



Industrial Wireless Radios

Banner's network radios provide the backbone of a very flexible and highly expandable wireless network for industrial environments. Simple wire replacement products easily replace discrete, analog, Serial, and Ethernet signal wires with no setup software needed. The Performance Series centers around a Gateway and up to 47 remotely located Nodes with multiple I/O options. The MultiHop Series uses repeaters to extend the range of the network using multiple "hops" to cover larger distances or to circumvent obstacles (trees, buildings, topology, etc.).

Sure Cross[®] PM Series

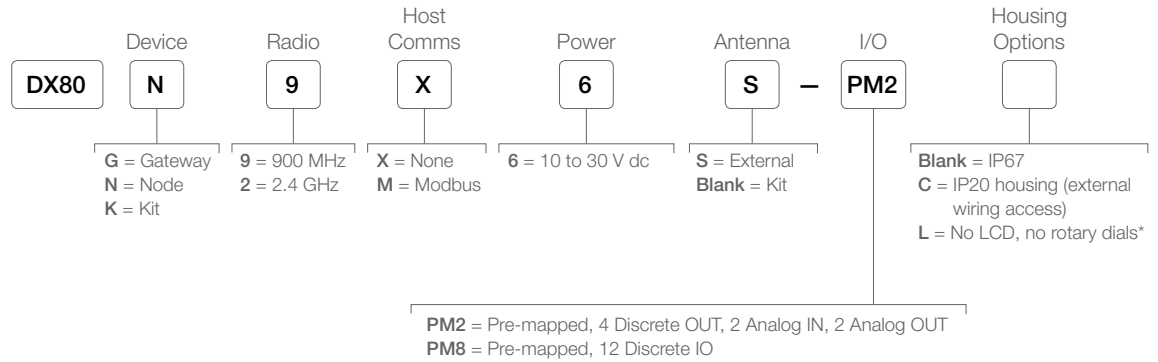


An I/O Radio network that combines long range line-of-sight coverage with ease of deployment and use.

Banner's PM Series provides a flexible network that easily sets up without software. Setting up a basic point-to-point network is as easy as pairing a cell phone to a headset. You can replace cables and extend the range of digital and analog signals with minimum effort.

Key Features:

- Menu-driven LCD user interface
- No software needed
- IP67-rated housing for demanding environments
- One Gateway is preconfigured to support up to six Nodes
- Choose from two I/O configurations
- Select from multiple I/O maps



* Available on PM8 models only

Sure Cross[®] PM Kit



Simple wire replacement is even simpler with Banner's fully integrated kit.

Plug-and-play with one Gateway and one Node, pre-bound and mapped to solve your first wireless challenge, and provide the start of a flexible network that can be expanded as production needs change.

Key Features:

- Pre-bound and mapped expandable bi-directional radios
- Eight LCD menu selectable I/O mapping options
- IP67-rated housing for demanding environments
- One Gateway is preconfigured to support up to six Nodes

PM2 and PM8 Gateways and Nodes Specifications

Radio Range	900 MHz (1 W): Up to 9.6 kilometers (6 miles)* 2.4 GHz (65 mW): Up to 3.2 kilometers (2 miles)* <small>*Line of sight with included 2 dB antenna</small>	
Minimum Separation Distance	900 MHz (1 W): 4.57 m (15 ft)	2.4 GHz (65 mW): 0.3 m (1 ft)
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
900 MHz Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024	
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Linked Timeout	Gateway: Configurable via User Configuration Tool (UCT) software	Node: Defined by Gateway
Communication Hardware (RS-485) - Gateways Only	Interface: 2-wire half duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k Data format: 8 data bits, no parity, 1 stop bit NOTE: Battery life is reduced to 1 year when the sample/report rate is increased to 16 seconds	
Communication Protocol	Modbus RTU	
Supply Voltage	10 to 30 V dc (Outside the USA: 12 to 24 V dc, $\pm 10\%$) 900 MHz Consumption: Maximum current draw is < 100 mA and typical current draw is < 50 mA at 24 V dc (2.4 GHz consumption is less)	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Interface	Indicators: Two bi-color LEDs	Buttons: Two Display: Six character LCD
Wiring Access	Two 1/2-in NPT ports	
Environmental Rating	PM2 and PM8 Models: IEC IP67; NEMA 6	PM2C and PM8C Models: IP20; NEMA 1
Operating Conditions	Temperature: $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}$ to $+185\text{ }^{\circ}\text{F}$) (Electronics); $-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$ to $+176\text{ }^{\circ}\text{F}$) (LCD) Humidity: 95% max. relative (non-condensing) Radiated Immunity: 10 V/m, 80-2700 MHz (EN61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	

Certifications



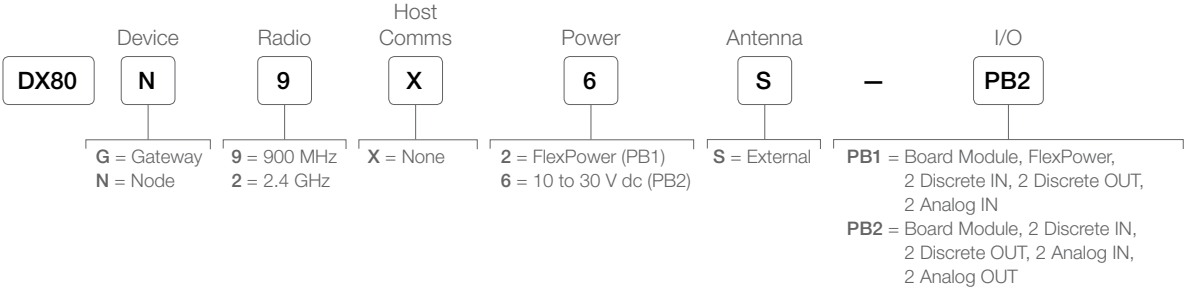
Performance Board Modules



Sure Cross® Performance Embeddable Board Modules were specifically designed for the needs of industrial users to provide connectivity where traditional wired connections are not possible or cost prohibitive. Performance Embeddable Board Modules communicate with all Sure Cross Performance radios.

