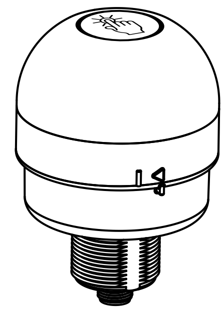
Datasheet

Sure Cross® K70 Wireless Touch Button combines the best of Banner's popular Touch Button family with its reliable, field-proven, Sure Cross wireless architecture.



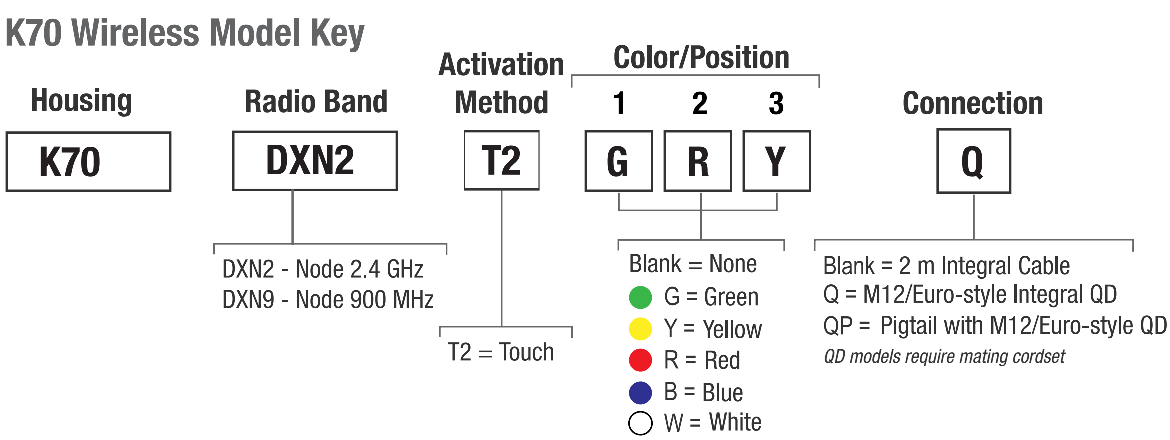
- Available in 900 MHz and 2.4 GHz ISM Bands
- Up to three colors in one device
- Rugged, water-resistant IP65 housing with UV-stabilized material
- Bright, uniform indicator segments appear gray when off to eliminate false indication from ambient light
- Excellent immunity to false triggering by water spray, detergents, oils, and other foreign materials
- Ergonomically designed to eliminate hand, wrist, and arm stresses associated with repeated switch operation; require no physical force to operate

Important: Please download the complete K70 Wireless Touch Button 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 K70 Wireless Touch Button, 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 K70 Wireless Touch Button 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

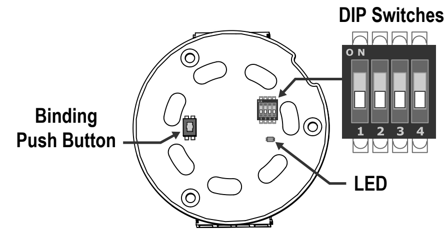


Example model number: K70DXN9T2GRYQ

Configuration Instructions

Set the Radio Module DIP Switches

Before applying power to the device, set the radio module's DIP switches. Default configurations are noted with (*). After changing DIP switch positions, cycle power to the device for the changes to take effect.



DIP Switch 1: Radio Transmit Power—The 900 MHz radios transmit at 1 Watt (30 dBm) or 250 mW (24 dBm). While the Performance radios operate in 1 Watt mode, they cannot communicate with the older 150 mW radios. To communicate with 150 mW radios, operate this radio in 250 mW mode. 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), making the 2.4 GHz Performance models automatically compatible with older 2.4 GHz models.

