# Features

The Sure Cross® TL70 Wireless Modular Tower Light combines the best of Banner's popular Tower Light family with its reliable, field-proven, Sure Cross wireless architecture.



- Available in 900 MHz and 2.4 GHz ISM radio frequencies
- Up to six colors, or five colors plus audible, in one device
- Rugged, water-resistant IP65 housing with UV-stabilized material
- Bright, uniform indicator segments appear gray when off to eliminate false indications from ambient light
- Two-way communication - light segments can be controlled with the input wires or the client radio
- Input wires can be configured as auxiliary sourcing inputs from external devices or as a 20 Hz, 32-bit event counter

**IMPORTANT:** Please download the complete TL70 Wireless Modular Tower Light technical documentation, available in multiple languages, from www.bannerengineering.com for details on the proper use, applications, Warnings, and installation instructions of this device.

**IMPORTANT:** Por favor descargue desde www.bannerengineering.com toda la documentación técnica de los TL70 Wireless Modular Tower Light, disponibles en múltiples idiomas, para detalles del uso adecuado, aplicaciones, advertencias, y las instrucciones de instalación de estos dispositivos.

**IMPORTANT:** Veuillez télécharger la documentation technique complète des TL70 Wireless Modular Tower Light sur notre site www.bannerengineering.com pour les détails sur leur utilisation correcte, les applications, les notes de sécurité et les instructions de montage.

# Models

*TL70 Pre-Assembled Models*

| Model | Radio Frequency | Included modules | Connection |
|---|---|---|---|
| **TL70DXN2GYROB** | 2.4 GHz ISM Band | Green, yellow, red, orange, blue | 2 m cable |
| **TL70DXN2GYRQ** | 2.4 GHz ISM Band | Green, yellow, red | 5-pin M12 male quick disconnect |
| **TL70DXN9GRALQ** | 900 MHz ISM Band | Green, red, loud audible | 5-pin M12 male quick disconnect |
| **TL70DXN9GRALQP** | 900 MHz ISM Band | Green, red, loud audible | 150 mm cable with a 5-pin M12 male quick disconnect |
| **TL70DXN9GYRALQ** | 900 MHz ISM Band | Green, yellow, red, loud audible | 5-pin M12 male quick disconnect |
| **TL70DXN9GYRAQ** | 900 MHz ISM Band | Green, yellow, red, audible | 5-pin M12 male quick disconnect |
| **TL70DXN9GYRBQ** | 900 MHz ISM Band | Green, yellow, red, blue | 5-pin M12 male quick disconnect |
| **TL70DXN9GYRQ** | 900 MHz ISM Band | Green, yellow, red | 5-pin M12 male quick disconnect |
| **TL70DXN9YALQ** | 900 MHz ISM Band | Yellow, loud audible | 5-pin M12 male quick disconnect |

*TL70 Base Modules (B-TL70xxx)*

| Model | Radio Frequency | Connection |
|---|---|---|
| **B-TL70DXN2-8** | 2.4 GHz ISM Band | 8-wire 2 m cable |
| **B-TL70DXN2-Q5** | 2.4 GHz ISM Band | 5-pin M12 male quick disconnect |
| **B-TL70DXN2-Q8** | 2.4 GHz ISM Band | 8-pin M12 male quick disconnect |
| **B-TL70DXN9-8** | 900 MHz ISM Band | 8-wire 2 m cable |
| **B-TL70DXN9-Q5** | 900 MHz ISM Band | 5-pin M12 male quick disconnect |
| **B-TL70DXN9-Q8** | 900 MHz ISM Band | 8-pin M12 male quick disconnect |
| **B-TL70DXN9-Q8C** (gray housing) | 900 MHz ISM Band | 8-pin M12 male quick disconnect |

Select the 5-pin base for tower light configurations of up to three segments. Select the 8-pin base for tower light configurations of up to six segments. See "SG-TL70 Tower Light Segment Models" on page 2 for the list of tower light segments that go with this base.

Any other models that fit this pattern are no longer available for order but are still covered by the information in this document.

Original Instructions
07-May-26

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p/n: 185469 Rev. O

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# SG-TL70 Tower Light Segment Models

*TL70 Segments (SG-TL70xxx)*

| Housing | - | Color/Alarm | Housing Color |
|---|---|---|---|
| **SG-TL70** | **-** | **R** | **C** |
| SG-TL70 | | G = Green<br>Y = Yellow<br>R = Red<br>B = Blue<br>W = White<br>O = Orange<br>A = Audible<br>AL = Load audible<br>ALM = Loud, multi-tone audible<br>AP = Programmable audible | Blank = Black<br>C = Gray |

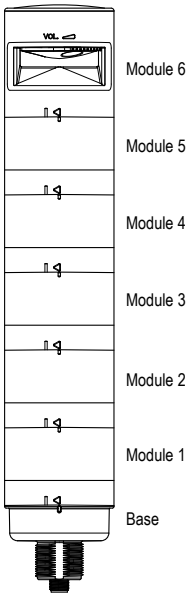
- Example light segment model number: **SG-TL70-G**
- Example audible segment model number: **SG-TL70-A**

# Configuration Instructions

## Configuring the Modules




Turn on the appropriate DIP switch to set the order of the components, counting up from the tower light's base.




