



Enhancing  
Safety +  
Productivity



# Wireless Solutions Catalog

## Site Acc/sess Technology:

Access and assess the operations in your hazardous and industrial applications.

 **COOPER** Crouse-Hinds



# Introduction & Table of Contents

**Providing reliable, secure, industrial wireless systems.**

Wireless connectivity from Cooper Crouse-Hinds. If motion, hazards, obstacles, expense, or distance make your wired solutions impractical or impossible, look no further. Cooper Crouse-Hinds can help.



Wireless systems are becoming more and more vital to streamlining operations in industrial environments. These systems eliminate the high cost of wiring and free up resources from having to manually collect process information in hazardous environments. In many applications, it is impossible to run wires to plant assets, but wireless systems allow you to transmit information to process monitoring systems so operators can monitor and prevent expensive shutdowns. Wireless systems also allow plant personnel to optimize the use of plant assets, and to coordinate preventative maintenance tasks, materials, and schedules. Wireless systems from Cooper Crouse-Hinds can help.



## Introducing ESP Solutions.

For more than 100 years, Cooper Crouse-Hinds has exceeded customer expectations when it comes to new ideas and technological advancements. Today, as the electrical industry's global leader for hazardous environments, we continue to reach beyond the expected - especially with our commitment to **ESP (Enhancing Safety & Productivity)**.

The problem that never happens. That's the goal behind ESP - smarter, more powerful solutions enhancing safety and productivity in your world. Making danger obsolete is what drives the innovative minds at Cooper Crouse-Hinds. ESP is all about anticipating customer needs while staying in tune with what's important to you. By providing innovative solutions for enhancing safety and productivity, we're helping you do more with less.



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# Types of Wireless Products

Cooper Crouse-Hinds industrial wireless products provide secure and reliable solutions for a wide range of industries and applications as an alternative for signal and data wiring. The products fall into two groups: Wireless I/O (which includes transceivers, gateways, receivers, and transmitters) and Wireless Modems. All wireless devices are rated and CSA certified for Class I, Division 2 applications when housed in a suitable enclosure for the environment. For Division 1 & 2 applications, please refer to page 40 for recommended enclosure offerings.



## Wireless I/O

**Transceivers** connect directly to sensor and control signals and transmit the signal values by radio. These units can also be used as a repeater to wirelessly re-transmit signals from other radios.

**Gateways** perform similarly to transceivers, but can also connect signals to various protocols of databus devices, such as Programmable Logic Controllers (PLCs), Distributed Control Systems (DCS), or Supervisory Control and Data Acquisition (SCADA).



**Receivers** receive commands from transmitters or transceivers to operate a certain device. These units have three digital outputs and one analog output, and are an economical way of delivering data to a remote location.

**Transmitters** are an economical way of sending a signal from a sensor or control system to monitor or control a process.

Two types of transmitters exist:

- D2 W LT – transmits a signal to a transceiver, receiver, or gateway.
- D2 W SIO – transmits a signal to a transceiver, receiver, or gateway, but can also better manage power consumption by reverting to “sleep mode.”

## Wireless Networks

Cooper Crouse-Hinds transceivers form networks which optimize wireless density and are configured to ensure a reliable signal. The signals are transmitted by radio and re-created as output signals, or output to control systems.

### Ordering Information Example (I/O Radios)

**D2 W MIO 1 900**

1. Select Division - Div. 2

2. Choose Unit:

- W LR = Wireless Receiver
- W LT = Wireless Transmitter
- WL P1 = Wireless Transmitter / Receiver Pair with DG900 1 Antenna
- WL P2 = Wireless Transmitter / Receiver Pair with CFD890EL Antenna
- W GMD = Wireless Gateway, Modbus
- W GPR1 = Wireless Gateway, Profibus Slave
- W GPR2 = Wireless Gateway, Profibus Master
- W GET1 = Wireless Gateway, Ethernet
- W GDET1 = Wireless Gateway, DeviceNet Slave
- W GM1 = Wireless Gateway, Modbus Plus
- W MIO = Wireless Multiple Inputs / Outputs
- W SIO = Wireless Single Input / Output
- NW SER = Serial Unit (wired)
- NW BAT = Battery (wired)

3. Select Type:

\*\* Not Required \*\* - D2 W LR, D2 W LT, D2 W GMD, D2 W GPR1, D2 W GPR2, D2 W GET1, D2 W GDET1, D2 W GM1, D2 W SIO, D2 WL P1, D2 WL P2 only

1, 2, 3, 4 - D2 W MIO only

11, 12, 13 - D2 NW SER only

2 - D2 NW BAT only

4. Frequency\*:

\*\* Not Required \*\* - D2 NW SER, D2 NW BAT

900 - License-free in the following countries:

USA, Canada, Chile, Colombia, Mexico, Puerto Rico, Argentina, Australia, Brazil, New Zealand

\*Devices with different frequencies are available upon request.

## Unidirectional Units D2 W LT/D2 W LR

- Used where a simple one-way link is required
- Transmitter and receiver units can be used as a pair or individually as part of a network (connecting to transceivers and/or gateway units)

### Example Application:

Monitoring temperature gauge of a furnace.

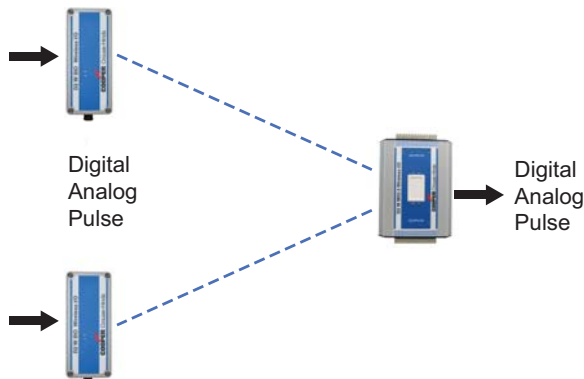


## Single Signal Units D2 W SIO

- Input only, one-way communications
- Managed ultra-low power consumption, suitable for battery-only power source
- Used to connect a single transducer/sensor into a wireless network (single signal unit)

### Example Application:

Monitoring tank level and overflow alarm from the top of tanks with no power supply.

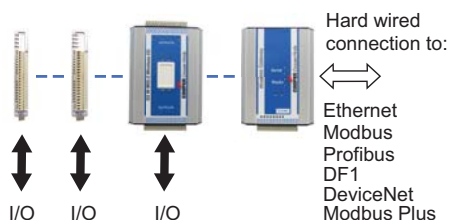


## Serial Units D2 NW SER

- Used to expand the number of I/O for transceivers and gateways via RS485

### Example Application:

Adding additional I/O to an existing wireless transceiver.

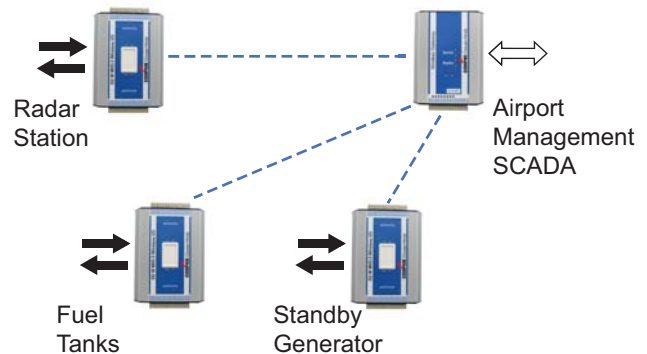


## Multiple Signal Units D2 W MIO

- Transceivers can send and receive multiple signals from instruments
- These units are used when communication is required in both directions, or when many signals need to be received and/or transmitted. Each network can handle multiple transceivers.

### Example Application:

Monitoring operational alarms from the service centers of several radar stations, fuel tanks, standby generators, etc.

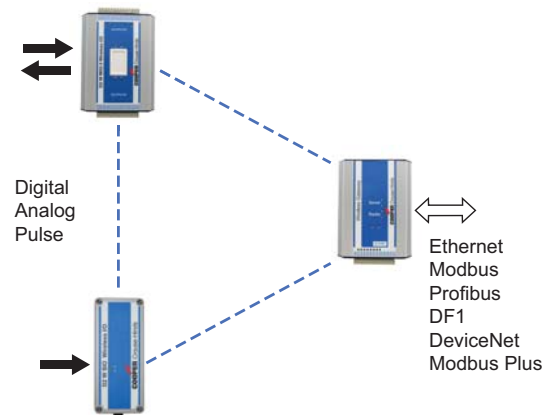


## Databus Gateway Units D2 W G

- Interface units to connect to:
  - Various fieldbuses: Ethernet, Modbus, Profibus, DF1, DeviceNet, and Modbus Plus
- Expansion serial units can be used when RS232 port not connected to PC or PLC
- Act as transceivers and are able to communicate with receivers, transmitters, sensors, PCs, PLCs, and SCADA

### Example Application:

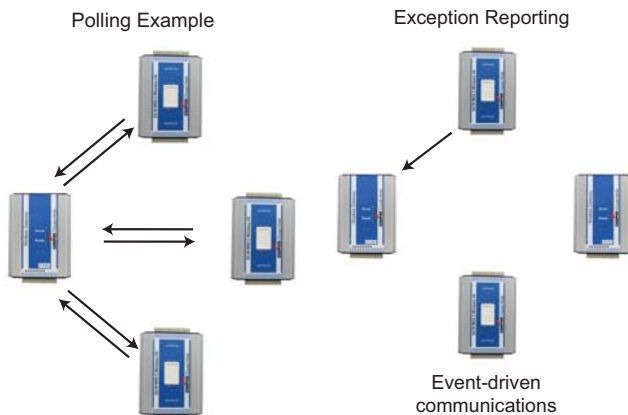
Receive temperature reading from a process while monitoring / controlling valve and pressure in a chemical plant.



# Wireless System Architecture

Cooper Crouse-Hinds' innovative *WIB-net*™ communications protocol is specifically designed for highly reliable and secure operation on open license-free radio bands. Cooper Crouse-Hinds wireless units form a **WIB** network – **Wireless Information Backbone**. A WIB is an effective plant-wide wireless information network for transferring data and connecting signals and databuses in a highly efficient exception-reporting, peer-to-peer network. *WIB-net* provides the following features:

- **Exception-reporting** transmissions for maximum wireless efficiency. Wireless messages are only transmitted whenever a signal value changes, yielding effective real-time performance. Integrity check messages ensure reliable operation of the wireless network as well as signal link accuracy. Exception-reporting reduces signal traffic to messages of only real significance.



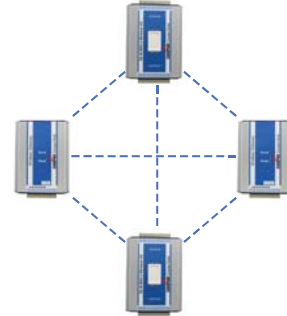
- **Error-checking** with automatic re-transmission for high reliability operation. Every radio message has a probability of corruption. Therefore, automatic error detection, acknowledgement, and re-transmission is critical to reliable operation.

*WIB-net* will send and then re-transmit up to five times. After the fifth attempt, a communication failure status is logged and an alarm set externally.

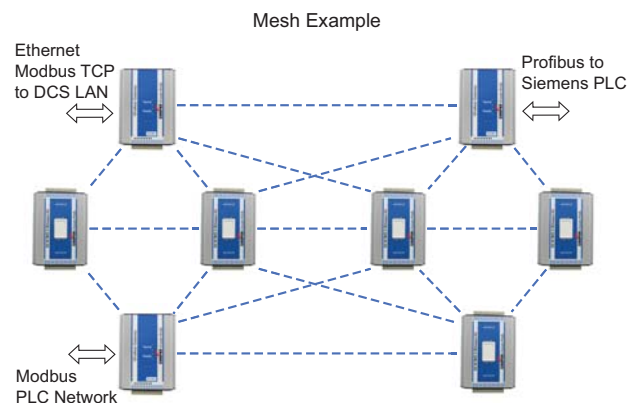
- **Listen-before transmit** wireless operation to maximize the chance of successful message transmission.
- **Peer-to-peer** networking, giving the maximum network flexibility. Each Cooper Crouse-Hinds wireless gateway and transceiver unit can transmit/receive directly to/from any other wireless gateway and transceiver, and can transmit/receive to/from multiple

wireless units. There are no master units and no slaves. Any module in a network can talk to any other. Input signals can be transmitted to multiple destinations.

Peer-to-Peer Example



- **Wireless mesh structure.** *WIB-net* enables every Cooper Crouse-Hinds wireless gateway/transceiver to act as a repeater to optimize wireless message propagation. Messages can hop through multiple gateway/transceiver units to reach a destination. Providing these units have a reliable wireless link to at least one other gateway/transceiver, a wireless mesh forms to enable reliable links to the whole network.



- **High security encryption.** *WIB-net* uses a highly secure data encryption technique to protect against misuse of wireless data. The level of security of Cooper Crouse-Hinds wireless networks is at an equivalent or higher level than wired networks.



## Input/Output Mapping

Process signals or sensors convey the value of an input value to a designated output channel:

- System address (15-bit, 1 – 32768)
- Source module address (1 – 127)
- Destination module address (1 – 127)
- Repeater addresses (up to 5 addresses)
- Output channel number
- I/O signal value (16-bit)
- CRC error-checking (16-bit)

All modules in the same system share a unique system address to avoid cross-talk between systems in the same radio environment. The configuration software automatically generates a random system address for each system.

Destination or repeater modules automatically acknowledge messages when received with a correct error-check value, except for messages from transmit-only units. If an acknowledgement is not received within 500 milliseconds, the message is re-transmitted. The message will be transmitted up to five times with random re-try times. After the fifth attempt, a “comms-fail” event will be set, which can be used to trigger an output alarm or register.

