

# DeltaV™ Wireless I/O Card

- Fully redundant wireless solution from Wireless I/O Card (WIOC) to the Smart Wireless Field Link
- Optional simplex for smaller applications
- Seamless integration with DeltaV™ system and AMS Device Manager
- Industry proven security
- *WirelessHART*® delivers PlantWeb®



Redundant Wireless I/O Card (WIOC).

## Introduction

A robust wireless solution is much more than the sum of its parts; it is the result of innovative integration with consideration given to every aspect of the overall system. A Smart Wireless solution consists of the measurement devices, the self-organizing network, and easy integration with the DeltaV™ system. Emerson Automation Solutions offers a full portfolio of wireless solutions enabled by self-organizing *WirelessHART* networks. The DeltaV system and AMS Device Manager provide seamless integration with the Wireless I/O Card. *WirelessHART* devices are the easiest devices to add to your existing control system! All the benefits of HART including HART device alerts for wireless devices are native with the latest DeltaV system and AMS Device Manager releases.

## Benefits

**Fully Redundant Wireless Networks.** The DeltaV WIOC is a complete redundant solution for your wireless needs. Redundant items include DeltaV network communication, 24 V DC power, WIOCs, and Smart Wireless Field Links, as well as the multiple communication paths of the adaptive mesh network itself. The redundant architecture eliminates any single point of failure and provides immediate switchover in case of a fault anywhere along the WIOC and Field Link hardware.

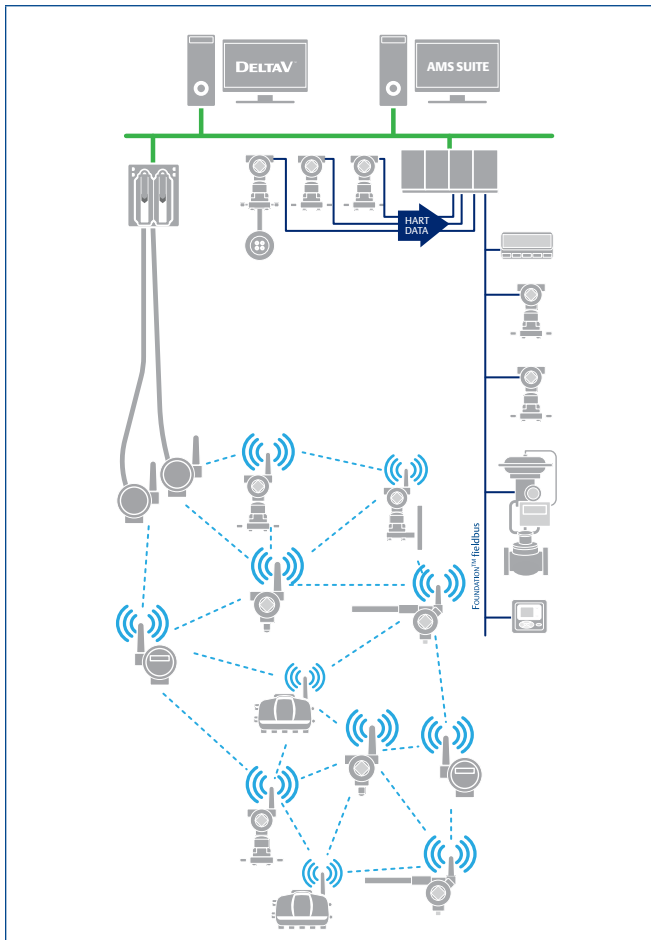
**Seamless integration with the DeltaV system and AMS Device Manager.** The WIOC is auto-detected on the DeltaV network and *WirelessHART* devices are auto-sensed as they are added to the network. There is no site survey required to determine equipment locations. The self-organizing network automatically determines the optimum communication paths for each device to navigate around structures, making it easy and fast to set up your wireless field instrumentation, saving you time and money. With their reliability and ease of use, self-organizing *WirelessHART* mesh networks are perfect in any environment.

Industry-proven security. The Emerson Automation Solutions layered approach to wireless network security ensures that your network stays protected. The network devices implement Encryption, Authentication, Verification, Anti-Jamming, and Key Management methods to ensure that data transmissions are secure.

