

# Wireless I/O Card



Wireless I/O Card (WIOC)

- Fully redundant Wireless solution from Wireless I/O Card to the Smart Wireless Field Link
- Seamless integration with DeltaV™ and AMS Suite.
- Industry Proven security
- WirelessHART®™ delivers PlantWeb®.

## 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 Process Management offers a full portfolio of wireless solutions enabled by self-organizing WirelessHART networks. The DeltaV system and AMS Suite version 11 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 and AMS Suite releases.



## Benefits

**Fully Redundant Wireless Networks.** The DeltaV Wireless I/O Card is a complete redundant solution for your wireless needs. Redundant items include DeltaV network communication, 24VDC power, Wireless I/O cards, 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 failures 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 Suite.** The Wireless I/O Card 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.

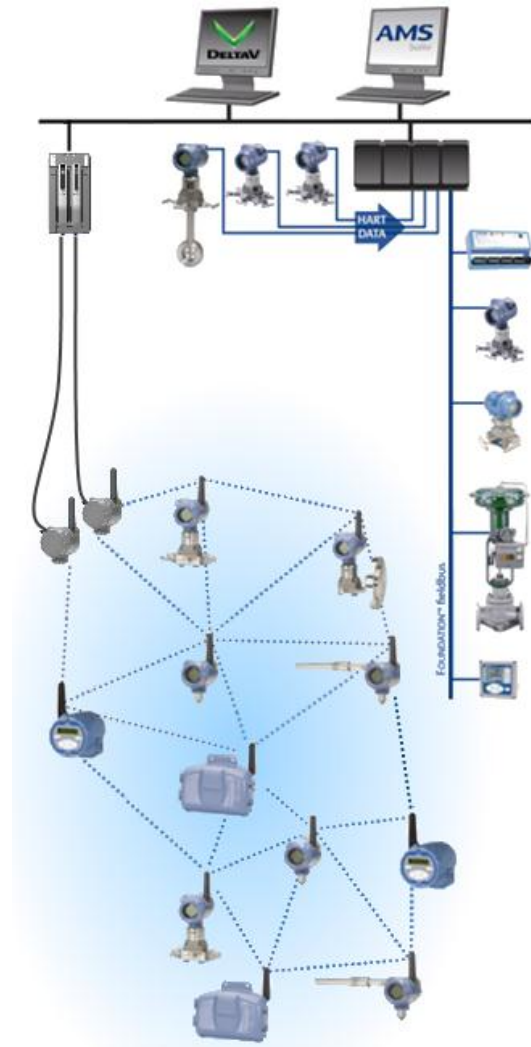
**Industry-proven security.** The Emerson Process Management layered approach to wireless network security ensures that your network stays protected. The network devices implement Encryption, Authentication, Verification, Anti-Jamming and Key Management methods to ensure that data transmissions are secure.

**WirelessHART delivers PlantWeb.** The Wireless I/O Card 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 Wireless I/O Card 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 Wireless I/O Card can be commissioned in a simplex mode if no redundancy is needed, this allows redundancy to be completed later, when needed.

The WIOC carrier has two Ethernet IO Ports that connect to the DeltaV Area Control Network and are available with copper or fiber optic 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.



*Self-Organizing WirelessHART Network Diagram*

The Wireless I/O Card 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 Suite

Native integration with the DeltaV system enables you to autosense the Wireless I/O Card 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**

