                                                         | Length          | Dimensions (mm) | Pinouts                   |                                                                                                 |
| BC-M12F4-M12M4A-22-1                                                                                          | 1 m (3.28 ft)   |                 | <p>Female</p> <p>Male</p> | <p>1 = Brown<br/>2 = White<br/>3 = Blue<br/>4 = Black<br/>5 = Unused</p> <p> c UL US LISTED</p> |
| BC-M12F4-M12M4A-22-2                                                                                          | 2 m (6.56 ft)   |                 |                           |                                                                                                 |
| BC-M12F4-M12M4A-22-5                                                                                          | 5 m (16.4 ft)   |                 |                           |                                                                                                 |
| BC-M12F4-M12M4A-22-8                                                                                          | 8 m (26.25 ft)  |                 |                           |                                                                                                 |
| BC-M12F4-M12M4A-22-10                                                                                         | 10 m (30.81 ft) |                 |                           |                                                                                                 |
| BC-M12F4-M12M4A-22-15                                                                                         | 15 m (49.2 ft)  |                 |                           |                                                                                                 |

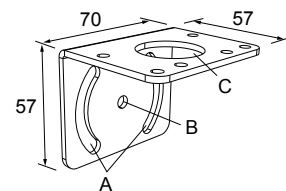
## Mounting Brackets

All measurements are listed in millimeters, unless noted otherwise. The measurements provided are subject to change.

### SMB30MM

- 12-gauge stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (1/4 in) hardware
- Mounting hole for 30 mm sensor
- CAD Files: [DXF](#), [PDF](#), [IGS](#), [STP](#)

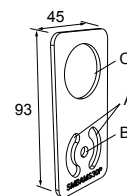
**Hole center spacing:** A=51, A to B=25.4  
**Hole size:** A=42.6 × 7, B=∅ 6.4, C=∅ 30.1



### SMBAMS30P

- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge 300 series stainless steel
- CAD Files: [DXF](#), [PDF](#), [IGS](#), [STP](#)

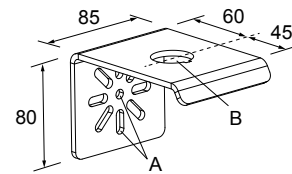
**Hole center spacing:** A=26.0, A to B=13.0  
**Hole size:** A=26.8 × 7.0, B=∅ 6.5, C=∅ 31.0



**SSA-MBK-EEC1**

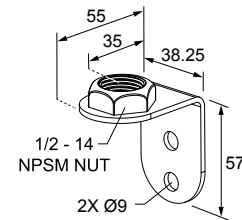
- Single 30 mm hole
- 8 gauge steel, black finish (powder coat)
- Front surface for customer-applied labels
- CAD Files: [DXF](#), [PDF](#), [IGS](#), [STP](#)

**Hole size:** A =  $\varnothing 7$  , B =  $\varnothing 30$

**LMBE12RA35**

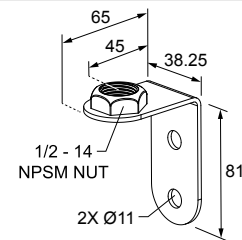
- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 35 mm
- CAD Files: [DXF](#), [PDF](#), [IGS](#), [STP](#)

**Hole center spacing:** 20.0

**LMBE12RA45**

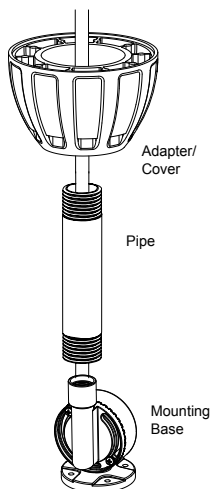
- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 45 mm
- CAD Files: [DXF](#), [PDF](#), [IGS](#), [STP](#)

**Hole center spacing:** 35.0



## Elevated Mount System

*Example Assembly for a TL70 Tower Light*

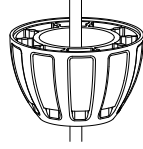


This example uses:

1. Adapter/Cover (SA-M30 shown)
2. Pipe
3. Mounting Base (SA-FFB12 shown)

Other compatible parts are listed in the following tables.