**WirelessHART delivers PlantWeb.** The WIOC powers PlantWeb by giving you access to intelligent devices using WirelessHART technology. WirelessHART devices have the same PlantWeb alerts as their wired counterparts, providing a consistent user experience.

## Product Description

The WIOC is a native DeltaV I/O node that supports up to 100 wireless devices. The cards install on a 2-wide carrier, with each card having its own Smart Wireless Field link. The WIOC can be commissioned in a simplex mode if no redundancy is needed. The WIOC allows redundancy to be completed later, when needed – online and bumpless.



Self-Organizing WirelessHART Network Diagram.

The WIOC carrier has two Ethernet IO Ports that connect to the DeltaV Area Control Network and are available with copper or fiberoptic media. The Smart Wireless Field links are connected to the I/O card using a 4-conductor cable. The cable has a pair of wires for power and a pair for the communication to the field link.

The WIOC uses the Smart Wireless technology supported by WirelessHART devices and a Self-Organizing Network.

- No wireless expertise is required; devices automatically find the best communication paths with Adaptive Mesh Routing.
- Network continuously monitors paths for degradation and repairs itself.
- Adaptive behavior provides reliable, hands-off operation and simplifies network deployments, expansion, and reconfiguration.

If an obstruction is introduced into the mesh network, devices will find the best alternate communication path. This alternate path is automatically created by the network management software and the device information will continue to flow.

## WirelessHART Integration with the DeltaV System and AMS Device Manager

Native integration with the DeltaV system enables you to autosense the WIOC and easily commission it for seamless integration with all DeltaV applications: Explorer, Diagnostics, and Control Studio. The WIOC is commissioned into the DeltaV I/O network and counts as one of the 300 I/O nodes.

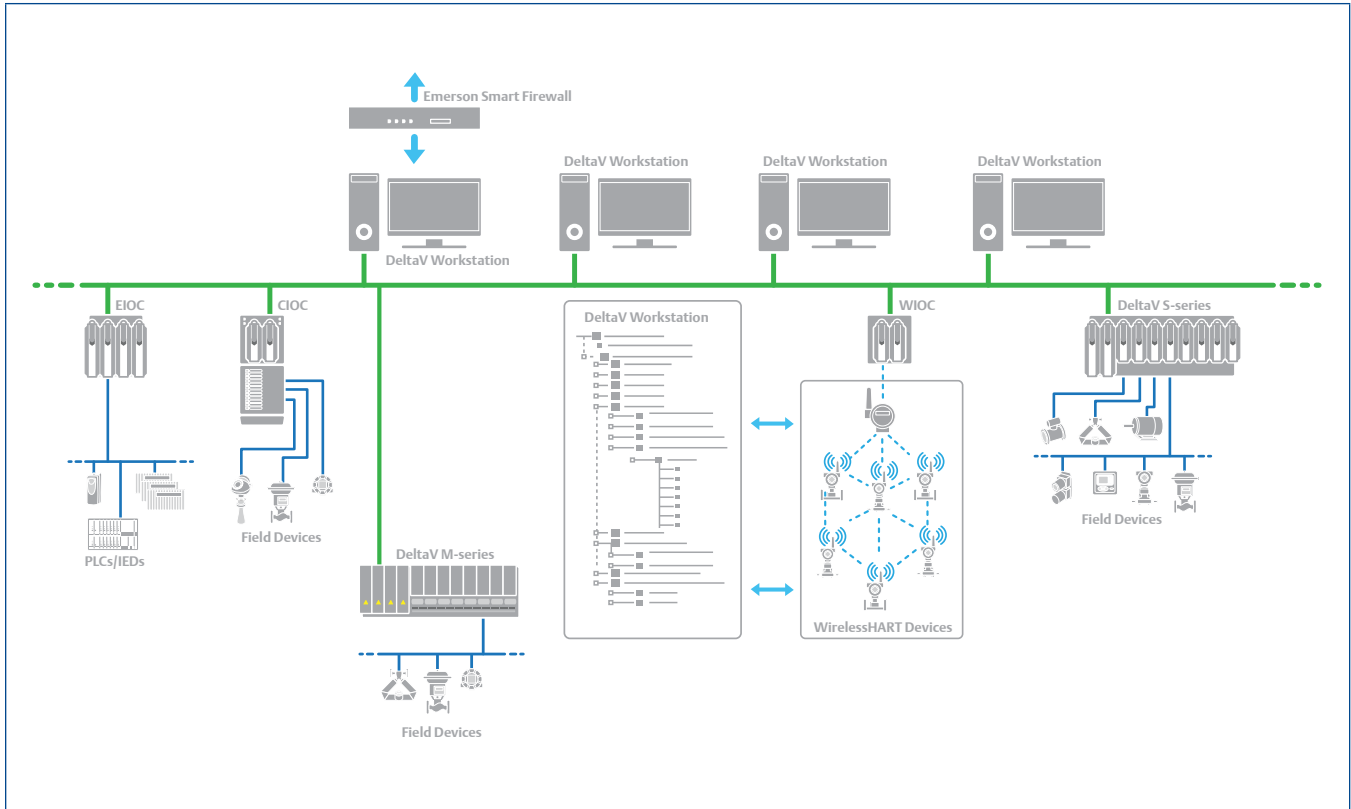
WirelessHART devices can be easily added to a mesh network using AMS Device Manager to assign the Network ID and Join Key. Once configured, simply install the device in the field and it is automatically detected and reconciled through DeltaV Explorer. The device can be assigned to any one of four controllers. Each device is also automatically defined with PlantWeb alerts that proactively report device health to maintenance personnel, with zero configuration.