DIP Switch 1 Position	900 MHz Models	2.4 GHz Models
OFF *	1 Watt (30 dBm) Operation	Disabled
ON	250 mW (24 dBm) Operation	

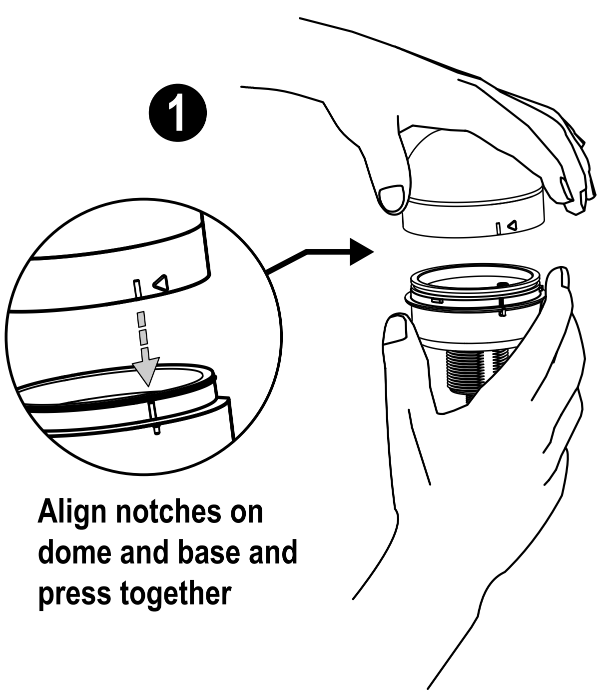
DIP Switch 2: Touch Button Behavior—Use DIP Switch 2 to set the latching or momentary behavior of the touch button.

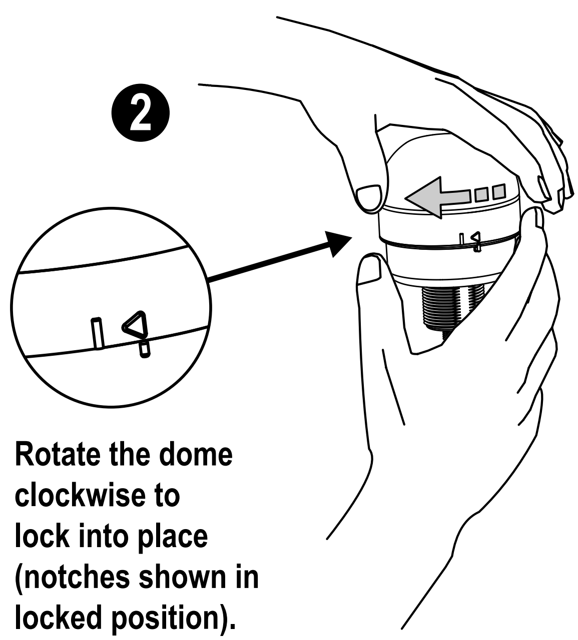
DIP Switch 2 Position	900 MHz and 2.4 GHz Models
OFF *	Latching—Output toggles between activated and non-activated on successive touches
ON	Momentary—Remains activated while touch is present

DIP Switches 3 and 4: Indicator Mapping—DIP switches 3 and 4 map the activation of the touch button to the one of the indicator light colors/positions to give visual feedback when the touch output is active.

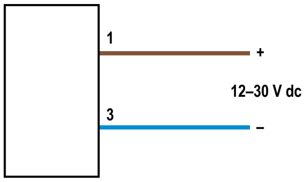
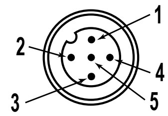
DIP Switches		Touch Button to Indicator Mapping
3	4	
OFF *	OFF *	Mapped to Color / Position 1
OFF	ON	Mapped to Color / Position 2
ON	OFF	Mapped to Color / Position 3
ON	ON	Mapping disabled

Assembling the K70



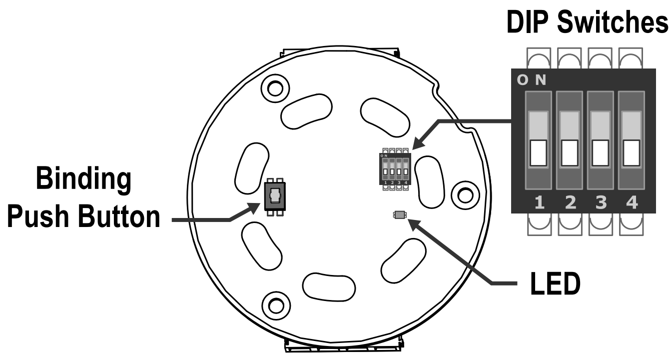


Wiring Diagrams

<table>
<tr><th></th><th>5-pin M12/Euro-style Pinout (Male)</th><th>Key</th></tr>
<tr><td>
</td><td>
</td><td>1 = brown
3 = blue</td></tr>
</table>