| Assembly Options | | DIP Switches | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Light and Standard Audible Components | Module 1 | ON | | | | | | | |
| | Module 2 | | ON | | | | | | |
| | Module 3 | | | ON | | | | | |
| | Module 4 | | | | ON | | | | |
| | Module 5 | | | | | ON | | | |
| | Module 6 | | | | | | ON | | |
| Light and Module Flash Rate | 3 Hz | | | | | | | ON | OF |
| | 1.5 Hz | | | | | | | ON | ON |
| | Solid On* | | | | | | | OFF | OFF |
| Standard Audible Module Settings | Pulse 1.5 Hz | | | | | | | ON | OFF |
| | Chirp Alarm | | | | | | | ON | ON |
| | Siren Alarm | | | | | | | OFF | ON |
| | Continuous Alarm* | | | | | | | OFF | OFF |

| Assembly Options | | DIP Switches | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Loud Audible Module Settings | Pulse 1.5 Hz | | | | | | | ON | OFF | | |
| | Chirp Alarm | | | | | | | ON | ON | | |
| | Siren Alarm | | | | | | | OFF | ON | | |
| | Continuous Alarm* | | | | | | | OFF | OFF | | |
| | Low Intensity* | | | | | | | | | OFF | OFF |
| | Med. Intensity | | | | | | | | | ON | OFF |
| | Med./Loud Intensity | | | | | | | | | OFF | ON |
| | Loud Intensity | | | | | | | | | ON | ON |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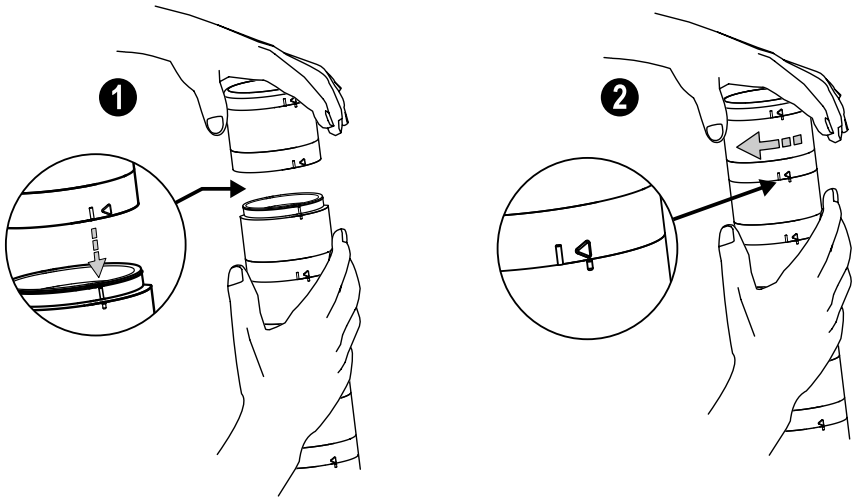
* Factory default setting

## 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:

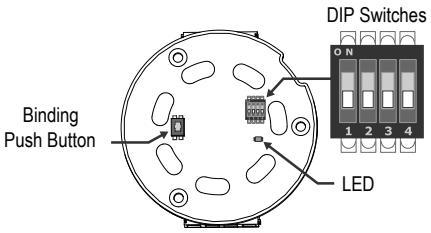
1. Align the notches on each module and press together.
2. Rotate the top module clockwise to lock into place (notches shown in the locked position).

**NOTE:** DIP switches should remain in the default off position.

# Configuring the Radio Module

## Set the Radio Module DIP Switches

Before applying power to the device, set the radio module's DIP switches. Default configurations are noted with (*).




| DIP Switch 1: Radio Transmit Power | 900 MHz Models | 2.4 GHz Models |
|---|---|---|
| OFF * | 500 mW (27 dBm) operation | Disabled |
| ON | 250 mW (24 dBm) operation | |

The 900 MHz radios have a high output option that will transmit at 500 mW (27 dBm). The low output option transmits at 250 mW (24 dBm). The 250 mW mode reduces the radio's range but improves the battery life in short-range applications. For 2.4 GHz models, this DIP switch is disabled. The transmit power for 2.4 GHz is fixed at about 65 mW EIRP (18 dBm).

| DIP Switch 2: Input Wires | 900 MHz Models and 2.4 GHz Models |
|---|---|
| OFF * | Input wires control lights |
| ON | Disables wired input control of lights and converts wires to auxiliary Inputs |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If there are no lights at the end of the input wires to turn on, the inputs still function as a sourcing input.

| DIP Switch 3: Event Counter | 900 MHz Models and 2.4 GHz Models |
|---|---|
| OFF * | Default I/O operation |
| ON | 8-pin Models: Configure input 5 as a 32-bit synchronous counter at a maximum frequency of 20 Hz; disable input 6 (the counter requires two registers)<br>5-Pin Models: Configure input 3 as a 32-bit synchronous counter at a maximum frequency of 20 Hz |

*The event counter is active for RF firmware revision 5.3 or higher.*

For the 8-pin models: In the default position (OFF), inputs 1 through 6 control the tower lights. When DIP switch 3 is ON, input 5 wire is the counter input and input 6 wire is disabled. Registers 5 and 6 store the 32-bit synchronous counter count. Inputs 5 and 6 are independent from the lights and will not drive any lights they are wired to. Inputs 1 through 4 function normally.

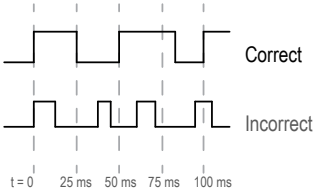
For the 5-pin models: In the default position (OFF), inputs 1 through 3 control the tower lights. When DIP switch 3 is ON, input 3 wire is the counter input. Registers 3 and 4 store the 32-bit synchronous counter count. Input 3 is independent from the lights and will not drive any lights they are wired to. Inputs 1 and 2 function normally.

| DIP Switch 4: Bit Packing I/O | 900 MHz Models and 2.4 GHz Models |
|---|---|
| OFF * | Default I/O operation |
| ON | Bit-packed I/O with all inputs in Modbus register 1 and all outputs in Modbus register 9. All other Modbus registers are disabled. |

*Bit packing is active for RF firmware revision 5.8 or higher.* Bit packing uses a single register, or range of contiguous registers, to represent I/O values. This allows you to read or write multiple I/O values with a single Modbus message. Input 1 is stored in the least significant bit of register 1. Output 1 is stored in the least significant bit of register 9.

