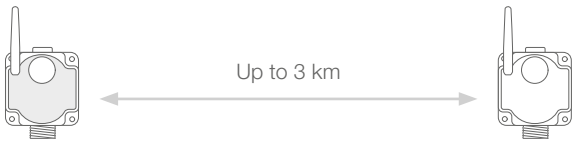
BANNER®

more sensors, more solutions

Wireless Solutions for Environmental and Process Monitoring

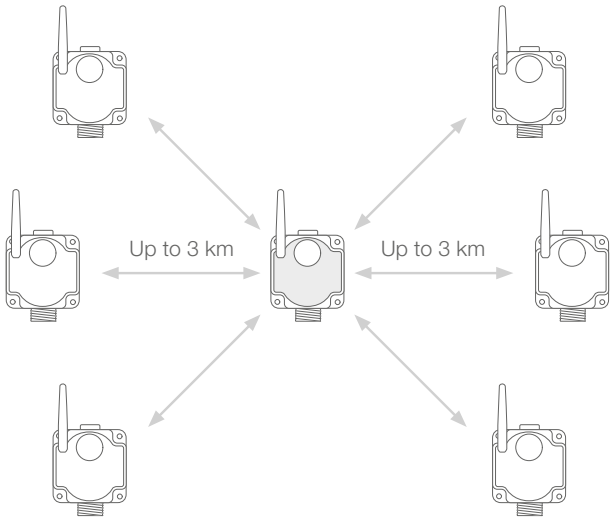
Network Topologies

Point-to-Point Topology



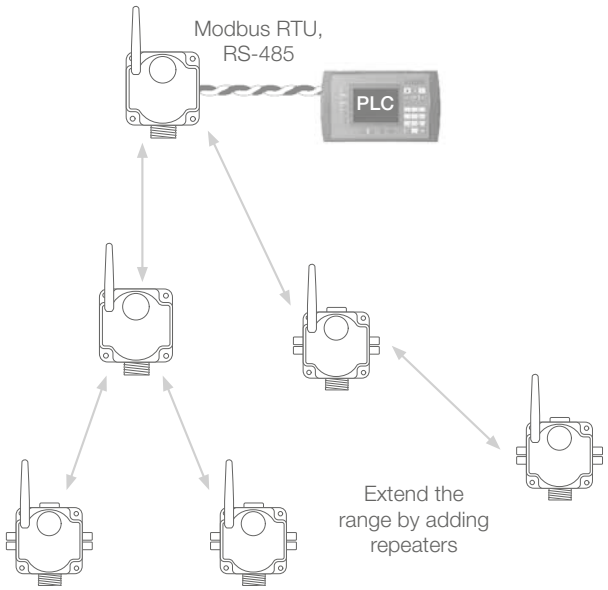
- Direct I/O mapping; no software required
- Digital and analogue I/O available on each device
- Up to 32 pairs in the same location
- Integrated LEDs provide real-time RF link indication
- 12 to 24 VDC, ±10%

Star Topology



- Gateways provide I/O and serial communication output (Modbus RTU or Ethernet)
- Free software simplifies user configuration and I/O mapping
- Digital, analogue, temperature and counter inputs available at the Node
- Expandable network with one Gateway supporting up to 47 Nodes
- Multiple networks in the same location
- 12 to 24 VDC, ±10%, solar panel or battery option

Tree Topology



- Host-controlled network with built-in repeater architecture
- Every radio can be set up as a master, repeater or slave through integrated DIP switches
- Digital, analogue, temperature, counter and more I/O options available on each device
- Up to 50 slaves per network master
- Unlimited networks in the same location
- 12 to 24 VDC, ±10%, solar panel or battery option