Key Features:

- Simple yet highly expandable
- Supports Point-to-Point and Star network topologies
- DIP switch mapping for up to two Nodes



PB2 Gateway and Node Specifications

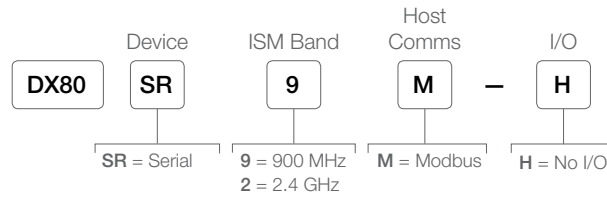
Radio Range	900 MHz (1 Watt): Up to 9.6 kilometers (6 miles)* 2.4 GHz (65 mW): Up to 3.2 kilometers (2 miles)* *Line of sight with included 2 dB antenna
Minimum Separation Distance	900 MHz (1 Watt): 4.57 m (15 ft) 2.4 GHz (65 mW): 0.3 m (1 ft)
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
900 MHz Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)
Supply Voltage	10 to 30 V dc (Outside the USA: 12 to 24 V dc, $\pm 10\%$) 900 MHz Consumption: Maximum current draw is < 100 mA and typical current draw is < 50 mA at 24 V dc (2.4 GHz consumption is less)
Current Draw (at 24 V dc)	900 MHz, 1 Watt: Approx. 3.5 mA 900 MHz, 250 mW: Approx. 1.5 mA 2.4 GHz, 65 mW: Approx. 3.5 mA
Interface	Indicators: One bi-color LEDs Buttons: One
Wiring Access	Terminal block
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms; Max Tightening Torque: 0.45 N-m (4 lbf-in) U.FL-R-SMT.(01); Use cable BWA-HW-030 (U.FL to RP-SMA) or the equivalent
Linked Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway
Operating Conditions	Temperature: $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}$ to $+185\text{ }^{\circ}\text{F}$) Humidity: 95% max. relative (non-condensing)
Radiated Immunity	10 V/m, 80-2700 MHz (EN61000-4-3)

Serial Data Radio

Sure Cross® Multi-Hop Serial Data Radios are wireless industrial communication devices used to extend the range of Serial communication networks.

Key Features:

- DIP switches select operational modes: master, repeater or slave
- No software required for deployment
- Serial communication style (RS-232 or RS-485) is user-selectable



Serial Data Radio Specifications

Radio Range	900 MHz (1 Watt): Up to 9.6 kilometers (6 miles)* 2.4 GHz (65 mW): Up to 3.2 kilometers (2 miles)* *Line of sight with included 2 dB antenna
Minimum Separation Distance	900 MHz (1 Watt): 4.57 m (15 ft) 2.4 GHz (65 mW): 0.3 m (1 ft)
Transmit Power	900 MHz (1 Watt): 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
900 MHz Compliance	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: In accordance with EN 300 328: V1.7.1 (2006-05) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)
Supply Voltage	10 to 30 V dc (Outside the USA: 12 to 24 V dc, ±10%)
Current Draw	Idle: At 30 V dc: 0.011 A At 24 V dc: 0.012 A At 10 V dc: 0.020 A Transmitting: At 30 V dc: 0.007 A At 24 V dc: 0.008 A At 10 V dc: 0.011 A
Housing	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N·m (5 lbf·in)
Interface	Indicators: Two bi-color LEDs Buttons: One (under small round cover)
Wiring Access	4-position terminal
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N·m (4 lbf·in)
Hardware (Serial Data Radio SRxM-H)	Interface: 2-wire half-duplex RS-485 (default) or RS-232 Baud rates: 1200, 2400, 9600, 19.2k (default), 38.4k, 57.6k, 115.2k Data format: 8 data bits, 1 stop bit, no parity (default), even parity, odd parity
Packet Size (Serial Data Radio)	1500 bytes maximum
Wireless Data Transfer Rate	900 MHz: 300 kbps 2.4 GHz: 250 kbps
Environmental Rating	IEC IP67; NEMA 6
Operating Conditions	Operating Temperature: -40 °C to +85 °C (-40 °F to +185 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) Operating Humidity: 95% max. relative (non-condensing) Radiated Immunity: 10 V/m, 80-2700 MHz (EN61000-6-2)
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz

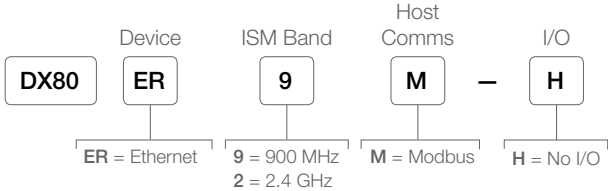
Ethernet Data Radio



Sure Cross® Multi-Hop Ethernet Data Radios are wireless industrial communication devices used to create point-to-multipoint configurations of wireless Ethernet networks.

Key Features:

- No IP address configuration is required
- Self-healing, auto-routing RF network with multiple hops extends the network's range
- DIP switches select operational modes: master, repeater or slave
- Built-in site survey mode enables rapid assessment of a location's RF transmission properties



Ethernet Data Radio Specifications

Radio Range	900 MHz (1 Watt): Up to 9.6 kilometers (6 miles)* 2.4 GHz (65 mW): Up to 3.2 kilometers (2 miles)* *Line of sight with included 2 dB antenna
Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP) 2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Receive Sensitivity	900 MHz: -104 dBm at 300 kbps; -107 dBm at 200 kbps; -108 dBm at 100 kbps 2.4 GHz: -104 dBm at 250 kbps
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	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: In accordance with EN 300 328: V1.7.1 (2006-05) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)
Communication	Ethernet: 10/100 baseT Ethernet RJ45 connection Radio: 200kbps to 300kbps Encryption: AES (Advanced Encryption Standard) using a 256-bit cryptographic key
Supply Voltage	10 to 30 V dc (Outside the USA: 12 to 24 V dc, ±10%) on the brown wire, or 3.6 to 5.5 V dc low power option on the gray wire
Current Consumption	Idle: 50 mA at 24 V; 100 mA at 12 V; 170 mA at 5 V Transmit 250 mW: 60 mA at 24V ; 120 mA at 12 V; 200 mA at 5 V Transmit 1 Watt: 70 mA at 24 V; 130 mA at 12 V; 240 mA at 5 V
Housing	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N·m (5 lbf·in)
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N·m (4 lbf·in)
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD
Environmental Rating	IEC IP20; NEMA 1
Operating Conditions	-40 °C to +85 °C (-40 °F to +185 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz

DXER9 Ethernet Data Radio

Sure Cross® Ethernet Radio is an industrial grade, long range, 900 MHz radio used to create point-to-multipoint configurations of wireless Ethernet networks.


Key Features:

- DIP switches select operational modes
- FHSS radios operate and synchronize automatically
- RF transmission rate of 1.536 Mb/s and a throughput of 935 Kb/s
- 128 bit AES encryption for Ethernet data packets
- Point-to-multipoint configurations with up to 16 subscriber units



Models	Range	Transmit Range	Environmental Rating
DXER9	Up to 3 mile range	125 mW	IP55

