EZ-LIGHT® K70 Wireless Touch Button

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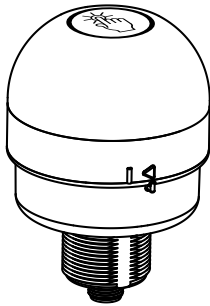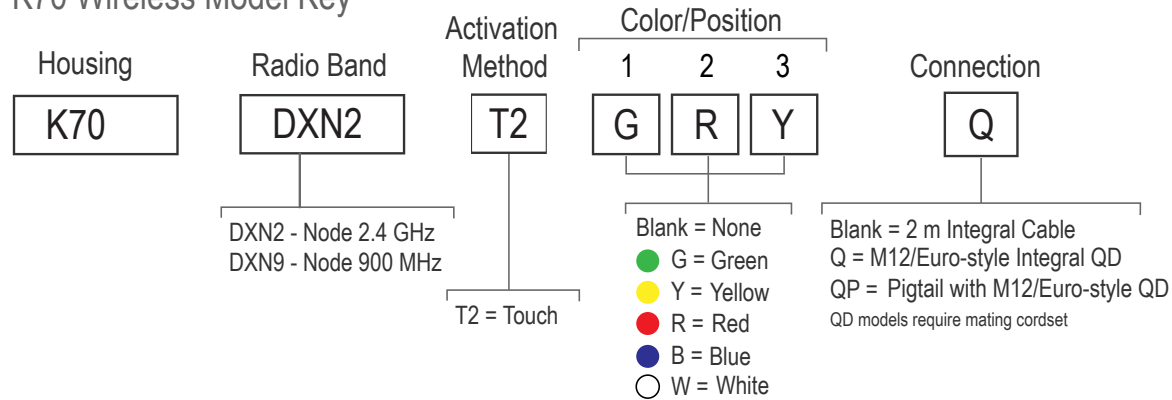
Datasheet

Sure Cross® Wireless K70 Touch Buttons combine 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

Models

K70 Wireless Model Key

Housing	Radio Band	Activation Method	Color/Position 1	2	3	Connection
K70	DXN2	T2	G	R	Y	Q

DXN2 - Node 2.4 GHz
DXN9 - Node 900 MHz

T2 = Touch

Blank = None
- G = Green
- Y = Yellow
- R = Red
- B = Blue
- W = White

Blank = 2 m Integral Cable
Q = M12/Euro-style Integral QD
QP = Pigtail with M12/Euro-style QD
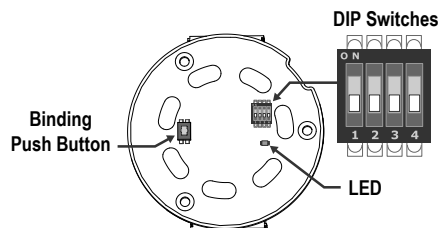QD models require mating cordset