## Block Messages

Block messages are similar to other transmissions. However, signal information is condensed into “blocks” and these blocks are sent at programmed intervals. Each block message contains up to 64 x 16-bits of values. Block messages are only transmitted or repeated by the wireless gateway product range (D2 W G).

Discrete/digital values can be packed (i.e. up to 1024 (64 x 16) digital values can be packed into a block message and unpacked at the destination gateway).

Block messaging creates a more robust, reliable, and efficient system by reducing the chance that messages will become corrupt and by minimizing radio frequency congestion.

## Message Control

The WIB-net protocol is based on exception-reporting for optimum performance. Messages can be triggered by any of the following:

- Exception – change in input value compared to user-configurable “sensitivity” values
- Update time – user-configurable time period since the last message, individually configured for each I/O register
- Real time – block mappings only; messages transmitted on real-time values
- On demand – block mappings only; poll command from another wireless unit or by a write command by a connected databus device

Before a message is transmitted, the radio channel is checked to ensure it is clear (listen-before-transmit). The message is preceded by a lead-in transmission; the length depends on the radio model to allow all other units to lock onto the transmitted message.

## Security Encryption

Security encryption of wireless messages is user-selectable. A 64-bit secure proprietary encryption algorithm is used. The 64-bit key is randomly generated by the configuration software and is never disclosed to the user or transmitted by radio.

Configuration files are protected by password, up to 256 characters.

# Unidirectional Transmitter / Receiver Units

## D2 W LT (transmitter) D2 W LR (receiver)

The unidirectional wireless range of products is suitable for connecting to a single sensor or group of sensors and provides an economical solution for remote monitoring systems. The unidirectional products can also be used in more complex networks such as signal transmitters or receivers.



NOTE: Antenna sold separately.



## Applications

- Wireless connection of flowmeters or energy meters
- Monitoring of storage tanks
- Monitoring cathodic protection on pipelines
- Wireless alarms from power reticulation fault-relays

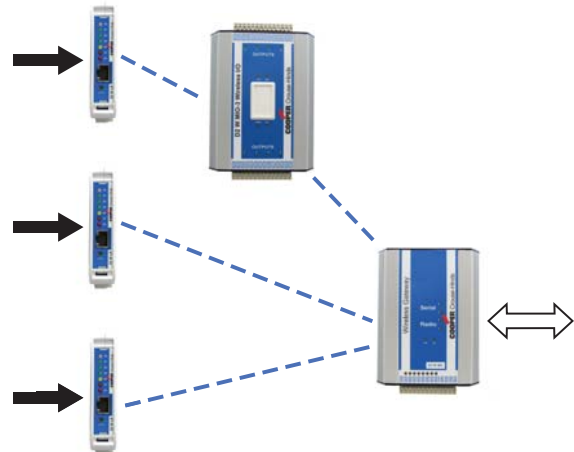
## Features

- Up to 5 intermediate transceiver or gateway units can be configured to link inputs and outputs between transmitters or receivers
- Factory-configured as a matched transmitter/receiver pair or user-configurable with E-Series Windows configuration program



## Transmitter Unit

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Input-only transmitter unit, two digital/pulse inputs, one analog input, and one thermocouple mV input

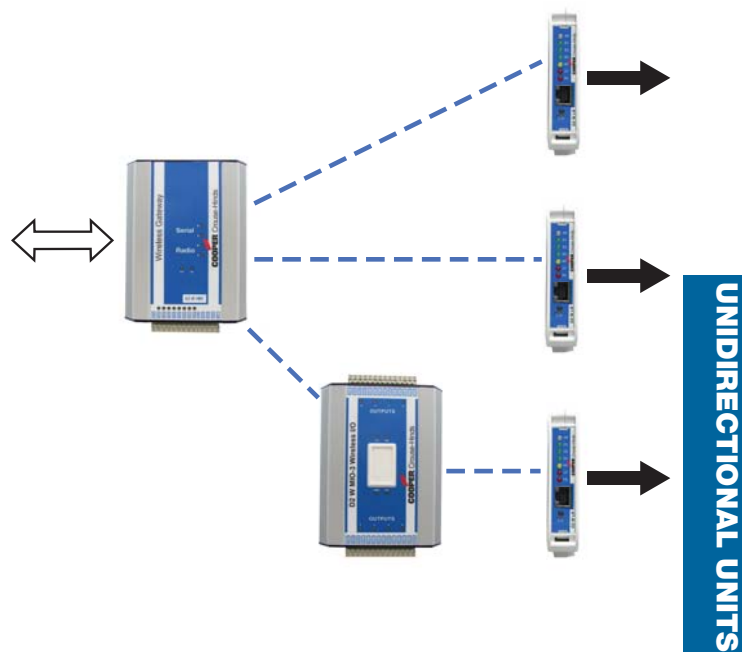


- Transmits to receiver unit as a matched pair where the input signals are re-created as output signals or can transmit to a transceiver or gateway unit
- Up to 3000 wireless transmitters can be used in a network (255 inputs can be linked to any radio unit address)
- External inputs plus internally calculated values, including analog set-point status, pulse count, power supply voltage
- Thermocouple input -10 to +100mV with cold-junction compensation and linearization for J, K, or T-type
- Set-point status generated by comparing analog input to high and low set-points
- Digital inputs can also be used as pulse count inputs
- Power supply 9 – 30VDC, measured and available as a transmitted variable
- 24VDC analog loop supply internally provided
- RS232 configuration and diagnostics port
- RS232 - RJ45 cable required for set-up (catalog number: CBLSER RJ45)



## Receiver Unit

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Output-only receiver unit, three digital contact outputs, and one analog output
- Receives radio commands from transmitter unit as a matched pair where the input signals are re-created as output signals, or can receive commands from a transceiver or gateway unit
- Up to 3000 wireless receivers can be used in a network (255 inputs can be linked to any radio unit address)
- Power supply 9 – 30VDC; 24VDC analog loop supply internally provided
- Communications failure indication and configurable output
- Outputs can be configured as retained or reset (fail-safe) on communications failure
- LED indication of radio signal strength
- RS232 configuration and diagnostics port
- RS232 - RJ45 cable required for set-up (catalog number: CBLSER RJ45)

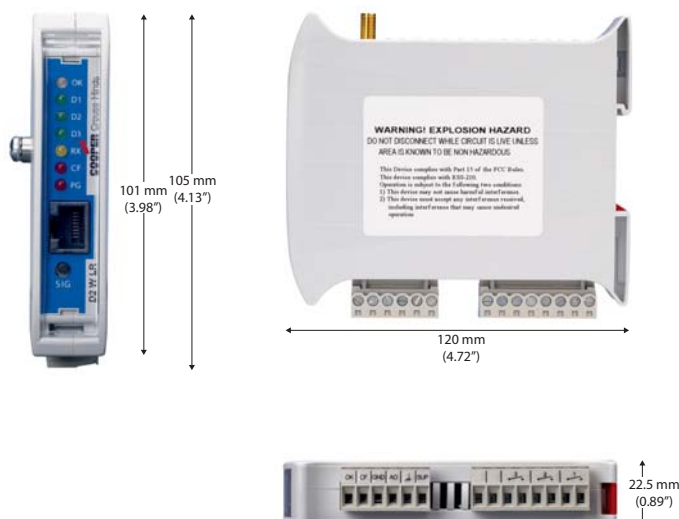


## Ordering Information

Catalog Number	Description
D2 W LT 900	Wireless Transmitter (900 MHz) (Antenna sold separately)
D2 W LR 900	Wireless Receiver (900 MHz) (Antenna sold separately)
D2 WL P1 900	Wireless Transmitter / Receiver Pair with DG900 1 Whip Antenna (900 MHz)
D2 WL P2 900	Wireless Transmitter / Receiver Pair with CFD890EL Dipole Antenna (900 MHz)

# Unidirectional Transmitter / Receiver Unit Specifications

## Dimensions



## General

- **Frequency:** frequency hopping spread spectrum 902-928 MHz, sub-bands available, 1W
- **Sensitivity:** line-of-sight range 20 miles (4W ERP - "effective radiated power"), 15 km (1W ERP); 3000' / 1000 m in obstructed industrial environments; radio distances can be increased by up to 5 intermediate transceiver or gateway units
- **Antenna Connector:** SMA female coaxial connector
- **Temperature:** -40 to 60°C / -40 to 140 °F
- **Humidity:** 0 - 99% RH
- **Regulatory Approvals:** EMC compliant 89/336 EEC, EN 301 489, AS3548, FCC Part 15, Approved to FCC Part 15.247, RS210
- **Housing:** DIN rail thermo-plastic enclosure 3.9" x 0.9" x 4.7" (100 x 22 x 120 mm)
- **Transmitter Unit:** Power/OK, radio TX, DIN1, DIN2, analog set-point status
- **Receiver Unit:** Power/OK, radio RX, DO1, DO2, DO3, communications fail LED's also used to provide radio signal strength indication

## Transmitter Inputs

Input Type	Source	Function
Digital	external	status
Pulse Total	external	count
Analog	external	analog
Thermocouple	external	analog
Set-point	internal	status
Supply Voltage	internal	analog

Input values transmitted as per *WIB-net* (see page 6) protocol - exception-reporting on signal change, and update time. Up to 5 intermediate transceiver or gateway units can be configured to link inputs and outputs between transmitters or receivers.

### Digital / Pulse Inputs

- Two inputs, suitable for voltage-free contacts / NPN, or voltage input 0-1 VDC on / >3 VDC off pulse input max. rate 10 Hz, 50 msec on time. Pulse counted as 16-bit register.

### Analog Inputs

- 0-20 mA (4-20mA, 0-10mA)
- "Floating" differential input, resolution 16-bit, accuracy < 0.1 %

### Thermocouple Inputs

- Millivolt (-10mV to +100mV), J, K, or T type linearization with on-board cold-junction compensation
- Accuracy better than 1°C

## Power Supply

- **Normal Supply:** 9 - 30VDC, power consumption @12VDC - receiver normal 70mA, max. 250mA
- Transmitter normal 70mA, transmitting max. 600mA
- Analog loop supply internally generated, 24VDC 35mA
- Internal monitoring of supply voltage may be transmitted as an "input" (transmitter unit only)

## Set-point Status

- High and low set-points generate internal digital status - set-point status sets (on) when analog value < low set-point and resets (off) when analog value > high set-point. Status is transmitted as per digital input, set-point values are set via the front panel rotary switch or configuration software.
- Separate set-points for (4-20 mA), thermocouple and supply inputs are configurable

## Receiver Outputs

### Digital Outputs

- Three relay contact outputs, 260V 1A

### Analog Outputs

- 0-20mA, source output, 12-bit resolution, 0.1% accuracy

### Communication Failure

- Internal status based on configurable time-out value
- “Comms-fail” status can be configured to a local output

### Fail-Safe

- On “comms-fail,” outputs user-configurable as retained last correct value or reset (fail-safe)

## Serial Port

- RS232 RJ45 female DCE, used for configuration and diagnostics

## LED Indication

### Transmitter Unit

- Power/OK, radio TX, DIN1, DIN2, analog set-point status

### Receiver Unit

- Power/OK, radio RX, DO1, DO2, DO3, communications fail
- LEDs also used to provide radio signal strength indication

## Configuration and Diagnostics

- Factory configuration transmitter/receiver matched pair, AI to AO, 2DI to 2DO, SP status to DO3 via RS232 - RJ45 cable
- User configuration via serial port. Unidirectional units can be configured to network with multi-I/O and gateway units.
- Diagnostics features: read input values, write output values, radio signal strength, monitor communication messages

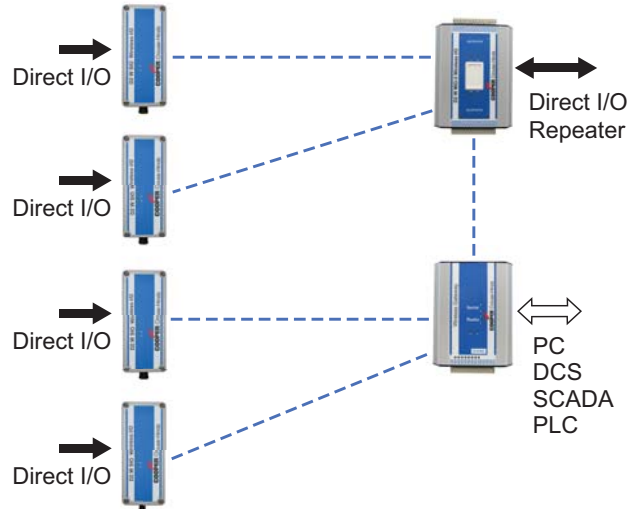
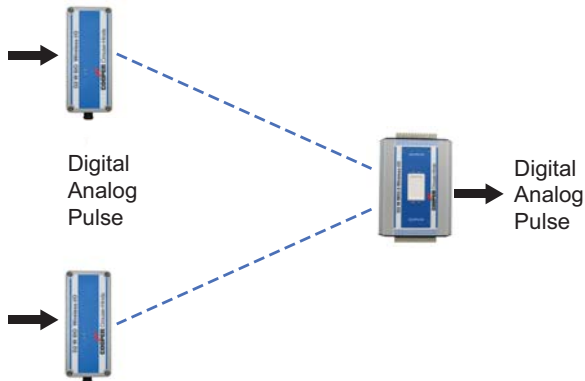




# Single Sensor Transmitters

## D2 W SIO

D2 W SIO wireless modules are economical solutions for monitoring remote process signals and are housed in a weatherproof (IP66) enclosure. They connect to discrete, pulse, or analog signals from process transducers, and transmit these signal values by radio. Capable of being powered by battery-only supplies, these products are particularly suitable where power is not available.