Ethernet Data Radio Specifications

RF Transmission Rate	1.536 Mb/s
Ethernet Throughput	935 Kb/s
Output Power	+21 dBm (4 Watts EIRP used with 15 dBi antenna)
Receive Sensitivity	-97 dBm at 10e-4 BER (-112 dBm with 15 dBi antenna)
Radio Link Budget	148 dB with 15 dBi antenna
Range	Up to 3 miles
Radio Channels/Bandwidth	12 non-overlapping with 2.0833 MHz spacing and 1.75 MHz occupied bandwidth
Spread Spectrum Technology	Direct Sequence Spread Spectrum
Manual Frequency Select	Channel selected with DIP switch or via Web browser interface
Connector Types	Ext. Reverse Polarity SMA / 10-100 baseT Industrial Ethernet / 5-pin or 4-pin M12/Euro-style power connection
Status LEDs	Power, Ethernet Link, RF RX, RF TX, 4/Channel, and 6/Link Quality
Error Correction Technique	Sub-block error detection and retransmission
Adjacent-Band Rejection	SAW receiver filter attenuates cellular and pager interference
Regulator Type	Switching regulator
Browser Management Tools	QoS Statistics, Network Settings, Spectrum Analyzer, and Firmware Upgrading
Power Consumption	Transmit: 1.7 Watts Receive: 0.8 Watts
Voltage	Apply power using one of the following connections: Euro-style connector: 5 to 48 V dc with pin 1 positive and pin 3 ground
Temperature Range	-40 °C to 70 °C (-40 °F to +158 °F)
Mounting	#10 or M5 (M5 hardware included)
M5 Fasteners Max Tightening Torque	0.56 N·m (5 in-lbf)
Material	Case: PBT
Environmental Rating	IEC IP65; NEMA 4X
Certifications	 IND. CONT. EQ. 447Y <p>Maximum ambient temperature: 70 °C Power rating: UL Class 2 Enclosure environmental rating: UL Type 1</p>

Performance Series—Gateways



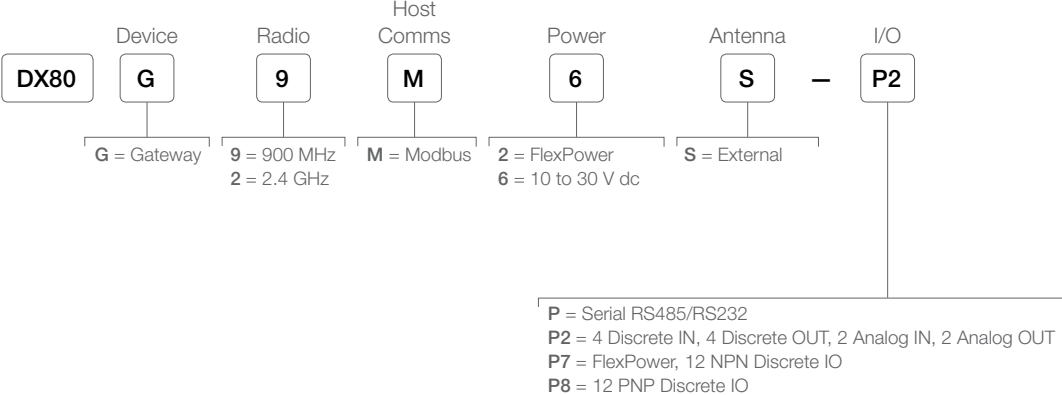
Create point-to-multipoint networks that distribute I/O over large areas. Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter.

Key Features:

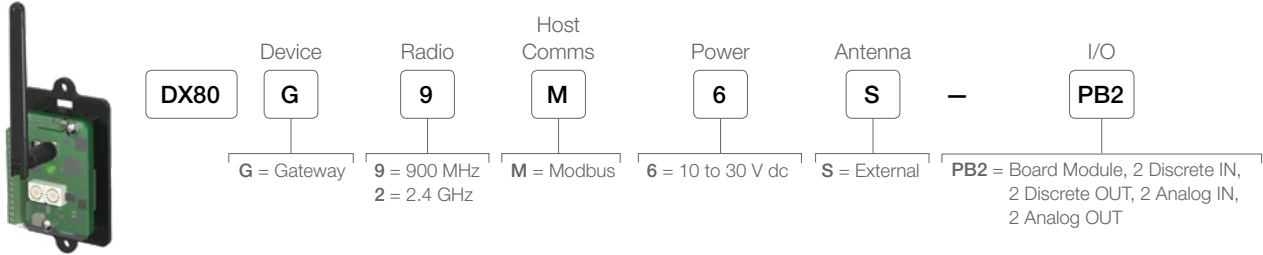
- Enhanced Gateways offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field



DX80 Performance Gateways



DX80 Performance Gateways, Board Models



DX80 Performance Gateway Specifications*

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)		
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)		
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP		
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024		
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)			
Communication Hardware	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches Data format: 8 data bits, no parity, 1 stop bit			
Communication Protocol	Modbus RTU			
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway			
RTD Inputs	Sample Rate: 1 second	Report Rate: 16 seconds	Accuracy: 0.1% of full scale	Resolution: 0.1 °C, 15-bit
Operating Conditions	-40 °C to +85 °C (-40 °F to +185 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)			
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27	Shock: 30g, 11 millisecond half sine wave, 18 shocks	Vibration: 0.5 mm p-p, 10 to 60 Hz	
Supply Voltage	DX80 and "C" Housing Models: 10 to 30 V dc or 3.6 to 5.5 V dc low power option (Outside the USA: 12 to 24 V dc, ±10% or 3.6 to 5.5 V dc low power option) 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)			
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) DX80 and "C" Housing Models: Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N·m (5 lbf·in)			
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms	Max Tightening Torque: 0.45 N·m (4 lbf·in)		
Interface	Indicators: Two bi-color LEDs	Buttons: Two	Display: Six character LCD	
Wiring Access	DX80 Housing Models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect "C" Housing Models: External terminals			
Environmental Rating	DX80 models: IEC IP67; NEMA 6 "C" Housing Models: IEC IP20; NEMA 1			
Certifications				

* See datasheet for model specific details

Performance Series—Nodes



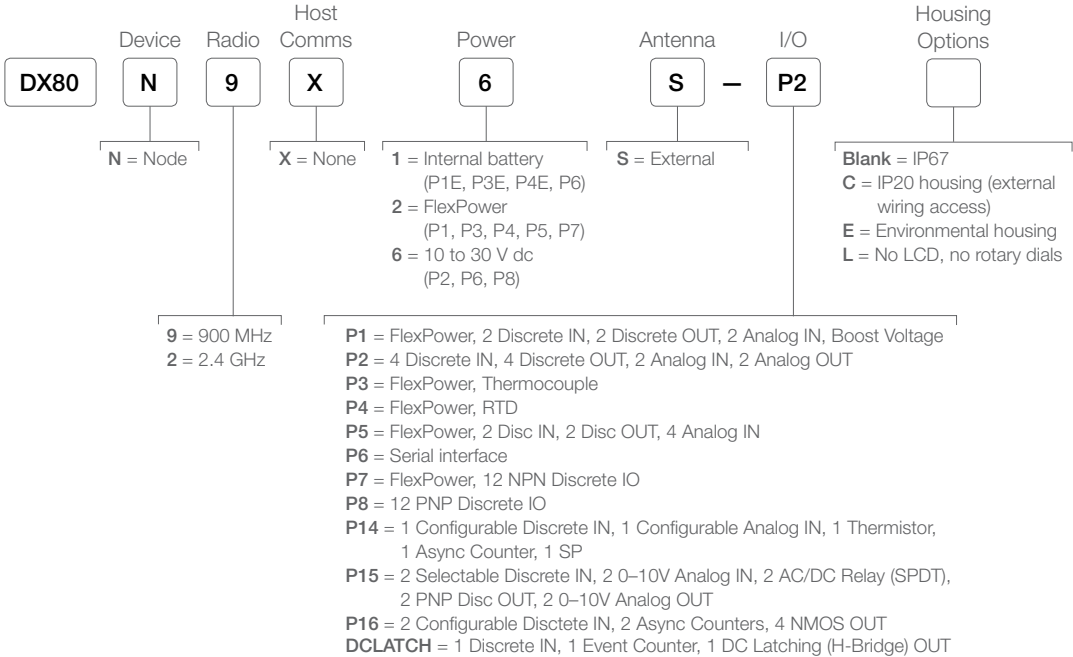
Create point-to-multipoint networks that distribute I/O over large areas. Input and output types include discrete (dry contact, PNP/NPN), analog (0 to 10 V dc, 0 to 20 mA), temperature (thermocouple and RTD), and pulse counter.