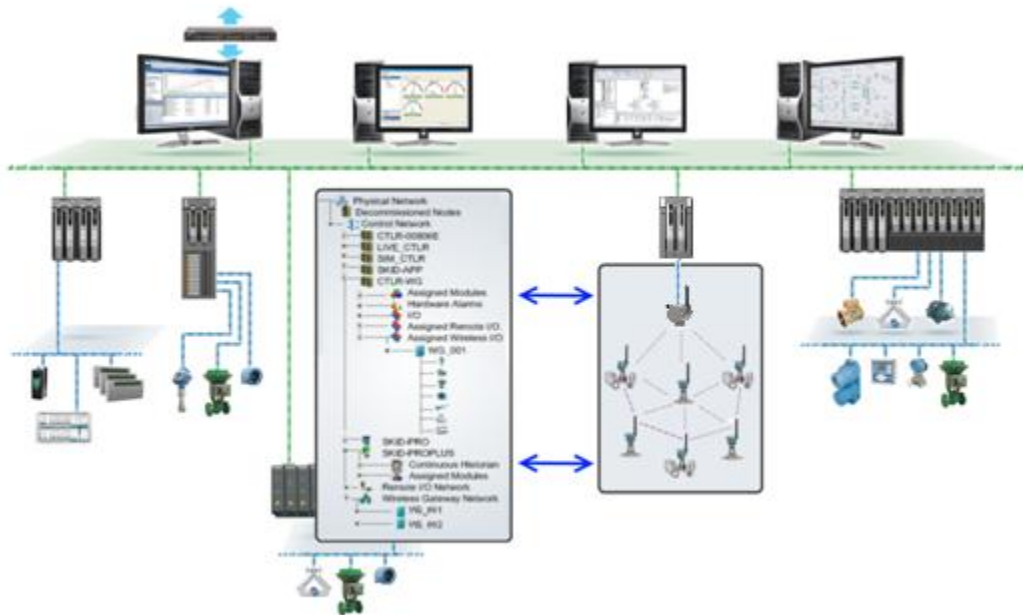
WirelessHART devices can be easily added to a mesh network using AMS Device Manager to assign the Network ID and Join Key. Once configured, simply install the device in the field and it is automatically detected and reconciled through DeltaV Explorer. The device can be assigned to any one of four controllers. 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 and can be connected with CIOC's 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 WIOC's to be daisy chained together to simplify the network design and reduce cost.

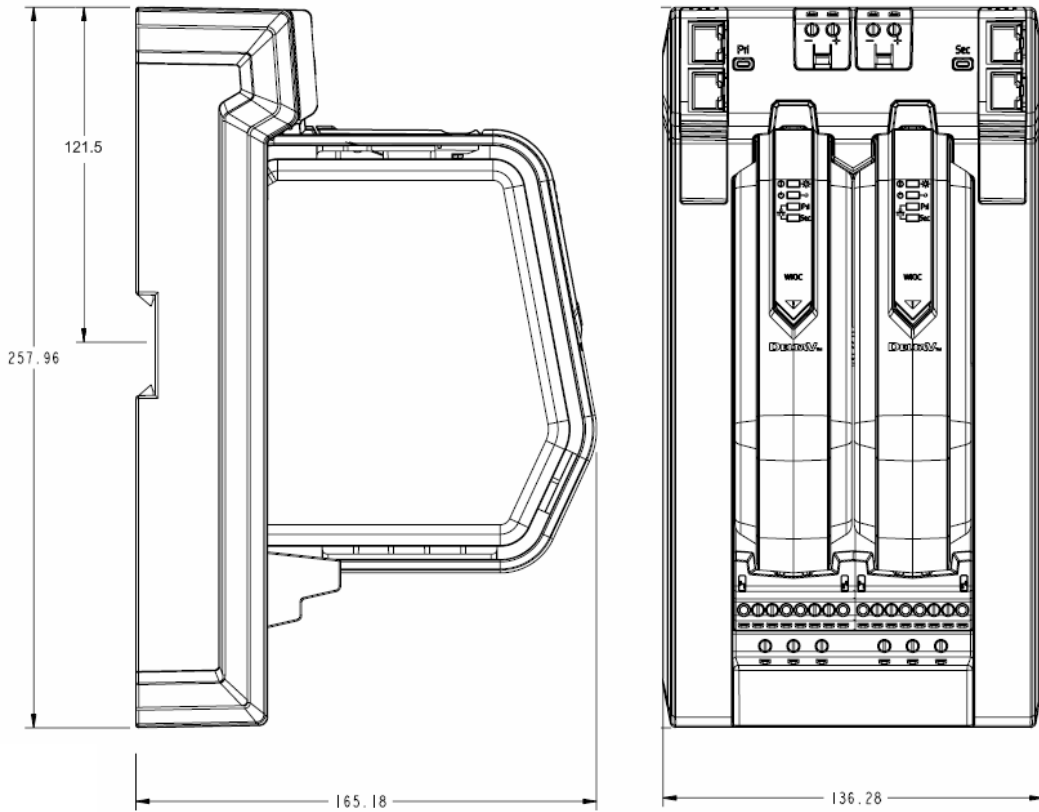
### Scalable Wireless I/O Card

The Wireless I/O Card 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.

