Sensors & Solutions

Banner’s wireless sensors, combined with Banner’s I/O Radios, allow you to automate monitoring and data collection from around your facility. Temperature and humidity sensors can help minimize material loss in climate controlled areas. Vibration and temperature sensors can detect failing motors before they shut down, minimizing downtime and machine damage. Wireless Tower Lights provide indication around your facility. All Banner wireless sensors are optimized to work with Banner’s wireless I/O Radios.
Vibration and Temperature Sensor

QM42VT1

The QM42VT1 Vibration and Temperature Sensor makes it easy to monitor a machine’s health. It measures RMS velocity and temperature so that problems can be detected before they become too severe and cause additional damage or result in unplanned downtime. Paired with a Banner wireless Node, it can provide local indication, wirelessly send the signal to a central location, and send the vibration and temperature data to the Gateway for collection and trending.

Key Features:

• Easily monitor machine health by sending info wirelessly to wherever you need it
• Avoid machine failures and delays by detecting problems early
• Reduce downtime and plan maintenance more efficiently
• Monitor a variety of machines to suit your needs
  - Motors
  - Pumps
  - Compressors
  - Fans
  - Blowers
  - Gear Boxes

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com
Sensor with Serial Interface

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QM42VT1</td>
<td>Vibration and temperature via a 1-wire serial interface</td>
</tr>
</tbody>
</table>

Nodes with Serial Interface

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9Q45VT</td>
<td>045 Vibration/Temperature Node with integrated batteries</td>
<td>see page 14</td>
</tr>
<tr>
<td>DX80N2Q45VT</td>
<td>045 Vibration/Temperature Node with integrated batteries</td>
<td>see page 14</td>
</tr>
<tr>
<td>DX80N9X1S-P6</td>
<td>1-wire serial Performance Node with integrated battery</td>
<td>see page 48</td>
</tr>
<tr>
<td>DX80N2X1S-P6</td>
<td>1-wire serial Performance Node</td>
<td>see page 48</td>
</tr>
<tr>
<td>DX80N9X6S-P6</td>
<td>1-wire serial Performance Node</td>
<td>see page 48</td>
</tr>
<tr>
<td>DX80N2X6S-P6</td>
<td>1-wire serial Performance Node</td>
<td>see page 48</td>
</tr>
<tr>
<td>DX80DR9M-H6</td>
<td>1-wire serial Modbus MultiHop Slave with integrated battery</td>
<td>see page 52</td>
</tr>
<tr>
<td>DX80DR2M-H6</td>
<td>1-wire serial Modbus MultiHop Slave with integrated battery</td>
<td>see page 52</td>
</tr>
</tbody>
</table>

QM42VT1 Vibration and Temperature Sensor Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>3.6 to 5.5 V dc</td>
</tr>
<tr>
<td>Current</td>
<td>Active comms: 11.9 mA at 5.5 V dc</td>
</tr>
<tr>
<td>Communication Hardware</td>
<td>Interface: 1-wire serial interface</td>
</tr>
<tr>
<td></td>
<td>Baud rates: 9.6k, 19.2k (default), or 38.4k</td>
</tr>
<tr>
<td></td>
<td>Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)</td>
</tr>
<tr>
<td>Communication Protocol</td>
<td>Sure Cross® DX80 Sensor Node 1-wire serial Interface</td>
</tr>
<tr>
<td>Communications Line</td>
<td>Level Receive ON: Greater than 2 V</td>
</tr>
<tr>
<td></td>
<td>Level Receive OFF: Less than 0.7 V</td>
</tr>
<tr>
<td></td>
<td>Level Transmit ON: 2.7 to 3 V</td>
</tr>
<tr>
<td></td>
<td>Level Transmit OFF: 0 V (pulldown resistor of 10 kOhm)</td>
</tr>
<tr>
<td>Vibration Sensor</td>
<td>Mounted base resonance: 5.5 kHz nominal</td>
</tr>
<tr>
<td></td>
<td>Measuring Range: 0–65 mm/sec or 0–6.5 in/sec RMS</td>
</tr>
<tr>
<td></td>
<td>Frequency Range: 10–1000 Hz</td>
</tr>
<tr>
<td></td>
<td>Accuracy: ±10% and 25 °C</td>
</tr>
<tr>
<td>Connector</td>
<td>3 m cable with 5-pin M12 fitting</td>
</tr>
<tr>
<td>Indicators</td>
<td>Green flashing: Power ON</td>
</tr>
<tr>
<td></td>
<td>Amber flicker: Serial Tx</td>
</tr>
<tr>
<td>Temperature Sensor</td>
<td>Measuring Range: −40 °C to +105 °C (−40 °F to +221 °F)</td>
</tr>
<tr>
<td></td>
<td>Resolution: 0.1 °C</td>
</tr>
<tr>
<td></td>
<td>Accuracy: ±3 °C</td>
</tr>
<tr>
<td>Environmental Rating</td>
<td>NEMA 6P, IEC IP67</td>
</tr>
<tr>
<td>Operating Conditions</td>
<td>−40 to 85 °C (−40 to 185 °F)</td>
</tr>
<tr>
<td>Shock and Vibration</td>
<td>400G</td>
</tr>
<tr>
<td>Mounting Options</td>
<td>The VT1 sensor can be mounted using a variety of methods, including 1/4 inch 28 hex screw, epoxy, thermal tape, or magnetic mount</td>
</tr>
</tbody>
</table>
Temperature and Humidity Sensor

M12FTH4Q and M12FT4Q

A simple way to verify conditions in locations that were once too difficult to access via traditional monitoring methods. With no software required, you can replace cables and extend the range of temperature and humidity signals with minimal effort.