Key Features:

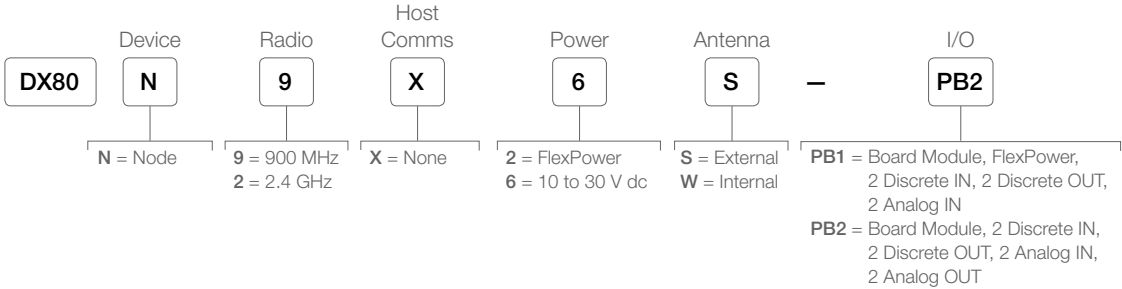
- Enhanced Nodes offer increased range in the 900 MHz frequency band
- High density I/O capacity provides up to 12 discrete inputs or outputs or a mix of discrete and analog I/O
- Universal analog inputs allow current or voltage to be selected in the field




DX80 Performance Nodes



DX80 Performance Nodes, Board Models



DX80 Performance Nodes Specifications*

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	
Operating Conditions	-40 °C to +85 °C (-40 °F to +185 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) "E" Housing Models -40 °C to +65 °C (-40 °F to +149 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27	Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz
Supply Voltage	DX80 and "C" Housing Models: 10 to 30 V dc or 3.6 to 5.5 V dc low power option (Outside the USA: 12 to 24 V dc, ±10% or 3.6 to 5.5 V dc low power option) "E" Housing Models: 3.6 V dc low power option from an internal battery or 10 to 30 V dc 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)	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) DX80 and "C" Housing Models: Mounting: #10 or M5 (SS M5 hardware included) "E" Housing Models: Mounting: 1/4-in or M7 (SS M7 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms	Max Tightening Torque: 0.45 N-m (4 lbf-in)
Interface	Indicators: Two bi-color LEDs	Buttons: Two Display: Six character LCD
Wiring Access	DX80 Housing Models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect "C" Housing Models: External terminals "E" Housing Models: Two 1/2-in NPT	
Environmental Ratingw	DX80 models: IEC IP67; NEMA 6 "C" Housing Models: IEC IP20; NEMA 1 "E" Housing Models: IEC IP65; NEMA 4X	
Certifications		

* See datasheet for model specific details

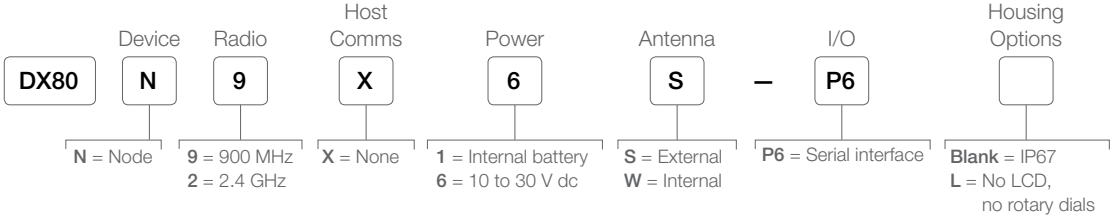
Performance Series-P6 Nodes



The -P6 Performance Node is an industrial radio device with a 1-wire Serial Interface that is designed to transmit data from 1-wire Serial sensors, such as the Banner Temperature and Humidity (M12FTH4Q), Vibration and Temperature (QM42VT1), or Ultrasonic (K50UX1RA) sensors.


Key Features:

- 1-wire Serial Interface
- Battery-powered models for a completely wireless solution
- Line-powered models for continuous sampling



Used with	
M12FTH4Q	Temperature and relative humidity via a 1-wire Serial Interface see page 6
M12FT4Q	Temperature via a 1-wire Serial Interface
QM42VT1	Vibration and temperature via a 1-wire Serial Interface see page 10
K50UX1RA	Ultrasonic sensor with a 1-wire Serial Interface see page 12

DX80 Performance P6 Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	
Operating Conditions	-40 °C to +85 °C (-40 °F to +185 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27	Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz
Supply Voltage	Integrated battery models: 3.6 V dc low power option from an internal battery Non-battery models: 10 to 30 V dc (Outside the USA: 12 to 24 V dc, ±10%)	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Integrated battery models: Weight: 0.30 kg (0.65 lbs) Non-battery models: Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms	Max Tightening Torque: 0.45 N-m (4 lbf-in)
Interface	Indicators: Two bi-color LEDs	Buttons: Two Display: Six character LCD
Wiring Access	Integrated battery models: One 5-pin threaded M12 Euro-style female quick-disconnect Non-battery models: One 5-pin threaded M12 Euro-style female quick-disconnect and one 5-pin threaded M12 Euro-style male quick-disconnect	
Environmental Rating	IEC IP67; NEMA 6	
Certifications		

Performance Series-P14 Nodes



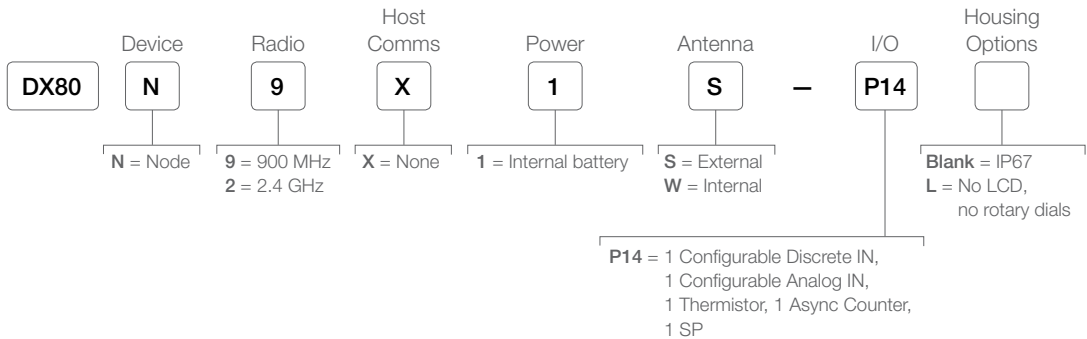
The -P14 Performance Node is an industrial radio device that makes it easy to add a remote monitoring point to a wireless network. Simply select one I/O from multiple options, then wire a sensor into the easily accessible wiring terminals inside the Node. The integrated D-cell lithium battery makes it easy to deploy, even where power is not readily available.