Choose your wireless device

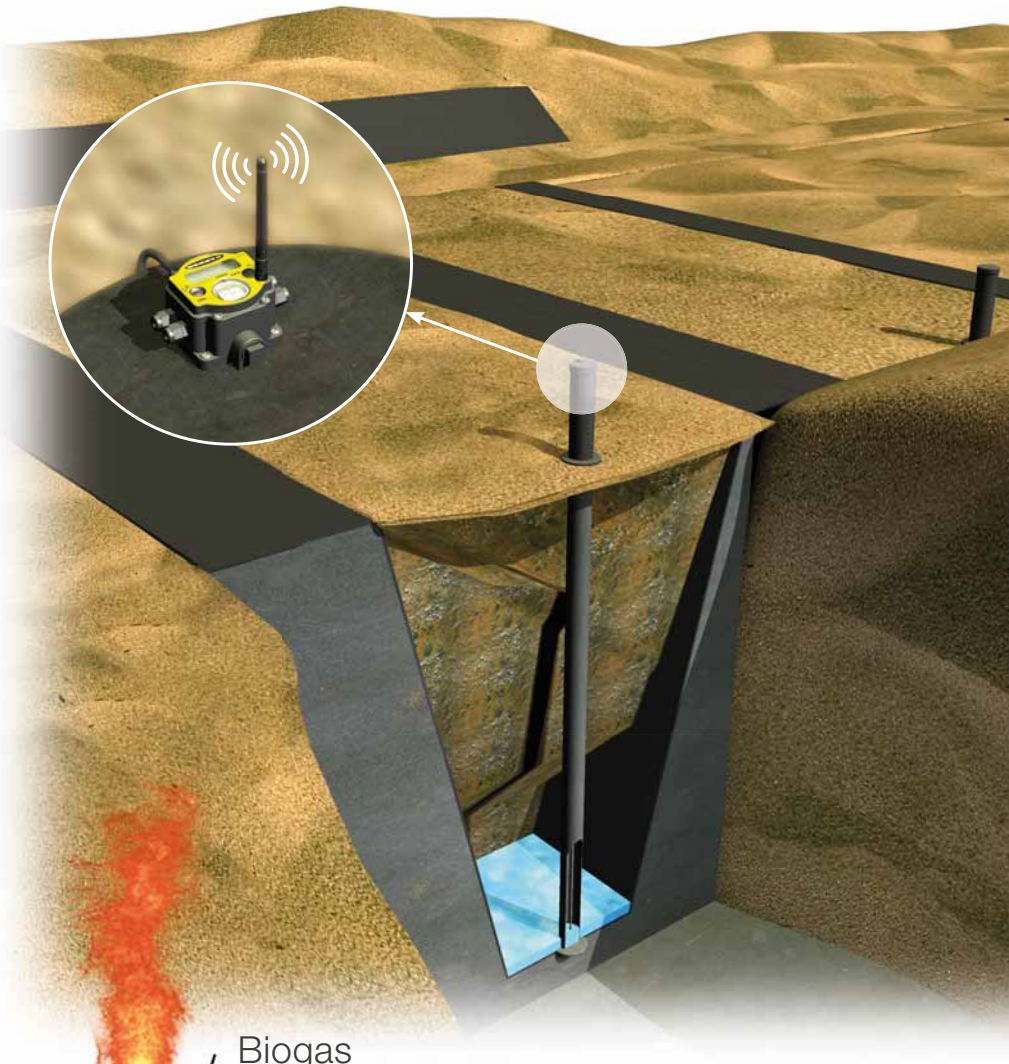
Network Architecture	Functionality	Topology			I/O and Communications					Board Level Available
	Premapped (PM)	Point-to-Point	Star	Tree	I/O	RS-232	RS-485	Modbus RTU	Ethernet	
Wireless Q45	✓	✓	✓		✓					✓
DX80PM	✓	✓	✓		✓			Gateway		
DX80		✓	✓		✓			Gateway		✓
Data Radio		✓	✓	✓	✓	✓	✓	✓		✓
Serial Radio		✓	✓	✓		✓	✓			
DXM100 Controller		✓	✓	✓	✓	✓	✓	✓	✓	

Solutions for Waste Management

Landfill

Leachate removal from a landfill well is necessary to guarantee consistent landfill gas production. Pumps used in these applications are frequently installed with a totalizing counter to monitor pump cycles and calculate the total volume of leachate being removed from the well.

FlexPower™ Counter Nodes wirelessly send data from the pumps to a central location. Site managers are able to monitor multiple deployments, receiving continuous updates and real-time data without requiring staff to be at a site to collect data.