Key Features:
• Achieves temperature accuracy of ± 0.3 ºC and humidity accuracy of ± 2% relative humidity
• Temperature and relative humidity sensing elements housed in a robust metal housing
• Traceable to NIST standards
• Temperature and Humidity or Temperature-only Sensor to choose from
• Each sensor comes with a Certificate of Factory Calibration
• Reduces labor costs by obviating manual checks and reducing error
## Sensors with Serial Interface

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12FTH4Q</td>
<td>Temperature and relative humidity via a 1-wire serial interface</td>
</tr>
<tr>
<td>M12FT4Q</td>
<td>Temperature via a 1-wire serial interface</td>
</tr>
</tbody>
</table>

## Nodes with Serial Interface

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N2045TH</td>
<td>Q45 Temperature/Humidity Node with integrated batteries</td>
</tr>
<tr>
<td>DX80N91X1S-P6</td>
<td>1-wire serial Performance Node with integrated battery</td>
</tr>
<tr>
<td>DX80N9X6S-P6</td>
<td>1-wire serial Performance Node</td>
</tr>
<tr>
<td>DX80DR9M-H6</td>
<td>1-wire serial Modbus MultiHop Slave with integrated battery</td>
</tr>
</tbody>
</table>

## M12FTH4Q and M12FT4 Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>3.6 to 5.5 V dc</td>
</tr>
</tbody>
</table>
| Current                        | Default sensing: 28 µAmps  
Disabled sensing: 15 µAmps  
Active comms: 4.7 mA                                       |
| Mounting Threads               | M12 x 1                                                                 |
| Indicators                     | Green flashing: Power ON  
Red flicker: Serial Tx                                                |
| Communication Hardware         | Interface: 1-wire serial interface  
Baud rates: 9.6k, 19.2k (default),  or 38.4k  
Data format: 8 data bits, no parity (default), 1 stop bit  
(even or odd parity available)                                    |
| Communication Protocol         | Sure Cross® DX80 Sensor Node 1-wire serial Interface                    |
| Communications Line            | Level Receive ON: Greater than 2 V  
Level Receive OFF: Less than 0.7 V  
Level Transmit ON: 2.7 to 3 V  
Level Transmit OFF: 0 V (pulldown resistor of 10 kOhm)                |
| Humidity                       | Measuring Range: 0 to 100% relative humidity  
Resolution: 0.1% relative humidity  
Accuracy: ±2% relative humidity at 25 °C  
NOTE: Humidity measurements are only available with the M12FTH4Q model.  
The M12FT4Q model does not include the humidity sensor. |
| Temperature                    | Measuring Range: −40 to +85 °C (−40 to +185 °F)  
Resolution: 0.1 °C  
Accuracy: ±0.3 °C at 25 °C                                           |
| Environmental Rating           | NEMA 6, IEC IP67                                                         |
| Operating Conditions           | −40 to 85 °C (−40 to 185 °F)                                            |
| 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                                    |

**Simple Wire Replacement**

- Sourcing Discrete In for red alarm indicator light
- Sourcing Discrete In for green alarm indicator light
- 4 to 20 mA Analog Out for scaled temperature
- 4 to 20 mA Analog Out for scaled humidity

**Host Controlled via Modbus RTU (up to 47 Nodes)**

- Red/Green bi-color alarm light
- Temperature and/or humidity

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Temperature and Humidity Sensor

M12FTH3Q and M12FT3Q

This temperature and humidity solution works in a variety of environments to wirelessly provide temperature and humidity measurements via Modbus RTU, RS-485.

Key Features:
• Achieves humidity accuracy of ±2% relative humidity and temperature accuracy of ± 0.3 °C
• Manufactured with a robust metal housing
• Traceable to NIST standards
• Functions as a Modbus slave device via RS-485
## Sensors with Modbus RTU

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12FTH3Q</td>
<td>Temperature and humidity sensor with Modbus RTU, RS-485 interface</td>
</tr>
<tr>
<td>M12FT3Q</td>
<td>Temperature sensor with Modbus RTU, RS-485 interface</td>
</tr>
</tbody>
</table>