Key Features:

- Inputs include: One configurable discrete, one configurable analog, one thermistor, one asynchronous counter
- Battery-powered models for a completely wireless solution
- Field-wireable terminal for wiring I/O


Applications:

- Door monitoring
- Tank level monitoring
- High speed counting
- Flow monitoring
- RPM monitoring
- Non-contact temperature monitoring
- Pressure monitoring



Used with		
T30UX	Long-range ultrasonic sensor	see bannerengineering.com
QT50ULB	Long-range ultrasonic sensor	see bannerengineering.com
M18T	Non-contact temperature sensor	see bannerengineering.com
TL70	Wireless modular tower light	see page 22

DX80 Performance P14 Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	
Operating Conditions	-40 to +85 °C (-40 to +185 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27	Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz
Discrete Input	Rating: 3 mA max current at 30 V dc Sample / Report Rates: DIP switch configurable	
Discrete Input ON Condition	PNP: Greater than 8 V NPN: Less than 0.7 V	
Discrete Input OFF Condition	PNP: Less than 5 V NPN: Greater than 2 V or open	
Supply Voltage	3.6 V dc low power option from an internal battery	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Integrated battery models: Weight: 0.30 kg (0.65 lbs) Non-battery models: Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms	Max Tightening Torque: 0.45 N-m (4 lbf-in)
Interface	Indicators: Two bi-color LEDs	Buttons: Two Display: Six character LCD
Wiring Access	Two 1/2-inch NPT	
Switch Power Outputs	Analog configuration: one (SP1) Discrete configuration: one (SP1)	
Thermistor Input	Model: 44006, 44016, or 44031 Series of 10 kOhm thermistors Sample Rate: 16 seconds Report Rate: 64 seconds Accuracy: 0.4 °C (10 °C to 50 °C); Up to 0.8 °C (-40 °C to 85 °C)	
Counter Input	Event counter: Input rating 1 Hz to 10 kHz (For battery powered devices, the recommended input rating is less than 1 kHz) Rate (frequency) counter: 1 Hz to 10 kHz Threshold: 1.7 V	
Environmental Rating	IEC IP67; NEMA 6	
Certifications		



Performance Series–P15E Nodes

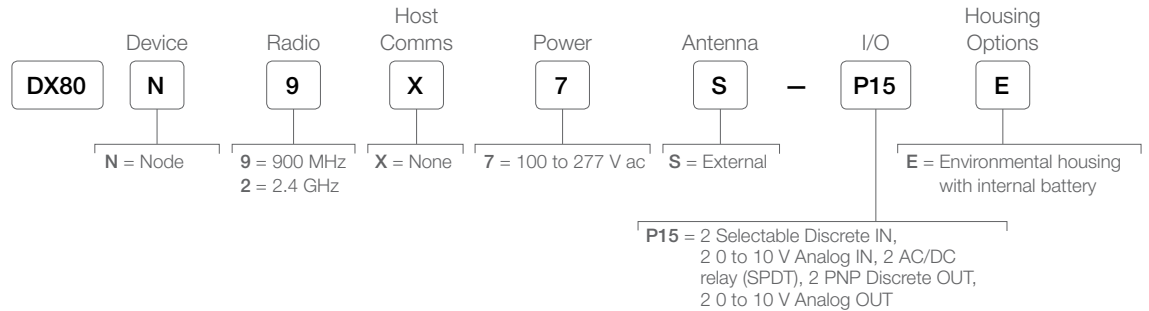
The P15E Performance Node enables users to wirelessly power and control any connected devices and easily monitor device status and performance. It is easy to deploy and a simple way to remotely control lights, fans, motors, and other AC-powered devices without the trouble or expense of running cable.

Key Features:

- Switch AC loads up to 10 amps
- AC-power field-wireable
- No separate power supply required
- Supply voltage of 100 to 277 V AC at 50/60 Hz

Applications:

- Remotely control lights, dimming levels, fans, and motors
- Provide power and control connectivity to remote I/O devices



Used with

WLB92ZC1100ACT	Large, ultra-bright LED work light	
WLB32ZC1130QM	Adjustable LED workstation light	see bannerengineering.com
K50LGRYA120Q	50 mm colored domed indicator	

DX80 Performance -P15E Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-06) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N·m (4 lbf·in)	
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	
Supply Voltage	Nominal voltage: 120–277 V ac at 60 Hz in North America Nominal voltage: 100–277 V ac at 50/60 Hz outside North America Maximum supply current: 0.37 A Maximum power consumption: 25 W	
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.51 kg (1.13 lbs) Mounting: 1/4-inch or M7 Max. Tightening Torque: 0.56 N·m (5 lbf·in)	
Wiring Access	Two 1/2-inch NPSM ports, 14 threads/inch (1/2-14 NPSM)	
Analog Input	0 to 10 V Input Rating: 10 V Impedance: Approximately 220 Ohms Sample Rate: 62.5 milliseconds Report Rate: 1 second or On Change of State (1% change in value) Accuracy: 0.2% of full scale +0.01% per °C Resolution: 12-bit	
Output State Following Timeout	De-energized (OFF)	
Relay Outputs	SPDT (Form C) relay 277 V ac, 10 A Minimum Mechanical Life: 10,000,000 Surge breakdown voltage (Between contacts and coil) (Initial): 10,000 V	
Analog Output	0 to 10 V Update Rate: 125 milliseconds Accuracy: 1.0% of full scale +0.01% per °C Resolution: 12-bit	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	
Operating Conditions	–40 °C to +85 °C (–40 °F to +185 °F) (Electronics); –20 °C to +80 °C (–4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Environmental Rating	IEC IP65	
Certifications	 	

MultiHop Modbus Radios

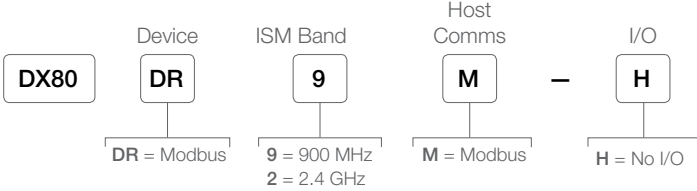


MultiHop Modbus Data Radios extend the range of Modbus or other Serial communication networks. Each radio may be set to act as either a master, repeater or slave. Models are available with built in discrete and analog I/O, which can be accessed using the Modbus protocol.