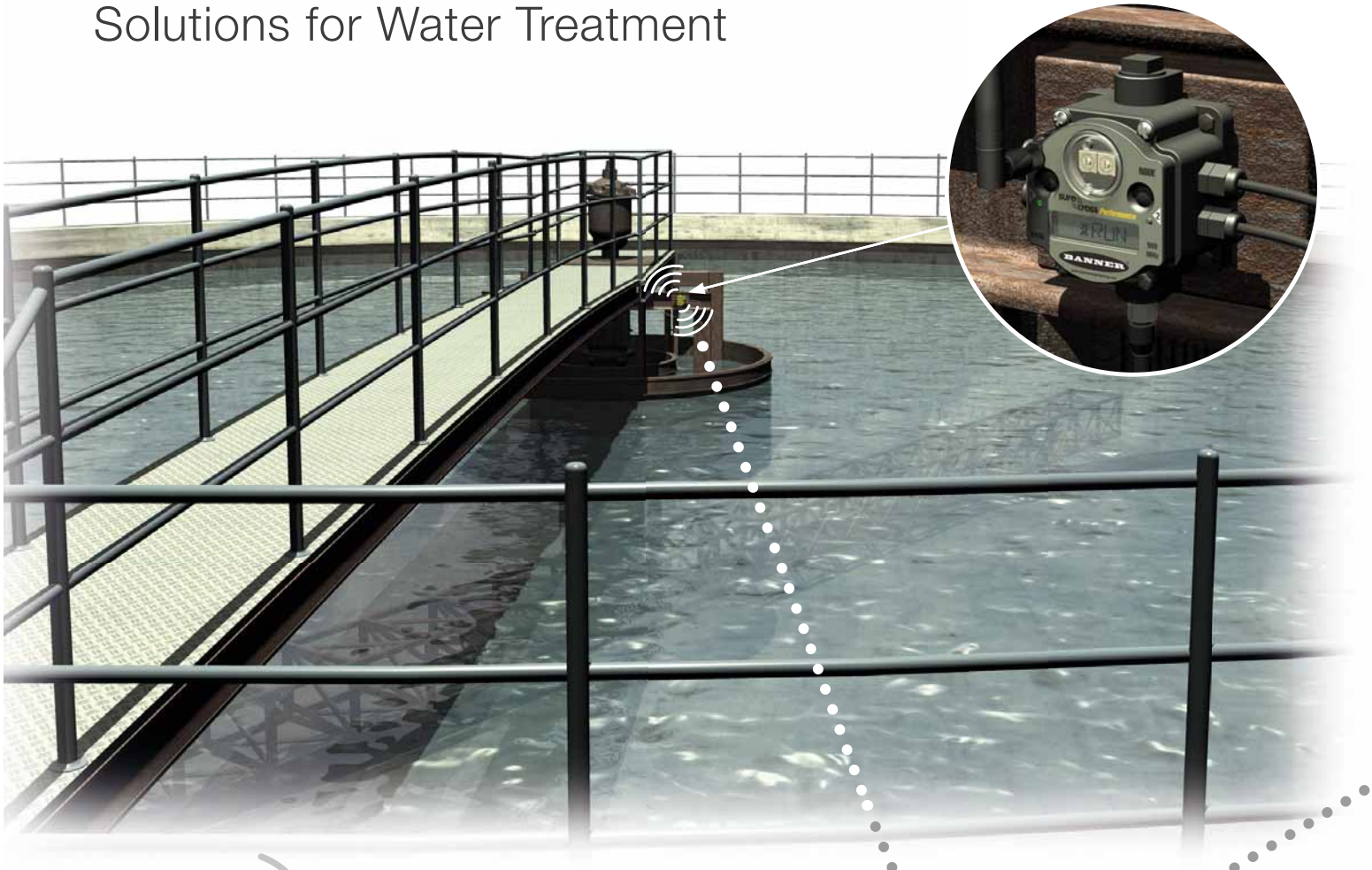


Biogas

To meet governmental regulations, it is important to accurately monitor methane gas production, removal, venting, and burning. Knowledge of both methane flow and temperature at the flare stack can define when CH_4 is being emitted to the atmosphere.

DX99 FlexPower Nodes can be installed in an EX area with a Zone 0 ATEX certification. Use the analogue input to determine methane production levels and flow and use the thermocouple model to measure the temperature of a vent to verify the continuous combustion of methane.

Solutions for Water Treatment



4 DI
4 DO
2 AI
2 AO
RS-485

Sludge Level

Monitoring multiple sensing points including sludge level, as well as pH, conductivity, and flow – often from varied locations in a large water treatment plant – can be a challenge.

With four analogue inputs, a single wireless Node can easily centralize and transmit critical monitoring information from multiple sensors. A MultiHop Data Radio will allow communication between all remote controllers or PLCs using RS-485.