## Applications

- Wireless connection of flowmeters or energy meters
- Monitoring of storage tanks
- Monitoring cathodic protection on pipelines
- Wireless alarms from power reticulation fault-relays

## Features

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Input-only transmitter unit, two digital/pulse inputs and one analog input
- Networks with multi-I/O and gateway units
- Sensor signals, inputs are transmitted to a transceiver module where the signals are re-created as output signals or passed by a gateway device to a host device such as a PLC or SCADA system
- Extremely low power consumption by reverting to "sleep" mode

- Multiple power supply options including battery-only supply
- Weatherproof (IP66) enclosures
- Up to 3000 wireless units per network
- Inputs on any D2 W SIO can be wirelessly linked to an output on any unit. Inputs can be linked to multiple outputs.
- Up to 5 intermediate transceiver or gateway units can be configured to link inputs or outputs to transmitters or receivers
- Interface with Modbus via the gateway device
- External inputs plus internally calculated values, analog set-point status, pulse rate and pulse total, power supply voltage, power supply alarm
- Set-point status generated by comparing analog input to high and low set-points
- Antenna sold separately (see page 34 for antenna options)

- Pulse inputs generate a separate pulse count value and a pulse rate value. Pulse rates are treated as internal analog registers with a configurable maximum value.
- Power supply generates internal signal which can be transmitted as low normal supply voltage status, low battery voltage status, and battery voltage (analog)
- Can connect to up/down counter transducers such as shaft-encoders
- Easily configured to repeat the transmission up to four additional times after the initial transmission to ensure that the transmission is received correctly
- Easy-to-use E-Series Windows configuration software

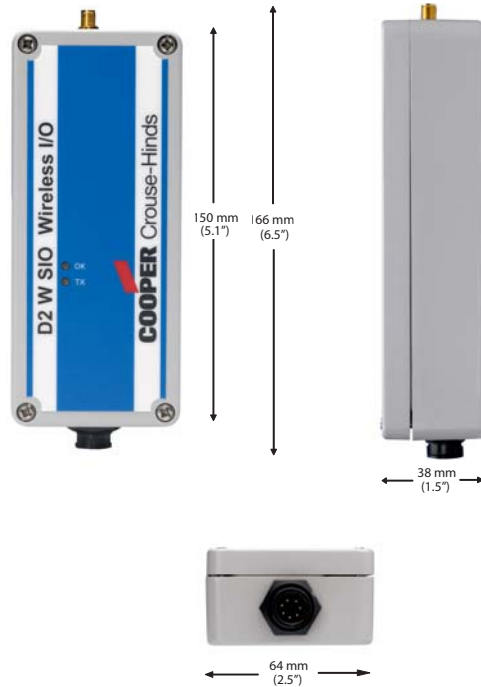
## Ordering Information

Catalog Number	Description
D2 W SIO 900	Wireless Transmitter (900 MHz) (Antenna sold separately)



# Single Sensor Transmitter Specifications

## Dimensions



## General

- **Frequency:** frequency hopping spread spectrum 902-928 MHz, sub-bands available
- **Power:** 1W
- **Max. Range (line-of-sight):** 20 miles (4 ERP), 15 km (1 ERP); 3000' / 1000 m in obstructed industrial environments
- **Antenna Connector:** SMA female coaxial connector
- **Temperature:** -40 to 60°C / -40 to 140 °F
- **Humidity:** 0-99% RH
- **Regulatory Approvals:** approved to FCC Part 15.247, RS210; EMC compliant 89/336 EEC, EN 300 683, AS3548, FCC Part 15
- **Housing:** weatherproof (IP66) painted aluminum enclosure 6.7" x 2.5" x 1.4" (170 x 64 x 36 mm); weather-proof connector for external connections
- Each transmission may be configured to be sent 1 to 5 times
- LED indicators - radio TX, operation OK
- High and low set-points generate internal digital status. Set-point status sets (on) when analog value < low set-point and resets (off) when analog value > high set-point status transmitted as per digital input.

## Inputs and Outputs

Input Type	Source	Function
Digital	external	status
Pulse Total	external	count
Pulse Rate (D2 W SIO only)	internal	analog
Analog	external	analog
Set-point	internal	status
Supply Voltage (D2 W SIO only)	internal	analog
Supply Low Voltage (D2 W SIO)	internal	status

### Digital Inputs

- Two inputs, suitable for voltage-free contacts / NPN, or voltage input 0-1VDC on / >3 VDC off
- Status transmission on change of input signal and on time elapsed since last transmission - update time period 10 sec. - 5 days, a separate update time can be configured when the discrete input is "on"

### Pulse Inputs

- Pulse input max. rate 100 Hz, 3 msec on time (1000 Hz available using a 1/10 divider). Pulse counted as 16-bit register with a 16-bit overflow register (total count 32-bit). Transmissions occur when count change exceeds configured increase or on time elapsed since last transmission. Update time 10 sec. - 5 days. Change-of-state transmissions may be suspended if increase exceeds a configured value to reduce radio traffic.
- **Up/Down Pulse Count:** the two pulse inputs may be configured to a single count to suit quadrature or incremental shaft encoder transducers
- **Pulse Rate:** calculated from rate of pulse input and treated as an internal analog input. Configurable scaling. Transmitted as per analog input.



### Analog Inputs

- 0-25 mA (4-20mA, 0-10mA) available all models, 0-10V also available “floating” differential input, resolution 12-bit, accuracy < 0.1 % measurement continuous or sampled, sample time configurable 0 - 9.1 hours, transducer warm-up time configurable 0.5-127 sec.
- Analog value transmitted on change of input signal or time elapsed since last transmission, change sensitivity configurable from 0.7-75%, update time configurable from 0.1 min. - 5 days

### Power Supply

- **Battery Supply\*:** D2 NW BAT Battery pack, 6 x AA batteries, 9VDC
- **Normal Supply:** 6-30VDC, power consumption @12VDC - quiescent (sleep mode) 120 $\mu$ A, operating mode 10mA + analog loop during radio transmission (50 - 100 msec.)
- 300mA @ 1W

\* See page 38 for D2 NW BAT Specifications.

- Analog loop supply internally generated (24VDC)
- Internal monitoring of supply low voltage status may be transmitted to remote modules as an “input”
- Power consumption increases for pulse inputs > 10 Hz

### Set-point Status

- High and low set-points generate internal digital status. Set-point status sets (on) when analog value < low set-point and resets (off) when analog value > high set-point. Status transmitted as per digital input.

### Serial Port

- RS232 DB9 female DCE used for configuration and diagnostics



# Serial Units

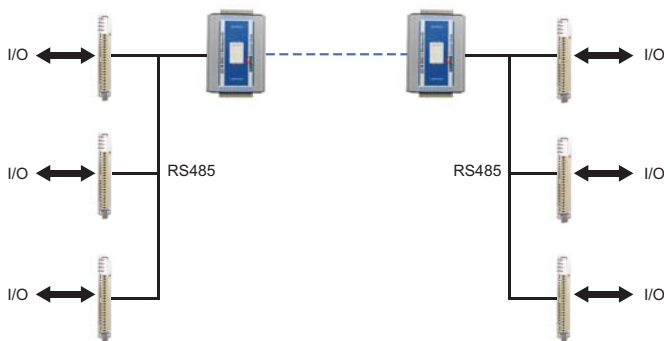
## D2 NW SER

The D2 NW SER is a wired device capable of interfacing with other Cooper Crouse-Hinds wireless radios to increase the number of signals radios can monitor/control. They can also be used as a slave to any Modbus control system.



## Applications

- Expansion I/O for D2 W MIO wireless units - up to 10 x D2 NW SER units can be connected to each wireless unit via RS485
- Serial unit multiplexer, signal transfer via RS485 - up to 10 units per multi-drop link
- Expansion I/O for Modbus devices - up to 99 x D2 NW SER units can be connected to each Modbus master via RS485

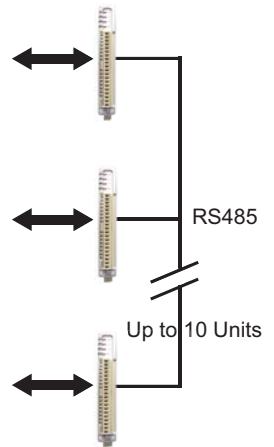


## Features

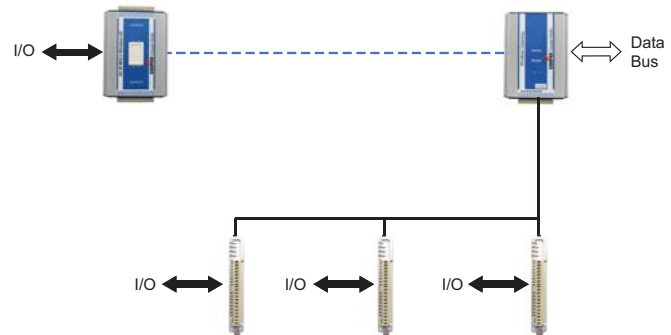
- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Connected via RS485 multi-drop
- Selectable communications via *WIB-net* or Modbus protocol (both RTU and ASCII formats)
- Sensor signals connected at one module; input signals are transmitted to another module where the signals are re-created as output signals to a host device such as a PLC or SCADA system
- Connect to D2 W MIO wireless units for I/O expansion - up to 10 serial addresses per wireless unit
- Connect D2 NW SER units together to form a serial

multi-drop system - up to 10 serial addresses per multi-drop link; no master device is required to control communications

- Connect up to 99 x D2 NW SER units as multi-drop Modbus I/O. RS485 extenders/isolators required for more than 31 units per single multi-drop length.
- RS485 multi-drop up to 2 km (1 mile) depending on installation environment
- Three versions available
- Set-point status generated by comparing analog inputs to high and low set-points
- RS485 cable required; serial units are powered by radios via cable (not provided) (see page 36 for cable options)



- Analog inputs selectable as “floating” dual-terminal inputs or commoned single-terminal inputs. Configurable current (0-10 / 0-20 / 4-20mA) or voltage (0-5 / 0-10 / 1-5V). Configurable scaling, zero and span parameters.
- Analog outputs selectable as single-terminal source or sink outputs. Configurable current (0-10 / 0-20 / 4-20mA) or voltage (0-5 / 0-10 / 1-5V).
- Pulse inputs generate separate pulse count value and a pulse rate value. Pulse rates are treated as internal analog registers with a configurable maximum value.
- Multiple communication failure diagnostics with output status
- Input measurement display and output “forcing” diagnostics
- Easy-to-use E-Series Windows configuration software



## Ordering Information

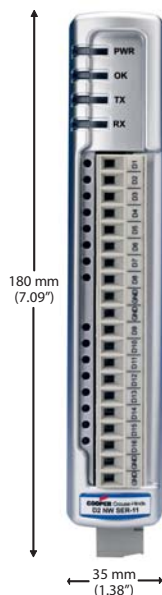
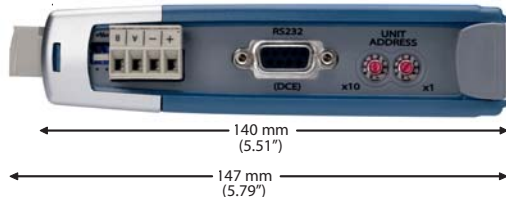
Catalog Number	Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs	Pulse Inputs	Pulse Outputs
D2 NW SER 11	Non-wireless Serial Unit	up to 16	up to 16	0	0	4 1 KHz	8 100 Hz
D2 NW SER 12	Non-wireless Serial Unit	up to 8 voltage-free contacts	up to 8 field effect transistor	4 “floating” / 8 commoned 0-20mA / 0-10V	0	0	8 100 Hz
D2 NW SER 13	Non-wireless Serial Unit	up to 8	up to 8	0	8 sink/source 0-20mA / 0-10V	0	8 100 Hz

Note: Digital inputs and outputs are combined channels. When a channel is used as an output, it is not available as an input. Pulse and digital I/O are same connection.



# Serial Unit Specifications

## Dimensions



## General

- **Temperature:** -40 to 60°C / -40 to 140 °F
- **Humidity:** 0-99% RH
- **Regulatory Approvals:** EMC FCC Part 15, AS3548, 89/336/EEC
- **Housing:** high density thermo-plastic, 5.91" x 7.09" x 1.38" (150 X 180 x 35 mm) with DIN rail mounting
- Removable terminals up to 12 gauge (2.5 sqmm) wires
- LED indication for power supply, processor OK, serial TX and RX, digital I/O

## Inputs and Outputs

### Digital Inputs

- Suitable for voltage-free contacts or NPN transistor, contact wetting current 5mA, inputs are surge protected
- **Type -11** - up to 16 selectable I/O
- **Type -12, -13**, - up to 8 selectable I/O

### Digital Outputs

- Field Effect Transistor (FET) outputs, 30VDC 200mA
- **Type -11** - up to 16 selectable I/O
- **Type -12, -13**, - up to 8 selectable I/O

### Analog Inputs

- "Floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, 0-20mA/0-10V, resolution 12-bit, accuracy 0.1%
- **Type-12** - 8 input channels, selectable as 4 dual-terminal floating inputs or 8 single-terminal commoned inputs

### Analog Outputs

- Selectable as current/voltage source or current sink to common, max. loop voltage 27V, max. loop resistance 1000 ohms, 0 – 20mA/0 – 10V, 12-bit, accuracy 0.1%
- **Type -13** - 8 channels

### **Pulse Inputs**

- Specifications as per digital inputs, max. pulse rate 1kHz, pulse width min. 0.5 ms
- **Type -11** - 4 inputs (DIO1-4)

### **Pulse Outputs**

- Specifications as per digital outputs, max. pulse rate 100 Hz, pulse width min. 5ms
- **Type -11,-12,-13**, - 8 outputs (DIO1-8)

### **Power Supply**

- **Battery Supply:** 9 - 30VDC, over-voltage and reverse power protected
- Internal monitoring of supply voltage. These values may be transmitted to remote modules for monitoring.
- Internal DC/DC converter provides 24VDC 250mA for analog loop supply

### **Serial Port**

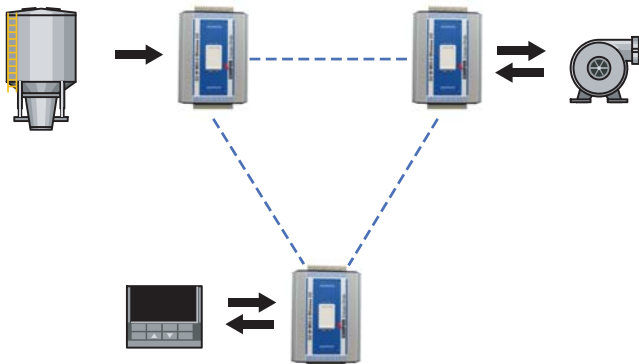
- RS485 serial port configurable up to 115.2 Kb/s, 7 or 8 data bits, none/even/odd parity, 1 or 2 stop bits
- RS232 configuration port 9 pin DB9 female connector, 9.6 Kb/s, 8/n/1
- RS485 max cable distance 2000 m terminal connections



# Transceivers

## D2 W MIO

A transceiver is a wireless device made up of a transmitter and receiver. Since each module can manage both input and output signals, it can be used to monitor transducers and control industrial processes. This module can also be used as a repeater to relay another wireless device's transmission, thus increasing the overall range of the system.