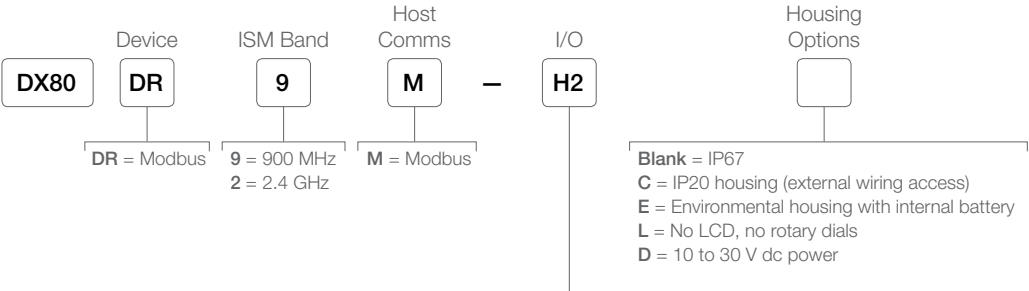
Key Features:

- Self-healing, auto routing RF network with multiple hops extends the network’s range
- Flexible: DIP switch selectable to be a master, repeater or slave
- User-selectable communication between RS-485 and RS-232

MultiHop Modbus Radios

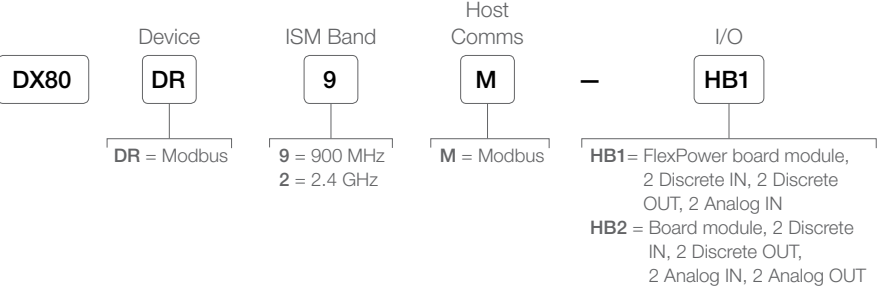


MultiHop Modbus Radios with I/O



- H1** = FlexPower, 4 Discrete IN, 2 Discrete OUT, 4 Analog IN, 1 thermistor IN, 1 Counter IN
- H2** = 4 Discrete IN, 4 Discrete OUT, 2 Analog IN, 2 Analog OUT
- H3** = FlexPower, Thermocouple
- H4** = FlexPower, RTD
- H5** = FlexPower, 4 Discrete IN, 2 Discrete OUT, 4 Analog IN
- H6** = Serial interface H12 = FlexPower, SDI-12, Bridge, Counter, Discrete, Analog
- H12** = FlexPower, SDI-12, Bridge, Counter, Discrete, Analog
- H14** = 1 Configurable Discrete IN, 1 Configurable Analog IN, 1 Thermistor, 1 SDI-12, 1 Async Counter, 1 SP
- H15** = 2 PNP Discrete IN, 2 0 to 20 mA Analog IN, 2 AC/DC Relay (SPDT), 2 PNP Discrete OUT, 2 0 to 10 V Analog OUT
- DCLATCH** = 2 Discrete IN, 2 Event Counters, 1 DC Latching (H-Bridge) OUT

MultiHop Modbus Radios with I/O — Board Models



MultiHop Modbus Radios with I/O Specifications*

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Power	<p><i>FlexPower</i> models: 10 to 30 V dc (Outside the USA: 12 to 24 V dc, $\pm 10\%$) on the brown wire, or 3.6 to 5.5 V dc low power option on the gray wire 6</p> <p>Integrated battery models: 3.6 V dc low power option from an internal battery or 10 to 30 V dc</p> <p>Master radio consumption (900 MHz): Maximum current draw is < 100 mA and typical current draw is < 30 mA at 24 V dc (2.4 GHz consumption is less)</p> <p>Repeater/slave radio consumption (900 MHz): Maximum current draw is < 40 mA and typical current draw is < 20 mA at 24 V dc (2.4 GHz consumption is less)</p>	
Compliance	<p>900 MHz Compliance (1 Watt)</p> <p>FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247</p> <p>IC: 7044A-RM1809</p>	<p>2.4 GHz Compliance</p> <p>FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247</p> <p>ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04)</p> <p>IC: 7044A-DX8024</p>
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms	Max Tightening Torque: 0.45 N-m (4 lbf-in)
Interface	Indicators: Two bi-color LEDs	Buttons: Two Display: Six character LCD
Communication Hardware (MultiHop RS-485)	<p>Interface: 2-wire half-duplex RS-485</p> <p>Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool</p> <p>Data format: 8 data bits, no parity, 1 stop bit</p>	
Packet Size (MultiHop)	900 MHz: 175 bytes (85 Modbus registers)	2.4 GHz: 75 bytes (37 Modbus registers)
Intercharacter Timing (MultiHop)	3.5 milliseconds	
Housing	<p>Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers</p> <p>Weight: 0.26 kg (0.57 lbs)</p> <p>M-Hx and M-HxC models: Mounting: #10 or M5 (SS M5 hardware included)</p> <p>M-HxE models: Mounting: 1/4-in or M7 (SS M7 hardware included)</p> <p>Max. Tightening Torque: 0.56 N-m (5 lbf-in)</p>	
Wiring Access	<p>M-Hx models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect</p> <p>M-HxC models: External terminals</p> <p>M-HxE models: Two 1/2-in NPT ports</p>	
Environmental Rating	<p>M-Hx: IEC IP67; NEMA 6</p> <p>"C" Housing Models: IEC IP20; NEMA 1</p> <p>"E" Housing Models: IEC IP65; NEMA 4X</p>	
Operating Conditions	<p>M-Hx and M-HxC models: $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}$ to $+185\text{ }^{\circ}\text{F}$) (Electronics); $-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$ to $+176\text{ }^{\circ}\text{F}$) (LCD)</p> <p>M-HxE models: $-40\text{ }^{\circ}\text{C}$ to $+65\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}$ to $+149\text{ }^{\circ}\text{F}$) (Electronics); $-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ ($-4\text{ }^{\circ}\text{F}$ to $+176\text{ }^{\circ}\text{F}$) (LCD)</p> <p>95% maximum relative humidity (non-condensing)</p> <p>Radiated Immunity: 10 V/m (EN 61000-4-3)</p>	
Shock and Vibration	<p>IEC 68-2-6 and IEC 68-2-27</p> <p>Shock: 30g, 11 millisecond half sine wave, 18 shocks</p> <p>Vibration: 0.5 mm p-p, 10 to 60 Hz</p>	
Certifications		

* See datasheet for model specific details

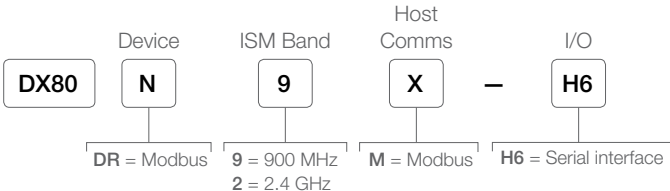
MultiHop Modbus-H6



The -H6 MultiHop Modbus Data Radio has a 1-wire Serial Interface that is designed to transmit data from 1-wire Serial sensors, such as the Banner Temperature and Humidity (M12FTH4Q), Vibration and Temperature (QM42VT1), or Ultrasonic (K50UX1RA) sensors.