## Event Counter

To use the event counter, the measured (logic high) signal must be greater than or equal to 25 ms. The 32-bit count is stored in I/O registers 3 and 4 for 5-pin models and 5 and 6 for 8-pin models.




To zero out (clear) the event counter,

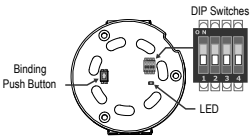
- Map an input/button on a Gateway to Node register 14 to clear the counter when the input/button is activated; or
- From a host system, write a 1 (the output must transition from a zero to a one to reset the counter) to Node register 14 or write a 5424 (0x1530) to Node control register 15.

*RF firmware revision 5.3 or higher (on all products released after 3/20/2015) is required to use this feature.*

## Bind the TL70 to the Gateway and Assign the Node Address

Before beginning the binding procedure, apply power to all the devices.

1. Enter binding mode.
   - For housed Gateways, triple-click button 2.
   - For board-level Gateway modules, triple-click the button.
   - For DXMs, under the **ISM Radio** menu, use the down arrow button to highlight the **Binding** menu. Click **ENTER**.

   On the board modules, the green/red LED flashes. On the housed models, both LEDs flash red.
2. Assign the TL70 a Node address using the Gateway's rotary dials or the DXM's arrow keys.
   - On a Gateway: Use the left rotary dial for the left digit and the right rotary dial for the right digit. For example, to assign your TL70 to Node 01, set the left dial to 0 and the right dial to 1.
   - On the DXM: Use the arrow keys to select the Node ID, then press **ENTER**. The display shows **Binding**.

   Valid Node addresses are 01 through 47.
3. Access the circuit board in the radio module of the TL70.
4. Enter binding mode on the TL70 by triple-clicking the binding button.
   The bicolor LED flashes alternately while it searches for a Gateway in binding mode. After the TL70 is bound, the LED is red and green for four seconds (looks amber), then it flashes four times (looks amber). The TL70 automatically exits binding mode, cycles power, and enters Run mode.
5. For DXMs, click **BACK** to exit binding for that specific Node address.
6. Label the Node with the assigned address for future references.
   This makes it easier to identify the physical Node location within a multi-Node network.
7. Reassemble the components back onto the base.
8. Repeat steps 2 through 5 for as many TL70 Wireless Modular Tower Lights as are needed for your network.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9. After binding all TL70s, exit binding mode on the Gateway.
    - For housed Gateways, double-click button 2.
    - For board-level Gateway modules, double-click the button.
    - For DXM models, click **BACK** until you return to the main menu.

## LED Behavior for the One LED Nodes

Nodes do not sample inputs until they are communicating with the Gateway. The radios and antennas must be a minimum distance apart to function properly.

Recommended minimum distances are:

900 MHz radio transmitting at ≤ 250 mW: 6 feet
900 MHz radios transmitting at ≥ 500 mW: 15 feet
2.4 GHz radios transmitting at 65 mW: 1 foot

| LED (Bi-color) | Node Status |
|---|---|
| Flashing green | Radio link okay |
| Green and red flashing alternately | In Binding mode |
| Both colors are solid for 4 seconds, then flash 4 times; looks amber | Binding mode is complete |
| Flashing red, once every 3 seconds | Radio link error |
| Flashing red, once every second | Device error |

# Modes of Operation

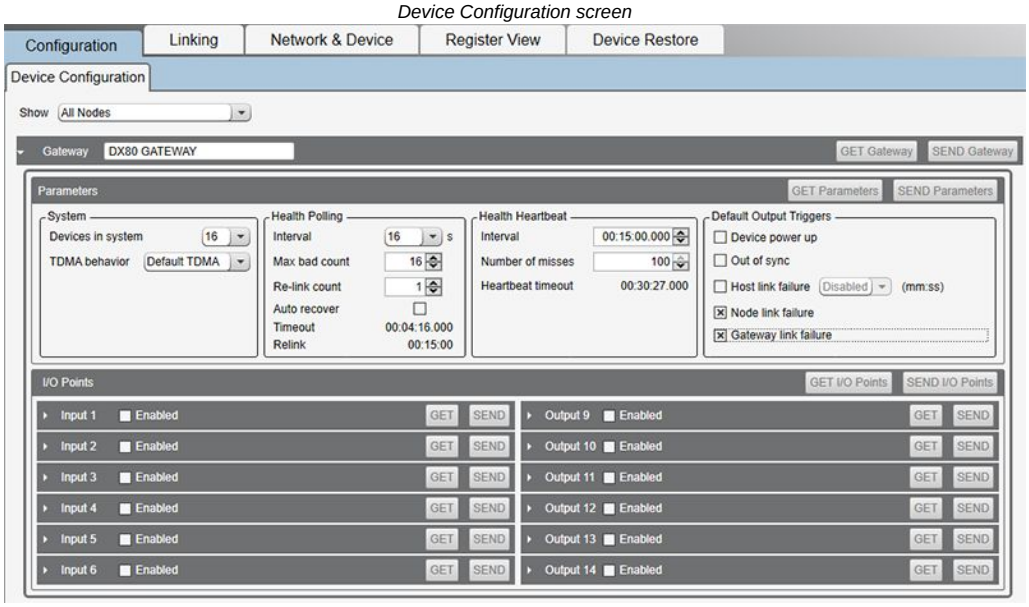
**Node Controlled**. The wireless TL70 Node can be operated similar to a wired model where the individual segments are activated by a PLC or manual switch. In this scenario, the Gateway only monitors the status of the light segments. An example application would be remotely monitoring the status of one or multiple machines from a single Gateway.