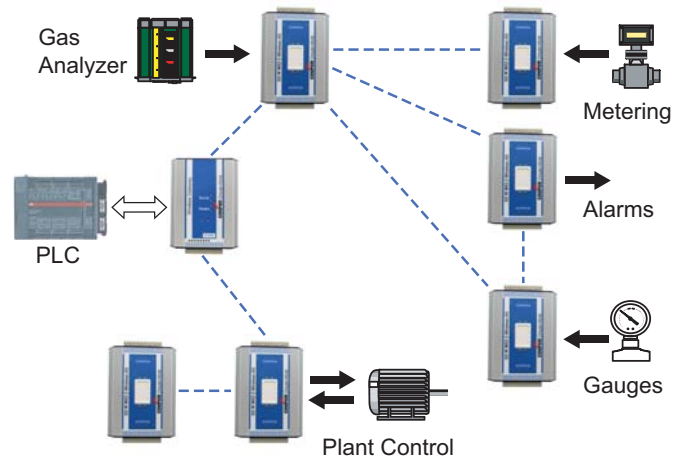
## Applications

- Wireless junction box in a process plant to connect a large number of signals to other parts of the plant and to the plant control center
- Simple Remote Terminal Unit (RTU) in a SCADA system, connecting sensors/instrumentation/process signals in pump stations, sub-stations, pipeline regulator stations, etc.
- Machine-2-Machine wireless connectivity in factories



## Features

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Multiple inputs/output channels for monitoring and control functions



- Up to 95 wireless units per network
- Each wireless unit can connect to input/output expansion modules via RS485 multi-drop with up to 10 expansion modules per wireless unit
- Sensor signals connected at one module; input signals are transmitted to another module where the signals are re-created as output signals or passed via serial to a host device such as a PLC or SCADA system
- Short distance and long distance applications with license-free and licensed products
- Multi-hop repeater functions – up to 5 intermediate units can be configured in any input/output link
- Four versions available
- Any input on any unit can be wirelessly linked to any output on another unit. Inputs can be linked to multiple outputs.
- Inputs and outputs can be added via additional serial units
- The units can be pre-programmed to consider analog set-points, pulse rate and pulse total, power supply voltage, power supply alarm
- Set-point status generated by comparing analog inputs to high and low set-points. Available on AI1 of -1 units, and AI1-4 of -2 units.



- Pulse inputs generate a separate pulse count value and a pulse rate value. Pulse rates are treated as internal analog registers with a configurable maximum value.
- Wide voltage power supply, with integral UPS battery charger and solar regulator
- Power supply generates internal signal values which can be transmitted, low normal supply voltage status, low battery voltage status, and battery voltage (analog)
- Multiple communication failure diagnostics with output status. Fail-to-transmit alarm and fail-to-receive alarm status.
- Radio receives signal and background RF noise measurement / logging diagnostics
- Input measurement display and output “forcing” diagnostics
- Communication logging diagnostics
- Easy-to-use E-Series Windows configuration software
- Antenna sold separately

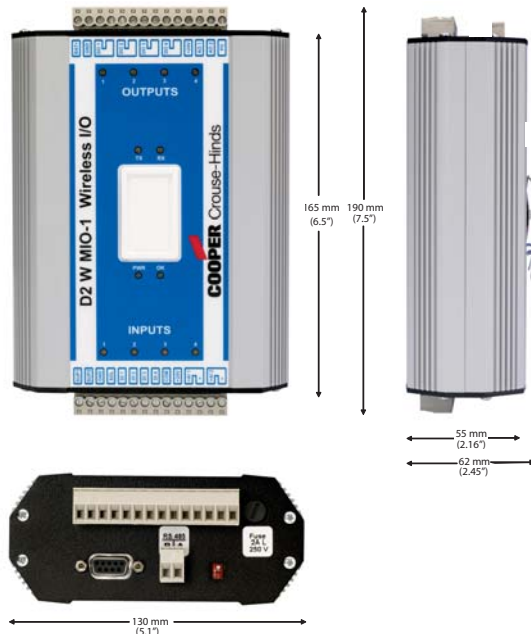
## Ordering Information

Catalog Number	Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs	Pulse Inputs	Pulse Outputs
D2 W MIO 1 900	Wireless Transceiver, Multiple Inputs & Outputs	4 voltage-free contacts	4 relay contacts	2 4-20mA	2 4-20mA	1 100 Hz	1 100 Hz
D2 W MIO 2 900	Wireless Transceiver, Multiple Inputs & Outputs	4 voltage-free contacts	1 field effect transistor	6 0-20mA	0	4 1 x 1 KHz, 3 x 100 Hz	0 100 Hz
D2 W MIO 3 900	Wireless Transceiver, Multiple Inputs & Outputs	0 voltage-free contacts	8 field effect transistor	0	8 0-20mA	0	4 100 Hz
D2 W MIO 4 900	Wireless Transceiver, Multiple Inputs & Outputs	4-16 voltage-free contacts	4-16 field effect transistor	0	0	4 1 x 1 KHz, 3 x 100 Hz	4 100 Hz

Note: Pulse and digital I/O are the same connection. The D2 W MIO-4 has 4 fixed inputs and 4 fixed outputs and a further 12 which may be configured as input or output combinations.

# Transceiver Specifications

## Dimensions



## General

- **Frequency:** frequency hopping spread spectrum 902-908 MHz, sub-bands configurable
- **Power:** transmit power 1W, approved to FCC Part 15.247, RSS210
- **Sensitivity:** receiver data sensitivity: -108dBm
- **Max. Range (line-of-sight):**  
USA/Canada - 4W ERP, 20+ miles  
Other countries - 1W ERP, 15+ km depending on local conditions
- **Data Rate:** 19.2 Kb/s with forward-error correction
- **Antenna Connector:** SMA female coaxial connector
- **Temperature:** -40 to 60°C / -40 to 140 °F
- **Humidity:** 0-99% RH
- **Regulatory Approvals:** EMC FCC Part 15, AS3548, 89/336/EEC, EN 301 489
- **Housing:** extruded aluminum case, 5.1" x 7.3" x 2.4" (130 x 185 x 60 mm) with DIN rail mounting
- Removable terminals up to 2.5 sqmm (12 gauge) wires
- LED indication for power supply, module status, digital I/O

## Inputs and Outputs\*

### Digital Inputs

- Opto-isolated (5000V) inputs suitable for voltage-free contacts or NPN transistor, contact wetting current 5mA
- **Type-1 & -2** - four inputs
- **Type-4** - up to 16 inputs (4 inputs + 12 selectable I/O). The 12 selectable inputs are surge protected, but not isolated.

### Digital Outputs

- **Type-1** - four relay, contacts, Form A, AC 50V 5A / DC 30V 2A
- **Type-2** - 1 FET output 30VDC 500mA
- **Type-3** - 8 FET output 30VDC 500mA
- **Type-4** - up to 16 FET output (4 outputs + 12 selectable I/O)

### Analog Inputs

- "Floating" differential inputs, common mode voltage 27V. 24VDC for powering external loops provided. Digital filtering 1 sec.
- **Type-1** - two 4-20mA resolution 15-bit, accuracy 0.1% (over range indication 2-25mA)
- **Type-2** - six 0-20mA resolution 12-bit, accuracy 0.1% (over range indication 0-25mA)

### Analog Outputs

- Current sink to common, max. loop voltage 27V, max. loop resistance 1000 ohms
- **Type-1** - two 4-20 mA resolution 15-bit, accuracy 0.1% (over range indication 0.5-25mA)
- **Type-3** - eight 0-20 mA resolution 12-bit, accuracy 0.1% (over range indication 0-20.5mA)

### Pulse Inputs

- Specifications as per digital inputs, max. pulse rate 100Hz, pulse width min. 5 ms
- **Type-1** - one input (DI1)
- **Type-2** - four inputs (DI1-4) - first pulse input (DI1) max. 1000Hz, pulse width min. 0.5 ms
- **Type-4** - four inputs (DI1-4) - first pulse input (DI1) max. 1000Hz, pulse width min. 0.5 ms

\* See page 21 for Input / Output summary table.

### **Pulse Outputs**

- FET 30VDC 500mA max. 100 Hz
- **Type-1** - one
- **Type-3 & -4** - four

### **Power Supply**

- **Battery Supply:** 11.5-15.0VDC
- **Normal Supply:** 12-24VAC or 15-30VDC, over-voltage and reverse power protected
- Internal monitoring of power fail, solar charge status, and battery voltage. These values may be transmitted to remote modules for monitoring.
- Internal DC/DC converter provides 24VDC 150mA for analog loop supply
- Battery charging circuit included for 1.2-12 Ahr sealed battery
- Solar regulator for direct connection of solar panel (up to 30W) and solar battery (100Ahr)

### **Serial Port**

- A serial port can be used to configure transceivers and to hard-wire one transceiver to another when desired. This connection avoids the need to add wireless nodes to circumvent impenetrable obstructions, and provides a redundant path for critical applications.
- RS232/RS485 serial port 9600 baud, 8 bits, no parity, 1 stop bit
- RS232 9 pin DB9 female connector
- RS485 terminal connections (max. cable distance 2000 m)

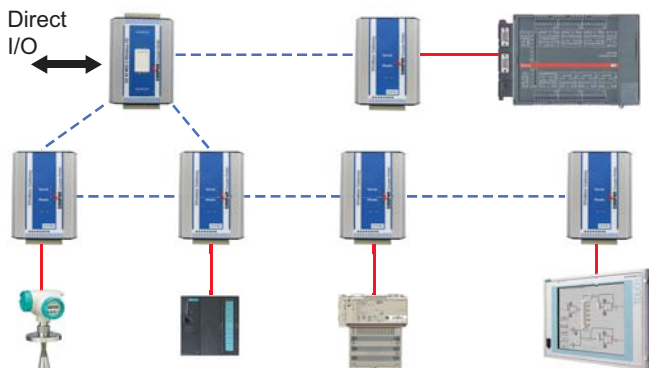




# Wireless Gateways

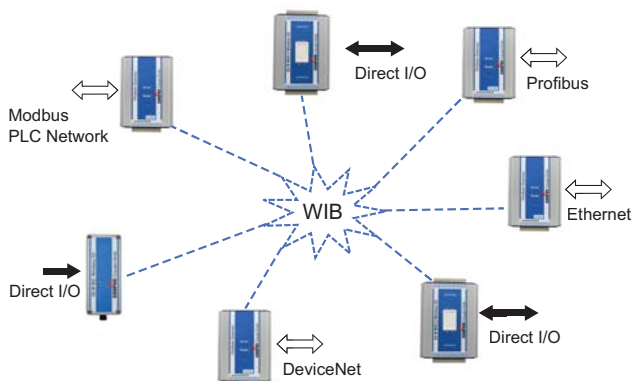
## D2 W G

Wireless gateways interface between other Cooper Crouse-Hinds wireless devices and control systems (such as PLCs, DCS, and SCADA). In addition to channeling the wireless network data into one central control system, they can also act as an eight input/output transceiver.



## Applications

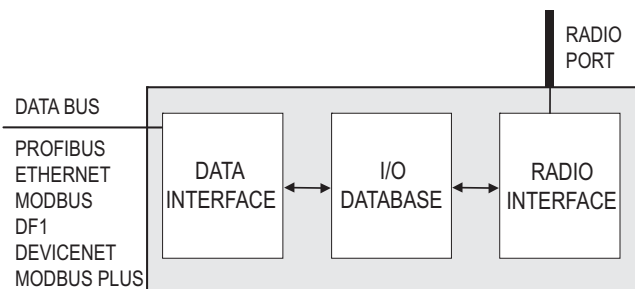
- Wirelessly connect PLCs on a new machine to an existing factory automation system
- Interface different automation systems in different sections of a plant
- Connect protocol devices into a common wireless network
- Cooper Crouse-Hinds wireless units are used to wirelessly transmit signals for PLCs or DCS



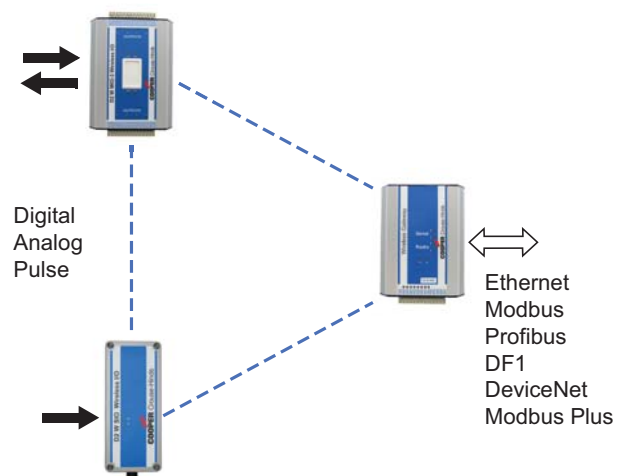
Wireless gateways connect to popular process control and automation databases, and convert signal information to Cooper Crouse-Hinds' proven *WIB-net* wireless protocol.