Pumps & Flow

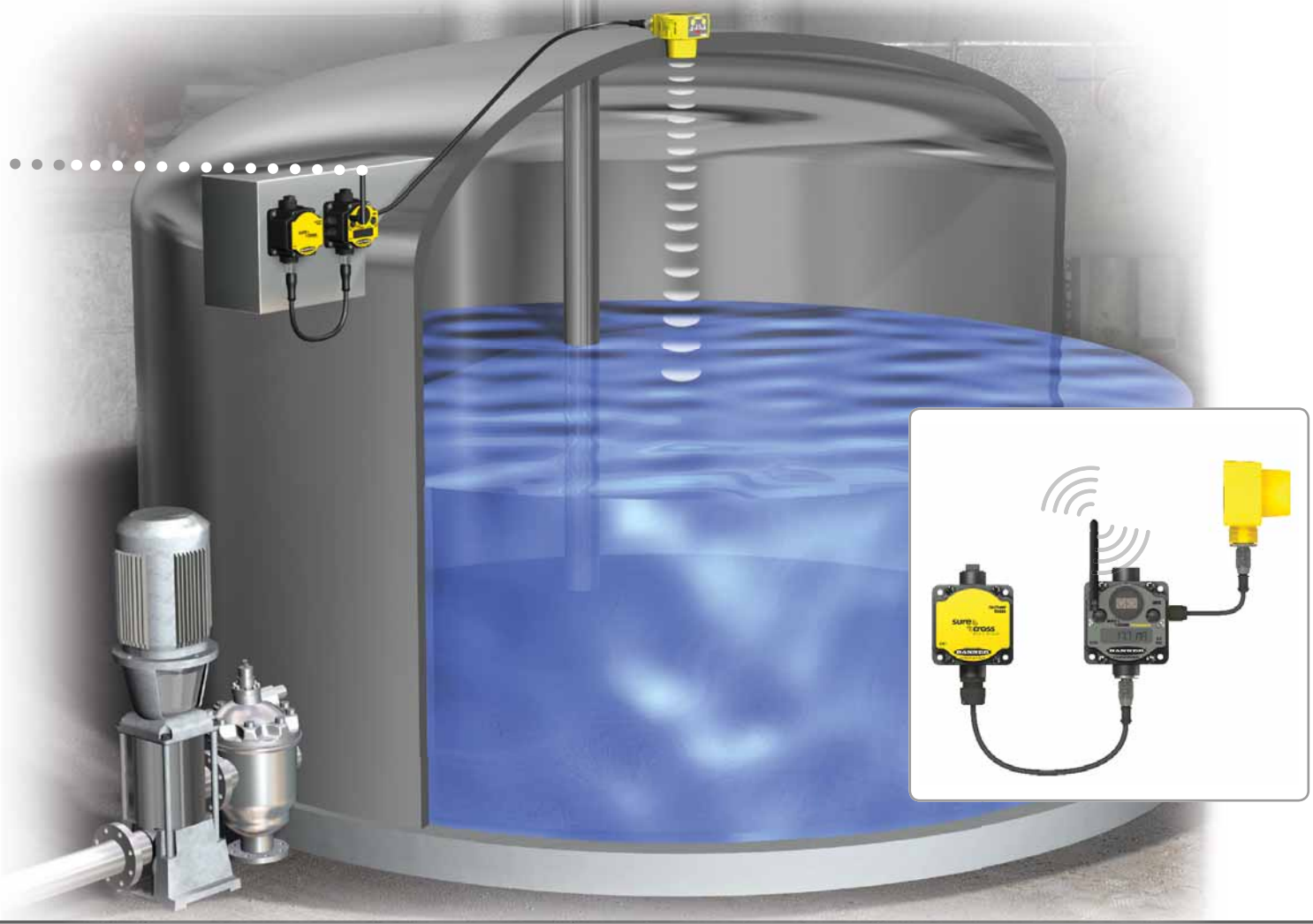
Wastewater “influent” must be pumped from the different pipes to the water treatment plant.

The total incoming and outgoing volume is measured by flow meters.

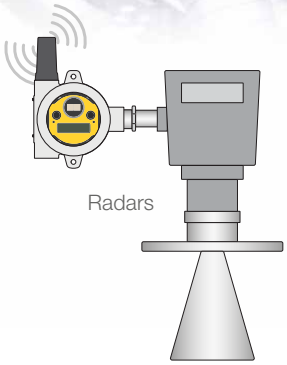
A battery powered counter node collects all pulses and transmits them to the control room.

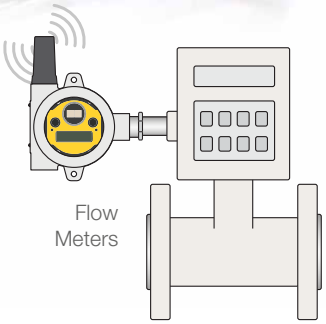
Liquid Level Detection

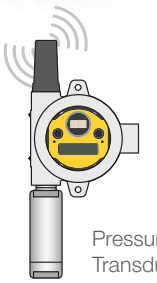
A single wireless Node and a FlexPower optimised QT50U ultrasonic level measurement sensor (8 m range) will provide tank level data for approximately four years from a single DX81 battery power supply (15 minutes sampling interval).

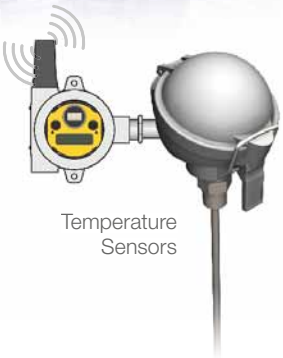


Process & Instrumentation









Zone 0 (Category 1 G)
Zone 20 (Category 1 D)
Temperature Class T4

Class I, Div 1, Groups A, B, C, D
Class II, Div 1, Groups E, F, G
Class III, Div 1

DX99 2.4 GHz Nodes for Hazardous Locations, ATEX Zone 0 & 20
Compatible with DX80 Gateways (located outside Ex area)

Model	Discrete IN	IP Rating	Analogue IN	Power (19 V boost)	Housing
DX99N2X1S1N0M3X0D5	1x NPN	IP68	1x 0-20 mA (29 s warm-up time) or 2x 0-20 mA, 1x 3-wire RTD (standard warm-up)	Internal battery 3.6 VDC	Metal

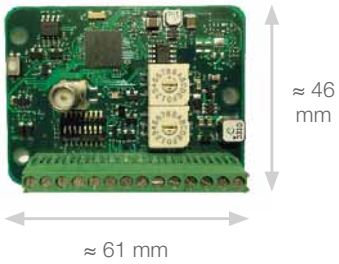
Other models available with Thermocouple and PT100 inputs

Embedded Wireless Option

OEM Solution

Banner offers a printed circuit board solution to sensors or instrumentation manufacturers who would like to add a wireless option for their devices.

