Honeywell | Connected Industrial

Honeywell OneWireless™ Field Device Access Point Specification Release R320 OW03-650-320, December 2020

Technical Specification

OneWireless Network Overview

Honeywell OneWireless™ Network is an industrial wireless mesh network capable of simultaneously supporting ISA100 Wireless* (IEC 62734), WirelessHART (IEC 62591) field instruments (transmitters, actuators, etc.), Wi-Fi devices and Ethernet/IP-based devices. The network is comprised of the following interconnected elements: Honeywell OneWireless Wireless Device Manager (WDM), Honeywell OneWireless Field Device Access Point (FDAP), Cisco* Aironet* 1552S Access Point, and Cisco Wireless Controller. The WDM manages the ISA100 Wireless and WirelessHART wireless field instrument network, including wireless field instruments, FDAPs, Cisco Aironet 1552S Access Points and HART* devices connected wirelessly through the Honeywell OneWireless Adapter or third party WirelessHART adapters

The FDAP is an industrial meshing access point providing secure and reliable wireless coverage for ISA100 Wireless and/or WirelessHART field instruments only. It uses advanced spatial diversity techniques to mitigate multi-path-induced communication problems found in typical industrial environments, and thereby improve communication reliability and increase effective range. FDAP can also be converted into a unique device type called as Field Expandable Wireless IO (FEWIO) allowing it to transmit data from connected Modbus devices over the wireless network back into the control room.

The FDAP self-discovers and forms an IEEE 802.15.4 -based wireless mesh network that routes data to and from ISA100 Wireless and/or WirelessHART field instruments and process control applications.

The Cisco Aironet 1552S is an industrial meshing access point that provides secure and reliable wireless coverage for IEEE 802.11b/g/n wireless devices and ISA100 Wireless and/or WirelessHART field instruments. Cisco access points self-discover and form a high-speed IEEE 802.11-based wireless mesh network that routes data to and from wireless clients (e.g., Wi-Fi clients, wired Ethernet devices and wireless field instruments) and process control applications.

The Cisco Wireless Controller provides real-time communications between the 1552S access points in order to simplify the deployment and operation of wireless networks. The controller delivers centralized security policies, Wireless Intrusion Prevention System (WIPS) capabilities, award-winning RF management, and Quality of Service (QoS) for process data, voice and video.

Honeywell Field Device Access Point (FDAP)

Product Overview

The FDAP is an industrial meshing access point for ISA100 Wireless and/or WirelessHART field instruments. Once implemented in a plant, it self-discovers other neighbouring wireless devices (e.g., Cisco access points, other FDAPs, and ISA100 Wireless/WirelessHART field Instruments) to form a reliable and secure IEEE 802.15.4-based wireless mesh network. The device can support all ISA100 Wireless and WirelessHART field instruments including wired HART instruments connected to the wireless adapters.

The FDAP uses an advanced spatial diversity scheme combined with Honeywell's intelligent wireless algorithm to significantly improve communication reliability in extreme multi-path environments and extend the wireless coverage for ISA100 Wireless/WirelessHART field instruments by a factor of 1.5 compared to other wireless routing devices without diversity.

Key Benefits

- Provides superior performance in multi-path and non-line-of-sight environments
- Enables use of wireless field instruments for applications requiring fast reporting rates (less than 10 seconds) and short latency (less than 250 mS)
- Optimizes the battery life of a wireless field instrument
- Enables wireless field devices in areas where Wi-Fi radios are not allowed
- Reduces the number of wireless routing devices needed for optimal wireless coverage of ISA100 Wireless/ WirelessHART field instruments
- Helps reduce operating costs (fewer line-powered routing devices and optimized batteries for wireless field instruments)

Hardware

The FDAP is a 24 VDC- or 120/230 VAC-powered field device featuring an ISA100 Wireless and WirelessHART Multiprotocol radio with spatial diversity and one Ethernet input for optional connection to a wired network or a wireless access point. Users terminate the power cable and Ethernet cable inside the unit, eliminating the need for a separate enclosure or junction box for termination in hazardous environments.

The FDAP comes in two models: one model certified for Div 2/Zone 2 areas and a second certified for Div 1/Zone 0 areas.

Access Point and Field Router

The FDAP can be used as both an access point and a field router. When connected to a wired backbone such as a Local Area Network (LAN) via an Ethernet port, the FDAP acts as an access point and will route ISA100 Wireless/WirelessHART traffic via the Ethernet connection to the WDM. When installed as a router in the field but not connected to a wired backbone, the FDAP acts a repeater and will route ISA100 Wireless/WirelessHART traffic to another routing field device.

Field Expandable Wireless IO (FEWIO)

A FDAP being used as a field router can be converted into a Modbus master through a software configuration over-the-air. Such a device is called as FEWIO. A FEWIO can connect to Modbus slaves through Modbus RTU or TCP and transmit the data from such slaves over the ISA100 Wireless network back to the control room.

Self-Configuring and Self-Healing Mesh

As previously stated, the FDAP self-discovers other neighboring ISA100 Wireless/WirelessHART devices to form a reliable and secure ISA100 Wireless/WirelessHART-based wireless mesh network. Honeywell's intelligent wireless routing algorithm enables the FDAP to identify the best route to send data to and from wireless field instruments. This algorithm optimizes the field instrument mesh network when FDAPs are added to, or removed from the network.