This provides added flexibility and accommodates late changes where control modules may be reassigned to a different controller.

The Ethernet I/O Ports of the WIOC are the same as DeltaV CHARM I/O Cards (CIOC) and can be connected with CIOCs in the DeltaV network topology. The I/O Port for copper 10/100BASE-TX media support a second “cascade” port that allows a series of WIOCs to be daisy-chained together to simplify the network design and reduce cost.

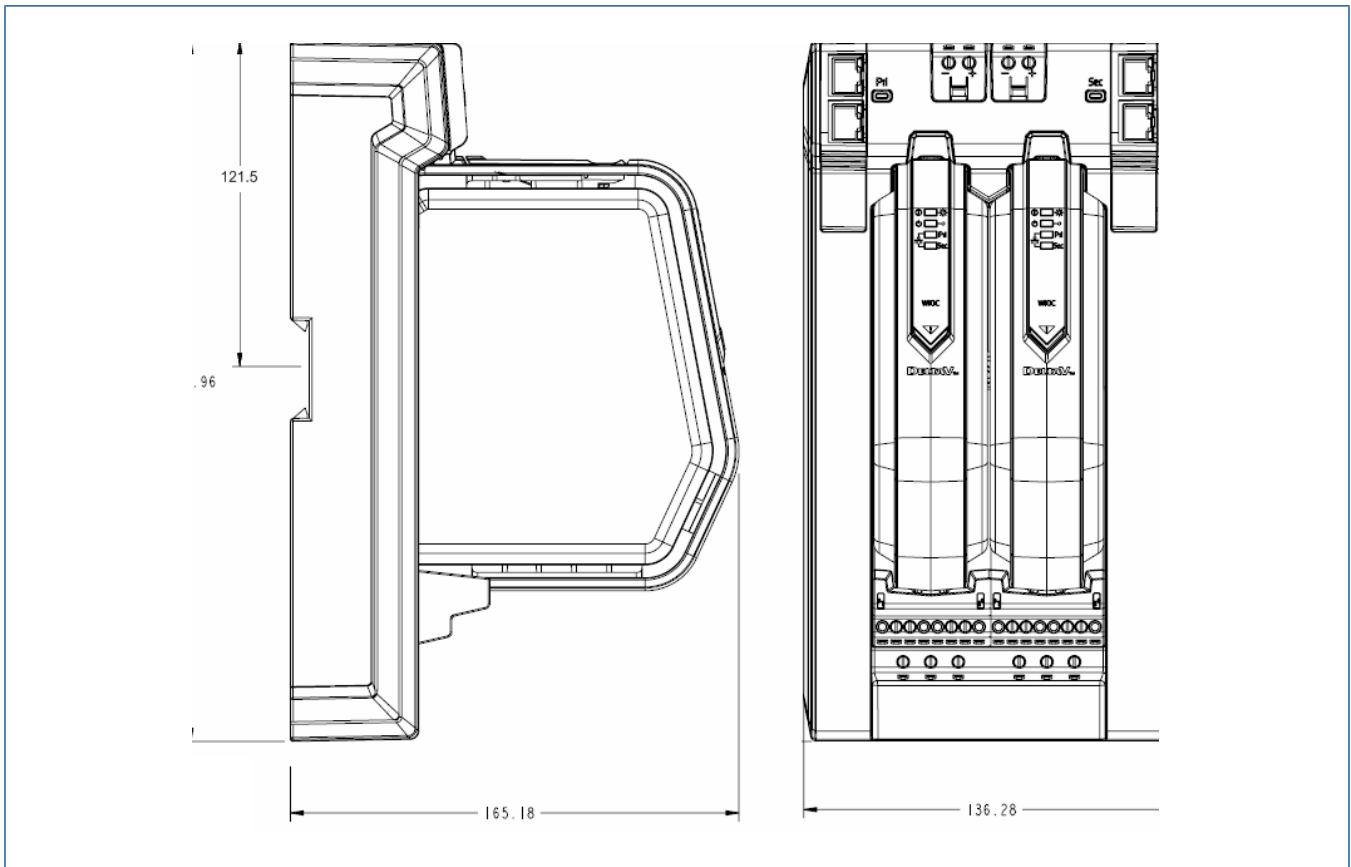
### Scalable WIOC

The WIOC is capable of supporting up to 100 wireless field devices. Once your initial network has been installed, it is quick and easy to add additional devices, allowing you to plan a large installation and add devices over time.