This PCB solution is available as a premapped DX80 to have the 0-20 mA signal on both the Node and Gateway, and as a MultiHop Data Radio for RS-485 communication, including a repeater function.

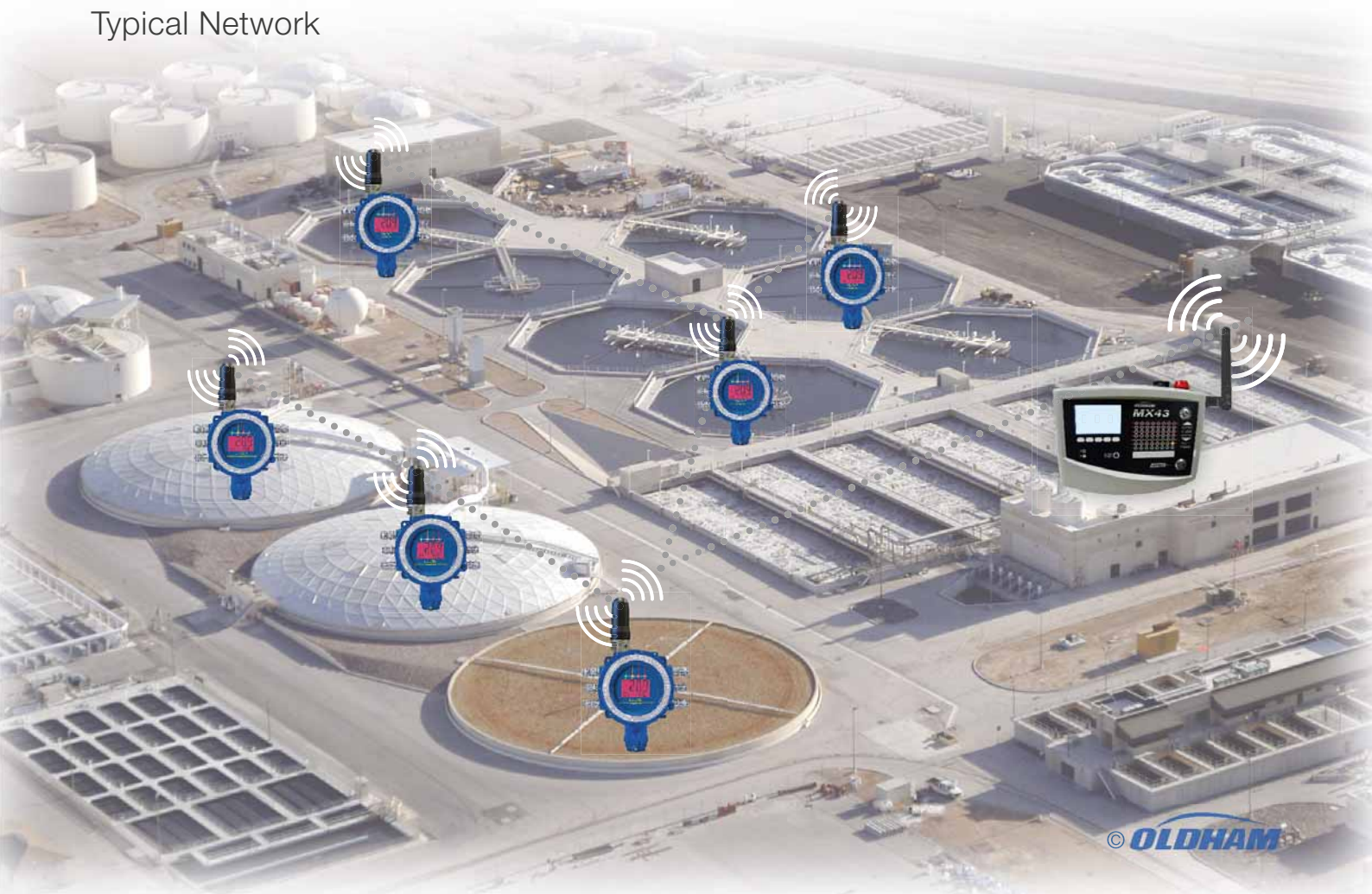


Solutions for Sensors

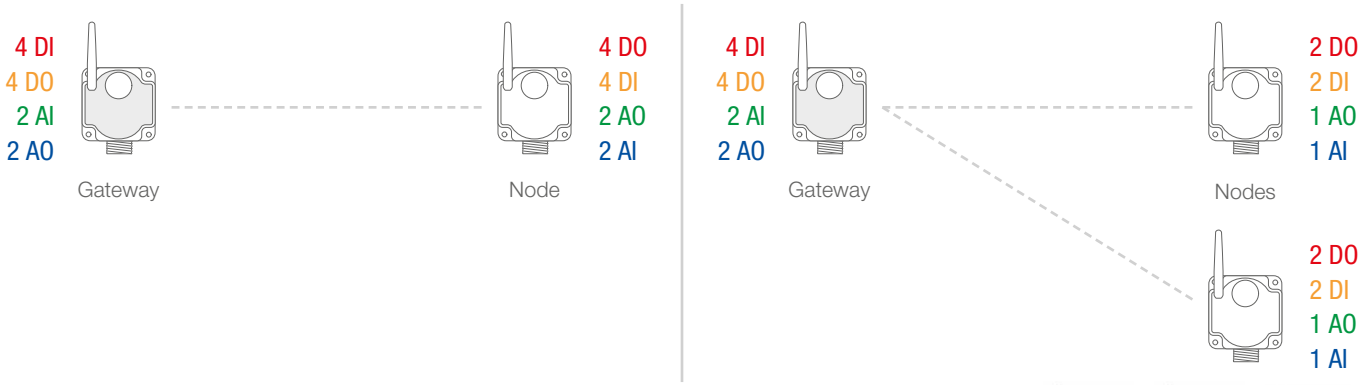
Application example for Industrial Gas Detection Solutions

Solutions for Controllers

Typical Network



DX80 Premapped, Wire Replacement



DX80PM Premapped 2.4 GHz Gateway and Node, 12-24 VDC, ±10%

Mixed discrete and analogue I/O		IP Rating	Discrete I/O		Analogue I/O	
			IN	OUT	IN	OUT
DX80G2M6S-PM2 DX80N2X6S-PM2	Gateway Node	IP67	4x PNP-NPN (selectable)	4x PNP	2x 0-20 mA	2x 0-20 mA
DX80G2M6S-PB2 DX80N2X6S-PB2	Gateway PCB Node PCB	IP50	2x PNP	2x PNP	2x 0-20 mA	2x 0-20 mA
Discrete I/O only		**IP Rating**	**IN**	**OUT**	**IN**	**OUT**
DX80G2M6S-PM8 DX80N2X6S-PM8*	Gateway Node	IP67	6x PNP-NPN (selectable)	6x PNP	/	/

*Models ending in "**L**" have no LCD, e.g. DX80N2X6S-PM8L

DX80PM Premapped Kit 2.4 GHz – 1x Gateway and 1x Node, 12-24 VDC, ±10%

Mixed discrete and analogue I/O Kit		IP Rating	Discrete I/O		Analogue I/O	
			IN	OUT	IN	OUT
DX80K2M6-PM2	1x GW: DX80G2M6S-PM2 1x Node: DX80N2X6S-PM2	IP67	4x PNP-NPN (selectable)	4x PNP	2x 0-20 mA	2x 0-20 mA
Discrete I/O only Kit		**IP Rating**	**IN**	**OUT**	**IN**	**OUT**
DX80K2M6-PM8	1x GW: DX80G2M6S-PM8 1x Node: DX80N2X6S-PM8	IP67	6x PNP	6x PNP	/	/

Accessories: Power Supplies

PSDINM-24-10	DIN-mountable power supply, input 85…264 VAC; output 24 VDC, 1 A
PSB4MK-24-10	Power supply, input 85…264 VAC; output 24 VDC, 1 A; with IP66 enclosure