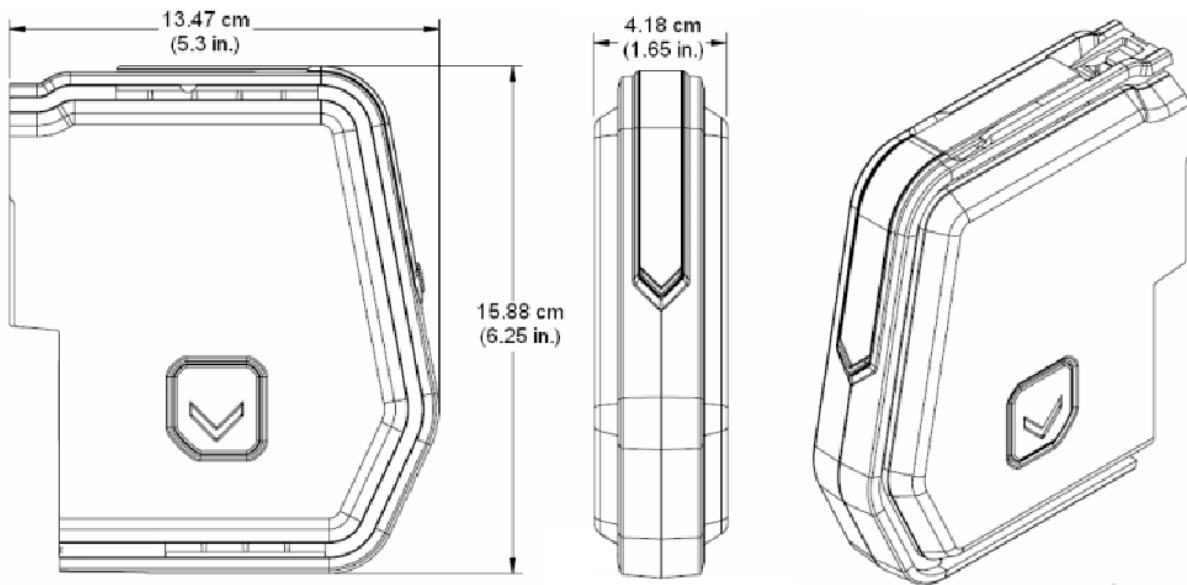


Integration of hardware and software within DeltaV

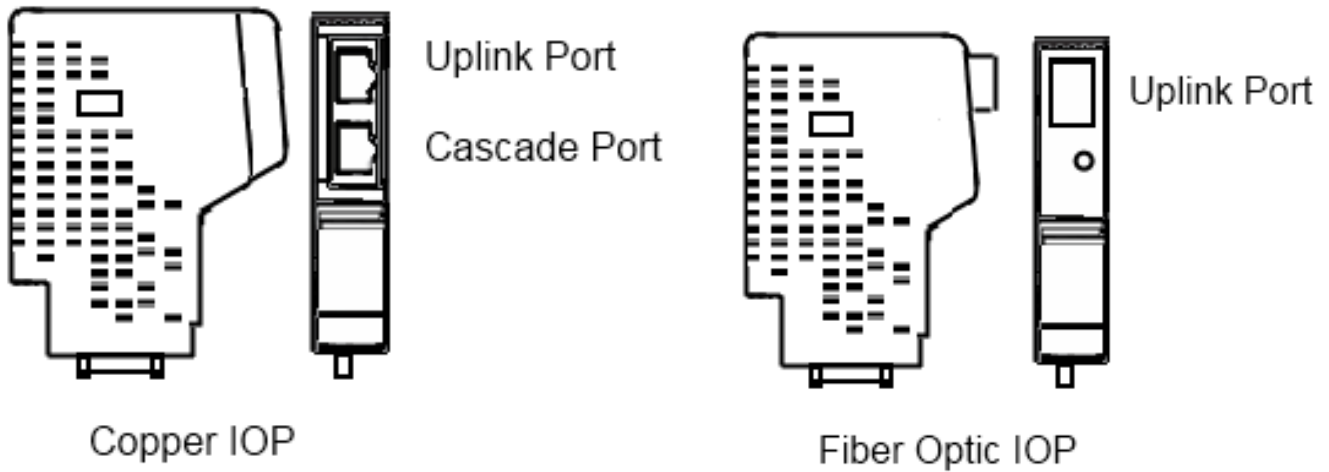
Hardware Specifications



Wireless I/O Card and Carrier



Wireless I/O Card (WIOC) Dimensions



Operating Temperature -40 to 70 °C (-40 to 158 °F)

Operating Temperature -40 to 60 °C (-40 to 140 °F)

WIOC Carrier Ethernet Communication Modules

**Wireless I/O Card 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, NEMA 12
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; 0.7 g from 13.2 to 150 Hz

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

## Wireless I/O Card hardware

Functional Specifications for the Wireless I/O Card	
Number of Field devices	100
Number of Controllers per IO Card	4
Update rates	As fast as 8 second for 100 devices
Input Power	24 V DC, 400 mA required to power the Wireless I/O Card 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 613261-1:2006
Antenna Options	Remote mounted Smart Wireless Field Link (one per card)
Location	Suitable for mounting in Class 1/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 VDC)
EMC Performance	Complies with EN 613261:2006
Location	Suitable for mounting in Class 1/Division 1 Hazardous Area or Zone 1 Hazardous Locations.
Mounting	All SST, 2 in. Pipe and Panel Mount Bracket
Standard Antenna	Wireless Output Power 10 dBm (10 mW)
Extended Range Antenna	Wireless Output Power 13 dBm (20 mW)