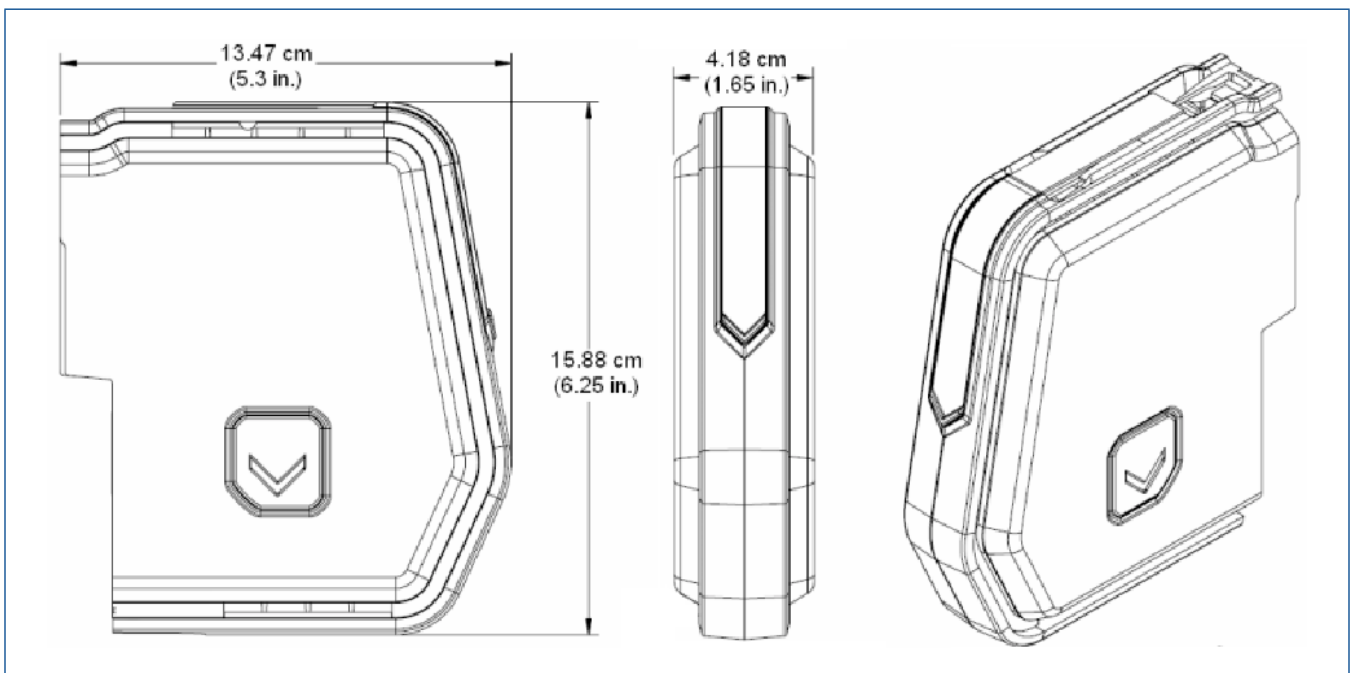


*Integration of hardware and software within DeltaV.*

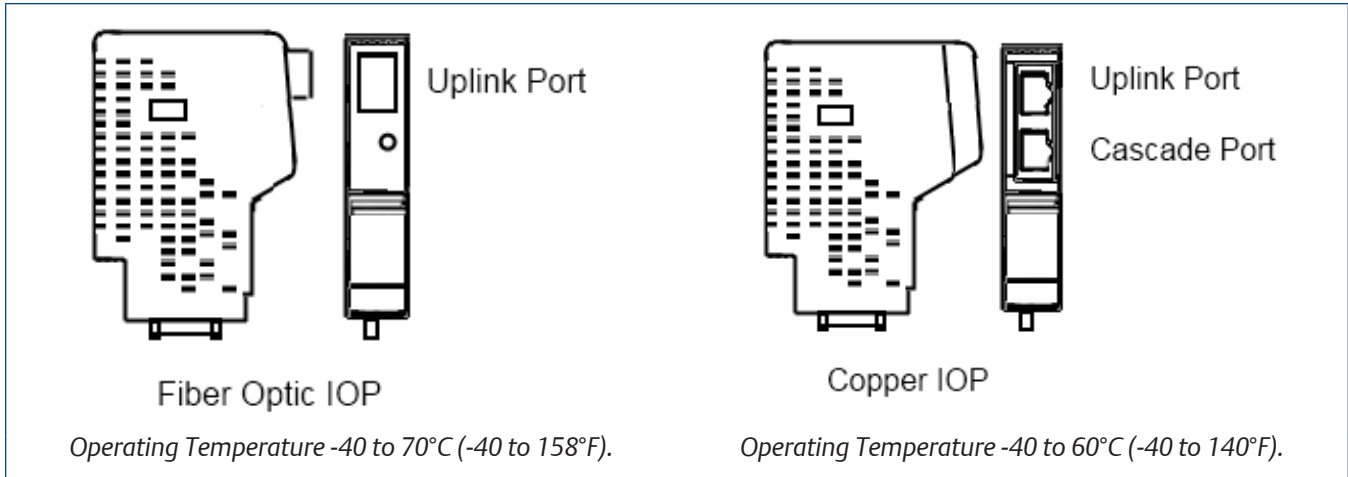
### Hardware Specifications



WIOC and Carrier.



WIOC Dimensions.



WIOC Carrier Ethernet Communication Modules.

## WIOC and Carrier Specification

Environmental Specifications for the Wireless I/O Carrier and Card	
Operating Temperature*	-40 to 70°C (-40 to 158°F)**
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5 to 95% , non-condensing
Protection Rating	IP 20
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 Conformal coating
Shock	10 g ½-sine wave for 11 ms
Vibration	1 mm peak-to-peak from 5 to 13.2 Hz; from 13.2 to 150 Hz

\*Operating any electronics at the higher end of its temperature range for long periods of time will shorten its expected lifetime, see **Effects of Heat and Airflow Inside an Enclosure White Paper** for more information.

\*\*When used with copper Ethernet I/O Ports (Copper IOP). When used with the Fiberoptic I/O Ports (Fiberoptic IOP), the operating temperature range is limited to -40 to 60°C (-40 to 140°F).

## WIOC Hardware

Functional Specifications for the WIOC	
Number of Field devices	100
Number of Controllers per IO Card	4
Update Rates	As fast as 8 seconds for 100 devices
Input Power	24 V DC, 400 mA required to power the WIOC module and the Smart Wireless field link.
Heat Dissipation	11 W maximum per red. WIOC Node: 3.5 W for each WIOC, 2 W for each FO IOP, 1.34 W for each Cu IOP
EMC Performance	Complies with EN 61326-1:2006
Antenna Options	Remote-mounted Smart Wireless Field Link (one per card)
Location	Suitable for mounting in Class I/Division 2 Hazardous Area or IECEx Zone 2 Hazardous Locations. (See Certifications section)