### Main benefits:

- Wireless extension of factory automation, providing a high security firewall. The wireless gateway connects to a databus and transfers I/O values to another wireless gateway unit via *WIB-net* communications. The other gateway interfaces to its own databus. Multiple gateway units can communicate in a WIB peer-to-peer network.
- There is an efficient wireless protocol conversion in the modules enabling an efficient transfer of data to Modbus, Profibus (Slave or Master), Ethernet, DeviceNet, and/or Modbus Plus
- Interface between PLCs, DCS, HMI, or SCADA and Cooper Crouse-Hinds wireless units. The wireless gateway keeps an "image" of the remote wireless network in its memory and interfaces this image to the databus.



- Network wireless units and gateways to connect sensor signals and control systems



## Features

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Connects to databus at full bus speed
- Can interconnect master-slave, slave-slave and master-master
- Provides a peer-to-peer wireless network using *WIB-net*
- High security data encryption
- Automatic acknowledgment and error-correction
- Multiple path routing by configuration
- Eight on-board discrete I/O, individually configurable as input or output
- Network configuration is performed with easy-to-use free software
- Wide range power supply with integral back-up battery-charging feature
- Antenna sold separately

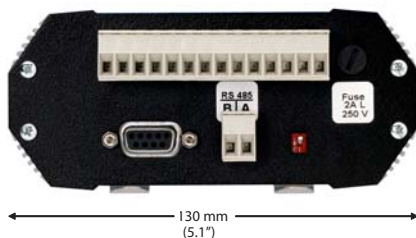
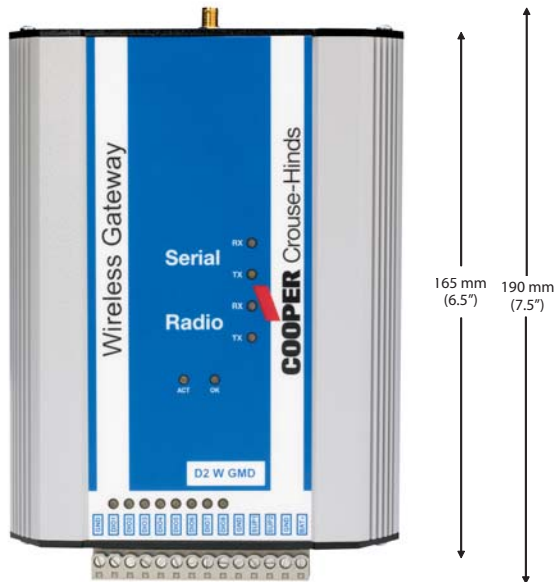
## Ordering Information

Catalog Number	Description
D2 W GMD 900	Wireless Gateway - Modbus (900 MHz)*
D2 W GPR1 900	Wireless Gateway - Profibus Slave (900 MHz)*
D2 W GPR2 900	Wireless Gateway - Profibus Master (900 MHz)*
D2 W GET1 900	Wireless Gateway - Allen-Bradley® EtherNet/IP, Modbus TCP, TCP/IP Functions (900 MHz)*
D2 W GDET1 900	Wireless Gateway - DeviceNet Slave (900 MHz)*
D2 W GM1 900	Wireless Gateway - Modbus Plus (900 MHz)*

\*Antenna sold separately.

# Wireless Gateway Specifications

## Dimensions



## General

- **Frequency:** frequency hopping spread spectrum 902-928 MHz, sub-bands configurable
- **Power:** transmit power 1W, approved to FCC Part 15.247, RSS210
- **Sensitivity:** receiver data sensitivity: -108dBm
- **Max. Range (line-of-sight):** USA/Canada, 4W ERP 20+ miles; other countries, 1W ERP, 15+ km depending on local conditions
- **Data Rate:** 19.2 Kb/s with forward-error correction
- **Antenna Connector:** SMA female coaxial connector
- **Temperature:** -40 to 60°C / -40 to 140°F (Modbus/DF1 version); 0 to 60°C / 30 to 140°F (Profibus, Ethernet, DeviceNet, and Modbus Plus versions)
- **Humidity:** 0 - 99% RH (Modbus/DF1 version); 0 - 95% RH (Profibus, Ethernet, DeviceNet, and Modbus Plus versions)
- **Regulatory Approvals:** EMC Compliant EN 301 489, FCC Part 15
- **Housing:** extruded aluminum case 5.1" x 7.3" x 2.4" (130 x 185 x 60 mm), DIN rail mounting, removable terminal blocks for ease of module replacement, terminals suitable for 12 gauge (2.5 sqmm) wire
- LED indication for processor OK, radio TX and RX, serial TX and RX, active status
- **Wireless Communications:** Radio communications can be configured for combination of event-reporting (change-of-state), update time, read/write blocks, and poll response. Radio message includes system addressing, unit addressing, error-checking, and configurable security encryption. Communication control includes message acknowledgments and up to four re-transmissions.
- Peer-to-peer addressing. Messages may be routed through five intermediate repeater addresses.
- Fail-to-transmit and fail-to-receive alarms are configurable



## Inputs and Outputs

- Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage-free contacts. Outputs are FET, 30VDC 500mA.

## Power Supply

- **Battery Supply:** battery charging circuit included for 12V back-up battery, max. charge current regulated to 0.7A (>12V supply)
- **Normal Supply:** 9 - 30VDC / 12 - 24VAC
- **Normal current drain:** 12V 150mA; 24V 90mA (MD1 version); 12V 270mA; 24V 170mA (other versions); add 5mA per active I/O

For current drain during radio transmission, add to above: 12V 350mA; 24V 200mA

## Set-point Status

- **Modbus/DF1:** 4300 I/O points (analog plus discrete)
- **Profibus Master, Ethernet, Modbus Plus:** 2048 bytes input and 2048 bytes output up to 4300 discrete I/O points, or up to 1024 analog in / 1024 analog out
- **Profibus Slave:** 416 I/O bytes up to 1952 DI / 1952 DO, or up to 122 AI / 122 AO
- **DeviceNet:** 512 bytes input and 512 bytes output up to 4300 discrete I/O points, or up to 256 analog in / 256 analog out

## Serial Port

- **Modbus:** Modbus RTU (binary), master / slave configurable; RS232 or RS485, 300 - 19200 bit/sec.
- **DF1:** Allen Bradley DF1 full duplex; RS232 only, 300 - 19200 bit/sec.
- **Profibus:** Profibus-DP functionality according to EN 50170; RS485 optically isolated with on-board DC/DC converter, automatic baud rate detection (9600 bit/s. - 12 Mbit/s.)
- **Ethernet:** 10/100 Mbit/s., RJ45 connector, transformer isolated interface; Modbus/TCP class 0, class 1, and partially class 2 slave; EtherNet/IP level 2 I/O server; embedded web system (dynamic HTTP), on-board file system via a 1.4 MB flash disc, user downloadable web pages through FTP server, e-mail functionality (SMTP)
- **DeviceNet:** DeviceNet 2.0 Slave, optically isolated RS422 with selectable baud rate between 125, 250, and 500 Kbit/sec.
- **Modbus Plus:** Modbus Plus Slave, optically isolated RS485 with standard baud rate of 1 Mbit/sec., global database transactions with routing for up to six networks

## Configuration and Diagnostics

- Diagnostics include online read/write of I/O registers, radio signal strength values from remote units, and off-line testing of databus protocol



# Wireless Modems

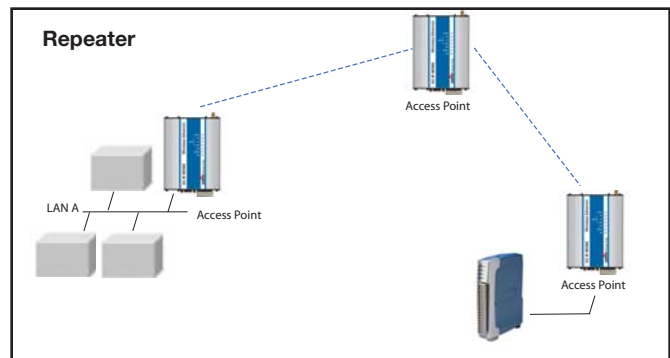
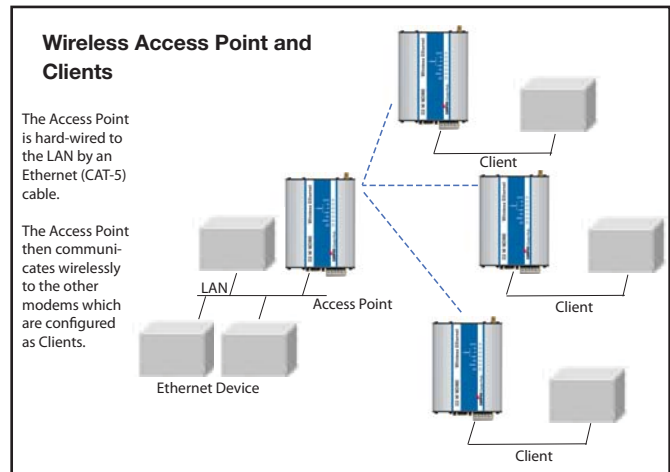
## Modem Overview

Wireless modems transmit serial or Ethernet data, for connecting PLC to PLC, linking SCADA to a group of PLCs, or to form a wireless PLC LAN. These modems provide a transparent data transfer and offer encrypted AES wireless transmissions via an embedded firewall. Modems are well suited for industrial or remote environments, and are easily configured.

Modems also have the ability to send or receive multiple combinations of input or output signals using any of the D2 NW SER units, and do not wirelessly communicate with the remainder of the I/O line of products.

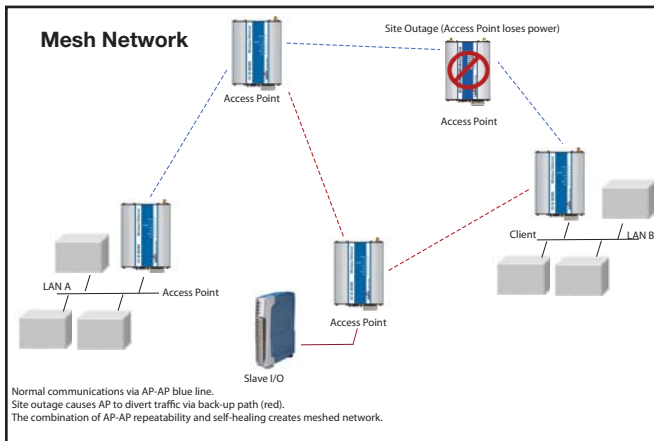
Each Ethernet modem is configured as: 1) an Access Point or a Client; and 2) a Bridge or a Router. The Wireless Access Point (WAP) acts as the “master” device, and can connect to a wireless network using Wi-Fi and communicate with multiple clients.

Modems are available at two different frequencies and various transmitting power capabilities. The D2 W MDME 900 (900 MHz Ethernet, 1W) and D2 W MDME 2400 (2.4 GHz Ethernet, 100mW or 300mW) modems can communicate in a point-to-point or point-to-multipoint mode. Both modems can be configured to allow for a self-healing of communications between network points (nodes) via Spanning Tree Algorithm technology. The D2 W MDME 2400 products can also use Wireless Distribution System (WDS) technology to extend radio coverage by linking two Access Points (AP/AP connectivity).

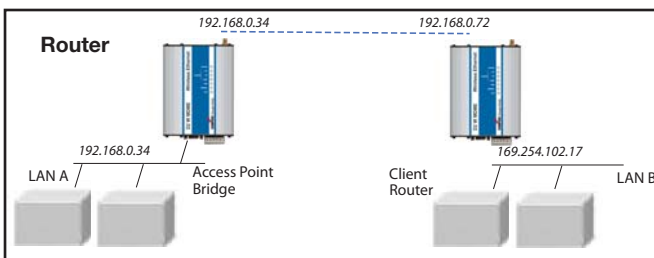


## Ordering Information Example (Modems)

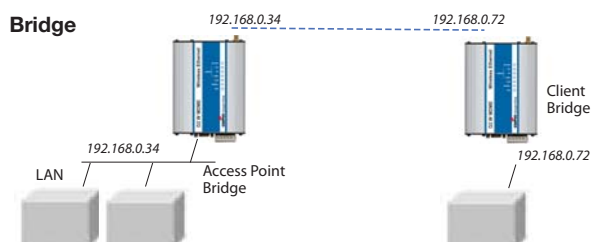
	D2	W MDME	2400	1
1. Select Division - Div. 2 _____				
2. Choose Radio Type: W MDME = Wireless Ethernet Modem _____				
3. Select Frequency: 900 (900 MHz) - License-free in the following countries: USA, Canada, Chile, Colombia, Mexico, Puerto Rico, Argentina, Australia, Brazil, New Zealand 2400 (2.4 GHz) - License-free in USA, Canada _____				
4. Power*: ** Not Required ** - D2 W MDME 900 1 (100mW) _____ 3 (300mW) _____				



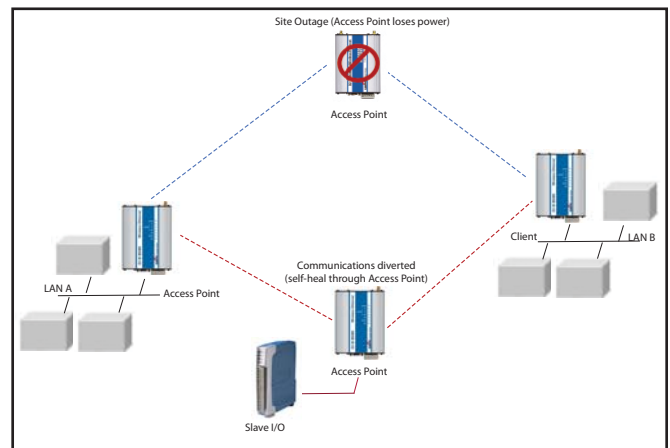
A router joins separate Ethernet networks together (i.e. links a LAN to a different LAN). The router has different IP addresses on its wired and wireless ports, reflecting the different IP addresses of the separate Ethernet networks. When devices on one network wish to communicate with devices on the other network, they direct their packets at the router for forwarding.