## 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, 50 devices up to 5, 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 IO port</li> <li>- 10/100Base-FO Ethernet IO Port</li> </ul> Wiring: <ul style="list-style-type: none"> <li>- Cat5E STP cable. Wiring distance 328 ft. (100 m)</li> <li>- Multimode Fiber Optic with MTRJ connectors (2 km)</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>o 24 AWG twisted shielded pair for data (Blu/Wht)</li> <li>o 22 AWG twisted shielded pair for power (Red/Blk)</li> </ul> </li> <li>- Wiring distance is maximum 656 ft. (200 m)</li> </ul>

\* Smart Wireless Field Links mounted in any other Location than Safe Area, would require a set of Barriers in between the WIOC and the Smart Wireless Field Links, while using Belden 3084A multi conductor cable (or equivalent)

The following Barriers are tested with the WIOC and the Smart Wireless Field Link and can be connected into the power supply line (30 VDC):

STAHL 9176 10-16-00

The following Barriers are tested with the WIOC and the Smart Wireless Field Link and can be connected into the data line (RS485):

GM International D1061S (the recommended DIP switch settings for this Barrier are shown below )

SW 1	Hazardous Area Termination								located on side B
	On	On	On	On					
SW 2	Safe Area Serial Line Type Hardware Configuration					Safe Area Termin.			located on side A
	Off	Off	On	Off	On	Off	On		
SW 3	Serial Line Type		Bit Frame Structure		Baud Rate				located on side A
	Off	Off	On	Off	Off	Off	On		

## **System Compatibility**

- The Wireless I/O card requires v11.3.x software and S-series Controller.
- Fiber Optic Ethernet I/O Ports requires DeltaV v12.3 or later software
- The Wireless I/O card is not supported on the S- series Migration Controller for PROVOX.