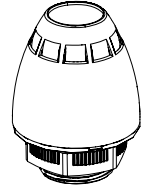
### Adapters/Covers

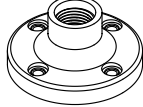
| Adapter/Cover Model          | Description                                                                                                                                                                                                                                                                                                                                                         |                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| SA-M30 - Black polycarbonate | <ul style="list-style-type: none"> <li>Streamlined black PC or Gray PC thread cover</li> <li>Covers the outer M30 threads on the light's base</li> <li>Typically used for the TL70 Tower Light and K90 series</li> <li>Mounting hardware included</li> <li>CAD files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |
| SA-M30C - Gray polycarbonate |                                                                                                                                                                                                                                                                                                                                                                     |                                                                                     |

## Pipes

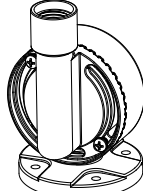
| Black Anodized Aluminum, ½ in. NPT Pipe Models | Clear Anodized Aluminum, ½ in. NPT Pipe Models | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SOP-E12-150A, 150 mm (6 in) long               | SOP-E12-150AC, 150 mm (6 in) long              | <ul style="list-style-type: none"> <li>Elevated-use stand-off pipe</li> <li>Threaded at both ends</li> <li>Compatible with most industrial environments</li> <li>CAD Files: <ul style="list-style-type: none"> <li>SOP-E12-150A: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> <li>SOP-E12-300A: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> <li>SOP-E12-600A: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> <li>SOP-E12-900A: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> </li> </ul> |
| SOP-E12-300A, 300 mm (12 in) long              | SOP-E12-300AC, 300 mm (12 in) long             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| SOP-E12-600A, 600 mm (24 in) long              | -                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| SOP-E12-900A, 900 mm (36 in) long              | SOP-E12-900AC, 900 mm (36 in) long             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

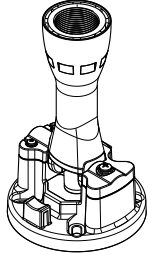
## Bottom Covers and Mounting Bases

| Mounting Base Model      | Description                                                                                                                                                                                                                                                                                                                                  |                                                                                      |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| SA-E12M30 - Black acetal | <ul style="list-style-type: none"> <li>Streamlined black acetal or white UHMW mounting base adapter/cover</li> <li>Adapter from ½ in. NPSM/DN15 pipe to 30 mm (1-3/16 in) drilled hole</li> <li>Mounting hardware included</li> <li>CAD files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |
| SA-E12M30C - White UHMW  |                                                                                                                                                                                                                                                                                                                                              |                                                                                      |

| Mounting Base Model | Description                                                                                                                                                                                                                                                                                                    |                                                                                       |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| SA-F12              | <ul style="list-style-type: none"> <li>Die-cast zinc base with black paint</li> <li>Elevated-use stand-off pipes (½ in, NPSM/DN15)</li> <li>M5 mounting hardware and nitrile gasket included</li> <li>CAD files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |

| Mounting Base Model | Description                                                                                                                                                                                                                                                                                          |                                                                                       |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| SA-F12-3            | <ul style="list-style-type: none"> <li>Black polycarbonate</li> <li>Elevated-use stand-off pipes (½ in, NPSM/DN15)</li> <li>M4 mounting hardware and nitrile blend gasket included</li> <li>CAD files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |

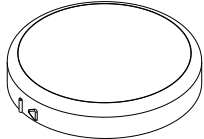
| Mounting Base Model            | Description                                                                                                                                                                                                                                          |                                                                                       |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| SA-FFB12 - Black polycarbonate | <ul style="list-style-type: none"> <li>For use with ½ in. stand-off pipes</li> <li>110° rotation</li> <li>Stainless steel hardware</li> <li>CAD files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |
| SA-FFB12C - Gray polycarbonate |                                                                                                                                                                                                                                                      |                                                                                       |

| Mounting Base Model | Description                                                                                                                                                                                                                                                                                                                                |                                                                                     |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>SOKTL150R4</b>   | <ul style="list-style-type: none"> <li>Black polycarbonate</li> <li>Foldable stand model with upright and 90° folding states</li> <li>Elevated-use stand-off pipes (½ in, NPSM/DN15)</li> <li>Mounting hardware included</li> <li>CAD files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |

## LMB Sealed Right Angle Bracket

| Model                                                                                                               | Description                                                                                                                                                               | Construction        |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------|
| <b>LMB30RA</b><br>CAD Files: <a href="#">DXF</a> , <a href="#">PDF</a> , <a href="#">IGS</a> , <a href="#">STP</a>  | <b>Direct-Mount Models:</b> Bracket kit with base, 30 mm adapter, set screw, fasteners, O-rings, and gaskets.                                                             | Black polycarbonate |  |
| <b>LMBE12RA</b><br>CAD Files: <a href="#">DXF</a> , <a href="#">PDF</a> , <a href="#">IGS</a> , <a href="#">STP</a> | <b>Pipe-Mount Models:</b> Bracket kit with base, ½-14 pipe adapter, set screw, fasteners, O-rings, and gaskets. For use with stand-off pipe (listed and sold separately). | Black polycarbonate |  |

## Top Replacement Cover

|                                                                                                                                                                                                                                                                              |                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>C-TL70 Replacement Top Cover</b> <ul style="list-style-type: none"> <li>Black polycarbonate housing</li> <li>Fits TL70 tower lights</li> <li>IP65 rated</li> <li>CAD Files: <a href="#">DXF</a>, <a href="#">PDF</a>, <a href="#">IGS</a>, <a href="#">STP</a></li> </ul> |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

# Chapter 6 Product Support and Maintenance

## Clean with Mild Detergent and Warm Water

Wipe down the device with a soft cloth dampened with a mild detergent and warm water solution. Do not use any other chemicals for cleaning.

## Repairs and Translations (No Field-Replaceable Parts)

### English

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

**IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

Obtain assistance with product repairs by contacting your local Banner Engineering Corp distributor or by calling Banner directly at (763) 544-3164. Access literature translated into your native language on the Banner website at [www.bannerengineering.com](http://www.bannerengineering.com) or contact Banner directly at (763) 544-3164.

### Deutsch

Wenden Sie sich zur Fehlerbehebung dieses Geräts an Banner Engineering. **Versuchen Sie nicht, Reparaturen an diesem Banner-Gerät vorzunehmen. Das Gerät enthält keine am Einsatzort auszuwechselnden Teile oder Komponenten.** Wenn ein Banner-Anwendungstechniker zu dem Schluss kommt, dass dieses Gerät, ein Teil oder eine Komponente davon defekt ist, erhalten Sie von dem Techniker Erläuterungen zu Banners RMA-Verfahren (Return Merchandise Authorization) für die Warenrückgabe.

**WICHTIG:** Wenn Sie der Techniker anweist, das Gerät zurückzusenden, verpacken Sie es bitte sorgfältig. Transportschäden bei der Rücksendung werden von der Garantie nicht abgedeckt.

Unterstützung bei Produktreparaturen erhalten Sie von Ihrem örtlichen Banner Engineering Corp Händler oder direkt von Banner unter Tel. (763) 544-3164. Die in Ihrer Muttersprache übersetzte Literatur finden Sie auf der Banner-Website unter [www.bannerengineering.com](http://www.bannerengineering.com) oder kontaktieren Sie Banner direkt unter Tel. (763) 544-3164.

### Français

Pour plus d'informations sur le dépannage du produit, contactez Banner Engineering. **Ne tentez pas de réparer ce dispositif Banner. Il ne contient aucun composant ou pièce qui puisse être remplacé sur place.** Si un ingénieur de Banner conclut que le dispositif ou l'une de ses pièces ou composants est défectueux, il vous informera de la procédure à suivre pour le retour des produits (RMA).

**Important :** Si vous devez retourner le dispositif, emballez-le avec soin. Les dégâts occasionnés pendant le transport de retour ne sont pas couverts par la garantie.

Pour vous aider lors de la réparation de produits, contactez votre distributeur Banner local ou appelez directement Banner au (763) 544-3164. La documentation traduite dans votre langue est disponible sur le site internet de Banner [www.bannerengineering.com](http://www.bannerengineering.com) ou contactez directement Banner au (763) 544-3164.

### Italiano

Per le procedure di individuazione e riparazione dei guasti di questo dispositivo, contattare Banner Engineering. **Non tentare di riparare questo dispositivo Banner, in quanto non contiene parti o componenti sostituibili dall'utente.** Se il dispositivo, una parte del dispositivo o un componente del dispositivo viene riscontrato difettoso da un tecnico Banner, il nostro personale vi comunicherà la procedura da seguire per ottenere l'autorizzazione al reso.

**Importante:** Se si ricevono istruzioni di rispedire il dispositivo al produttore, imballarlo con cura. I danni dovuti al trasporto non sono coperti dalla garanzia.