DX81-LITH or DX81P6	Battery supply module with one or six 3.6 V Lithium "D" cell(s), with mounting hardware
DX81H	Battery supply module with one 3.6 V Lithium "D" cell for DX99 – ATEX, with mounting hardware
BWA-SOLAR PANEL 20W	Solar panel, 12 V, 20 W, 573 x 357 x 30 mm, "L" style mounting bracket included; (smaller panels available)
BWA-SOLAR CNTRL-12V	Solar controller, 6 A load current, 12 V system voltage, recommended for sealed lead acid battery (SLA) (battery not included)

MultiHop Data Radio, Repeater Option

MultiHop Data Radio 2.4 GHz with Modbus
Can be set up as master, slave or repeater

Model	Power	IP Rating	Discrete I/O		Analogue I/O		Serial Interface
			IN	OUT	IN	OUT	
DX80DR2M-H	FlexPower	IP67	Modbus RS-485/RS-232 (no I/O)				
DX80DR2M-H1*	FlexPower	IP67	4x NPN	2x NMOS	2x 0-20 mA, 1x Thermistor, 1x Counter	/	RS-485
DX80DR2M-H2	12-24 VDC, ±10%	IP67	4x PNP	4x PNP	2x 0-20 mA	2x 0-20 mA	RS-485
DX80DR2M-H3*	FlexPower	IP67	2x NPN	2x NMOS	4x Thermocouple, 1x Thermistor	/	RS-232
DX80DR2M-H4*	FlexPower	IP67	/	/	4x 3-wire PT100 RTD	/	RS-232
DX80DR2M-H5	FlexPower	IP67	4x NPN	2x NMOS	4x 0-20 mA	/	RS-485
DX80DR2M-H6	3.6 VDC battery	IP67	1-wire serial interface for one 1-wire serial sensing device, integrated battery (see also page 10)				
DX80DR2M-H6L	12-24 VDC, ±10%	IP67	1-wire serial interface for one 1-wire serial sensing device (see also page 10)				
DX80DR2M-H12*	FlexPower	IP67	2x NPN	2x NMOS	2x 0-20 mA, 1x Thermistor, 2x SDI-12	/	RS-485
DX80DR2M-DCLATCHE	FlexPower	IP65	2x NPN	DC Latch output (H-Bridge)	/	/	/
DX80DR2M-HB1	FlexPower PCB	/	2x NPN	2x NMOS	2x 0-20 mA	/	RS-485
DX80DR2M-HB2	12-24 VDC, ±10% PCB	/	2x PNP	2x PNP	2x 0-20 mA	2x 0-20 mA	RS-485