## Smart Wireless Field Link

Environmental Specifications for the Smart Wireless Field Link	
Operating Temperature*	-40° to 70° C (-40° to 158° F)
Relative Humidity	0 to 90%, relative humidity
Functional Specifications for the Smart Wireless Field Link	
Number of Field Links per WIOC	1 per card (two Field links for redundant WIOC)
Input Power	Supplied by WIOC (24 V DC)
EMC Performance	Complies with EN 61326-1:2006
Location	Suitable for mounting in Class I/Division 1 Hazardous Area or Zone 1 Hazardous Locations.
Mounting	<ul style="list-style-type: none"> <li>■ All SST, 2 in. Pipe and Panel Mount Bracket,</li> <li>■ Install redundant Smart Wireless Field Links' antennas at the same height and space them between 1m to 3m apart (3 to 9 feet) horizontally</li> </ul>
Standard Antenna	Wireless Output Power 10 dBm (10 mW)
Extended Range Antenna	Wireless Output Power 13 dBm (20 mW)

\*Operating any electronics at the higher end of its temperature range for long periods of time will shorten its expected lifetime, see *Effects of Heat and Airflow Inside an Enclosure White Paper* for more information.

## Network Specification

Self-Organizing Wireless Network	
Protocol	WirelessHART, 2.4-2.5 GHz (2.400-2.4835 GHz) DSSS IEC 62591
Maximum Network Size	100 Devices
Supported Device Update Rates	WirelessHART, 1 sec., 4 sec., 8 sec., up to 60 min.
Network Size/Latency	100 devices up to 10 sec., 50 devices up to 5 sec., 15 devices up to 2 sec.

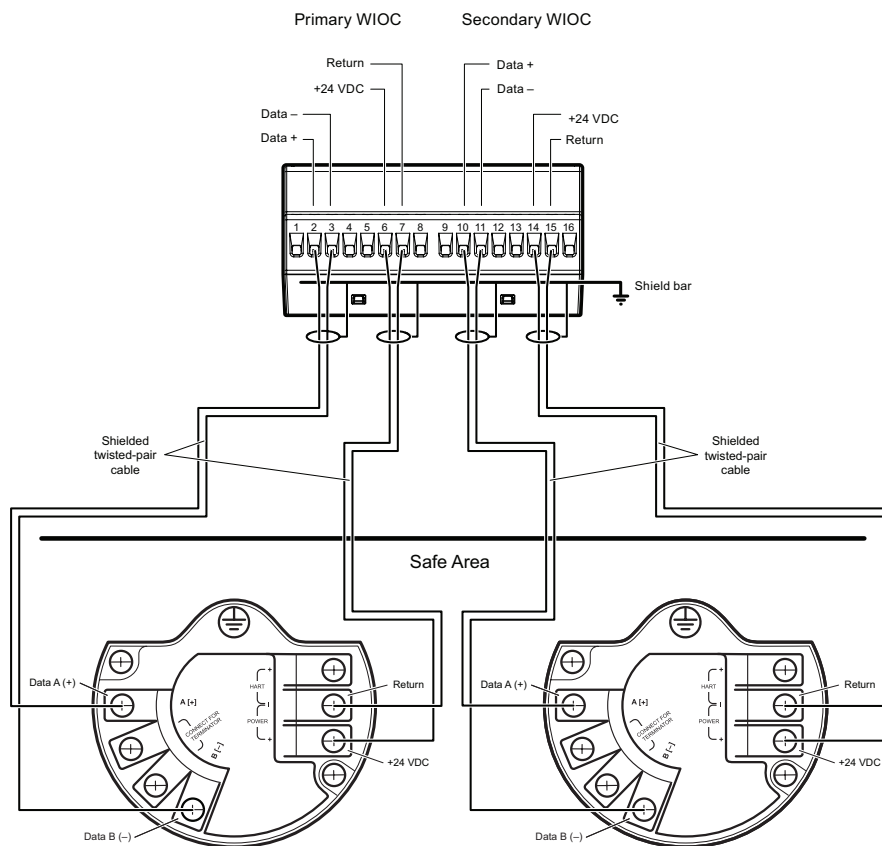
## System Security

System Security	
Ethernet	Secure Sockets Layer (SSL)-enabled (default) TCP/IP communications.
Self-Organizing Network	AES-128 Encrypted WirelessHART, including individual session keys. Unique join keys and device white listing.