Example model number: K70DXN9T2GRYQ

Configuration Instructions

Set the Radio Module DIP Switches

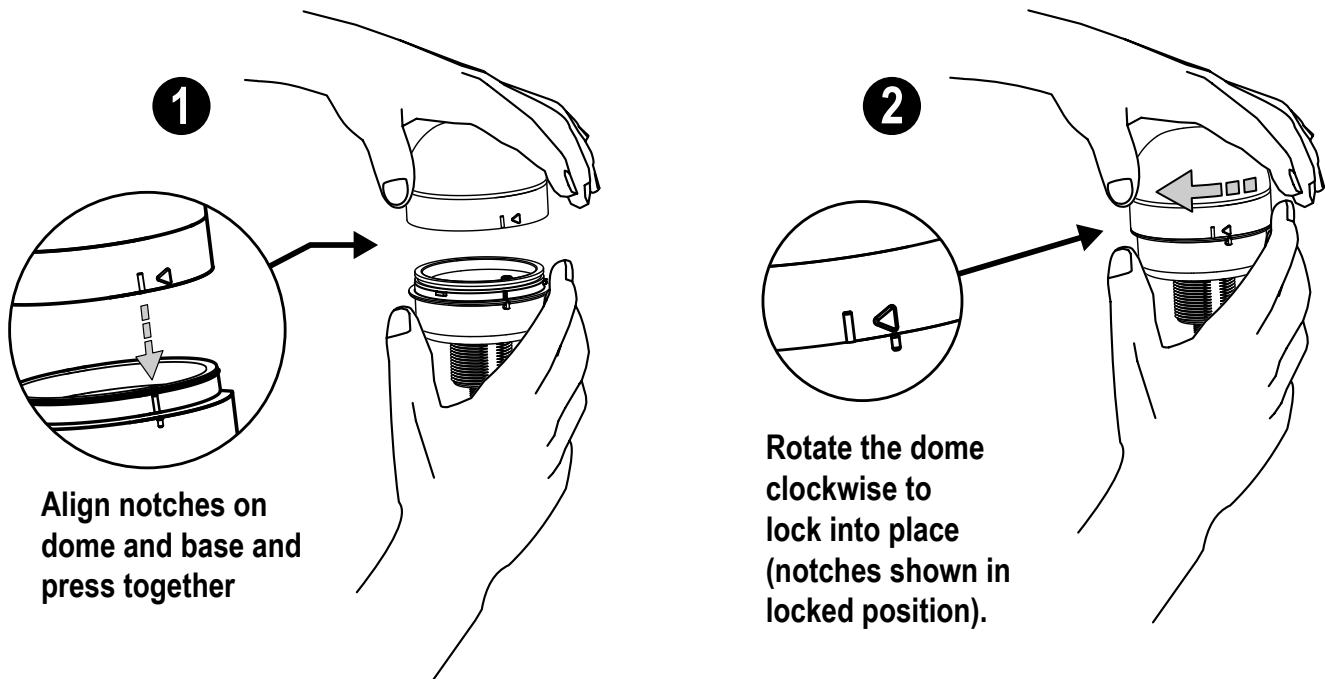Before applying power to the device, set the radio module's DIP switches. Default configurations are noted with (*).
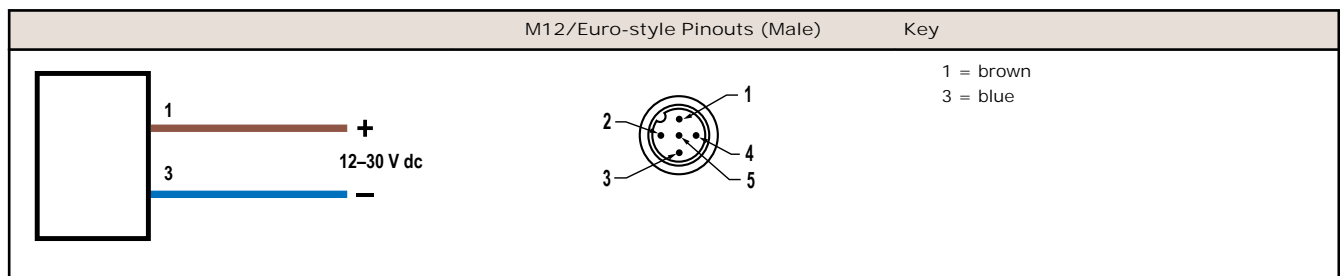

DIP Switches

Binding Push Button

LED

DIP Switch 1: Radio Transmit Power

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

The 900 MHz radios can be operated 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 the older 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.

Assembling the K70

① Align notches on dome and base and press together

② Rotate the dome clockwise to lock into place (notches shown in locked position).

Wiring Diagrams

	M12/Euro-style Pinouts (Male)	Key
1 + 3 − 12–30 V dc	(pinout diagram) 1, 2, 3, 4, 5	1 = brown 3 = blue

Bind the K70 to the Gateway and Assign the Node Address

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

DIP Switches

Binding Push Button

LED
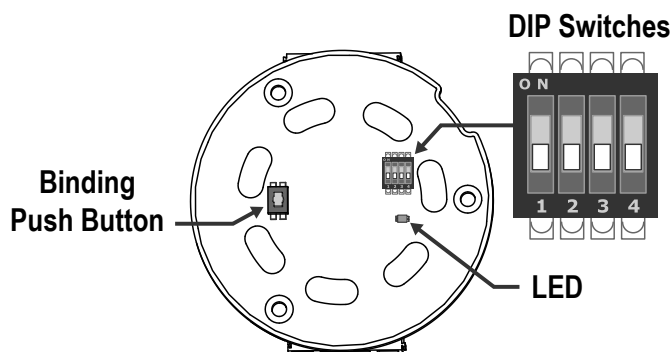
1. Enter binding mode on the Gateway.
   - For board modules, triple-click the button.
   - For housed models, triple-click button 2.

   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. 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 base 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. Write the Node address on the provided label.
   This makes it easier to identify the physical Node location within a multi-Node network.
6. Reassemble the components back onto the base.
7. Repeat steps 2 through 5 for as many K70 Wireless Touch Buttons as are needed for your network.
8. After binding all K70s, exit binding mode on the Gateway.
   - For board modules, double-click the button.
   - For housed models, double-click button 2.

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 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 Tool

The User Configuration Tool (UCT) software runs on any Windows machine and uses a USB to RS-485 adapter cable to connect your Gateway to the computer.
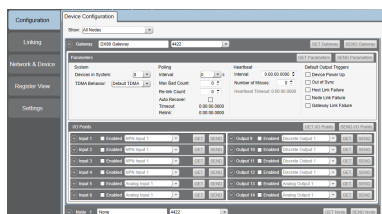
The User Configuration Tool (UCT) offers an easy way to link I/O points in your wireless network, view I/O register values graphically, and set system communication parameters when a host system is not part of the wireless network. Download the most recent revisions of the UCT software from Banner Engineering's website: *http://www.bannerengineering.com/wireless*.

The UCT requires a special USB to RS-485 (model number BWA-UCT-900 for 1 Watt radios, BWA-HW-006 can be used for all other radios) converter cable to pass information between your computer and the Gateway.