Bridges are typically used to connect sections of the same IP network together. For a bridge, the IP section for the wireless side is the same as the Ethernet side. Two routers can exist within the same radio network. There is no limit to the number of bridges in the same network - although, there is a limit of 128 (for the D2 W MDME 2400) and 255 (for the D2 W MDME 900) clients linked to any one Access Point.



The Spanning Tree Algorithm function was introduced to handle network loops and provide redundant paths in networks. The Spanning Tree Algorithm can be configured; however, the factory default setting is “disabled.” There is some overhead in maintaining a network utilizing the Spanning Tree Algorithm. Users wishing to increase their throughput, at the expense of redundancy, should disable Spanning Tree.



Consider this network above which has a redundant wireless link. If the Spanning Tree Algorithm function is enabled, one of the two wireless links will be disabled - that is, all wireless data will be transferred by one link only. If the active link fails, the other link will automatically start transferring the wireless data.





# Wireless Ethernet Modems - 900 Series

## D2 W MDME 900

The D2 W MDME 900 Wireless Ethernet Modem is an ideal solution for Ethernet connections in process control and automation applications with PLCs, DCS, and SCADA acquisition. The D2 W MDME 900 can handle multiple applications simultaneously.



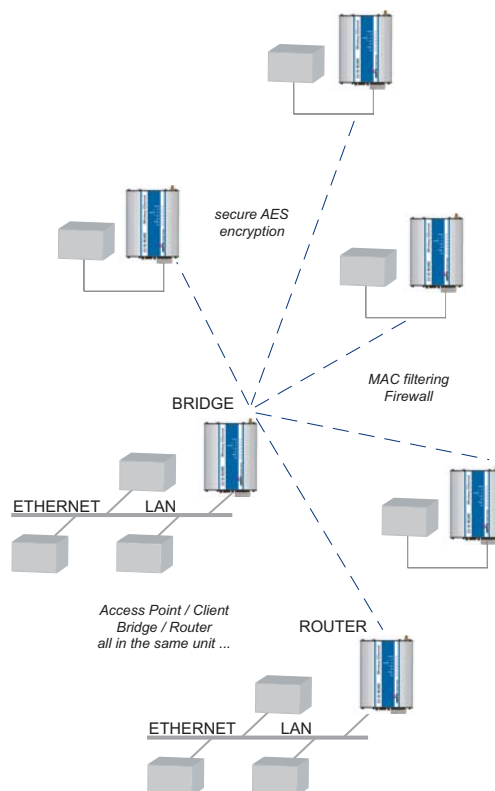
## Applications

- Remote RTU connectivity
- PLC connectivity

## Features

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Suitable for North and South America, Australia/New Zealand, Hong Kong, India
- 10/100 BaseT Ethernet, wireless data up to 200 Kbit/sec.
- 902 - 928 MHz, 0.1 - 1W, frequency hopping spread spectrum
- Typical line-of-sight distance: 20+ miles North America when using a higher gain antenna; 15 km elsewhere (1W ERP)
- Configurable as Access Point / Client; Bridge / Router
- Security, reliability, redundancy
- Multiple layers of error detection and correction
- Automatic changeover to another Access Point if a wireless link fails
- Military grade AES security encryption of wireless data
- Firewall protection and efficient wireless management
- Message filtering at MAC and IP address level

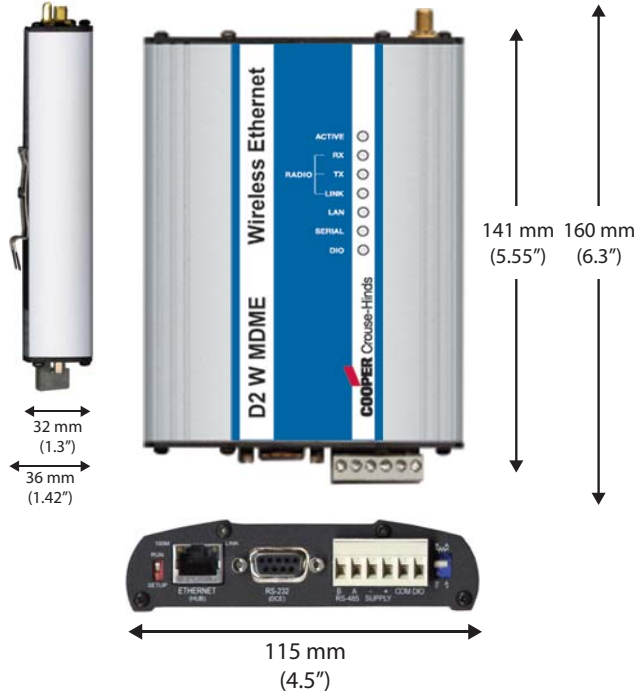
- Filtering via Black or White List
- Two serial interfaces: RS232 and RS485
- Serial connectivity + Ethernet connectivity at the same time, both RS232 and RS485
- PPP and serial server functionality
- Serial Modbus to Modbus TCP conversion
- Discrete channel for status I/O, for failure status or external status transfer
- Easy-to-use configuration and powerful diagnostics
- Configuration and diagnostics via web browser
- Remote configuration and diagnostics via the wireless link
- Antenna sold separately



## Ordering Information

Catalog Number	Description
D2 W MDME 900	Wireless Ethernet Modem (900 MHz)

## Dimensions



## General

- **Antenna Connector:** SMA female coaxial connector
- **Temperature:** -40 to 140°F / -40 to 60°C
- **Humidity:** 99% RH
- **Power Supply:** 10 - 30VDC
- **Current Normal:** 280mA (12V), 150mA (24V)
- **Housing:** case - heavy-duty painted aluminum, DIN rail mounting
- **Approvals:** FCC 15.247, RSS210
- Transmit (1W) 500mA (12V), 300mA (24V)

## Ethernet

- 10/100 BaseT RJ45 connection, IEEE 802.3 compliant
- Bridge / Router functions work with all Ethernet protocols (Embedded Protocols: TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, Modbus TCP Client and Server)

## Serial

- RS232 V.24 DCE, 1.2 to 115.2 Kb/s
- RS485, 1.2 to 115.2 Kb/s
- Serial server, PPP, Modbus TCP to Modbus RTU conversion

## Discrete I/O

- One I/O channel
- Input: voltage-free contact / Output: FET 30VDC 500mA

## Networking

- Configurable as Access Point / Client; Bridge / Router
- Point-to-point, point-to-multipoint, user configurable addressing
- Repeater functionality
- MAC filtering and IP filtering, White List or Black List

## Radio

- Frequency hopping spread spectrum
- Frequency bands
- USA/Canada: 902 - 928 MHz
- Transmit power 0.1 - 1W (20 - 30dBm) configurable
- Receiver sensitivity: -108dBm @ 10-6 Bit Error Rate (BER)
- Data rates 19.2, 38.4, 100, 200 Kb/s or auto rate selection
- Protocol CSMA/CA with 32-bit CRC and auto-correction
- Radio range up to 60 miles / 100 km line-of-sight using high gain antennas (up to 4W ERP permitted in USA/Canada)
- Range may be extended using repeater feature
- SMA female coaxial antenna connection

## Security

- 128-bit AES or 64-bit proprietary encryption (configurable)
- MAC filtering and IP filtering
- Password protected configuration

## Configuration and Diagnostics

- HTTP with remote configuration via wireless link
- Receive Signal Strength Indicator (RSSI), channel noise, BER, connection monitoring and statistics
- Firmware upgrade via radio or Ethernet port

# Wireless Ethernet Modems - 2400 Series

## D2 W MDME 2400

The D2 W MDME 2400 Wireless Ethernet Modem provides reliable and secure high-speed wireless Ethernet connectivity across a broad range of applications in process and automation plants.



### Applications

- PLC connectivity
- SCADA data transfer
- Wireless Ethernet
- Wireless video feeds

### Features

- Class I, Division 2 hazardous areas approved (CSA certified to U.S. and Canadian standards)
- Uses global 2.4 GHz ISM band
- 10/100 BaseT Ethernet, wireless data up to 11 Mbit/sec.
- 802.11b compliant 2.4 GHz Direct Sequence Spread Spectrum (DSSS), 100mW or 300mW
- Typical line-of-sight distance: 5+ miles North America when using a higher gain antenna (300mW model); 1 km elsewhere (100mW ERP)
- Configurable as Access Point / Client; Bridge / Router
- Security, reliability, redundancy
- High RF output and superior receiver sensitivity gives excellent penetration in congested industrial environments
- Wireless Distribution System (WDS) mesh networking
- Multiple layers of error detection and correction

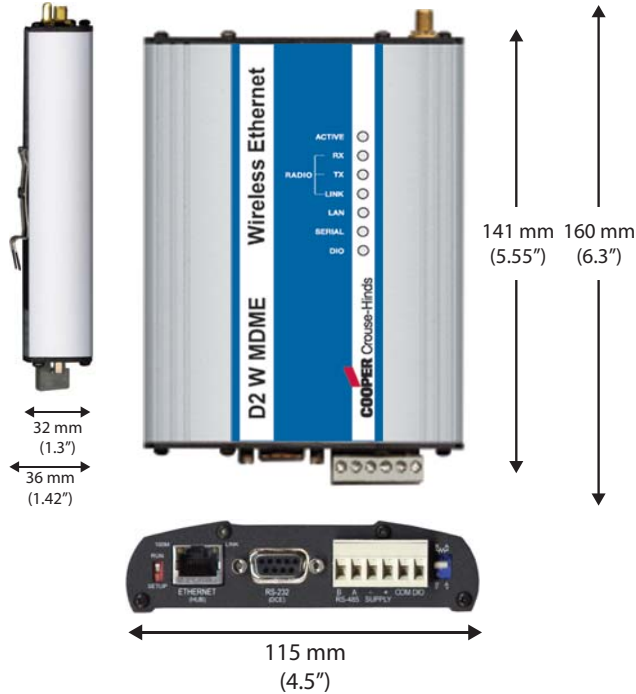
- Automatic changeover to another Access Point if a wireless link fails
- Industrial ratings down to -35°C
- Military grade WPA2 AES security encryption of wireless data
- Firewall protection and efficient wireless management
- Message filtering at MAC and IP address level
- Filtering via Black or White List
- Two serial interfaces: RS232 and RS485
- Serial connectivity + Ethernet connectivity at the same time, both RS232 and RS485
- PPP and serial server functionality
- Serial Modbus to Modbus TCP conversion
- Discrete channel for status I/O, for failure status or external status transfer
- Easy-to-use configuration and powerful diagnostics
- Configuration and diagnostics via web browser
- Remote configuration and diagnostics via the wireless link
- Antenna sold separately

### Ordering Information

Catalog Number	Description
D2 W MDME 2400 1	100mW Wireless Ethernet Modem (2.4 GHz)
D2 W MDME 2400 3	300mW Wireless Ethernet Modem (2.4 GHz)



## Dimensions



## General

- **Antenna Connector:** SMA female coaxial connector
- **Temperature:** -35 to 150°F / -35 to 65°C
- **Humidity:** 99% RH
- **Power Supply:** 9 - 30VDC, current 240mA (12VDC), 150mA (24VDC)
- **Housing:** case - heavy-duty painted aluminum, DIN rail mounting
- **Approvals:** FCC 15.247, CE ETS 300 328, RSS210
- **Certifications:** IEC 60950, CSA

## Ethernet

- 10/100 BaseT RJ45 connection, IEEE 802.3 compliant
- Bridge / Router functions work with all Ethernet protocols (Embedded Protocols: TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, Modbus TCP)

## Serial

- RS232 V.24 DCE, 1.2 to 115.2 Kb/s
- RS485, 1.2 to 115.2 Kb/s
- Serial server, PPP, Modbus TCP to Modbus RTU conversion

## Discrete I/O

- One I/O channel
- Input: voltage-free contact / Output: FET 30VDC 500mA

## Networking

- Configurable as Access Point / Client; Bridge / Router
- Point-to-point, point-to-multipoint, user configurable addressing
- WDS self-organizing mesh networking
- MAC filtering and IP filtering, White List or Black List
- Serial gateway TELNET

## Wireless

- 2.400 - 2.484 GHz Direct Sequence Spread Spectrum (DSSS), 13 selectable zones
- 802.11b compliant, auto rate selection 1 MB, 2 MB, 5.5 MB, 11 MB
- Transmit power 100mW (20dBm) / 300mW (25dBm), dependent on local regulations
- Receiver sensitivity: -96dBm @ 1 MB/s, -91dBm @ 11 MB/s < 8% BER
- Line-of-sight range: 1 km @ 100mW ERP, 8 km @ 4W ERP
- Range may be extended using repeater features
- Dual SMA female coaxial antenna connection for antenna diversity

## Security

- 128-bit AES encryption (WPA), TKIP (WPA), or 128-bit/64-bit WEP
- MAC address and IP address filtering
- Password protected configuration

## Configuration and Diagnostics

- HTTP with remote configuration via wireless link
- Web-based system management, RF signal strength, Bit Error Rate, connection monitoring and statistics
- PPP Protocol access to diagnostics
- Firmware upgrade via radio or Ethernet port

## Antennas

Antennas should be selected considering the desired transmit distance, line-of-sight, RF cable length, and height of transmission. Each of these parameters should be evaluated in selecting the right antenna for your application. For more information, please visit [crouse-hinds.com/WirelessIO/](http://crouse-hinds.com/WirelessIO/). Cooper Crouse-Hinds Sales Representatives can also help you select the right antenna using a diagnostic tool embedded in the Demonstration Kit transceiver modules.