FlexPower = 12-24 VDC, ±10% or 3.6 to 5.5 VDC battery supply module
*Models ending in "**E**" use 12-24 VDC, ±10% or 3.6 to 5.5 VDC integrated battery, e.g. DX80DR2M-H1E. Models ending in "**E**" are IP65 rated.

Data Radio 2.4 GHz with serial communication (RS-232 or RS-485)
Extends the range of a serial communication network
Can be set up as master, slave or repeater

Model	Power	IP Rating	Communication
DX80SR2M-H	12-24 VDC, ±10%	IP67	Serial communication RS-232 or RS-485 user selectable (no I/O)

DXM100 Wireless Controller

DXM100 Wireless Controller 2.4 GHz
Preconfigured as a Modbus RTU to EtherNet/IP protocol converter
RS-232, RS-485 and Ethernet Communication Ports; USB Configuration Port

Model	Power	Topology	IP Rating	Discrete I/O		Analogue I/O	
				IN	OUT	IN	OUT (DAC)
DXM100-B1R3	12-30 VDC, 12 VDC solar panel or 12 V battery	DX80 Radio	IP20	PNP-NPN	NMOS	4–20 mA, 0–10 V, Counter, Temperature 10 kΩ Thermistor	0-20 mA or 0-10 VDC
DXM100-B1R4	12-30 VDC, 12 VDC solar panel or 12 V battery	MultiHop Radio	IP20	PNP-NPN	NMOS	4–20 mA, 0–10 V, Counter, Temperature 10 kΩ Thermistor	0-20 mA or 0-10 VDC

2.4 GHz Compliance

Models listed are in accordance with EN 300 328: V1.8.1 (2012-06).

Vibration, Temperature and Humidity Monitoring

Vibration, Temperature and/or Humidity Sensors with Serial Interface

Model (Wireless node required)	IP Rating	Power	Description
QM42VT1	IP67	3.6-5.5 VDC	Vibration and temperature sensor via 1-wire serial interface
M12FTH4Q	IP67	3.6-5.5 VDC	Temperature and relative humidity sensor via 1-wire serial interface
M12FT4Q	IP67	3.6-5.5 VDC	Temperature sensor via 1-wire serial interface

Nodes with Serial Interface 2.4 GHz

Model	Power	IP Rating	Description
DX80N2Q45VT	2x 3.6 VDC	IP67	Q45 Vibration/Temperature Node with integrated batteries
DX80N2Q45TH	2x 3.6 VDC	IP67	Q45 Temperature/Humidity Node with integrated batteries
DX80N2X1S-P6	3.6 VDC	IP67	1-wire serial interface for one 1-wire serial sensing device, integrated battery
DX80N2X6S-P6	12-24 VDC, ±10%	IP67	1-wire serial interface for one 1-wire serial sensing device
DX80DR2M-H6	3.6 VDC	IP67	1-wire serial Modbus MultiHop slave with integrated battery 1-wire serial interface for one 1-wire serial sensing device
DX80DR2M-H6L	12-24 VDC, ±10%	IP67	1-wire serial Modbus MultiHop slave 1-wire serial interface for one 1-wire serial sensing device

Temperature and/or Humidity Sensors with Modbus RTU

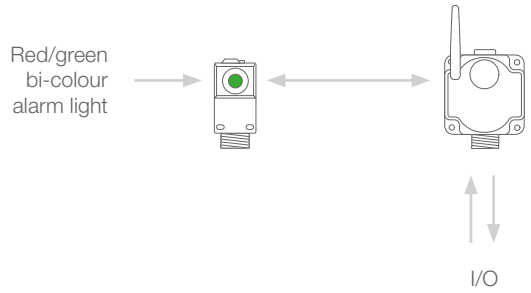
Model	IP Rating	Power	Description
M12FTH3Q	IP67	12-24 VDC or 3.6-5.5 VDC	Temperature and humidity sensor with Modbus RTU, RS-485
M12FT3Q	IP67	12-24 VDC or 3.6-5.5 VDC	Temperature sensor with Modbus RTU, RS-485