## Radios with Modbus RTU (see pages 50-51)

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
<th>Environmental Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-H1</td>
<td>Inputs: Four discrete, two 0 – 20 mA analog, one thermistor, one counter</td>
<td>900 MHz (1 W)</td>
<td>IP67</td>
</tr>
<tr>
<td></td>
<td>Outputs: Two NMOS discrete</td>
<td>2.4 GHz (65 mW)</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR9M-H1E</td>
<td>Serial interface: RS-485 Wireless Q45 Serial Node for use with either M12FTH3Q or M12FT3Q</td>
<td>900 MHz (1 W)</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H1E</td>
<td>Switch Power Outputs: Two</td>
<td>2.4 GHz (65 mW)</td>
<td>IP65</td>
</tr>
<tr>
<td>DX80DR9M-H2</td>
<td>Inputs: Four discrete, two 0-20 mA analog</td>
<td>900 MHz (1 W)</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR2M-H2</td>
<td>Outputs: Four sourcing discrete, two 0-20 mA analog</td>
<td>2.4 GHz (65 mW)</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80DR9M-HB1</td>
<td>Inputs: Two NPN discrete, two 0-20 mA analog</td>
<td>900 MHz (1 W)</td>
<td>Board module</td>
</tr>
<tr>
<td>DX80DR2M-HB1</td>
<td>Switch Power Outputs: Two</td>
<td>2.4 GHz (65 mW)</td>
<td>Board module</td>
</tr>
<tr>
<td>DX80DR9M-HB2</td>
<td>Inputs: Two PNP discrete, two 0-20 mA analog</td>
<td>900 MHz (1 W)</td>
<td>Board module</td>
</tr>
<tr>
<td>DX80DR2M-HB2</td>
<td>Outputs: Two PNP discrete, two 0-20 mA analog</td>
<td>2.4 GHz (65 mW)</td>
<td>Board module</td>
</tr>
<tr>
<td>DX80SR9M-H</td>
<td>Serial Interface: RS-232, RS-485</td>
<td>900 MHz (1 W)</td>
<td>IP67</td>
</tr>
<tr>
<td>DX80SR2M-H</td>
<td></td>
<td>2.4 GHz (65 mW)</td>
<td>IP67</td>
</tr>
</tbody>
</table>

## M12FTH3Q and M12FT3Q Sensors Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>12 to 24 V dc or 3.6 to 5.5 V dc low power option</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>Default sensing: 45 µAmps</td>
</tr>
<tr>
<td></td>
<td>Disabled sensing: 32 µAmps</td>
</tr>
<tr>
<td></td>
<td>Active comms: 4 mA</td>
</tr>
<tr>
<td><strong>Mounting Threads</strong></td>
<td>M12 x 1</td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
<td>Green flashing: Power ON</td>
</tr>
<tr>
<td></td>
<td>Red flicker: Serial Tx</td>
</tr>
<tr>
<td><strong>Communication Hardware</strong></td>
<td>Interface: RS-485 serial</td>
</tr>
<tr>
<td></td>
<td>Baud rates: 9.6k, 19.2k (default), or 38.4k</td>
</tr>
<tr>
<td><strong>Communication Protocol</strong></td>
<td>Modbus RTU</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>Measuring Range: 0 to 100% relative humidity</td>
</tr>
<tr>
<td></td>
<td>Resolution: 0.1% relative humidity</td>
</tr>
<tr>
<td></td>
<td>Accuracy: ±2% relative humidity at 25 °C</td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td>Humidity measurements are only available with the M12FTH3Q model. The M12FT3Q model does not include the humidity sensor.</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Measuring Range: −40 to +85 °C (−40 to +185 °F)</td>
</tr>
<tr>
<td></td>
<td>Resolution: 0.1 °C</td>
</tr>
<tr>
<td></td>
<td>Accuracy: ±0.3 °C at 25 °C</td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
<td>NEMA 6, IEC IP67</td>
</tr>
<tr>
<td><strong>Operating Conditions</strong></td>
<td>−40 to 85 °C (−40 to 185 °F)</td>
</tr>
<tr>
<td><strong>Shock and Vibration</strong></td>
<td>IEC 68-2-6 and IEC 68-2-27</td>
</tr>
<tr>
<td></td>
<td>Shock: 30g, 11 millisecond half sine wave, 18 shocks</td>
</tr>
<tr>
<td></td>
<td>Vibration: 0.5 mm p-p, 10 to 60 Hz</td>
</tr>
</tbody>
</table>

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Q45 Vibration and Temperature

Q45VT

The Q45VT provides a simple solution for predictive maintenance monitoring. Designed to pair with the QM42VT1, it easily connects with a 5-pin Euro connector. Vibration thresholds can be set using DIP switches and a built-in LED is pre-mapped to illuminate when a threshold has been exceeded.

Key Features:
- Easily connects using the 5-pin Euro connector
- Set vibration thresholds using DIP switches
- Built-in LED is pre-mapped to illuminate when a threshold has been exceeded
- Integrated lithium batteries
- Available in 2.4 GHz and 900 MHz
### Q45VT Node

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9Q45VT</td>
<td>Q45 Vibration/Temperature Node</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2Q45VT</td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

### Vibration Sensor

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>QM42VT1</td>
<td>Vibration and temperature via a 1-wire serial interface</td>
<td>see page 8</td>
</tr>
</tbody>
</table>