Per assistenza nelle riparazioni dei prodotti, contattare il distributore locale Banner Engineering Corp o contattare direttamente Banner al numero (763) 544-3164. È possibile accedere alla documentazione tradotta nella propria lingua madre sul sito Web Banner all'indirizzo [www.bannerengineering.com](http://www.bannerengineering.com) o contattare direttamente Banner al numero (763) 544-3164.

## Español

Comuníquese con Banner Engineering para solucionar de problemas de este dispositivo. **No intente ninguna reparación a este dispositivo de Banner, contiene piezas o componente que no se pueden cambiar en terreno.** Si algún ingeniero de aplicaciones de Banner determina que el dispositivo, alguna de las piezas o alguno de los componentes del dispositivo está defectuoso, le informará el procedimiento de autorización de devolución de mercancía (RMA, por sus siglas en inglés) de Banner.

**Importante:** Si se le solicita devolver el dispositivo, empáquelo con cuidado. Puede haber daños durante el envío de devolución que no estén cubiertos por la garantía.

Para reparaciones de productos, por favor contacte a su distribuidor local de Banner Engineering o llame a Banner directamente al 00 1 (763) 544-3164. Vea la literatura traducida en su idioma en el sitio web Banner en [www.bannerengineering.com](http://www.bannerengineering.com) o comuníquese con Banner directamente al 00 1 (763) 544-3164.

## 中国人

如需对本装置进行故障排查, 请联系邦纳。请勿尝试自行维修该邦纳装置; 本装置不包含任何可在现场更换的部件或组件。若经邦纳应用工程师确认设备、设备部件或组件存在缺陷, 他们将告知您邦纳退货授权 (RMA) 流程。

**重要注意事项:** 如被要求退回装置, 请妥善包装后寄回。退货运输过程中发生的损坏不在保修范围内。

请联系当地的 Banner Engineering Corp 经销商或直接致电 Banner +1 (763) 544-3164, 以获得产品维修帮助。请访问邦纳网站 [www.bannerengineering.com](http://www.bannerengineering.com) 或直接拨打 +1 (763) 544-3164 联系邦纳, 获取翻译成您母语的资料。

## 한국인

이 장치의 문제를 해결하려면 Banner Engineering에 문의하십시오. 이 Banner 장치에는 현장에서 교체할 수 있는 부품 또는 구성품이 없으므로 수리를 시도하지 마십시오. Banner 애플리케이션 엔지니어가 장치, 장치 부품 또는 장치 구성품에 결함이 있는 것으로 판정하면, Banner의 RMA(제품 반송 승인)절차에 대해 안내해 드립니다.

**중요:** 제품을 반송하도록 안내 받으셨다면 잘 포장해주시십시오. 반송 도중에 발생한 손상은 보증 서비스가 적용되지 않습니다.

제품 수리에 대한 지원은 지역 Banner Engineering Corp 대리점에 문의하거나 Banner에 직접 (763) 544-3164로 문의하실 수 있습니다. 사용자의 모국어로 번역된 자료는 Banner 웹사이트 [www.bannerengineering.com](http://www.bannerengineering.com)에서 액세스하거나 Banner에 직접 (763) 544-3164로 문의하실 수 있습니다.

## 日本語

この装置のトラブルシューティングについては、バナーエンジニアリングにお問い合わせください。このバナー装置には、現場では交換できない部品またはコンポーネントが含まれているため、修理を試みてもいけません。バナーのアプリケーションエンジニアが装置、装置の部品、または装置のコンポーネントに欠陥があると判断した場合、バナーのRMA（返品承認）手続きについてお知らせします。

**重要：** 返品を指示された場合は、装置を丁寧に梱包してください。返品時に発生した破損は保証の対象外となります。

製品の修理については、最寄りのBanner Engineering Corp代理店にお問い合わせいただくか、米国+1 (763) 544-3164まで直接お電話でお問い合わせください。バナーのウェブサイト（[www.bannerengineering.com](http://www.bannerengineering.com)）でお客様の言語に翻訳された資料にアクセスするか、米国+1 (763) 544-3164まで直接お電話でお問い合わせください。

## čeština

Pro řešení problémů se zařízením kontaktujte společnost Banner Engineering. **Neprovádějte žádné opravy zařízení Banner. Neobsahují žádné komponenty nebo části, které by byly vyměnitelné.** Pokud je zařízení, jeho část nebo díl označen technikem společnosti Banner jako poškozený, bude Vám doporučeno vyplnit reklamční RMA protokol.