## Communication

Communication	
WIOC to Controller	Standard DeltaV Area Control Network <ul style="list-style-type: none"> <li>■ 10/100base-TX Ethernet I/O port</li> <li>■ 10/100Base-FO Ethernet I/O Port Wiring:                             <ul style="list-style-type: none"> <li>■ Cat5E STP cable. Wiring distance 328 ft. (100 m)</li> <li>■ Multimode Fiberoptic with MTRJ connectors (2 km)</li> </ul> </li> </ul>
Smart Wireless Field Link to WIOC	Protocol: Proprietary Wiring: Belden 3084A multi-conductor (or equivalent) <ul style="list-style-type: none"> <li>■ 4-conductor cable                             <ul style="list-style-type: none"> <li>● 24 AWG twisted shielded pair for data (Blu/Wht)</li> <li>● 22 AWG twisted shielded pair for power (Red/Blk)</li> </ul> </li> <li>■ Wiring distance is maximum 656 ft. (200 m)</li> </ul>

### Redundant Smart Wireless Field Links in a safe area



Reference schematic based on the use of power limiting WIOC terminal block (KL4302X1-CA2). For additional wiring schemes and information about supported I.S. Barriers, please refer to the Guardian Knowledge Base.

## System Compatibility

- The WIOC requires v11.3.1 software or later for SQ, SD Plus, and SX controllers.
- The WIOC requires v14.3 software or later for MQ, MD Plus, and MX controllers.
- Fiberoptic Ethernet I/O Ports require DeltaV v12.3 or later software.
- Assigning I/O Signals from the WIOC to the SZ Controller requires DeltaV v12.3 or later software.
- The WIOC is not supported on any M- or S-series Controller Interface for PROVOX.
- The WIOC is not supported on any M-series Controller Interface for RS3 I/O.
- V1.2.1 Steam Logic or higher required for HART IP-based communication supported by simplex WIOC setups only.
- Topworx 4310 On/Off Valve Positioner with DI and DO Function block support in Control studio requires v13.3 software.
- Rosemount 702 Discrete Transmitter with DI and DO Function block support in Control studio requires v13.3 software.

## Certifications

The following certifications are available for the WIOC (see actual certificates for exact certifications):

- **CE:**  
EMC- EN 61326-1
- **FM:**  
FM 3600  
FM 3611
- **CSA:**  
CSA C22.2 No. 213  
CSA C22.2 No. 61010-1
- **ATEX:**  
IEC 60079-0  
IEC 60079-7

- **IEC Ex:**  
IEC 60079-0  
IEC 60079-7
- **Marine Certifications:** IACS E10  
ABS Certificate of Design Assessment  
DNV Marine Certificate
- **Worldtech:**  
Achilles Communications Certification Level 2

## Hazardous Area/Locations

The WIOC can be installed and used based on the following standards (see actual certificates for exact product markings):

- **FM (USA):**  
Class I, Division 2, Groups A, B, C, D, T4
- **cFM (Canada):**  
Class I, Division 2, Groups A, B, C, D, T4
- **ATEX:**  
II 3G Ex ec IIC T4 Gc
- **IEC Ex:**  
II 3G Ex ec IIC T4 Gc

The WIOC itself is a wired device and is not governed by related certifications, FCC and IC regulations. The Smart Wireless Field Link is a wireless device and does fall under these certifications and regulations.

## Telecommunication Compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.



## Smart Wireless Field Link

The field link is a remote antenna, mounted within 200 m of the WIOC, which provides power to the field link. The field link communicates wirelessly with the field instrumentation and as such is governed by RF interference guidelines, FCC and IC regulations.