### 900 MHz Dipole Antenna (CFD890EL)

- 2.15dB gain
- Used in applications where signal strength is important in all directions from the antenna
- A ground independent half wave dipole suitable for 900 MHz products
- 15' (5 m) of RG58 coaxial cable already terminated with a crimped SMA male connector
- Includes a 304 stainless steel standard pole bracket and clamps



- Omni-directional and designed for flexible mounting on a variety of explosionproof housings (with a 3/4" NPT pipe thread)
- Mounting base is made of heavy, nickel-plated brass with an integrated TNC (female) coaxial connector for ease of installation with a (catalog number: A53649A) cable
- The radome is optimized for rugged industrial applications, while maintaining maximum radio frequency transmission and reception efficiency
- May be mounted up to 18" away from the enclosure within a hazardous location without an additional seal



### 900 MHz Collinear Antenna (SG900EL)

- 5dB gain
- A short RG58 coaxial tail is terminated with a crimped N-Type female connector; the CC3 SMA, CC10 SMA, and CC20 SMA coaxial extender kits are also suitable for use with this antenna
- Includes a 304 stainless steel standard pole bracket and clamps



### 900 MHz Whip Antenna (DG900 1)

- -2dB gain
- Fitted with approximately 17' (5 m) coaxial cable with SMA male connector; further coaxial extensions are not recommended
- Designed for short range use only (2 miles maximum)
- Mounted from the base through a 3/8" (10 mm) hole or with a bracket (**ordered separately - catalog number: ANT BR COL KIT**)



### 900 MHz Collinear Antenna (SG900 6)

- 8dB gain
- A short RG58 coaxial tail is terminated with a crimped N-Type female connector; the CC3 SMA, CC10 SMA, and CC20 SMA coaxial extender kits are also suitable for use with this antenna
- Mounted at the base tube by a U-bracket (**ordered separately - catalog number: ANT BR COL KIT**)
- Used when maximum range is required or as a base station antenna



### 900 MHz Whip Antenna (WH900 SMA)

- -2dB gain
- Made for use with the D2 W DEMO 900 Demonstration Kit
- Measures only 3.5" (90 mm) in length
- Designed for internal use only; may be connected directly to Cooper Crouse-Hinds modules
- Fitted with a SMA male connector



### 900 MHz Division 1 Antenna (D1 NW ANT 1 900)

- 2dB gain
- Designed for use in hazardous/classified and industrial applications

### 900 MHz 6 Element Yagi Antenna (YU6 900)

- 10dB gain
- Focuses power in a forward direction for longer range applications
- Higher gain antennas direct power into a tighter beam
- Requires a single mounting bracket (**ordered separately - catalog number: ANT BR YAG KIT**)
- A standard female N-Type connection from a 6" (150 mm) tail provides a simple connection method when using the CC3 SMA, CC10 SMA, or CC20 SMA extender cable
- The narrow beam width and high front-to-back ratio is effective in reducing the effects of interference and counteracting losses in long coaxial runs



### 900 MHz 16 Element Yagi Antenna (YU16 900)

- 15dB gain
- Suitable for use when extended coaxial cable runs are encountered with 9dB loss or greater
- Equivalent to the YU6 900, but has additional director elements which provide additional gain
- A standard female N-Type connection from a 6" (150 mm) tail provides a simple connection method when using the CC3 SMA, CC10 SMA, or CC20 SMA extender cable

### 2.4 GHz Whip Antenna (WH2400 SMA)

- 0dB gain
- Made for use with the D2 W MDME 2400 Wireless Ethernet Modem
- Measures only 3.5" (90 mm) in length
- Fitted with SMA male connector



### 2.4 GHz Collinear Antenna (SG2400EL)

- 5.1dB gain
- A short RG58 coaxial tail is terminated with a crimped N-Type female connector
- Includes a 304 stainless steel standard pole bracket
- Designed for use with the CC10 SMA or custom coaxial cable extender kits



- At data link 2.4 GHz frequencies, it is important to keep cable runs to the shortest length possible; where a long run is unavoidable, a suitable low loss cable should be used

### 2.4 GHz Collinear Antenna (MD2400EL)

- 1dB gain (including cable)
- Approximately 15' (5 m) of low loss RG58 coaxial cable is terminated with a male SMA connector
- Includes a 304 stainless steel standard pole bracket and clamps



### 2.4 GHz 18 Element Yagi Antenna (Y2400 18EL)

- 18dB gain
- Suitable for use with the CC3 SMA, CC10 SMA, and CC20 SMA coaxial extenders
- A standard female N-Type connection from a 150 mm tail provides a simple connection method
- Includes mounting brackets



### 2.4 GHz Collinear Antenna (Z2400EL)

- 10dB gain
- An N-Type female connector is built into the stainless steel mount tube
- Mounting brackets (**ordered separately - catalog number: ANT BR COL KIT**) are ideal for mounting to a mast up to 50 mm in diameter



### 2.4 GHz Division 1 Antenna (CTX 2400 TR)

- 2dB gain
- Designed for use in hazardous/classified and industrial applications
- Omni-directional and designed for flexible mounting on a variety of explosionproof housings (with a 3/4" NPT pipe thread)
- Mounting base is made of heavy, nickel-plated brass with an integrated TNC (female) coaxial connector for ease of installation with a (catalog number: A10832A) cable



## Brackets

Brackets are available to provide a solid support for any antenna. Mounting brackets may be replaced if the antenna is dismantled for maintenance. The brackets are suitable for pole sizes up to a maximum of 2" (50 mm) in diameter.

### Yagi Antenna Brackets (ANT BR YAG KIT)

- The Yagi antenna requires a single mounting bracket
- Bracket assembly consists of 1 x U-Bolt, 1 x D-plate with nuts and washers
- Brackets are zinc plated mild steel



### Collinear Antenna Brackets (ANT BR COL KIT)

- The collinear antenna requires two mounting brackets to hold the antenna in position
- Bracket assembly consists of 1 x U-Bolt, 3 x D-plates with nuts and washers
- Brackets are zinc plated mild steel

## Cables

Cables are available for use between any Cooper Crouse-Hinds radio and its antenna, or between a PC and radio for configuration and diagnostics.

### Serial Cable (CBLSER DB9)

- A RS232 serial cable used for all Cooper Crouse-Hinds telemetry products, allowing connection to a computer or laptop's RS232 port for diagnostic and configuration purposes
- Fitted with a molded DB9 male and DB9 female straight-through connector



### Serial Cable (CBLSER RJ45)

- Equivalent to the CBLSER DB9, but is fitted with a molded RJ45 male (Ethernet connector) and a DB9 female connector for use with D2 W LT and D2 W LR radios



### Coaxial Cable (CC900TAIL)

- A 24" (800 mm) RG58 coaxial lead; tail is terminated with a SMA (male) connector for module connection and a flanged N-Type (female) bulkhead connector



### Coaxial Extension Cable (CC Series)

- Lengths: CC3 SMA - 10' (3 m); CC10 SMA - 33' (10 m); CC20 SMA - 66' (20 m)
- Cables are terminated and ready for use with a SMA male and N-Type male connector; the SMA connector is provided for direct module connection, and the N-Type connects directly to the antenna tail lead



### Coaxial Cable (A53649A)

- Length: 2'
- Ideally suited for connecting any radio or modem to the 900 MHz Division 1 antenna (D1 NW ANT 1 900)
- Fitted with a TNC male and a SMA male connector

### Coaxial Cable (A10832A)

- Length: 2'
- Ideally suited for connecting any radio or modem to the 2.4 GHz Division 1 antenna (CTX 2400 TR)
- Fitted with a RPTNC male and a SMA male connector

### Straight-through Configuration Cable (CBLETH C5A)

- Used to connect to and communicate with Cooper Crouse-Hinds Wireless Ethernet Modems using a PC or via a network router, switch, or hub
- Length: 2 m
- Fitted with two RJ45 male connectors



### Crossover Configuration Cable (CBLETH C5X)

- Used to connect to and communicate with the D2 W GET1 900 Ethernet gateway using a PC or via a network router, switch, or hub
- Length: 2 m
- Fitted with two RJ45 male connectors



## Power Supplies

Power supplies are available for any radio, and come either standard or DIN rail mounted.

### Power Supply (PS 110 20)

- Designed for use with Cooper Crouse-Hinds telemetry modules
- 110 Volt AC pack that mounts directly into a wall-mounted power outlet



### DIN Rail Mounted Power Supply (PS DR Series)

- Designed for use with Cooper Crouse-Hinds telemetry modules
- Single power output
- Universal AC input / full range (110/240VAC)
- Can be mounted on TS-35/7.5 or 15 DIN rail



## Surge Devices

These components are ideally suited for protecting panel-mounted equipment, and are typically used in the controls section of a motor control center (MCC).

### 15 Amp Surge / Filter Device (MA15 Series)

- AC/DC mains power surge protector, filter, and ring suppressor
- Absorbs transient surges that may otherwise damage equipment
- Filters noise in the system
- Prevents surges, causing the filter to "ring" (oscillate) under low load conditions



### I/O Signal Surge Diverter (IOP32 Series)

- Redirects electrical surges safely to ground, and then resets automatically
- Cost-effective surge protection solution which uses minimal space



### Antenna Surge Diverter (CSD 900)

- Installed between the antenna and any Cooper Crouse-Hinds wireless device to reduce lightning surge voltages from entering the radio module
- Fitted with a male SMA connector and a female SMA connector



# Battery Pack

## Battery Pack

The D2 NW BAT 2 is a battery pack for the D2 W SIO wireless device. The battery pack is used in applications where power lines are either not installed or not allowed.

## Applications

- Used to power D2 W SIO units atop of water tanks for monitoring fluid level
- Used to power D2 W SIO units to monitor pipeline cathodes

## Features

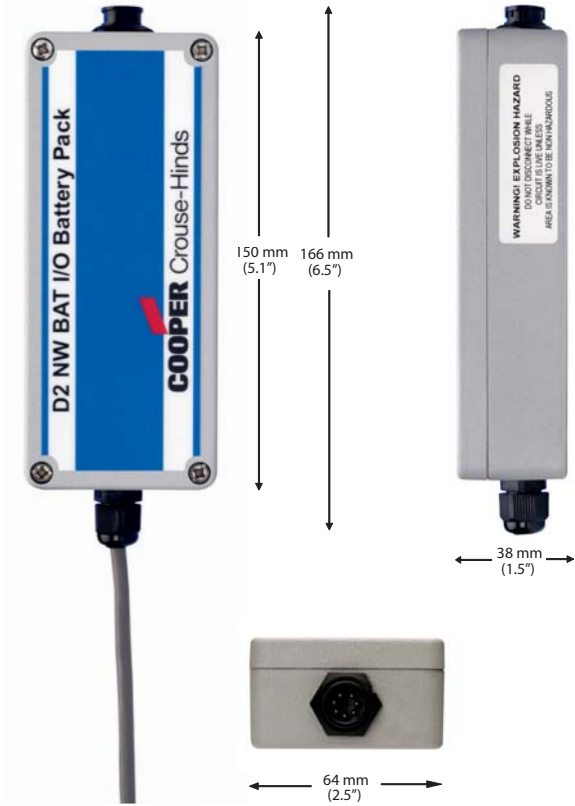
- 9V, 6 AA alkaline batteries
- Housed in a weatherproof (IP66) enclosure



## D2 NW BAT 2



## Dimensions



## Specifications

- Class I, Division 2
- **Expected Life:** up to 1 year, depending on usage and power settings (D2 W SIO will indicate low battery status)

## Ordering Information

Catalog Number	Description
D2 NW BAT 2	Battery Pack for D2 W SIO

# Accessory Ordering Information

	Catalog Number	Description	Gain (dBd)	Connector
ANTENNAS & BRACKETS	CFD890EL	Dipole Antenna with 15' RG58 Coax Cable	2.15	SMA (male)
	SG900EL	Collinear Antenna with 1 ¼" Pole Bracket	5	N-Type (female)
	SG900 6	Collinear Antenna	8	N-Type (female)
	D1 NW ANT 1 900	Division 1 Antenna with RG58 Coaxial Lead	2	TNC (female)
	DG900 1	Whip Antenna with 15' RG8 Coax Cable	-2	SMA (male)
	WH900 SMA	¼ Wave Whip Antenna	-2	SMA (male)
	YU6 900	Yagi Antenna, 6 Element	10	N-Type (female)
	YU16 900	Yagi Antenna, 16 Element	15	N-Type (female)
	WH2400 SMA	2.4 GHz Demo Whip Antenna	0	SMA (male)
	SG2400EL	2.4 GHz Collinear Antenna	5.1	N-Type (female)
	MD2400EL	2.4 GHz Dipole Antenna 5M RG58	1	SMA (male)
	Y2400 18EL	2.4 GHz Yagi Antenna	18	N-Type (female)
	Z2400EL	2.4 GHz Antenna	10	N-Type (female)
	CTX 2400 TR	2.4 GHz Division 1 Antenna	2	RPTNC (female)
	ANT BR YAG KIT	Yagi U-Bolt Bracket	-	-
	ANT BR COL KIT	Collinear U-Bolt Bracket	-	-
CABLES	CBLSER DB9	PC Serial Cable	-	DB9 (male); DB9 (female)
	CBLSER RJ45	PC Serial Cable	-	DB9 (female); RJ45 (male)
	CC900TAIL	RG58 Coaxial Lead - 24" (0.8 m) long	-0.8 (900 MHz); -1.2 (2.4 GHz)	SMA (male); N-Type (female)
	CC3 SMA	RG58 Coaxial Extender Kit - 10' (3m) long	-1 (900 MHz); -2 (2.4 GHz)	SMA (male); N-Type (male)
	CC10 SMA	RG58 Coaxial Extender Kit - 33' (10 m) long	-3.2 (900 MHz); -5.9 (2.4 GHz)	SMA (male); N-Type (male)
	CC20 SMA	RG58 Coaxial Extender Kit - 66' (20 m) long	-6.2 (900 MHz); -11.4 (2.4 GHz)	SMA (male); N-Type (male)
	A 53649A	RG58 Coaxial Cable - 24" long	-1.1	TNC (male); SMA (male)
	A10832A	RG58 Coaxial Cable - 24" long	-1.3	RPTNC (male); SMA (male)
	CBLETH C5A	Ethernet Cable - Direct	-	RJ45 (male); RJ45 (male)
	CBLETH C5X	Ethernet Cable - Crossover	-	RJ45 (male); RJ45 (male)
POWER SUPPLY	PS 110 20	20VDC Power Supply	-	-
	PS DR3012	DIN Rail 12 VDC Power Supply	-	-
	PS DR3024	DIN Rail 24 VDC Power Supply	-	-
	D2 NW BAT 2	Battery Pack	-	-
SURGE PROTECTION	MA15 D 1 SI	110VAC Single Phase Power Surge Protector	-	-
	MA15 D 2 SI	240VAC Single Phase Power Surge Protector	-	-
	IOP32	Single Channel, 24VDC I/O Signal Surge Diverter	-	-
	IOP32D	Dual Channel, 24VDC I/O Signal Surge Diverter	-	-
	CSD 900	900MHz Coax Surge Diverter	-0.2	SMA (male); SMA (female)