Key Features:

- 1-wire Serial Interface
- Battery-powered models for a completely wireless solution
- Tree topology allows for multiple hops to cover longer distances and circumvent obstacles



Used with		
M12FTH4Q	Temperature and relative humidity via a 1-wire Serial Interface	see page 6
M12FT4Q	Temperature via a 1-wire Serial Interface	
QM42VT1	Vibration and temperature via a 1-wire Serial Interface	see page 10
K50UX1RA	Ultrasonic sensor with a 1-wire Serial Interface	see page 12

MultiHop -H6 Modbus Radio Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Supply Voltage	3.6 V dc low power option from an internal battery	
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms	Max Tightening Torque: 0.45 N-m (4 lbf-in)
Interface	Indicators: Two bi-color LEDs	Buttons: Two Display: Six character LCD
Communication Hardware (MultiHop RS-485)	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool Data format: 8 data bits, no parity, 1 stop bit	
Packet Size (MultiHop)	900 MHz: 175 bytes (85 Modbus registers)	2.4 GHz: 75 bytes (37 Modbus registers)
Intercharacter Timing (MultiHop)	3.5 milliseconds	
Housing	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Wiring Access	One 5-pin threaded M12/Euro-style male quick-disconnect	
Environmental Rating	IEC IP67; NEMA 6	
Operating Conditions	-40 °C to +65 °C (-40 °F to +149 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	
Certifications		

MultiHop Modbus-H14

The -H14 Multi-Hop Modbus Data Radio makes it easy to add a remote monitoring point to a wireless network. Simply select one I/O from multiple options, then wire a sensor into the easily accessible wiring terminals inside the Node. The integrated D-cell lithium battery makes it easy to deploy, even where power is not readily available.

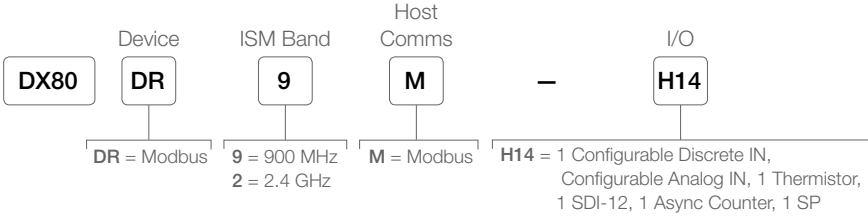


Key Features:

- Inputs include: One configurable discrete, one configurable analog, one thermistor, one asynchronous counter, and one SDI-12
- Battery-powered models for a completely wireless solution
- Tree topology allows for multiple hops to cover longer distances and circumvent obstacles
- Field-wireable terminal for wiring I/O


Applications:

- Door monitoring
- Tank level monitoring
- High speed counting
- Flow monitoring
- RPM monitoring
- Non-contact temperature monitoring
- Pressure monitoring



Used with		
T30UX	Long-range ultrasonic sensor	see bannerengineering.com
QT50ULB	Long-range ultrasonic sensor	see bannerengineering.com
M18T	Non-contact temperature sensor	see bannerengineering.com
TL70	Wireless modular tower light	see page 22

DX80 Performance H14 Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Supply Voltage	3.6 V dc low power option from an internal battery	
Current Draw at 3.6 V dc	900 MHz, 1 Watt Approximately 1 mA 900 MHz, 250 mW: Approximately 0.5 mA 2.4 GHz, 65 mW: Approximately 0.3 mA	
Communication Hardware (MultiHop RS-485)	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool Data format: 8 data bits, no parity, 1 stop bit	
Packet Size (MultiHop)	900 MHz: 175 bytes (85 Modbus registers) 2.4 GHz: 75 bytes (37 Modbus registers)	
Intercharacter Timing (MultiHop)	3.5 milliseconds	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Integrated battery models: Weight: 0.30 kg (0.65 lbs) Non-battery models: Weight: 0.26 kg (0.57 lbs) Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD	
Wiring Access	Two 1/2-inch NPT	
Operating Conditions	-40 to +85 °C (-40 to +185 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	
Discrete Input	Rating: 3 mA max current at 30 V dc Sample Rate: 40 milliseconds ON Condition (NPN): Less than 0.7 V OFF Condition (NPN): Greater than 2 V or open	
Analog Input	Rating: 24 mA Impedance: Approximately 220 Ohms Sample Rate: 1 second Accuracy: 0.1% of full scale +0.01% per °C Resolution: 12-bit	
Thermistor Input	Model: 44006 or 44031 Series of 10 kOhm thermistors Sample Rate: 1 second Report Rate: 64 seconds Accuracy: 0.4 °C (10 °C to 50 °C); Up to 0.8 °C (-40 °C to 85 °C)	
Counter Input	Event counter: Input rating 1 Hz to 10 kHz (For battery powered devices, the recommended input rating is less than 1 kHz) Rate (frequency) counter: 1 Hz to 10 kHz Threshold: 1.7 V	
Environmental Rating	IEC IP67; NEMA 6	
Certifications		



MultiHop Modbus-H15E

The H15E MultiHop Modbus Data Radio enables users to wirelessly power and control any connected devices and easily monitor device status and performance. It is easy to deploy and a simple way to remotely control lights, fans, motors, and other AC powered devices without the trouble or expense of running cable.