### ■ CE:

EMC- EN 61326-1

### ■ CSA:

CSA C22.2 No. 0-M91

CSA-C22.2 No. 61010-1

### ■ ATEX:

II 1G Ex ia IIC T4 Ga

### ■ IEC-Ex:

II 1G Ex ia IIC T4 Ga

## Redundant WIOC Ordering Information

Description	Model Number
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Copper Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Aluminum</b> Housings and <b>Standard</b> Antennas	SE4801T01
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Copper Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Stainless Steel</b> Housings and <b>Standard</b> Antennas	SE4801T02
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Copper Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Aluminum</b> Housings and <b>Extended</b> Range Antennas	SE4801T03
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Copper Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Stainless Steel</b> Housings and <b>Extended</b> Range Antennas	SE4801T04
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Fiber optic Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Aluminum</b> Housings and <b>Standard</b> Antennas	SE4801T05*
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Fiber optic Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Stainless Steel</b> Housings and <b>Standard</b> Antennas	SE4801T06*
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Fiber optic Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Aluminum</b> Housings and <b>Extended</b> Range Antennas	SE4801T07*
<b>Redundant WIOC; WirelessHART Field Link;</b> Includes two WIOCs, a Carrier with a Terminal Block for two WIOCs and <b>Fiber optic Ethernet Ports;</b> two <i>WirelessHART</i> Field Links with <b>Stainless Steel</b> Housings and <b>Extended</b> Range Antennas	SE4801T08*

\* *Fiber optic Ethernet I/O Ports requires DeltaV v12.3 or later software and are not cascade able.*

## Simplex WIOC Ordering Information

Description	Model Number
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Copper Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Aluminum</b> Housing and <b>Standard</b> Antenna	SE4801T09
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Copper Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Stainless Steel</b> Housing and <b>Standard</b> Antenna	SE4801T10
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Copper Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Aluminum</b> Housing and <b>Extended</b> Range Antenna	SE4801T11
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Copper Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Stainless Steel</b> Housing and <b>Extended</b> Range Antenna	SE4801T12
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Fiberoptic Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Aluminum</b> Housing and <b>Standard</b> Antenna	SE4801T13*
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Fiberoptic Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Stainless Steel</b> Housing and <b>Standard</b> Antenna	SE4801T14*
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Fiberoptic Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Aluminum</b> Housings and <b>Extended</b> Range Antenna	SE4801T15*
<b>Simplex WIOC; WirelessHART Field Link;</b> Includes one WIOC, a Carrier with a Terminal Block for two WIOCs, a Carrier Protection Cover and <b>Fiberoptic Ethernet Ports;</b> one <i>WirelessHART</i> Field Link with <b>Stainless Steel</b> Housing and <b>Extended</b> Range Antenna	SE4801T16*

## WIOC Spare Part Ordering Information

WIOC Spare Parts	
Description	Model Number
Copper Ethernet I/O Ports; for WIOC Carriers	KL1601X1-BA1
Fiber optic Ethernet I/O Ports; for WIOC Carriers	KL1602X1-BA1 *
WIOC	KL2102X1-BA1
2-Wide Carrier for WIOC; Screw Terminals	KL4102X1-BA1
WIOC Redundant Terminal Block	KL4302X1-CA2
Power Terminal Plug for CHARM I/O Carrier	KJ4005X1-BF1
WirelessHART Field Link; <b>Aluminum</b> Housing, <b>Standard</b> Antennas	KJ1621X1-BA1
WirelessHART Field Link; <b>Stainless Steel</b> Housing, <b>Standard</b> Antennas	KJ1621X1-BA2
WirelessHART Field Link; <b>Aluminum</b> Housing, <b>Extended</b> Range Antennas	KJ1621X1-BA3
WirelessHART Field Link; <b>Stainless Steel</b> Housing, <b>Extended</b> Range Antennas	KJ1621X1-BA4
Protection Cover for WIOC Carrier	SE6105

\*Fiber optic Ethernet I/O Ports requires DeltaV v12.3 or later software and are not cascade able.

## Prerequisites

- Using the WIOC with Electronic Marshalling requires DeltaV v11.3.x or later software.
- Using the WIOC with DeltaV SIS with Electronic Marshalling requires DeltaV v12.3.x or later software.
- Using the WIOC with MD Plus, MQ, and MX controllers requires DeltaV v14.3 or later software.
- The WIOC is not supported with the M- or S-series Controller Interface for PROVOX.
- The WIOC is not supported on any M-series Controller Interface for RS3 I/O.

©2022, Emerson. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co. The DeltaV logo is a mark of one of the Emerson family of companies. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while diligent efforts were made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.

### Contact Us

[www.emerson.com/contactus](http://www.emerson.com/contactus)