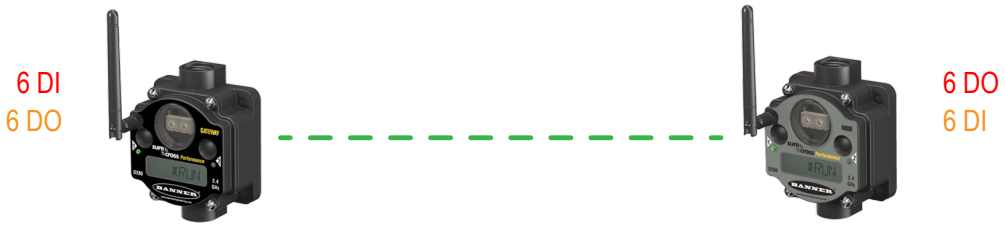
Sure Cross® Performance Mapping PM8 Kits

User Instructions



The Sure Cross® Performance Mapping kits include one Gateway, which acts as the wireless network master device, and one Node. I/O mapping between the Gateway and Node are set using the Gateway's DIP switches.

Kit	Gateway and Node in Kit	Frequency	Inputs and Outputs
DX80K9M6-PM8	Gateway: DX80G9M6S-PM8 Node: DX80N9X6S-PM8	900 MHz, ISM Band	Inputs: Six PNP discrete Outputs: Six PNP discrete I/O is automatically mapped to the PM8 Gateway using the Gateway's menu system
DX80K2M6-PM8	Gateway: DX80G2M6S-PM8 Node: DX80N2X6S-PM8	2.4 GHz, ISM Band	

WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

CAUTION: Never Operate 1 Watt Radios Without Antennas

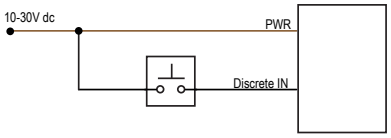
To avoid damaging the radio circuitry, never power up Sure Cross® Performance or Sure Cross MultiHop (1 Watt) radios without an antenna.

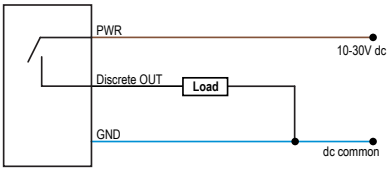
CAUTION: Electrostatic Discharge (ESD)

ESD Sensitive Device. This product uses semiconductors that can be damaged by electrostatic discharge (ESD). When performing maintenance, care must be taken so the device is not damaged. Disconnect power from the device when accessing the internal DIP switches. Proper handling procedures include wearing anti-static wrist straps. Damage from inappropriate handling is not covered by warranty.

Connecting the Sensors

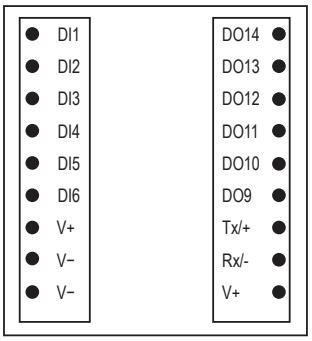
Discrete Input Wiring for PNP Sensors	Discrete Output Wiring (PNP)





Connecting dc power to the communication pins will cause permanent damage. For the DX8*x*...C models, PWR in the wiring diagram refers to V+ on the wiring board and GND in the wiring diagram refers to V- on the wiring board. To power the sensor using the switch power output (SPx), replace the PWR with SPx in these wiring diagrams.

Gateway and Node Terminals	Terminal Labels



DI*x*. Discrete IN *x*
DO*x*. Discrete OUT *x*
RX/-. Serial communication line for the Gateway. No connection for Nodes
TX/+. Serial communication line for the Gateway; no connection for Nodes
V+. 10 to 30 V dc power connection
V–. Ground/dc common connection

LED Behavior for the PMx Kits

Verify all devices are communicating properly. The radios and antennas must be a minimum distance apart to function properly. Recommended minimum distances are:

900 MHz 1 Watt radios: 15 feet
2.4 GHz 65 mW radios: 1 foot

Gateway LEDs

LED 1	LED 2	Gateway Status
Solid green		Power ON
Flashing red	Flashing red	Device Error
	Flashing amber	Modbus Communication Active
	Flashing red	Modbus Communication Error

The Modbus communication LEDs refer to the communication between the Gateway and its host system (if applicable).

Node LEDs

LED 1	LED 2	Node Status
Flashing green		Radio Link Ok
Flashing red	Flashing red	Device Error
	Flashing red, 1 per 3 sec	No Radio Link

I/O Mapping for the PM8 Kits

By default, the PM8 kits are set to map between the Gateway and one Node. The rotary dials for the Node must be set to 01 for this mapping to work.