Key Features:

- Switch AC loads up to 10 amps
- AC power field wireable
- No separate power supply required
- Supply voltage of 100 – 277 V AC at 50/60 Hz

Applications:

- Remotely control lights, dimming levels, fans, and motors
- Provide power and control connectivity to remote I/O devices
- Use as an AC powered repeater to extend the range of the wireless network

MultiHop Modbus Radio

Models	I/O	Frequency
DX80DR9M-H15E	Inputs: Two selectable discrete, two 0 to 10 V analog Outputs: Two AC/DC relay (SPDT), two PNP discrete, two 0 to 10 V analog	900 MHz
DX80DR2M-H15E		2.4 GHz



Used with

WLB92ZC1100ACT	Large, ultra-bright LED work light	
WLB32ZC1130QM	Adjustable LED workstation light	see bannerengineering.com
K50LGRYA120Q	50 mm colored domed indicator	

MultiHop -H15E Modbus Radio Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
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)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	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: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Radio Packet Size	900 MHz: 175 bytes (85 Modbus registers)	2.4 GHz: 75 bytes (37 Modbus registers)
Communication Hardware (RS-485)	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool Data format: 8 data bits, no parity, 1 stop bit	
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	
Supply Voltage	Nominal voltage: 120–277 V ac at 60 Hz in North America Nominal voltage: 100–277 V ac at 50/60 Hz outside North America Maximum supply current: 0.37 A Maximum power consumption: 25 W	
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD	
Construction	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.51 kg (1.13 lbs) Mounting: 1/4-inch or M7 Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Wiring Access	Two 1/2-inch NPSM ports, 14 threads/inch (1/2-14 NPSM)	
Analog Input	0 to 20 mA Input Rating: 24 mA Impedance: Approximately 100 Ohms Sample Rate: 1 second Accuracy: 0.1% of full scale +0.01% per degree C Resolution: 12-bit	
Output State Following Timeout	De-energized (OFF)	
Relay Outputs	SPDT (Form C) relay 277 V ac, 10 A Minimum Mechanical Life: 10,000,000 Surge breakdown voltage (Between contacts and coil) (Initial): 10,000 V	
Analog Output	0 to 10 V Update Rate: 125 milliseconds Accuracy: 1.0% of full scale +0.01% per °C Resolution: 12-bit	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	
Operating Conditions	–40 °C to +85 °C (–40 °F to +185 °F) (Electronics); –20 °C to +80 °C (–4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Environmental Rating	IEC IP65	
Certifications	 	



Intrinsically Safe Nodes

Hazardous area radios are a state-of-the-art combination of wireless communication, battery technology and intrinsically safe electronics. Networks are formed using DX80 Performance Gateways installed beyond the hazardous area and one or more Nodes operating in the same frequency band.

Key Features:

- The DX99 is a state-of-the-art combination of wireless communication, battery technology and intrinsically safe electronics
- All models are certified for operation in Class I, Division 1 and ATEX Zone 0 locations
- Networks formed using DX80 Performance Gateways installed beyond the hazardous area and one or more Nodes operating in the same frequency band
- Both 900 MHz 150 mW and 2.4 GHz 63 mW models are available



Models	I/O	Power Boost	Frequency
DX99N9X1S2N0M2X0D1	Discrete: Two inputs Analog: Two inputs (0-20 mA)	10 V	900 MHz
DX99N9X1S2N0M2X0D2		18 V	
DX99N9X1S2N0V2X0D1	Discrete: Two inputs Analog: Two inputs (0-10 V)	10 V	
DX99N9X1S2N0V2X0D2		18 V	
DX99N2X1S2N0M2X0D1	Discrete: Two inputs Analog: Two inputs (0-20 mA)	10 V	2.4 GHz
DX99N2X1S2N0M2X0D2		18 V	
DX99N2X1S2N0V2X0D1	Discrete: Two inputs Analog: Two inputs (0-10 V)	10 V	
DX99N2X1S2N0V2X0D2		18 V	
DX99N9X1S2N0T4X0D0	Thermocouple: Three inputs, one thermistor input Discrete: Two (NPN) inputs	n/a	900 MHz
DX99N2X1S2N0T4X0D0		n/a	2.4 GHz
DX99N9X1S0N0R4X0D0	RTD: Four inputs	n/a	900 MHz
DX99N2X1S0N0R4X0D0		n/a	2.4 GHz
DX99N9X1S2N0B2X0D0	Bridge: Two inputs Discrete: Two inputs	n/a	900 MHz
DX99N2X1S2N0B2X0D0		n/a	2.4 GHz
DX99N9X1S1S0V2X0D4	Inputs (Modbus Mode): One RS-485 Inputs (Voltage Mode): Two analog, one discrete	13 V	900 MHz
DX99N2X1S1S0V2X0D4			2.4 GHz
DX99N9X1S1N0M3X0D5	Inputs: One analog input with a 29 second warm-up time; one sinking discrete Additional Input Configurations: One 3-wire 100-Ohm Platinum RTD, one sinking discrete, and two analog (0-20 mA)	19 V	900 MHz
DX99N2X1S1N0M3X0D5			2.4 GHz

DX99 FlexPower Node Specifications

Radio Range	900 MHz, 150 mW: Up to 4.8 km (3 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 150 mW: 2 m (6 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 150 mW: 21 dBm (150 mW) conducted	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Compliance	900 MHz Compliance FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-DX8009	2.4 GHz Compliance FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
RS-485 Inputs	Interface: 2-wire half-duplex RS-485 Baud Rates: 9.6k, 19.2k (default), or 38.4k Data Format: 8 data bits, no parity, 1 stop bit (even and odd parity selection are available)	
Communication Hardware (MultiHop RS-485)	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool Data format: 8 data bits, no parity, 1 stop bit	
Link Timeout	Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway	
Supply Voltage	3.6 V dc low power option from an internal battery	
Power Consumption	Consumption: Application dependant	
Housing	Glass and cast aluminium with chromating and chemically-resistant paint (outside only)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD	
Wiring Access	Two 1/2-in NPT ports, one 3/4-in NPT port (internal threads)	
Environmental Rating	IEC IP68	
Operating Conditions	-40 °C to +65 °C (-40 °F to +149 °F) (Electronics); -20 °C to +80 °C (-4 °F to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	

Certifications



CSA: Class I, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1 (Ex ia IIC T4 / AEx ia IIC T4)
Certificate: 2008243



LCIE/ATEX: Zone 0 (Category 1G) and 20 (Category 1D), Temperature Class T4 (II 1 GD / Ex ia IIC T4/Ex iaD 20 IP68 T82°C)
Certificate: LCIE 08 ATEX 6098 X

Special Conditions for Safe Use imposed by Intrinsic Safety Certificate LCIE 08 ATEX 6098 X:

Ambient temperature range is -40 to 70 °C. Sure Cross® DX99 FlexPower devices can only be connected to Intrinsically Safe certified equipment or simple apparatus as defined by EN 60079-11. All connected equipment must comply with the Entity Parameters (Safety Parameters) listed in the Control Drawings (p/n 141513). The device must only use a lithium battery manufactured by XENO, type XL-205F.

K50 and K30 Hazardous Indicators



Banner's K50 and K30 Indicator Lights for hazardous areas have a smooth 50 or 30 mm diameter dome that provides uniform illumination from all directions.

- Up to three colors in one device and five colors to choose from
- Models rated to IP67 and IP69K for use in harsh environments
- Unique design appears gray when OFF, eliminating false indication from ambient light
- Easy mounting and configuration
- Worldwide IECEx approval for quicker access into countries outside Europe and North America