### Q45VT Specifications

<table>
<thead>
<tr>
<th></th>
<th>900 MHz</th>
<th>2.4 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio Range</strong></td>
<td>Up to 3.2 Km (2 miles) with line of sight</td>
<td>Up to 1000 m (3280 ft) with line of sight</td>
</tr>
<tr>
<td><strong>Minimum Separation Distance</strong></td>
<td>4.57 m (15 ft)</td>
<td>0.3 m (1 ft)</td>
</tr>
<tr>
<td><strong>Transmit Power</strong></td>
<td>1W (25 dBm)</td>
<td>65 mW</td>
</tr>
<tr>
<td><strong>Compliance</strong></td>
<td>FCC ID UE3ERM1809 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI EN 300 328 V1.8.1 IC: 7044A-RM1809</td>
<td>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</td>
</tr>
<tr>
<td><strong>Spread Spectrum Technology</strong></td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
<td></td>
</tr>
<tr>
<td><strong>Default Sensing Interval</strong></td>
<td>5 minutes</td>
<td></td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
<td>Red and green LEDs (radio function)</td>
<td></td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td>One 5-pin threaded M12/Euro-style female quick-disconnect</td>
<td></td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.</td>
<td></td>
</tr>
<tr>
<td><strong>Battery Life at Default Sensing Interval</strong></td>
<td>Up to 2.5 years</td>
<td>Up to 3 years</td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
<td>NEMA 6P, IEC IP67</td>
<td></td>
</tr>
<tr>
<td><strong>Operating Conditions</strong></td>
<td>~40 °C to 70 °C (~40 °F to 158 °F); 90% relative humidity at 50 °C (non-condensing)</td>
<td></td>
</tr>
</tbody>
</table>
Q45 Temperature and Humidity

The Q45TH connects directly to the M12FTH4Q & M12FT4Q sensors. With integrated lithium batteries, no software required to deploy it, and sample rates selectable using DIP switches, it is a simple solution for monitoring temp & humidity in climate controlled areas.

Key Features:
- Connects directly to the M12FTH4Q and the M12FT4Q
- Includes a red/green LED that can be used to provide local visual indication
- Set sample rates using DIP switches
- Integrated lithium batteries
### Q45TH Specifications

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9Q45TH</td>
<td>Q45 Temperature and Humidity Node</td>
<td>900 MHz</td>
</tr>
<tr>
<td>DX80N2Q45TH</td>
<td></td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

#### Temperature and Humidity Sensor

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12FT4H4Q</td>
<td>Temperature and Humidity Sensor</td>
<td></td>
</tr>
<tr>
<td>M12FT4Q</td>
<td>Temperature Sensor</td>
<td>see page 10</td>
</tr>
</tbody>
</table>

#### 900 MHz

<table>
<thead>
<tr>
<th>Parameter</th>
<th>900 MHz</th>
<th>2.4 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Range</td>
<td>Up to 3.2 Km (2 miles) with line of sight</td>
<td>Up to 1000 m (3280 ft) with line of sight</td>
</tr>
<tr>
<td>Minimum Separation Distance</td>
<td>4.57 m (15 ft)</td>
<td>0.3 m (1 ft)</td>
</tr>
<tr>
<td>Transmit Power</td>
<td>1W (25 dBm)</td>
<td>65 mW</td>
</tr>
<tr>
<td>Spread Spectrum Technology</td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
<td></td>
</tr>
<tr>
<td>Default Sensing Interval</td>
<td>64 seconds</td>
<td></td>
</tr>
<tr>
<td>Temperature Sensor</td>
<td>Measuring Range: −40 °C to +85 °C (−40 °F to +185 °F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resolution: 0.1 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accuracy: ±0.3 °C</td>
<td></td>
</tr>
<tr>
<td>Humidity Sensor</td>
<td>Measuring Range: 0% to 100% relative humidity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resolution: 0.1% relative humidity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accuracy: ±2% relative humidity at 23 °C</td>
<td></td>
</tr>
<tr>
<td>Indicators</td>
<td>Red and green LEDs (radio function)</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>One 5-pin threaded M12/Euro-style female quick-disconnect</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>Molded reinforced thermoplastic polyester housing, o-ring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.</td>
<td></td>
</tr>
<tr>
<td>Typical Battery Life at Default Sensing Interval</td>
<td>Up to 1.5 years</td>
<td>Up to 2 years</td>
</tr>
<tr>
<td>Environmental Rating</td>
<td>NEMA 6P, IEC IP67</td>
<td></td>
</tr>
<tr>
<td>Operating Conditions</td>
<td>−40 °C to 70 °C (−40 °F to 158 °F); 90% relative humidity at 50 °C (non-condensing)</td>
<td></td>
</tr>
</tbody>
</table>
Q45 Push Button

Sure Cross® Wireless Q45 Sensors combine the best of Banner’s flexible Q45 sensor family with its reliable, field-proven, Sure Cross wireless architecture to solve new classes of applications limited only by the user’s imagination.

Key Features:
- Wireless node with independently controlled push-button input and a two-color LED indicator light which can be configured for solid or flashing operation
- DIP switch configurable for either toggle or momentary operation
- IP67-rated housing for use in demanding environments
- 2.4 GHz ISM band radio meets worldwide standards

Applications:
- Call-for-parts
- Call-for-service
- Pick-to-light

Q45BL

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com
## Q45BL Push Button, Battery Power

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
<th>Power</th>
<th>Environmental Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9Q45BL-RYGB</td>
<td>Inputs: One button</td>
<td>900 MHz</td>
<td>Integrated battery</td>
<td>IP67, NEMA 6</td>
</tr>
<tr>
<td></td>
<td>Outputs: Two color light</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX80N2Q45BL-RG</td>
<td></td>
<td>2.4 GHz</td>
<td>Integrated battery</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DX80N2Q45BL-RG-L</td>
<td></td>
<td>2.4 GHz</td>
<td>10-30 V dc</td>
<td></td>
</tr>
</tbody>
</table>