**Důležité:** Pokud byl vydán požadavek na vrácení zařízení, pečlivě ho zabalte. Poškození vzniklé při dopravě není považováno za záruční opravu.

Pokud produkt potřebuje opravu, vyžádejte si pomoc od místního distributora společnosti Banner Engineering Corp nebo přímo na telefonním čísle (763) 544-3164. Dokumentaci přeloženou do vašeho jazyka si vyhledejte na webových stránkách společnosti Banner na adrese [www.bannerengineering.com](http://www.bannerengineering.com) nebo se obraťte přímo na společnost Banner na telefonním čísle (763) 544-3164.

## Polski

W celu rozwiązania problemów z urządzeniem należy skontaktować się z działem technicznym firmy Banner Engineering. **Pod żadnym pozorem nie próbuj naprawiać tego urządzenia firmy Banner; nie zawiera ono części ani elementów, które można wymieniać samodzielnie.** Jeśli urządzenie, jego część lub element zostaną uznane za wadliwe przez inżyniera technicznego Banner, poinformuje on użytkownika o firmowej procedurze zwrotu towaru (RMA) firmy Banner.

**Ważne:** Jeśli urządzenie ma zostać zwrócone, należy je starannie zapakować. Uszkodzenia powstałe podczas odsyłki nie są objęte gwarancją.

Aby uzyskać pomoc w zakresie naprawy produktu, należy skontaktować się z lokalnym dystrybutorem Banner Engineering Corp lub zadzwonić bezpośrednio do firmy Banner pod numer (763) 544-3164. Dostęp do literatury przetłumaczonej na swój język ojczysty można uzyskać na stronie internetowej firmy Banner pod adresem [www.bannerengineering.com](http://www.bannerengineering.com) lub kontaktując się bezpośrednio z firmą Banner pod numerem (763) 544-3164.

## Português

Entre em contato com a Engenharia da Banner para a solução de problemas deste dispositivo. **Não tente fazer nenhum reparo neste dispositivo Banner; ele não contém peças ou componentes substituíveis em campo.** Se um técnico de aplicações da Banner determinar que o dispositivo, peça ou componente do dispositivo está com defeito, ele o informará sobre o procedimento de RMA (Autorização de Devolução de Mercadoria) da Banner.

**Importante:** Se for instruído a devolver o dispositivo, embale-o com cuidado. Os danos ocorridos no transporte de devolução não são cobertos pela garantia.

Obtenha assistência para reparos do produto entrando em contato com o distribuidor local da Banner Engineering Corp ou ligando diretamente para a Banner no telefone (763) 544-3164. Acesse a literatura traduzida para seu idioma nativo no site da Banner em [www.bannerengineering.com](http://www.bannerengineering.com) ou entre em contato diretamente com a Banner pelo telefone (763) 544-3164.

## Türkçe

Bu cihazda sorun giderme işlemleri için Banner Engineering ile iletişime geçin. **Bu Banner cihazını onarmaya çalışmayın; cihaz sahada değiştirilebilir parça veya bileşen içermez.** Bir Banner Uygulama Mühendisi tarafından cihazın, cihazın bir parçasının veya bir cihaz bileşeninin kusurlu olduğu tespit edilirse, Banner RMA (İade Mal Yetkilendirme) prosedürü hakkında bilgilendirilirsiniz.

**ÖNEMLİ:** İade etmeniz istenirse, cihazı dikkatli bir şekilde paketleyin. İade nakliyesinde meydana gelecek hasarlar garanti kapsamında değildir.

Yerel Banner Engineering Corp distribütörünüzle iletişime geçerek veya doğrudan (763) 544-3164 numaralı telefondan Banner'ı arayarak ürün onarımlarıyla ilgili yardım alın. Ana dilinize çevrilmiş dokümanlara [www.bannerengineering.com](http://www.bannerengineering.com) adresindeki Banner web sitesinden erişilebilir veya (763) 544-3164 numaralı telefondan doğrudan Banner ile iletişime geçebilirsiniz.

# Contact Us

Banner Engineering Corp. | 9714 Tenth Avenue North | Plymouth, MN 55441, USA | Phone: + 1 888 373 6767

For worldwide locations and local representatives, visit [www.bannerengineering.com](http://www.bannerengineering.com).

# Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

**THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.**

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

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For patent information, see [www.bannerengineering.com/patents](http://www.bannerengineering.com/patents).