Bind the K70 to the Gateway and Assign the Node Address

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



1. Enter binding mode on the Gateway.
   - For housed models, triple-click button 2.
   - For board-level modules, triple-click the button.
   - For DXM models, 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 K70 a Node address using the Gateway's rotary dials or the DXM's arrow keys. Use the left rotary dial for the left digit and the right rotary dial for the right digit. For example, to assign your K70 to Node 01, set the left dial to 0 and the right dial to 1.

   Valid Node addresses are 01 through 47.
3. Remove any components to access the circuit board in the radio module of the K70.
4. Enter binding mode on the K70 by triple-clicking the button.
   The bicolor LED flashes alternately while it searches for a Gateway in binding mode. After the K70 is bound, the LED is red and green for four seconds (looks amber), then it flashes four times (looks amber). The K70 automatically exits binding mode, cycles power, and enters Run mode.
5. For DXM Gateways, 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 K70 Wireless Touch Buttons as are needed for your network.
9. After binding all K70s, exit binding mode on the Gateway.
   - For housed models, double-click button 2.
   - For board-level modules, double-click the button.
   - For DXM models, click **BACK** until you return to the main menu.

LED Behavior for the Nodes

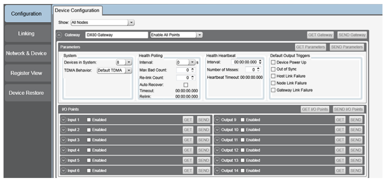
Nodes do not sample inputs until they are communicating with the Gateway. The radios and antennas must be a minimum distance apart to function properly. Recommended minimum distances are:

900 MHz 150 mW and 250 mW radios: 6 feet
900 MHz 1 Watt radios: 15 feet
2.4 GHz 65 mW radios: 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

Sure Cross® User Configuration Software

The User 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.



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 a USB or Ethernet connection. Download the most recent revisions of the configuration software from Banner Engineering's website: www.bannerengineering.com/wireless.

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

Creating Flash Patterns

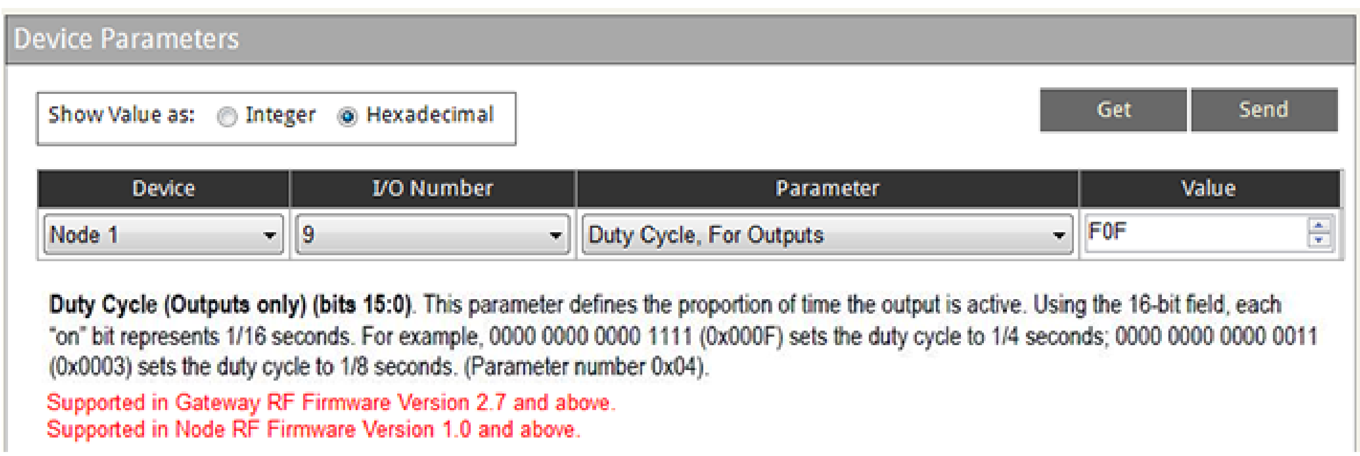
Use the User Configuration Tool (UCT) to set the Duty Cycle, For Outputs of Node 1, output 9, to 0x0F0F as shown below, to achieve this flash pattern.