**Gateway Controlled**. In the Gateway-controlled mode, the TL70 Node only requires 10 V DC to 30 V DC power. Input signals sent from the Gateway have full control over the status of all the segments. An example application would be a call-for-parts application with a TL70 Node mounted to a fork truck and the Gateway mounted in a work cell or stock room. When part pick-up or delivery is needed, the operator sends a signal to the fork truck driver. A multicolor TL70 could be used when there are multiple pick-up or delivery locations.

## DX80 Performance Configuration Software

The configuration software offers an easy way to link I/O points in your wireless network, view I/O register values, and set system communication parameters when a host system is not part of the wireless network. The software runs on any computer with the Windows Vista, Windows 7, Windows 8, or Windows 10 operating system.

*Device Configuration screen*




Use a USB to RS-485 adapter cable to connect a standalone DX80 Gateway to the computer. For DXM Controllers with an internal DX80 radio, connect a computer to the DXM Controller using the supplied USB or Ethernet connection. Download the most recent revisions of the configuration software from Banner Engineering's website: https://www.bannerengineering.com/us/en/products/wireless-sensor-networks/reference-library/software.html.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The USB to RS-485 adapter cable is not required for the DXM Controller. For standalone DX80 Gateway devices use:

- USB to RS-485 adapter cable model **BWA-UCT-900** for 1 Watt radios
- USB to RS-485 adapter cable model **BWA-HW-006** for all other radios

## Modbus Registers

Modbus holding registers for the 5-pin models.

| I/O | Modbus Holding Register | | I/O Type | I/O Range | | Holding Register Representation (Dec.) | | Module # |
|---|---|---|---|---|---|---|---|---|
| | Gateway | Any Node | | Min. | Max. | Min. | Max. | |
| 1 | 1 | 1 + (Node# × 16) | Discrete IN 1 / Bit-packed inputs | 0 | 1 | 0 | 1 | M1 |
| 2 | 2 | 2 + (Node# × 16) | Discrete IN 2 | 0 | 1 | 0 | 1 | M2 |
| 3 | 3 | 3 + (Node# × 16) | Discrete IN 3 / 32-bit event counter high word | 0 | 1 / 65535 | 0 | 1 / 65535 | M3 |
| 4 | 4 | 4 + (Node# × 16) | Reserved / 32-bit event counter low word | 0 | 65535 | 0 | 65535 | M4 |
| | | . . . | | | | | | |
| 8 | 8 | 8 + (Node# × 16) | Device Message | | | | | |
| 9 | 9 | 9 + (Node# × 16) | Discrete OUT 9 / Bit-picked outputs | 0 | 1 | 0 | 1 | M1 |
| 10 | 10 | 10 + (Node# × 16) | Discrete OUT 10 | 0 | 1 | 0 | 1 | M2 |
| 11 | 11 | 11 + (Node# × 16) | Discrete OUT 11 | 0 | 1 | 0 | 1 | M3 |
| 12 | 12 | 12 + (Node# × 16) | Discrete OUT 12 | 0 | 1 | 0 | 1 | M4 |
| 13 | 13 | 13 + (Node# × 16) | Discrete OUT 13 | 0 | 1 | 0 | 1 | M5 |
| 14 | 14 | 14 + (Node# × 16) | Discrete OUT 14 / Zero out (clear) the counter | 0 | 1 | 0 | 1 | M6 |
| 15 | 15 | 15 + (Node# × 16) | Control Message | | | | | |
| 16 | 16 | 16 + (Node# × 16) | Reserved | | | | | |

Modbus holding registers for the 8-pin models.

| I/O | Modbus Holding Register | | I/O Type | I/O Range | | Holding Register Representation (Dec.) | | Module # |
|---|---|---|---|---|---|---|---|---|
| | Gateway | Any Node | | Min. | Max. | Min. | Max. | |
| 1 | 1 | 1 + (Node# × 16) | Discrete IN 1 / Bit-packed inputs | 0 | 1 | 0 | 1 | M1 |
| 2 | 2 | 2 + (Node# × 16) | Discrete IN 2 | 0 | 1 | 0 | 1 | M2 |
| 3 | 3 | 3 + (Node# × 16) | Discrete IN 3 | 0 | 1 | 0 | 1 | M3 |
| 4 | 4 | 4 + (Node# × 16) | Discrete IN 4 | 0 | 1 | 0 | 1 | M4 |
| 5 | 5 | 5 + (Node# × 16) | Discrete IN 5 / 32-bit event counter high word | 0 | 1 / 65535 | 0 | 1 / 65535 | M5 |
| 6 | 6 | 6 + (Node# × 16) | Discrete IN 6 / 32-bit event counter low word | 0 | 1 / 65535 | 0 | 1 / 65535 | M6 |
| 7 | 7 | 7 + (Node# × 16) | Reserved | | | | | |
| 8 | 8 | 8 + (Node# × 16) | Device Message | | | | | |
| 9 | 9 | 9 + (Node# × 16) | Discrete OUT 9 / Bit-picked outputs | 0 | 1 | 0 | 1 | M1 |
| 10 | 10 | 10 + (Node# × 16) | Discrete OUT 10 | 0 | 1 | 0 | 1 | M2 |
| 11 | 11 | 11 + (Node# × 16) | Discrete OUT 11 | 0 | 1 | 0 | 1 | M3 |
| 12 | 12 | 12 + (Node# × 16) | Discrete OUT 12 | 0 | 1 | 0 | 1 | M4 |
| 13 | 13 | 13 + (Node# × 16) | Discrete OUT 13 | 0 | 1 | 0 | 1 | M5 |
| 14 | 14 | 14 + (Node# × 16) | Discrete OUT 14 / Zero out (clear) the counter | 0 | 1 | 0 | 1 | M6 |
| 15 | 15 | 15 + (Node# × 16) | Control Message | | | | | |
| 16 | 16 | 16 + (Node# × 16) | Reserved | | | | | |

Use the DX80 Performance Configuration Software to define unique synchronous flash patterns for the lights.