## Q45BL Specifications

### 900 MHz

- **Radio Range**: Up to 3.2 Km (2 miles) with line of sight
- **Minimum Separation Distance**: 4.57 m (15 ft)
- **Transmit Power**: 1W (25 dBm)
- **Compliance**: FCC ID UE3RM1809 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI EN 300 328 V1.8.1 IC: 7044A-RM1809
- **Construction**: Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.
- **Supply Voltage**: 10 to 30 V dc (DX80N2Q45BL-RG-L)
- **Current Consumption**: Less than 10 mA (DX80N2Q45BL-RG-L)
- **Default Sensing Interval**: 62.5 milliseconds
- **Report Rate**: On Change of State
- **Adjustments**: Multi-turn sensitivity control (allows precise sensitivity setting - turn clockwise to increase gain)
- **Indicators**: Red and green LEDs (radio function); amber LED indicates when input 1 is active
- **Environmental Rating**: NEMA 6, IEC IP67
- **Certifications**: CE

### 2.4 GHz

- **Radio Range**: Up to 1000 m (3280 ft) with line of sight
- **Minimum Separation Distance**: 0.3 m (1 ft)
- **Transmit Power**: 65 mW EIRP
- **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
- **Construction**: Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.
- **Supply Voltage**: 10 to 30 V dc (DX80N2Q45BL-RG-L)
- **Current Consumption**: Less than 10 mA (DX80N2Q45BL-RG-L)
- **Default Sensing Interval**: 62.5 milliseconds
- **Report Rate**: On Change of State
- **Adjustments**: Multi-turn sensitivity control (allows precise sensitivity setting - turn clockwise to increase gain)
- **Indicators**: Red and green LEDs (radio function); amber LED indicates when input 1 is active
- **Environmental Rating**: NEMA 6, IEC IP67
- **Certifications**: CE
Sure Cross® Wireless Q45 Sensors combine the best of Banner’s flexible Q45 sensor family with its reliable, field-proven, Sure Cross wireless architecture to solve new classes of applications limited only by the user’s imagination. Containing a variety of sensor models, a radio, and internal battery supply, this product line is truly plug and play.

Key Features:
- Designed to interface with isolated dry contacts (push buttons), sourcing outputs, or NAMUR inductive proximity sensors
- IP67-rated housing for use in demanding environments
- 2.4 GHz ISM band radio meets worldwide standards

Applications:
- Door monitoring
- Call-for-parts
- Presence sensing
- Parts in position
Q45RD Specifications

900 MHz

- **Radio Range**: Up to 3.2 Km (2 miles) with line of sight
- **Minimum Separation Distance**: 4.57 m (15 ft)
- **Transmit Power**: 1W (25 dBm)
- **Compliance**: FCC ID UE3RM1809 - This device complies with FCC Part 15, Subpart C, 15.247
- **Spread Spectrum Technology**: FHSS (Frequency Hopping Spread Spectrum)
- **Externally Powered Sourcing Sensors**: ON Condition: 2 V to 5 V
- **Construction**: Molded reinforced thermoplastic polyester housing, oring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.
- **Indicators**: Red and green LEDs (radio function); amber LED indicates when input 1 is active
- **Environmental Rating**: NEMA 6P, IEC IP67
- **Battery Life**: See Datasheet
- **Default Sample Rate**: 62.5 milliseconds (dry contact) or 125 milliseconds (NAMUR)
- **Report Rate**: On Change of State
- **Operating Conditions**: –40 °C to 70 °C (–40 °F to 158 °F); 90% relative humidity at 50 °C (non-condensing)
- **Certifications**: CE

2.4 GHz

- **Radio Range**: Up to 1000 m (3280 ft) with line of sight
- **Minimum Separation Distance**: 0.3 m (1 ft)
- **Transmit Power**: 65 mW EIRP
- **Compliance**: ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04)
- **Battery Life**: See Datasheet
- **Default Sample Rate**: 62.5 milliseconds (dry contact) or 125 milliseconds (NAMUR)
- **Report Rate**: On Change of State
- **Operating Conditions**: –40 °C to 70 °C (–40 °F to 158 °F); 90% relative humidity at 50 °C (non-condensing)
- **Certifications**: CE

Q45RD Remote Device, Battery Power

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Connector</th>
<th>Frequency</th>
<th>Environmental Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9Q45RD</td>
<td>Radio Function: Red and green light</td>
<td>Female connector embedded in the front</td>
<td>900 MHz</td>
<td></td>
</tr>
<tr>
<td>DX80N2Q45RD</td>
<td>Input 1 Active: Amber Light</td>
<td>Female connector embedded in the front</td>
<td>2.4 GHz</td>
<td>IP67, NEMA 6P</td>
</tr>
<tr>
<td>DX80N2Q45RD-QPF-0.5</td>
<td></td>
<td>18 inch female pigtail</td>
<td>2.4 GHz</td>
<td></td>
</tr>
</tbody>
</table>
Photoelectric Q45 Sensors

The Sure Cross® Q45 is the first self-contained wireless standard photoelectric solution for the most challenging control and monitoring needs. Easily add a scalable wireless sensor network to improve efficiency by monitoring and coordinating multiple machines and processes without pulling cables.