Flash a K70 light by entering a time-based bit mask into the Duty Cycle parameter for that output register. Bit 0 represents the first 62.5 ms time window, bit 1 represents the second 62.5 ms window, etc.

For example, turn ON the output from 0 to 250 ms, OFF from 250 to 500 ms, ON from 500 to 750 ms, then OFF again from 750 ms to 1 second by writing 0x0F0F to the appropriate output.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Bin	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
Hex	0				F				0				F			
Light	Turned off from 750 ms to 1 s				Turned on from 500 to 750 ms				Turned off from 250 to 500 ms				Turned on from 0 to 250 ms			

This example shows 0F0F being written to the Duty Cycle, For Outputs parameter for Node 1, output 9.



Latch/Toggle Table for Host Systems or Scripting

For most models, use the DIP switches to set latch and toggle modes. Not all models have a DIP switch setting for Latch mode. If your model does not have those DIP switch settings, use the User Configuration Tool to enable latch or toggle inputs.

1. Set the DIP switch to allow the User Configuration Tool to configure the device and ignore the DIP switch settings.
2. Connect the Gateway to the computer with the User Configuration Tool installed.
3. Launch the User Configuration Tool and go to **Configuration** > **Device Configuration**.
4. For the Node you are configuring, click **GET Node** to load all of that Node's parameter settings.
5. Click on the arrow next to the Node to expand the list of that Node's inputs and outputs.
6. For the specific input, click on the arrow next to the input number to expand those parameters.
7. Under the **Serial options** section, select **Latch** or **Toggle** or **None** (momentary) in the **Sync Counter**'s drop-down list.
8. Click **SEND Node** to send the changes to that Node's parameters to the network.

Latch

After an input is activated (set to 1) with a button press or using the messages, the input remains at 1 until cleared or alternated by writing to I/O 15. Latching prevents a successive button press from setting the input to 0.

Toggle

The input toggles between 0 and 1 with successive button pushes or touches. Write to I/O 15 to clear the toggle or to alternate the current state of the toggle.

To change the latch/toggle register value using a host system, write the following to the Node's I/O point 15:

	Write this decimal value	
For I/O point	To clear the register value	To alternate the state of the latch/toggle register value
1	5377	5505
2	5378	5506

	Write this decimal value	
For I/O point	To clear the register value	To alternate the state of the latch/toggle register value
3	5380	5508
4	5384	5512
5	5392	5520
6	5408	5536
All Points	5439	5567

Important: DO NOT write these values to I/O 15 if the device is used in momentary mode.

Modbus Registers

I/O	Modbus Holding Register		I/O Type	I/O Range		Holding Register Representation (Dec.)		Color #
	Gateway	Any Node		Min.	Max.	Min.	Max.	
1	1	1 + (Node# × 16)	Touch Input 1	0	1	0	1	
7	7	7 + (Node# × 16)	Reserved					
8	8	8 + (Node# × 16)	Device Message					
9	9	9 + (Node# × 16)	Discrete OUT 9	0	1	0	1	Color 1
10	10	10 + (Node# × 16)	Discrete OUT 10	0	1	0	1	Color 2
11	11	11 + (Node# × 16)	Discrete OUT 11	0	1	0	1	Color 3
15	15	15 + (Node# × 16)	Control Message					
16	16	16 + (Node# × 16)	Reserved					

Use the User Configuration Tool (UCT) software to define unique synchronous flash patterns for the lights.