## Creating Flash Patterns

Use the DX80 Performance Configuration Software to create the flash pattern.

To create a flash pattern:

1. Enable the appropriate output if it is not yet enabled.


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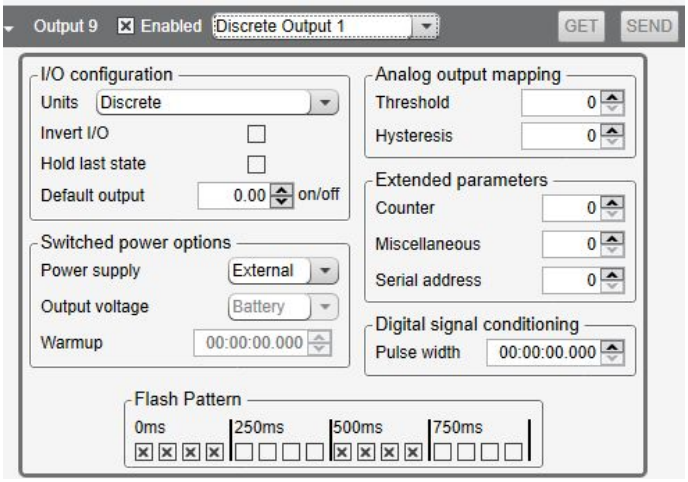
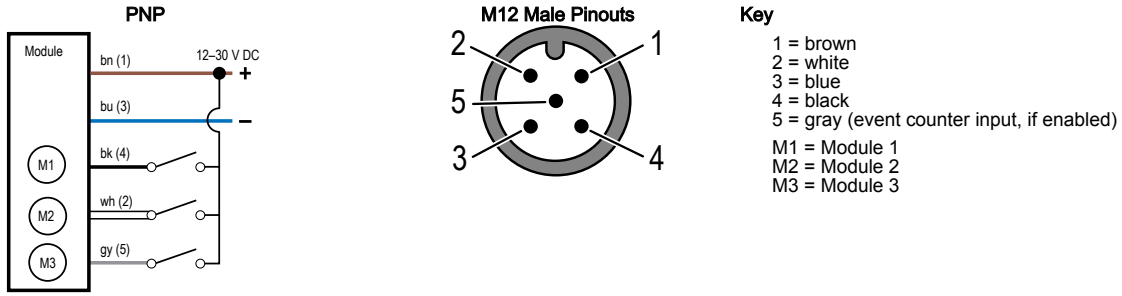
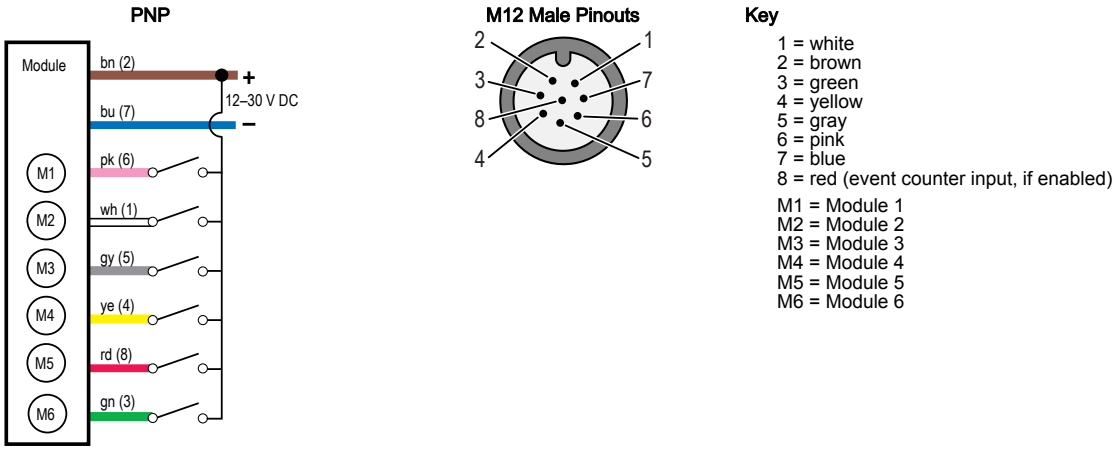
2. Click **GET** to download the input/output current configuration from the device to the configuration software. This automatically populates the Output configuration settings specific to the Node type.
3. For this example, configure output 9 is enabled and configured as discrete output 1 (color 1 for this K70 light). Different models may use distinct output types and I/O configuration values.
4. Define the flash pattern by selecting the appropriate checkboxes in the **Flash Pattern** section. In this example, the light will flash twice a second.
5. Click **SEND** to upload the configuration to the device.