Key Features:

- True self-contained wireless with no cables, cordsets or external power
- 1 km line-of-sight
- Built-in antenna
- 2.4 GHz unlicensed frequency
- Used exclusively with Banner’s DX80 Gateways
Photoelectric Q45 Sensor Specifications

Radio (2.4 GHz)
Range: Up to 1000 m (3280 ft) with line of sight
Transmit Power: 65 mW EIRP

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)

Construction
Molded reinforced thermoplastic polyester housing, o-ring-sealed transparent Lexan® cover, molded acrylic lenses, and stainless steel hardware. Q45s are designed to withstand 1200 psi washdown.

Typical Battery Life
Up to 2 years, typical
A typical battery life assumes an average of 10 seconds between sensor changes of state and the default 62.5 millisecond sample rate. Battery life is reduced to 1 year with an average of 1 second between changes of state.

Default Sensing Interval
62.5 milliseconds

Adjustments
Multi-turn sensitivity control (allows precise sensitivity setting - turn clockwise to increase gain)

Sensing Range
Retroreflective: 0.15 m to 6 m (6 in to 20 ft)
Diffuse: 101 mm to 300 mm (4 in to 12 in)
Opposed: Up to 30 m (100 ft) depending on Excess Gain requirements
Glass Fiber Optic: 1½-in focal point

Report Rate
On Change of State

Indicators
Red and green LEDs (radio function); amber LED (only for alignment mode)

Environmental Rating
NEMA 6P, IEC IP67

Operating Conditions
-40 °C to 70 °C (-40 °F to 158 °F); 90% relative humidity at 50 °C (non-condensing)

---

Retroreflective Q45 Wireless

<table>
<thead>
<tr>
<th>Sensing Mode</th>
<th>Models</th>
<th>Sensing Range</th>
<th>Wireless Communication Range</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retroreflective</td>
<td>DX80N2Q45LP</td>
<td>6 m</td>
<td>1,000 m (with line of sight)</td>
<td>Discrete output via Gateway</td>
</tr>
<tr>
<td></td>
<td>Visible Red LED</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diffuse Q45 Wireless

<table>
<thead>
<tr>
<th>Sensing Mode</th>
<th>Models</th>
<th>Sensing Range</th>
<th>Wireless Communication Range</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse</td>
<td>DX80N2Q45D</td>
<td>300 mm</td>
<td>1,000 m (with line of sight)</td>
<td>Discrete output via Gateway</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Convergent Q45 Wireless

<table>
<thead>
<tr>
<th>Sensing Mode</th>
<th>Models</th>
<th>Sensing Range</th>
<th>Wireless Communication Range</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opposed</td>
<td>DX80N2Q45CV</td>
<td>38 mm</td>
<td>1,000 m (with line of sight)</td>
<td>Discrete output via Gateway</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fiber Optic (Glass) Q45 Wireless

<table>
<thead>
<tr>
<th>Sensing Mode</th>
<th>Models</th>
<th>Sensing range</th>
<th>Wireless Communication Range</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass Fiber</td>
<td>DX80N2Q45F</td>
<td>varies by selected fiber</td>
<td>1,000 m (with line of sight)</td>
<td>Discrete output via Gateway</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wireless Tower Light

Monitor where you couldn’t before: Effectively manage your factory visually without the cost of wiring.

Key Features:
- Save money and time – eliminate costly and time-consuming wire runs
- Scalable all-in-one solution with two-way wireless communication and visual status indication
- Improve productivity with a clear, easy-to-read signal tower light
- Use in harsh environments with rugged, water-resistant IP65 housing with UV-stabilized material
- Segments appear gray when off to eliminate false indication from ambient light
**TL70 Wireless Tower Light Specifications**

**Supply Voltage**
12 to 30 V dc (Outside the USA: 12 to 24 V dc, ± 10%)

**Supply Protection Circuitry**
Protected against transient voltages

**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

**Audible Alarm**
2.6 kHz ± 250 Hz oscillation frequency; maximum intensity 92 dB (Audible) and 101 dB (Louder Audible) at 1 m (3.3 ft) (typical)

**Indicators**
1 to 5 colors depending on model: Green, Red, Yellow, Blue, and White
Flash rates: 1.5 Hz ±10% and 3 Hz ±10%
LEDs are independently selected

**Construction**
Bases, segments, covers: polycarbonate

**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 to 55 Hz 0.5 mm p-p amplitude per IEC60068-2-6
Shock 15G 11 ms duration, half sine wave per IEC60068-2-27

**Radio Range**
900 MHz, 1 W: 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 W: 4.57 m (15 ft)
2.4 GHz 65 mW: 0.3 m (1 ft)

**Radio Transmit Power**
900 MHz, 1 W: 30 dBm (1 W) conducted
(1-4 modules)
900 MHz, 1 W: 30 dBm (1 W) conducted
(5-6 modules)
2.4 GHz, 65 mW: 18 dBm (65 mW) conducted,
≤ 20 dBm (100 mW) EIRP