Specifications

Touch Button

Supply Voltage
12 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.)

Supply Current
< 220 mA maximum current at 12 V DC
< 110 mA maximum current at 30 V DC

Supply Protection Circuitry
Protected against transient voltages

Construction
Polycarbonate

Connections
Integral 5-pin M12/Euro-style male quick disconnect; 150 mm (6 in) PVC cable with a 5-pin M12/Euro-style male quick disconnect; or a 2 m (6.5 ft) unterminated 5-wire PVC cable depending on the model ordered

Operating Conditions
–40 °C to +50 °C (–40 °F to +122 °F)
95% at +50 °C maximum relative humidity (non-condensing)

Environmental Rating
IEC IP65

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

Certifications

(CE approval only applies to 2.4 GHz models)

(NOM approval only applies to 900 MHz models)

Indicator Response Time
Off Response: 150 µs (maximum) at 12 to 30 V DC
On Response: 180 ms (maximum) at 12 V DC; 50 ms (maximum) at 30 V DC

Indicators
1 to 3 colors depending on model: Green, Red, Yellow, Blue, and White
LEDs are independently selected

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 (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

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

Radio

Radio Range[2]
900 MHz, 1 Watt (Internal antenna): Up to 3.2 km (2 miles) with line of sight
2.4 GHz, 65 mW (Internal antenna): Up to 1000 m (3280 ft) with line of sight

900 MHz Compliance (1 Watt)
FCC ID UE3RM1809: FCC Part 15, Subpart C, 15.247
IC: 7044A-RM1809

2.4 GHz Compliance
FCC ID UE300DX80-2400: FCC Part 15, Subpart C, 15.247
RED Directive 2014/53/EU
IC: 7044A-DX8024

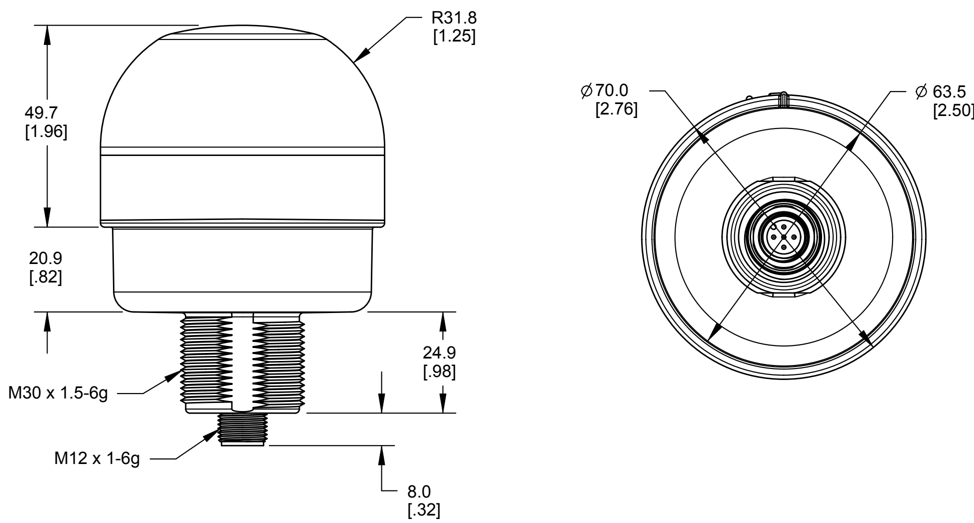
Antenna Minimum Separation Distance
900 MHz, 150 mW and 250 mW: 2 m (6 ft)
900 MHz, 1 Watt: 4.57 m (15 ft)
2.4 GHz, 65 mW: 0.3 m (1 ft)

Radiated Immunity HF
10 V/m (EN 61000-4-3)

Spread Spectrum Technology
FHSS (Frequency Hopping Spread Spectrum)

Link Timeout
Gateway: Configurable via User Configuration Software
Node: Defined by Gateway

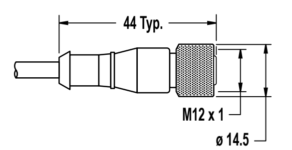
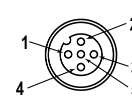
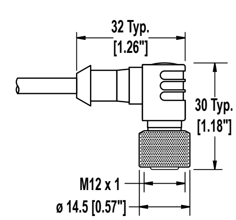
Dimensions



All measurements are listed in millimeters [inches], unless noted otherwise.