*Defining a flash pattern for discrete output 1*




## Wiring Diagrams




Input wires M1 through M6 can be used to either control the light segments or can be configured as external PNP Inputs. Refer to "Set the Radio Module DIP Switches" on page 3 for configuration instructions.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# Specifications

## Radio Specifications for Performance Internal Antenna

**Radio Transmit Power (900 MHz, 500 mW radios)**

Conducted: 27 dBm (500 mW)

EIRP with the supplied antenna: < 36 dBm

**Radio Transmit Power (2.4 GHz radios)**

Conducted: < 18 dBm (65 mW)

EIRP with the supplied antenna: < 20 dBm (100 mW)

**Antenna Minimum Separation Distance**

900 MHz radios transmitting at ≥ 500 mW: 4.57 m (15 ft) with the supplied antenna

2.4 GHz radios transmitting at 65 mW: 0.3 m (1 ft) with the supplied antenna

**Radio Range**

A 2 dB antenna ships with this device.

Transmit power and range are subject to many factors, including antenna gain, installation methods, characteristics of the application, and environmental conditions.

Please refer to the following documents for installation instructions and high-gain antenna options.

Installing Your Sure Cross® Radios (151514)
Conducting a Site Survey (133602)
Sure Cross® Antenna Basics (132113)

**Link Timeout (Performance)**

Gateway: Configurable via User Configuration Software

Node: Defined by Gateway

**Spread Spectrum Technology**

FHSS (Frequency Hopping Spread Spectrum)

**900 MHz Compliance (SX7023EXT Radio Module)**

Radio module is indicated by the product label marking

Contains FCC ID: UE3SX7023EXT

Contains IC: 7044A-SX7023EXT

**2.4 GHz Compliance (SX243 Radio Module)**

Radio module is indicated by the product label marking

Contains FCC ID: UE3SX243

Radio Equipment Directive (RED) 2014/53/EU

Contains IC: 7044A-SX243

## FCC Part 15 Class A for Intentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(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 Statement for Intentional Radiators

This device contains licence-exempt transmitters(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence conformes à la norme Innovation, Sciences, et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage.
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## TL70 Wireless Modular Tower Light Specifications

**Supply Voltage and Current**

12 V DC to 30 V DC (Outside the USA: 12 V DC to 24 V DC, ± 10%) (1)

900 MHz Consumption: Maximum current draw is < 40 mA and typical current draw is < 30 mA at 24 V DC. (2.4 GHz consumption is less.)

| Indicator Color or Audible Model | Maximum Current (mA) | |
|---|---|---|
| | at 12 V DC | at 30 V DC |
| Blue, Green, White | 420 | 150 |
| Red, Yellow, Orange | 285 | 120 |
| Standard Audible | 30 | 30 |
| Loud Audible (Intensity 1) | 18 | 14 |
| Loud Audible (Intensity 2) | 40 | 28 |
| Loud Audible (Intensity 3) | 160 | 70 |

Continued on page 9

(1) For European applications, power this device from a Limited Power Source as defined in EN 60950-1.

Continued from page 7

| Indicator Color or Audible Model | Maximum Current (mA) | |
|---|---|---|
| | at 12 V DC | at 30 V DC |
| Loud Audible (Intensity 4) | 350 | 110 |

**Supply Protection Circuitry**

Protected against transient voltages


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### Audible Alarm

**Standard Audible:** 2.6 KHz ± 250 Hz oscillation frequency; maximum intensity (typical) 92 dB at 1 m (3.3 ft)

**Loud Audible:** 2.6 KHz ± 250 Hz oscillation frequency; maximum intensity (typical) at 1 m (3.3 ft)

| DIP Switches | | Maximum Intensity (typical) at 1 meter dB |
|---|---|---|
| 9 | 10 | |
| ON | ON | Intensity 4: 109 dB |
| OFF | ON | Intensity 3: 106 dB |
| ON | OFF | Intensity 2: 101 dB |
| OFF | OFF | Intensity 1: 94 dB |

### Audible Adjustment

**Standard Audible:** Rotate the cover until the desired volume is reached

**Loud Audible Adjustment:** Select the desired volume using DIP switches 9 and 10

**Typical Reduction in Sound Intensity with Audible Adjustment (maximum to minimum):**

- **Standard Audible:** 8 dB
- **Loud Audible:** 16 dB

### Indicators

1 to 6 colors depending on model (Green, Red, Yellow, Blue, White, and Orange)

LEDs are independently selected

**Flash Rates:** 1.5 Hz ±10% and 3 Hz ±10%

### Indicator Response Time

**Off Response:** 150 µs (maximum) at 12 V DC to 30 V DC

**On Response:** 180 ms (maximum) at 12 V DC; 50 ms (maximum) at 30 V DC

### Connections

5-pin M12 quick disconnect, 8-pin M12 quick disconnect, 150 mm (5.9 in) PVC cable with an M12 quick disconnect, or 2 m (6.5 ft) unterminated cable, depending on model

### 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

### Indicator Characteristics

| Color | Dominant Wavelength (nm) or Color Temperature (CCT) | Color Coordinates[2] | | Lumen Output (Typical at 25 °C) |
|---|---|---|---|---|
| | | x | y | |
| Green | 525 nm | – | – | 92 |
| Red | 625 nm | – | – | 40 |
| Yellow | 590 nm | – | – | 22 |
| Blue | 470 nm | – | – | 32 |
| White | 5000 K | – | – | 125 |
| Orange | – | 0.66 | 0.33 | 33 |

[2] Refer to CIE 1931 chromaticity diagram or color chart, to show equivalent color with indicated color coordinates.