**Compliance**
900 MHz Compliance (1 Watt)
FCC ID UESRM1809: 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

**Certifications**

---

**Order Preassembled**

<table>
<thead>
<tr>
<th>Housing</th>
<th>Radio Band</th>
<th>Color/Position</th>
<th>Audible Alarm</th>
<th>Housing Color</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL70</td>
<td>DXN2</td>
<td></td>
<td></td>
<td></td>
<td>Q</td>
</tr>
<tr>
<td>DXN2 = Node 2.4 GHz</td>
<td>DXN9 = Node 900 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TL70 Base</th>
<th>TL70 Light Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Radio Band</td>
</tr>
<tr>
<td>B-TL70</td>
<td>DXN2</td>
</tr>
<tr>
<td>DXN2 = Node 2.4 GHz</td>
<td>DXN9 = Node 900 MHz</td>
</tr>
<tr>
<td>Q5 = 5-pin Euro Integral QD (1-4 modules)</td>
<td>Q8 = 8-pin Euro Integral QD (5-6 modules)</td>
</tr>
</tbody>
</table>

* For audible only, leave colors blank

---

**Order Components to Build your Own**

<table>
<thead>
<tr>
<th>TL70 Base</th>
<th>TL70 Light Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Radio Band</td>
</tr>
<tr>
<td>SG-TL70</td>
<td>DXN2</td>
</tr>
<tr>
<td>DXN2 = Node 2.4 GHz</td>
<td>DXN9 = Node 900 MHz</td>
</tr>
<tr>
<td>Q5 = 5-pin Euro Pigtail (1-4 modules)</td>
<td>Q8 = 8-pin Euro Pigtail (5-6 modules)</td>
</tr>
</tbody>
</table>

---

**Connection Housing**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Housing</th>
<th>Color/Position</th>
<th>Housing Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-TL70</td>
<td>TG-TL70</td>
<td>SG-TL70</td>
<td>Q5 = 5-pin Euro Integral QD</td>
</tr>
<tr>
<td>DXN2 = Node 2.4 GHz</td>
<td>DXN9 = Node 900 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5 = 5-pin Euro Pigtail (1-4 modules)</td>
<td>Q8 = 8-pin Euro Integral QD (5-6 modules)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Radio Band**

<table>
<thead>
<tr>
<th>DXN2</th>
<th>DXN9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node 2.4 GHz</td>
<td>Node 900 MHz</td>
</tr>
</tbody>
</table>

---

**Housing Color**

<table>
<thead>
<tr>
<th>Housing Color</th>
<th>Housing Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>G = Green</td>
<td>Blank = Black</td>
</tr>
<tr>
<td>Y = Yellow</td>
<td>Blank = Black</td>
</tr>
<tr>
<td>R = Red</td>
<td>Blank = Black</td>
</tr>
<tr>
<td>C = Gray</td>
<td>Blank = Black</td>
</tr>
</tbody>
</table>

---

**Order Preassembled**

**Order Components to Build your Own**

---

**Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com**
Vehicle Detection Sensor

Ultrasonic Sensor Node

The Ultrasonic Sensor Node is ideal for indoor parking applications. Using sound waves to detect objects, it can be mounted directly on the ceiling of a parking garage to identify the presence of a car in the parking space below. The integrated D-cell battery reduces the cost of installation by eliminating the need to run wires and conduit.

Key Features:
- Wireless industrial I/O device with an Ultrasonic sensor integrated into the housing
- *FlexPower* technology driven by one lithium primary battery integrated into the housing
- Power-efficient occupancy sensor for parking applications

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com
### Ultrasonic Nodes

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
<th>Environmental Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9X1W0P0U</td>
<td>Inputs: One Ultrasonic, one temperature</td>
<td>900 MHz ISM Band</td>
<td>IP67, NEMA 6</td>
</tr>
<tr>
<td>DX80N2X1W0P0U</td>
<td></td>
<td>2.4 GHz ISM Band</td>
<td></td>
</tr>
</tbody>
</table>

### Ultrasonic MultiHop

<table>
<thead>
<tr>
<th>Models</th>
<th>I/O</th>
<th>Frequency</th>
<th>Environmental Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-HU</td>
<td>Inputs: Ultrasonic</td>
<td>900 MHz ISM Band</td>
<td>IP67, NEMA 6</td>
</tr>
<tr>
<td>DX80DR2M-HU</td>
<td></td>
<td>2.4 GHz ISM Band</td>
<td></td>
</tr>
</tbody>
</table>