Accessories

Cordsets

5-Pin Threaded M12/Euro-Style Cordsets—Single Ended				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MQDC1-501.5	0.50 m (1.5 ft)	Straight		1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
MQDC1-506	1.83 m (6 ft)			
MQDC1-515	4.57 m (15 ft)			
MQDC1-530	9.14 m (30 ft)			
MQDC1-506RA	1.83 m (6 ft)	Right-Angle		
MQDC1-515RA	4.57 m (15 ft)			
MQDC1-530RA	9.14 m (30 ft)			

All measurements are listed in millimeters [inches], unless noted otherwise.

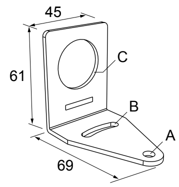
[2] Range depends on the environment and decreases significantly without line of sight. Always verify your wireless network's range by performing a Site Survey.

Brackets

SMB30A

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor
- 12-ga. stainless steel

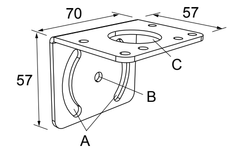
Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 x 6.3, C=ø 30.5



SMB30MM

- 12-ga. stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor

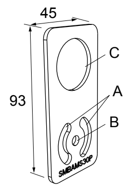
Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 x 7, B = ø 6.4, C = ø 30.1



SMBAMS30P

- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-ga. 300 series stainless steel

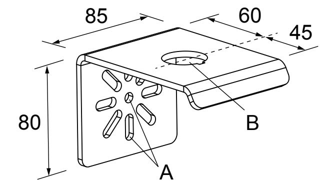
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 x 7.0, B=ø 6.5, C=ø 31.0



SSA-MBK-EEC1

- Single 30 mm hole
- 8 gauge steel, black finish (powder coat)
- Front surface for customer applied labels

Hole size: A = ø 7 , B = ø 30



All measurements are listed in millimeters, unless noted otherwise.

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.

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For patent information, see www.bannerengineering.com/patents.

Notas Adicionales

Información México: La operación de este equipo está sujeta a las siguientes dos condiciones: 1) es posible que este equipo o dispositivo no cause interferencia perjudicial y 2) este equipo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Banner es una marca registrada de Banner Engineering Corp. y podrán ser utilizadas de manera indistinta para referirse al fabricante. "Este equipo ha sido diseñado para operar con las antenas tipo Omnidireccional para una ganancia máxima de antena de 6 dBd y Yagi para una ganancia máxima de antena 10 dBd que en seguida se enlistan. También se incluyen aquellas con aprobación ATEX tipo Omnidireccional siempre que no excedan una ganancia máxima de antena de 6dBd. El uso con este equipo de antenas no incluidas en esta lista o que tengan una ganancia mayor que 6 dBd en tipo omnidireccional y 10 dBd en tipo Yagi, quedan prohibidas. La impedancia requerida de la antena es de 50 ohms."

Antenas SMA	Modelo
Antena, Omni 902-928 MHz, 2 dBd, junta de caucho, RP-SMA Macho	**BWA-9O2-C**
Antena, Omni 902-928 MHz, 5 dBd, junta de caucho, RP-SMA Macho	**BWA-9O5-C**

Antenas Tipo-N	Modelo
Antena, Omni 902-928 MHz, 6 dBd, fibra de vidrio, 1800mm, N Hembra	**BWA-9O6-A**
Antena, Yagi, 900 MHz, 10 dBd, N Hembra	**BWA-9Y10-A**

Mexican Importer

Banner Engineering de Mèxico, S. de R.L. de C.V.
David Alfaro Siqueiros 103 Piso 2 Valle oriente
San Pedro Garza Garcia Nuevo Leòn, C. P. 66269

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