Gateway	Maps to	Node
Discrete IN 1	→	Discrete OUT 9
Discrete IN 2	→	Discrete OUT 10
Discrete IN 3	→	Discrete OUT 11
Discrete IN 4	→	Discrete OUT 12
Discrete IN 5	→	Discrete OUT 13
Discrete IN 6	→	Discrete OUT 14
Discrete OUT 9	←	Discrete IN 1

Gateway	Maps to	Node
Discrete OUT 10	←	Discrete IN 2
Discrete OUT 11	←	Discrete IN 3
Discrete OUT 12	←	Discrete IN 4
Discrete OUT 13	←	Discrete IN 5
Discrete OUT 14	←	Discrete IN 6

To add additional Nodes to your original kit, download the Performance PM8 Gateway datasheet (p/n *173569*) for the I/O mapping options and their respective Node rotary dial settings.

Modbus Register Table

I/O	Modbus Holding Register		I/O Type	I/O Range		Holding Register Representation	
	Gateway	Any Node		Min.	Max.	Min. (Dec.)	Max. (Dec.)
1	1	1 + (Node# × 16)	Discrete IN 1	0	1	0	1
2	2	2 + (Node# × 16)	Discrete IN 2	0	1	0	1
3	3	3 + (Node# × 16)	Discrete IN 3	0	1	0	1
4	4	4 + (Node# × 16)	Discrete IN 4	0	1	0	1
5	5	5 + (Node# × 16)	Discrete IN 5	0	1	0	1
6	6	6 + (Node# × 16)	Discrete IN 6	0	1	0	1
7	7	7 + (Node# × 16)	Reserved				
8	8	8 + (Node# × 16)	Device Message				
9	9	9 + (Node# × 16)	Discrete OUT 9	0	1	0	1
10	10	10 + (Node# × 16)	Discrete OUT 10	0	1	0	1
11	11	11 + (Node# × 16)	Discrete OUT 11	0	1	0	1
12	12	12 + (Node# × 16)	Discrete OUT 12	0	1	0	1
13	13	13 + (Node# × 16)	Discrete OUT 13	0	1	0	1
14	14	14 + (Node# × 16)	Discrete OUT 14	0	1	0	1
15	15	15 + (Node# × 16)	Control Message				
16	16	16 + (Node# × 16)	Reserved				

Specifications

Radio Range
900 MHz, 1 Watt: Up to 9.6 km (6 miles) [1]
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

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

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

Supply Voltage
10 to 30 V dc (Outside the USA: 12 to 24 V dc, ±10%). [2]

Power Consumption
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.)

[1] Radio range is with the 2 dB antenna that ships with the product. High-gain antennas are available, but the range depends on the environment and line of sight. Always verify your wireless network's range by performing a Site Survey.
[2] For European applications, power this device from a Limited Power Source as defined in EN 60950-1.

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: Two
Display: Six character LCD

Antenna Connection
Ext. Reverse Polarity SMA, 50 Ohms
Max Tightening Torque: 0.45 N·m (4 lbf·in)

Spread Spectrum Technology
FHSS (Frequency Hopping Spread Spectrum)

Wiring Access
Two 1/2-inch NPT ports

Operating Conditions
–40 °C to +85 °C (–40 °F to +185 °F) (Electronics); –20 °C to +80 °C (–4 °F to +176 °F) (LCD) [3]
95% maximum relative humidity (non-condensing)
Radiated Immunity: 10 V/m (EN 61000-4-3)

Environmental Ratings
IEC IP67; NEMA 6 [4]

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
CE

Discrete Inputs
Six sourcing/PNP
Rating: 3 mA max current at 30 V dc
Sample Rate: 62.5 milliseconds
Report Rate: On change of state
ON Condition: Greater than 8 V
OFF Condition: Less than 5 V

Discrete Outputs
Six, Sourcing/PNP
Update Rate: 125 milliseconds
ON Condition: Supply minus 2 V
OFF Condition: Less than 2 V
Output State Following Timeout: OFF

Discrete Output Rating (PNP)
100 mA max current at 30 V dc
ON-State Saturation: Less than 3 V at 100 mA
OFF-state Leakage: Less than 10 µA

Communication (Gateway only)

Communication Hardware (RS-485)
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

Communication Protocol
Modbus RTU

Warnings

Install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna configurations installed without surge suppressors invalidate the manufacturer's warranty. Keep the ground wire as short as possible and make all ground connections to a single-point ground system to ensure no ground loops are created. No surge suppressor can absorb all lightning strikes; do not touch the Sure Cross® device or any equipment connected to the Sure Cross device during a thunderstorm.

Exporting Sure Cross® Radios. It is our intent to fully comply with all national and regional regulations regarding radio frequency emissions. Customers who want to re-export this product to a country other than that to which it was sold must ensure the device is approved in the destination country. A list of approved countries appears in the *Radio Certifications* section of the product manual. The Sure Cross wireless products were certified for use in these countries using the antenna that ships with the product. When using other antennas, verify you are not exceeding the transmit power levels allowed by local governing agencies. Consult with Banner Engineering Corp. if the destination country is not on this list.

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Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp.

[3] Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.
[4] Refer to the *Sure Cross® Wireless I/O Networks Instruction Manual* (p/n 132607) for installation and waterproofing instructions.