### Ultrasonic Sensor Specifications

<table>
<thead>
<tr>
<th>Nodes/MultiHop</th>
<th>Radio Range</th>
<th>Radio Transmit Power</th>
<th>900 MHz Compliance (150 mW)</th>
<th>2.4 GHz Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>900 MHz: 300 meters (1000 ft)</td>
<td>21 dBm (150 mW) conducted</td>
<td>FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247</td>
<td>FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247</td>
</tr>
<tr>
<td></td>
<td>2.4 GHz: 150 meters (500 ft)</td>
<td>18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP</td>
<td>IC: 7044A-DX8009</td>
<td>IC: 7044A-DX8024</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Spread Spectrum Technology</th>
<th>Link Timeout</th>
<th>Power Requirements</th>
<th>Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
<td></td>
<td>3.6 V dc low power option from an internal battery</td>
<td>Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non sulphur cured button covers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Weight: 0.26 kg (0.57 lbs)</td>
</tr>
<tr>
<td></td>
<td>Gateway: Configurable via User Configuration Tool (UCT) software</td>
<td></td>
<td></td>
<td>Mounting: #10 or M5 (SS M5 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)</td>
</tr>
<tr>
<td></td>
<td>Node: Defined by Gateway</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Interface</th>
<th>Packet Size</th>
<th>Intercharacter Timing</th>
<th>Ultrasonic Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indicators: One bi-color LED</td>
<td>900 MHz: 175 bytes (85 Modbus registers)</td>
<td>3.5 milliseconds</td>
<td>Range: 600–4000 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.4 GHz: 125 bytes (60 Modbus registers)</td>
<td></td>
<td>Sample Rate: 10 seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Report Rate: 64 seconds or on Change of State</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Operating Conditions</th>
<th>Environmental Rating</th>
<th>Shock and Vibration</th>
<th>Certifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operating Temperature: -40 to 85 °C</td>
<td>IEC IP67; NEMA 6</td>
<td>IEC 68-2-6 and IEC 68-2-7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operating Humidity: 95% max. relative (non-condensing)</td>
<td></td>
<td>Shock: 30g, 11 millisecond half sine wave, 18 shocks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiated immunity: 10 V/m, 80-2700 MHz (EN61000-6-2)</td>
<td></td>
<td>Vibration: 0.5 mm p-p, 10 to 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IEC 68-2-6; IEC 68-2-7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The M-GAGE sensor uses a passive sensing technology to detect large ferrous objects. The sensor measures the change in the Earth’s natural magnetic field (ambient magnetic field) caused by the introduction of a ferromagnetic object. The M-GAGE provides an alternative replacement for inductive loop systems and needs no external control box. Its unique design allows quick installation within a core hole.

Key Features:
- Internal three-axis magnetoresistive-based technology senses three dimensional changes to the Earth’s magnetic field caused by the presence of ferrous objects
- Designed to minimize the effects of temperature changes and destabilizing magnetic fields
- Sensor learns ambient background and stores settings in non-volatile memory
- Powered by a lithium battery pack integrated into the housing
- Fully potted and sealed housing contains the power source, sensor, and antenna for a completely wireless solution
M-GAGE Sensor Nodes

<table>
<thead>
<tr>
<th>Models</th>
<th>Power</th>
<th>Frequency</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80N9X1W0P0ZT</td>
<td>Low Profile: 3 AA batteries integrated into the housing</td>
<td>900 MHz ISM Band</td>
<td>Input: Internal M-GAGE™</td>
</tr>
<tr>
<td>DX80N2X1W0P0ZT</td>
<td></td>
<td>2.4 GHz ISM Band</td>
<td></td>
</tr>
<tr>
<td>DX80N9X1W0P0ZTD</td>
<td>D-cell lithium battery integrated into the housing</td>
<td>900 MHz ISM Band</td>
<td></td>
</tr>
<tr>
<td>DX80N2X1W0P0ZTD</td>
<td></td>
<td>2.4 GHz ISM Band</td>
<td></td>
</tr>
</tbody>
</table>

MultiHop M-GAGE

<table>
<thead>
<tr>
<th>Models</th>
<th>Power</th>
<th>Frequency</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX80DR9M-HMT</td>
<td>Low Profile: 3 AA batteries integrated into the housing</td>
<td>900 MHz ISM Band</td>
<td>Input: Internal M-GAGE™</td>
</tr>
<tr>
<td>DX80DR2M-HMT</td>
<td></td>
<td>2.4 GHz ISM Band</td>
<td></td>
</tr>
<tr>
<td>DX80DR9M-HMD</td>
<td>D-cell lithium battery integrated into the housing</td>
<td>900 MHz ISM Band</td>
<td></td>
</tr>
<tr>
<td>DX80DR9M-HMD</td>
<td></td>
<td>2.4 GHz ISM Band</td>
<td></td>
</tr>
</tbody>
</table>

M-GAGE Specifications

<table>
<thead>
<tr>
<th>Nodes</th>
<th>Radio Range</th>
<th>300 m (1000 ft) depending on installation</th>
<th>900 MHz: 300 m (1000 ft) 2.4 GHz: 150 m (500 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Radio Transmit Power</td>
<td>900 MHz: 20 dBm (100 mW) conducted 2.4 GHz: 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>900 MHz Compliance (150 mW)</td>
<td>FCC ID TGUDX80 - This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-DX8009</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4 GHz Compliance</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spread Spectrum Technology</td>
<td>FHSS (Frequency Hopping Spread Spectrum)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Link Timeout</td>
<td>Gateway: Configurable via User Configuration Tool (UCT) software Node: Defined by Gateway NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power Requirements</td>
<td>Lithium battery integrated into the housing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housing</td>
<td>ABS Weight: 0.14 kg (0.3 lbs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interface</td>
<td>Indicators: One bi-color LED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M-GAGE Inputs</td>
<td>Input: Internal Magnetometer Sample Rate: 1 second Ambient Temperature Effect: Less than 0.5 milligauss/°C Input: Internal Magnetometer Sample Rate: 250 milliseconds Report Rate: On Change of State Ambient Temperature Effect: Less than 0.5 milligauss/°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental Rating</td>
<td>IEC IP67; NEMA 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operating Conditions</td>
<td>–40 °C to +85 °C (~40 °F to +185 °F) 95% maximum relative humidity (non-condensing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiated Immunity HF</td>
<td>10 V/m (EN 61000-4-3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shock and Vibration</td>
<td>IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 1 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Certifications</td>
<td>CE</td>
<td></td>
</tr>
</tbody>
</table>