### Operating Conditions

–40 °C to +50 °C (–40 °F to +122 °F)

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

### Environmental Rating

IP65

### Radiated Immunity HF

10 V/m (EN 61000-4-3)

### Certifications

CE/UKCA approval only applies to 2.4 GHz models

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

Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

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03737-22-04042

### 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.

| 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 |

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Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL www.gov.br/anatel/pt-br/


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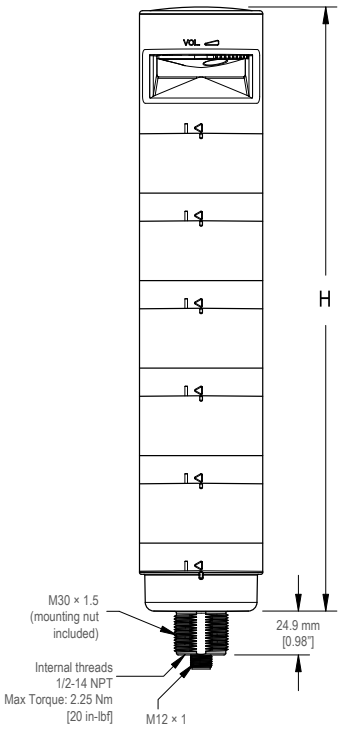
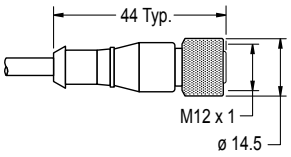
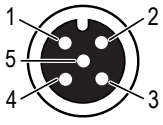
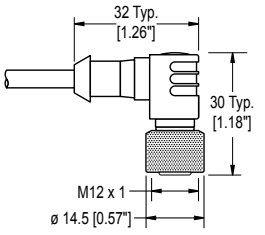
# Dimensions




| 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) |

# Accessories

## Cordsets

| 5-Pin Single-Ended M12 Female Cordsets | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** |
| **MQDC1-501.5** | 0.5 m (1.5 ft) | Straight |  |  1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black<br>5 = Gray |
| **MQDC1-503** | 0.9 m (2.9 ft) | | | |
| **MQDC1-506** | 2 m (6.5 ft) | | | |
| **MQDC1-515** | 5 m (16.4 ft) | | | |
| **MQDC1-530** | 9 m (29.5 ft) | | | |
| **MQDC1-560** | 18 m (59 ft) | | | |
| **MQDC1-5100** | 31 m (101.7 ft) | | | |
| **MQDC1-506RA** | 2 m (6.5 ft) | Right-Angle |  | |
| **MQDC1-515RA** | 5 m (16.4 ft) | | | |
| **MQDC1-530RA** | 9 m (29.5 ft) | | | |
| **MQDC1-560RA** | 19 m (62.3 ft) | | | |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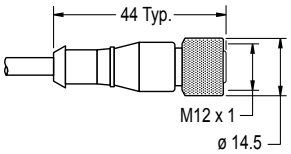
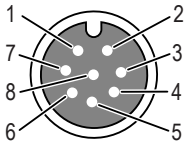
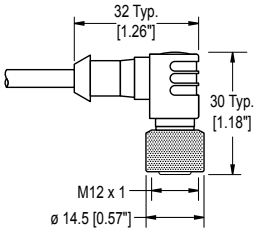
| 8-Pin Single-Ended M12 Female Open-Shielded Cordsets | | | | |
|---|---|---|---|---|
| **Model** | **Length** | **Style** | **Dimensions** | **Pinout (Female)** |
| **MQDC2S-806** | 2.04 m (6.7 ft) | Straight |  | <br>1 = White<br>2 = Brown<br>3 = Green<br>4 = Yellow<br>5 = Gray<br>6 = Pink<br>7 = Blue<br>8 = Red |
| **MQDC2S-815** | 5.04 m (16.54 ft) | | | |
| **MQDC2S-830** | 10.04 m (32.95 ft) | | | |
| **MQDC2S-850** | 16 m (52.49 ft) | | | |
| **MQDC2S-806RA** | 2 m (6.56 ft) | Right-Angle |  | |
| **MQDC2S-815RA** | 5 m (16.4 ft) | | | |
| **MQDC2S-830RA** | 10 m (32.81 ft) | | | |
| **MQDC2S-850RA** | 16 m (52.49 ft) | | | |

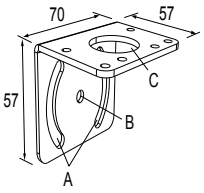
# Mounting Brackets

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 (¼ in) hardware
- Mounting hole for 30 mm sensor
- CAD Files: DXF, PDF, IGS, STP

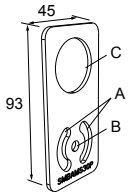
**Hole center spacing:** A=51, A to B=25.4
**Hole size:** A=42.6 × 7, B=ø 6.4, C=ø 30.1




**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

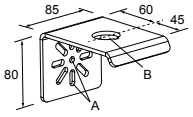
**Hole center spacing:** A=26.0, A to B=13.0
**Hole size:** A=26.8 × 7.0, B=ø 6.5, C=ø 31.0




**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

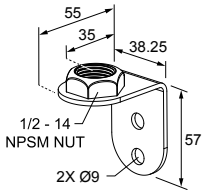
**Hole size:** A = ø 7 , B = ø 30




**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

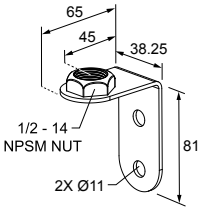
**Hole center spacing:** 20.0




**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





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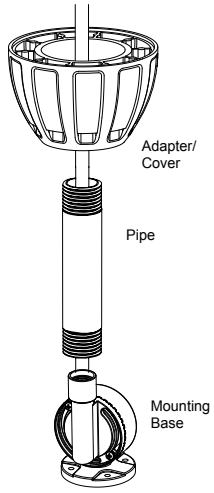
# Elevated Mount System