# Enclosures - Divisions 1 & 2

For wet, corrosive, hazardous (classified) areas or other industrial locations, we recommend that Cooper Crouse-Hinds radios and components be mounted in the following suitable enclosures. Additional sizes and accessories are available. See the Cooper Crouse-Hinds Product Catalog, [www.crouse-hinds.com](http://www.crouse-hinds.com), or your local Cooper Crouse-Hinds Sales Representative for more information.

## EJB

EJBs are used to house Cooper Crouse-Hinds radios, terminal blocks, and other electrical devices in indoor or outdoor areas which are wet and hazardous due to combustible gases and dust.

## Certifications and Compliances

- Class I, Division 1, Groups C, D\*
- Class I, Division 2, Groups B, C, D\*
- NEMA 3, 4, 7B Div. 2, 7CD, 12
- Explosionproof, watertight

## Design Features

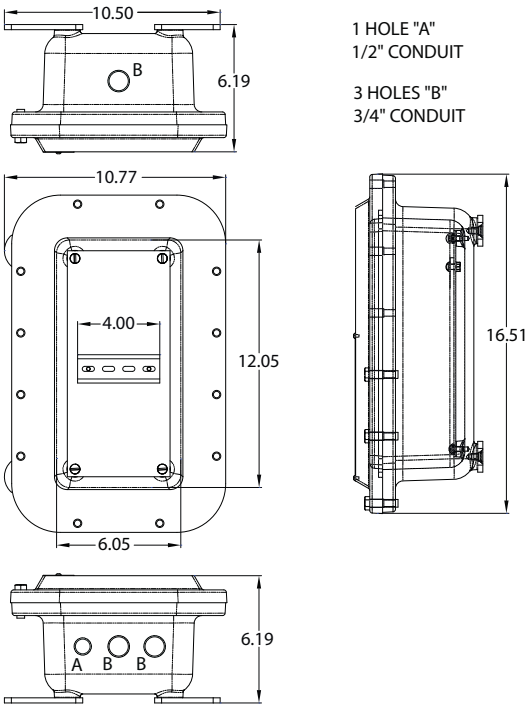
- Special neoprene cover gasket provides a watertight seal to meet NEMA 4 requirements, and provides superior protection for enclosed equipment against water corrosion
- Steel cover bolts
- External flange design - wide unobstructed cover opening provides a completely accessible interior for wiring and electrical equipment
- Furnished with a mounting plate, DIN rail, tapped and plugged conduit entries, and tapped and plugged drain and antenna entries

\*All conduit entries must be sealed per installation instructions. Mounting instructions and provisions provided.

Note: AC/DC power supply will not fit in this enclosure with certain radios. Please consult factory for larger enclosure options.



## Dimensions



## Ordering Information

Catalog Number	Description
EJB120604 MP SA RF KIT**	EJB Enclosure Assembly (Recommended for use with G, MIO, MDME)

\*\*EJB120604 MP SA RF KIT assembly includes the following:

- (1) EJB120604 MP SA (Explosionproof Junction Box drilled and tapped per above drawing)
- (1) MTG PLATE 1299003 (Mounting Plate)
- (1) PLG1 SA (1/2" Plug)
- (3) PLG2 SA (3/4" Plug)
- (1) 1298201 (4" DIN Rail)



## GUB

GUBs are used in applications similar to the EJB Series, but offer a glass window for quick visual inspection of internal devices which are protected in harsh and wet environments.

## Certifications and Compliances

- Class I, Divisions 1 & 2, Group D†
- NEMA 3, 7D, 12
- Explosionproof, raintight

## Design Features

Domed cover or glass window cover can be selected:

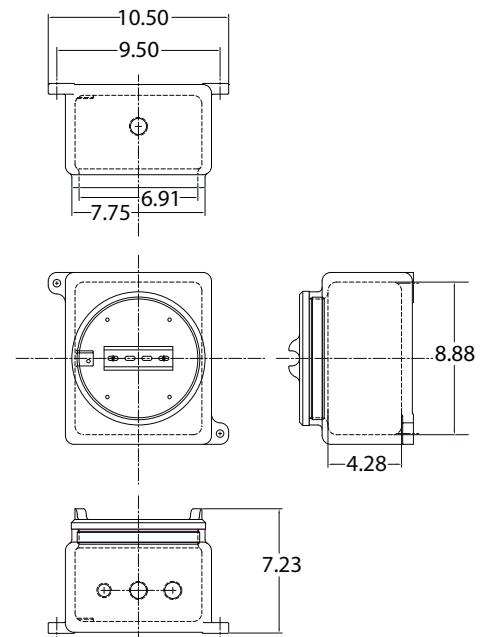
- Glass window cover offers visibility of LED lights used for diagnostics
- Furnished with a mounting plate, DIN rail, tapped and plugged conduit entries, and tapped and plugged drain and antenna entries

†All conduit entries must be sealed per installation instructions. Mounting instructions and provisions provided.

Note: A larger GUB kit is available (**catalog number: GUB319 MP SA RF KIT**) to house radios and additional components.



## Dimensions



## Ordering Information

Catalog Number	Description
GUB06 SA RF KIT††	GUB Enclosure Assembly (Recommended for use with LT, LR, MDME)

††GUB06 SA RF KIT assembly includes the following:

- (1) GUB06 (Explosionproof Junction Box)
- (1) GUB0108 (Glass Window Cover)
- (1) PLG1 SA (½" Plug)
- (3) PLG2 SA (¾" Plug)
- (1) 1298201 (4" DIN Rail)

Note: Mounting plate not required.

# Non-metallic Enclosures - Division 2

Cooper Crouse-Hinds fiberglass enclosures are lightweight and well suited for harsh, wet, and Class I, Division 2 environments. For additional sizes and accessories, see your local Cooper Crouse-Hinds Sales Representative for more information.

## FJDS

The FJDS Series is a cost-effective solution for housing Cooper Crouse-Hinds radios in environmentally harsh conditions.

## Certifications and Compliances

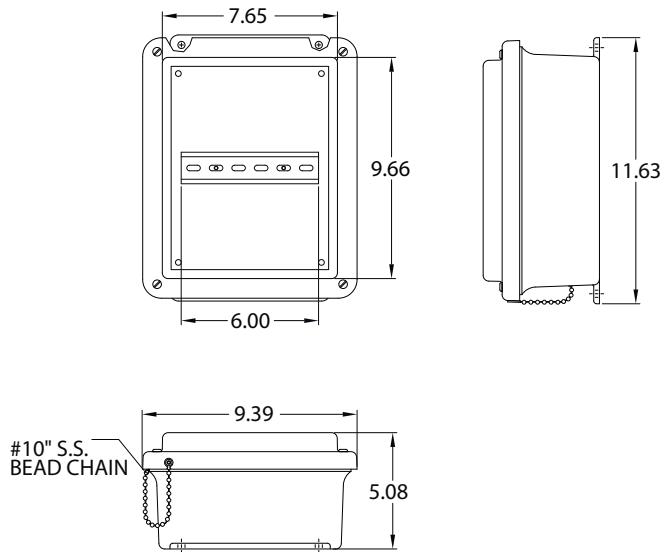
- Class I, Division 2
- NEMA 1, 3, 3R, 4, 4X, 6P, 7 Division 2, 12
- Watertight, raintight, dust-tight, corrosion resistant

## Design Features

- Lift off cover design
- Surface flat stainless steel screw
- Integral mounting flange
- Soft, rounded edges
- Overhang cover
- Stainless steel beaded cover retention chain
- Provided with a mounting plate and DIN rail for easy mounting of Cooper Crouse-Hinds radio components



## Dimensions



## Ordering Information

Catalog Number	Description
FJDS100804 MP FG RF KIT*	Lift Cover Enclosure Kit (Recommended for use with G, MIO, SIO, MDME, BAT)

\*FJDS100804 MP FG RF KIT assembly includes the following:

- (1) FJDS100804 (Enclosure Box)
- (1) 1299013 (Mounting Plate)
- (1) 1298628 (6" DIN Rail)

## FXDJ

The FXDJ Series provides easy access to Cooper Crouse-Hinds wireless devices, and will keep all electrical components free from rain and dust.

## Certifications and Compliances

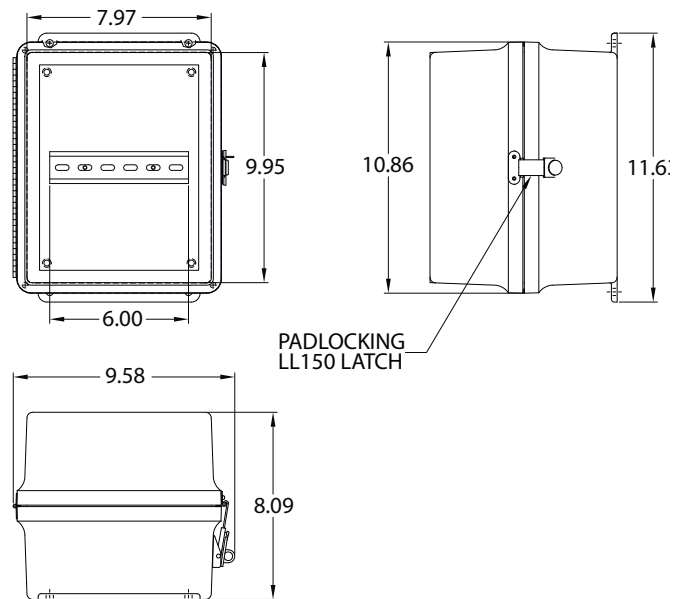
- Class I, Division 2
- NEMA 1, 3, 4X, 7 Division 2, 12
- Watertight, raintight, dust-tight, corrosion resistant

## Design Features

- Latched cover allows for quick entry (can also be locked)
- Latch lies flat on side of enclosure
- Can be lifted and turned with ease
- Full 180° door opening
- Provided with a mounting plate and DIN rail for easy mounting of Cooper Crouse-Hinds radio components



## Dimensions



## Ordering Information

Catalog Number	Description
FXDJ100808 MP FG RF KIT**	Latched Cover Enclosure Kit (Recommended for use with G, MIO, LT, LR, MDME)

\*\*FXDJ100808 assembly includes the following:

- (1) FXDJ100808 (Enclosure Box)
- (1) 1299013 (Mounting Plate)
- (1) 1298628 (6" DIN Rail)

## For more information:

If further assistance is required, please contact an authorized Cooper Crouse-Hinds Distributor, Sales Office, or Customer Service Department.

### U.S. (Global Headquarters):

#### Cooper Crouse-Hinds

Wolf & Seventh North Streets  
Syracuse, NY 13221  
(866) 764-5454  
FAX: (315) 477-5179  
FAX Orders Only: (866) 653-0640  
wireless.support@cooperindustries.com

### Canada:

#### Cooper Crouse-Hinds Canada

Toll Free: 800-265-0502  
FAX: (800) 263-9504  
FAX Orders only: (866) 653-0645

### Mexico/Latin America/Caribbean:

#### Cooper Crouse-Hinds, S.A. de C.V.

52-555-804-4000  
FAX: 52-555-804-4020  
mxmercadotecnia@cooperindustries.com

### Europe (Germany):

#### Cooper Crouse-Hinds GmbH

49 (0) 6271 806-500  
49 (0) 6271 806-476  
info-ex@ceag.de

### Middle East (Dubai):

#### Cooper Crouse-Hinds LLC

971 4 4272500  
FAX: 971 4 4298521

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65-6297-4849  
FAX: 65-6297-4819  
sales@cchspore.com.sg

### China:

#### Cooper Crouse-Hinds Pte. Ltd.

86-21-2899-3600  
FAX: 86-21-2899-4055  
cchsales@cooperindustries.com

### Korea:

#### Cooper Crouse-Hinds Korea

82-2-3484-6783  
82-2-3484-6778

### Australia:

#### Cooper Electrical Australia

61-2-8787-2777  
FAX: 61-2-9609-2342  
sales@cooperelectrical.com.au

### India:

#### Cooper India Pvt. Ltd.

91-124-4683888  
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cchindia@cooperindustries.com

[www.crouse-hinds.com](http://www.crouse-hinds.com)

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