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.

Duty Cycle (Outputs only) (bits 15:0). This parameter defines the proportion of time the output is active. Using the 16-bit field, each "on" bit represents 1/16 seconds. For example, 0000 0000 0000 1111 (0x000F) sets the duty cycle to 1/4 seconds; 0000 0000 0000 0011 (0x0003) sets the duty cycle to 1/8 seconds. (Parameter number 0x04).

Supported in Gateway RF Firmware Version 2.7 and above.
Supported in Node RF Firmware Version 1.0 and above.

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

I/O	Modbus Holding Register		I/O Type	I/O Range		Holding Register Representation (Dec.)		Color #
	Gateway	Any Node		Min.	Max.	Min.	Max.	
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 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 (QD); 150 mm (6 in) pigtail PVC cable with a 5-pin M12/Euro-style male quick disconnect (QD); or a 2 m (6.5 ft) unterminated 5-wire 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 p-p amplitude per IEC 60068-2-6
Shock 15G 11 ms duration, half sine wave per IEC 60068-2-27

Certifications

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 *http://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

Radio

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

Minimum Separation Distance
900 MHz, 1 Watt: 4.57 m (15 ft)
2.4 GHz, 65 mW: 0.3 m (1 ft)

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

2.4 GHz Compliance
FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247
ETSI EN 300 328 V1.8.1 (2012-06)
IC: 7044A-DX8024

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 Tool (UCT) software
Node: Defined by Gateway

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[1] For European applications, power this device from a Limited Power Source as defined in EN 60950-1.
[2] Radio range significantly decreases without line of sight. Always verify your wireless network's range by running a site survey.
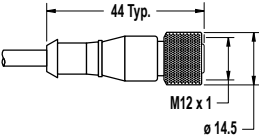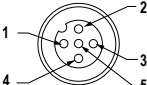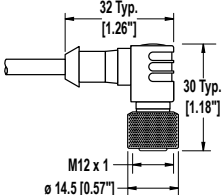
Dimensions

R31.8 [1.25]

49.7 [1.96]

20.9 [.82]

M30 x 1.5-6g

24.9 [.98]

M12 x 1-6g

8.0 [.32]

Ø70.0 [2.76]

Ø63.5 [2.50]
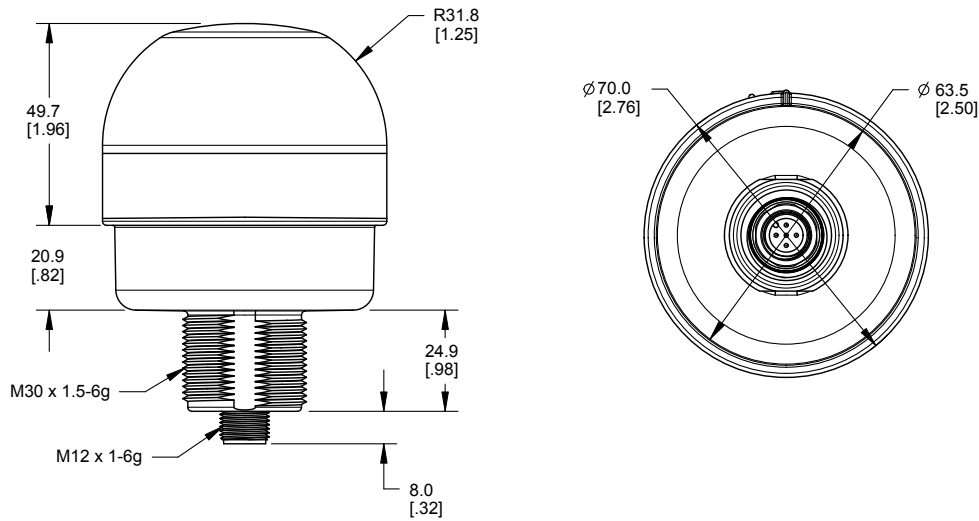
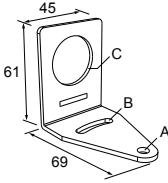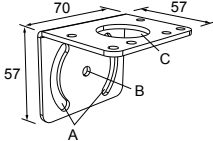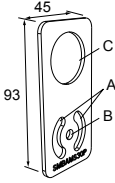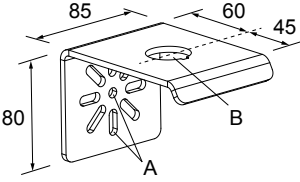All measurements are listed in millimeters (inches), unless noted otherwise.

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	44 Typ. M12 x 1 ø 14.5	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	32 Typ. [1.26"] 30 Typ. [1.18"] M12 x 1 ø 14.5 [0.57"]	
MQDC1-515RA	4.57 m (15 ft)			
MQDC1-530RA	9.14 m (30 ft)			

All measurements are listed in millimeters, unless noted otherwise.

Mounting 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 (zinc-plated)
- Front surface for customer applied labels

Hole size: A = ø 7 , B = ø 30

All measurements are listed in millimeters, unless noted otherwise.

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