Radios with Modbus RTU

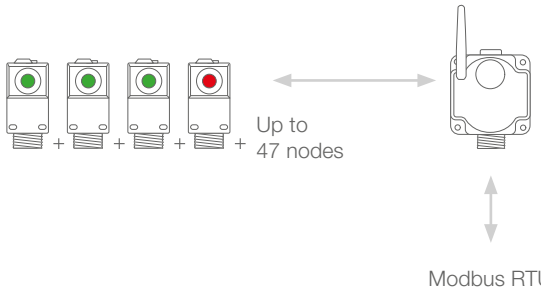
DX80DR2M-H1, DX80DR2M-H1E, DX80DR2M-H2, DX80DR2M-HB1, DX80DR2M-HB2, DX80SR2M-H	See page 9

Wireless Q45 Sensors

Simple Wire Replacement



Host Controlled via Modbus RTU



Wireless Q45 Sensors 2.4 GHz

Model	IP Rating	Power	Description
DX80N2Q45LP	IP67	2x 3.6 VDC	Polarized retroreflective (range up to 6 m), discrete output via Gateway, visible red LED; integrated batteries
DX80N2Q45CV	IP67	2x 3.6 VDC	Convergent (38 mm focal point), discrete output via Gateway, visible red LED; integrated batteries
DX80N2Q45F	IP67	2x 3.6 VDC	Fibre optic (1.3 m in opposed mode with IP23S fibres or 100 mm in diffuse mode with BT23S fibres), discrete output via Gateway, visible red LED; integrated batteries
DX80N2Q45D	IP67	2x 3.6 VDC	Diffuse (range up to 300 mm), discrete output via Gateway, visible red LED; integrated batteries
DX80N2Q45RD	IP67	2x 3.6 VDC	Remote device, red and green LEDs (radio function), amber LED indicates when input 1 is active; integrated batteries
DX80N2Q45BL-RG	IP67	2x 3.6 VDC	Node with independently controlled push button input and 2-colour LED indicator light (red and green); integrated batteries
DX80N2Q45BL-RG-L	IP67	12-24 VDC, ±10%	Node with independently controlled push button input and 2-colour LED indicator light (red and green)

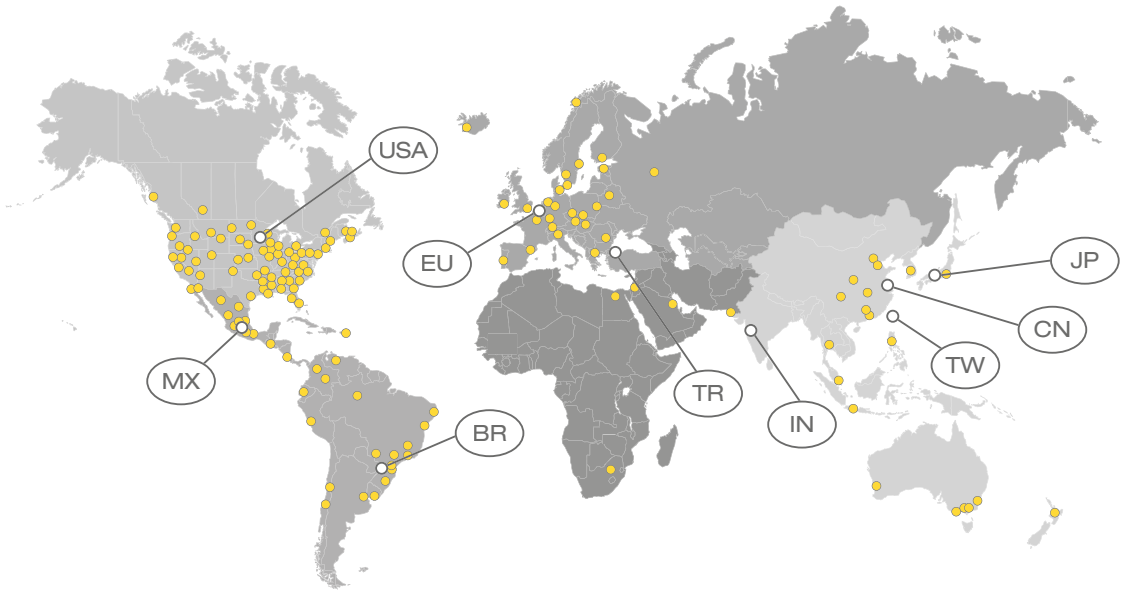
DX80 Premapped 2.4 GHz Gateway for Wireless Q45 Sensors, 12-24 VDC, ±10%

Model	Inputs	Outputs	IP Rating	Topology	Housing Style
DX80G2M6-B2Q	2x PNP discrete	2x PNP discrete	/	Two point system	Board mount
DX80G2M6-QC	6x* PNP discrete	6x* PNP discrete	IP20	Six point system	External terminal blocks
DX80G2M6-Q	6x* PNP discrete	6x* PNP discrete	IP67	Six point system	Sealed enclosure

*Up to 47 sensors possible using Modbus host system
Wireless sensors can also be connected to all 2.4 GHz DX80 Gateways

Global Presence – Regional Offices

We are a global company with a focus on our commitment to customers around the world. Banner has worldwide support with a network of 3.000 professionals who are ready to help you in your plant no matter where you are located.



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