*Example Assembly for a TL70 Tower Light*

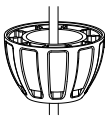


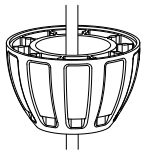

This example uses:

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 | • Streamlined black PC or Gray PC thread cover<br>• Covers the outer M30 threads on the light's base<br>• Typically used for the TL70 Tower Light and K90 series<br>• Mounting hardware included<br>• CAD files: DXF, PDF, IGS, STP |  |
| **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 | • Elevated-use stand-off pipe<br>• Threaded at both ends<br>• Compatible with most industrial environments<br>• CAD Files:<br>◦ **SOP-E12-150A**: DXF, PDF, IGS, STP<br>◦ **SOP-E12-300A**: DXF, PDF, IGS, STP<br>◦ **SOP-E12-600A**: DXF, PDF, IGS, STP<br>◦ **SOP-E12-900A**: DXF, PDF, IGS, STP |
| **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 | |

| 304 Stainless Steel, ½ in. NPT Pipe Models | Description |
|---|---|
| **SOP-E12-150SS**, 150 mm (6 in) long | • Elevated-use stand-off pipe<br>• Threaded at both ends<br>• Compatible with most industrial environments<br>• CAD Files:<br>◦ **SOP-E12-150x**: DXF, PDF, IGS, STP<br>◦ **SOP-E12-300x**: DXF, PDF, IGS, STP<br>◦ **SOP-E12-600x**: DXF, PDF, IGS, STP<br>◦ **SOP-E12-900x**: DXF, PDF, IGS, STP |
| **SOP-E12-300SS**, 300 mm (12 in) long | |
| **SOP-E12-600SS**, 600 mm (24 in) long | |
| **SOP-E12-900SS**, 900 mm (36 in) long | |

## Bottom Covers and Mounting Bases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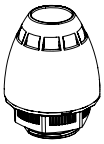
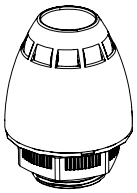
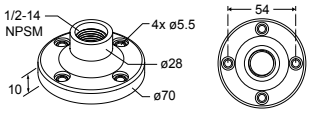
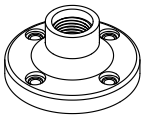
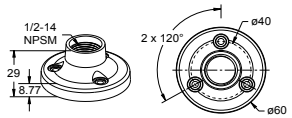
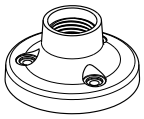


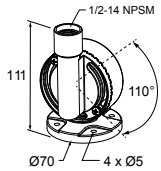
| Mounting Base Model | Description | |
|---|---|---|
| **SA-E12M30** - Black acetal<br>**SA-E12M30C** - White UHMW | • Streamlined black acetal or white UHMW mounting base adapter/cover<br>• Adapter from ½ in. NPSM/DN15 pipe to 30 mm (1-3/16 in) drilled hole<br>• Mounting hardware included<br>• CAD files: DXF, PDF, IGS, STP |  |

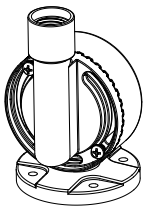



| Mounting Base Model | Description | |
|---|---|---|
| **SA-F12** | • Die-cast zinc base with black paint<br>• Elevated-use stand-off pipes (½ in, NPSM/DN15)<br>• M5 mounting hardware and nitrile gasket included<br>• CAD files: DXF, PDF, IGS, STP |  |




| Mounting Base Model | Description | |
|---|---|---|
| **SA-F12-3** | • Black polycarbonate<br>• Elevated-use stand-off pipes (½ in, NPSM/DN15)<br>• M4 mounting hardware and nitrile blend gasket included<br>• CAD files: DXF, PDF, IGS, STP |  |




| Mounting Base Model | Description | |
|---|---|---|
| **SA-FFB12** - Black polycarbonate<br>**SA-FFB12C** - Gray polycarbonate | • For use with ½ in. stand-off pipes<br>• 110° rotation<br>• Stainless steel hardware<br>• CAD files: DXF, PDF, IGS, STP |  |

## LMB Sealed Right-Angle Bracket

| Model | Description | |
|---|---|---|
| **LMB30RA** - Black polycarbonate<br>CAD Files: DXF, PDF, IGS, STP<br>**LMB30RAC** - Gray polycarbonate<br>CAD Files: DXF, PDF, IGS, STP | • **Direct-Mount Models**<br>• Bracket kit with base, 30 mm adapter, set screw, fasteners, O-rings, and gaskets. |  |
| **LMBE12RA** - Black polycarbonate<br>CAD Files: DXF, PDF, IGS, STP<br>**LMBE12RAC** - Gray polycarbonate<br>CAD Files: DXF, PDF, IGS, STP | • **Pipe-Mount Models**<br>• Bracket kit with base, ½-14 pipe adapter, set screw, fasteners, O-rings, and gaskets<br>• For use with stand-off pipe (listed and sold separately) |  |

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**Approved Antennas**

**BWA-9O2-C**--Antena, Omni 902-928 MHz, 2 dBd, junta de caucho, RP-SMA Macho
**BWA-9O5-C**--Antena, Omni 902-928 MHz, 5 dBd, junta de caucho, RP-SMA Macho
**BWA-9O6-A**--Antena, Omni 902-928 MHz, 6 dBd, fibra de vidrio, 1800mm, N Hembra
**BWA-9Y10-A**--Antena, Yagi, 900 MHz, 10 dBd, N Hembra

# Mexican Importer

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