## Certifications

### Wireless I/O Card certifications

The Wireless I/O card and carrier have been designed to meet or exceed the requirements for certification according to the following standards:

■ **CE:**

- EMC- EN 61326-1:2006
- LVD- EN 61010-1:2001

■ **CSA:**

- CLASS 2252 05 - PROCESS CONTROL EQUIPMENT:

CAN/CSA-C22.2 No. 213-M1987  
Requirements-Canadian Electrical Code, Part II

CAN/CSA-C22.2 No. 1010-1-04 Safety  
Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use,  
Part 1: General Requirements

■ **CENELEC Zone 2 ATEX/IEC EX**

IEC 60079-0:2009  
IEC 60079-15:2005/2010  
Certifying agency: Nemko

II 3G Ex nA IIC T4 Gc – Ta +70°C:  
Certificate Number: Nemko  
10ATEX3225U

■ **FM Approval**

**Class 1 Division 2 Hazardous Locations**

Certifying agency: FM Approvals  
FM Class 3606  
3611  
3810

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 61326-1:2006
- LVD- EN 61010-1:2001

■ **CSA:**

CLASS 2252 05 - PROCESS CONTROL EQUIPMENT:

CAN/CSA-C22.2 No. O-M91 General  
Requirements-Canadian Electrical Code, Part II

CAN/CSA-C22.2 No. 61010-1-04 Safety  
Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use,  
Part 1: General Requirements

■ **ATEX/IEC EX**

II 1G Ex ia IIC T4 Ga – Ta +70°C:

## Ordering Information

Set Description	Model Number
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Copper Ethernet Ports</b> ; 2 WirelessHART Field Links w/ <b>Aluminum</b> Housings and <b>Standard</b> Antennas	SE4801T01
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Copper Ethernet Ports</b> ; 2 WirelessHART Field Link w/ <b>Stainless Steel</b> Housings and <b>Standard</b> Antennas	SE4801T02
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Copper Ethernet Ports</b> ; 2 WirelessHART Field Links w/ <b>Aluminum</b> Housings and <b>Extended Range</b> Antennas	SE4801T03
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Copper Ethernet Ports</b> ; 2 WirelessHART Field Link w/ <b>Stainless Steel</b> Housings and <b>Extended Range</b> Antennas	SE4801T04
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Fiber Optic Ethernet Ports</b> ; 2 WirelessHART Field Link w/ <b>Aluminum</b> Housings and <b>Standard</b> Antennas	SE4801T05*
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Fiber Optic Ethernet Ports</b> ; 2 WirelessHART Field Link w/ <b>Stainless Steel</b> Housings and <b>Standard</b> Antennas	SE4801T06*
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Fiber Optic Ethernet Ports</b> ; 2 WirelessHART Field Link w/ <b>Aluminum</b> Housings and <b>Extended Range</b> Antennas	SE4801T07*
<b>Redundant Wireless I/O Card</b> ; WirelessHART Field Link; Includes 2 WIOCs, a Carrier with a Terminal Block for 2 WIOCs and <b>Fiber Optic Ethernet Ports</b> ; 2 WirelessHART Field Link w/ <b>Stainless Steel</b> Housings and <b>Extended Range</b> Antennas	SE4801T08*
Description	Model Number
Copper Ethernet I/O Ports; for WIOC Carriers	KL1601X1-BA1
Fiber Optic Ethernet I/O Ports; for WIOC Carriers	KL1602X1-BA1*
Wireless I/O Card (WIOC)	KL2102X1-BA1
2-Wide Carrier for Wireless I/O Card; Screw Terminals	KL4102X1-BA1
Wireless I/O Card Redundant Terminal Block	KL4302X1-CA1
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 Range</b> Antennas	KJ1621X1-BA3
WirelessHART Field Link; <b>Stainless Steel</b> Housing <b>Extended Range</b> Antennas	KJ1621X1-BA4

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

## Prerequisites

S-Series Electronic Marshalling hardware requires DeltaV v11.3.x or later software.

The Wireless I/O card is not supported on the S- series Migration Controller for PROVOX

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