The FDAP radio operates in the license-free 2.4 GHz ISM band using the ISA100 Wireless and WirelessHART Multiprotocol radio, which is a standard-based IEEE 802.15.4 radio

Robust Embedded Security for ISA100 and WirelessHART Communications

Security is a primary concern for the process automation community. To mitigate security threats, ISA100 Wireless and WirelessHART requires all process data to be AES-128-bit encrypted. The data is encrypted and decrypted at the field I/O device and WDM level to provide end-to-end security for the process data.

In addition to data encryption, the ISA100 Wireless and WirelessHART standards require each wireless field device to be authenticated before joining the network. The ISA100 Wireless standard supports two types of authentication key distribution:

over-the-air and infrared. The infrared authentication key distribution method adds another layer of security as it requires users to be physically next to the wireless field instrument to add it to the network. The FDAP supports both authentication key distribution methods. The WirelessHART standard supports authentication key deployment only through a physical HART modem connection to the device.

Third-Party Library Support

The authentication keys are managed by the WDM. A handheld device is used when opting for the infrared / HART modem authentication key distribution. The handheld uploads the authentication keys from the WDM and downloads keys to field devices using short-range infrared communication for ISA100 Wireless or using a HART modem connection for WirelessHART devices. The FDAP features a conveniently located IR port for use in device commissioning. Once a key is deployed to any wireless field device, including the FDAP, it is validated by the WDM before the wireless field device can join the OneWireless Network. Key deployment is a one-time activity, which means that devices can re-join the network after power-down or other service interruptions without re-keying the device.

Remote and Local Configuration

FDAPs require minimal configuration. All configuration parameters are easily accessible from the WDM, which centralizes all key functions required to manage the field instrument network and wireless field devices.

Hardware Specifications

Lightning Surge Arrestors and Antenna Selection

FDAPs come with the choice of integral and remote surge arrestors as well as integral and remote antennas. The antenna selection includes integrated omni-directional antennas and remote-mounted, high-gain, directional and omni-directional antennas. The FDAP supports a variety of high- and low-gain directional antennas to provide flexibility in installation and maximum performance of the wireless system.

Model Numbers	FDAP1 (Class 1 Div 1 / Zone 0) FDAP2 (Class 1 Div 2 / Zone 2)
Multiple Standards / Field Protocols	ISA100 Wireless
Weight	3.86 kg (5.5 lbs)
Dimensions	216 x 170 x 86 mm (8.47 x 6.73 x 3.37 in)
Power	FDAP1: 18-30 VDC at 2 Watts FDAP2[1]: 18-30 VDC at 2 Watts / 100-240 VAC, 50/60 Hz
External Ports and Connections	2 X external antenna ports for 2.4 GHz ISA100 Wireless and WirelessHART field instruments
Internal Connections	1 X 10/100 Mbps auto-negotiation Ethernet port 1 X shielded power cable 1 X grounding cable
Environmental Ratings	IP66, NEMA Type 4X, G3 corrosion resistance per ANSI/ISA-S71.04-1985
Operating Temperature	FDAP1: -40 to +75° C (FM) -40 to +70° C (IECEx) -40 to +70° C (ATEX) -40 to +70° C (CSA) FDAP2: -40 to +70° C (FM) -40 to +70° C (IECEx) -40 to +70° C (ATEX) -40 to +70° C (CSA)

Operating Humidity	0~100% non-condensing
Transportation and Storage Humidity	0~100% non-condensing
Mechanical Shock	4G
Data Rates and Modulations	Radio: 250 Kbps, DSSS/O-QPSK Wire: 10 / 100 Mbps Fast Ethernet
Frequency Band and Operating Channels	Unlicensed ISM Band (2.4 – 2.483 GHz) 13 DSSS channels for ISA100 Wireless
Compliance	**Radio Approvals** **FCC Part 15.247 Subparts B and C** **Canada – Industry Canada** Method RSS-210, Issue 7 RSS-Gen, Issue 2 ICES-003, Issue 4 **Australia and New Zealand – ACMA** AS NZS 4268-2008 **European Union – ETSI** EN 300 328 V1.8.1 EN 301 489-17 V2.2.1 EN 301 489-1 V1.9.2 IEC61326-1, 2006 **CE Mark** R&TTE Directive 1999 / 5 / EC EMC Directive 2004 / 108 / EC LVD Directive 73 / 23 / EEC ATEX Directive 94 / 9 / EC **Hazardous Environment Ratings** *FDAP1 Model:* FM: Class I, Division 1 Group C, D / Zone 0 Group IIB T4 CSA: Class I, Division 1, Group C, D; T4 Ex ia IIC T4 Ga IECEx: Ex ia IIB Ga T4 ATEX: II 1G Ex ia IIB T4 Ga *FDAP2 Model:* FM: Class I, Division 2 Group A, B, C, D / Zone 2 Group IIC T4 CSA: Class I, Division 2, Group C, D; T4 Ex nA nC [ic] IIC T4 GcIECEx: Ex nA nC [ic] IIC T4 Gc ATEX: II 3G Ex nA nC [ic] IIC T4 Gc
Security	128-bit AES encryption
Quality of Service	Supported
Transmit Power (Maximum)	18 dBm
Receive Sensitivity (Typical)	-95 dBm @ 250 kbps
Network Interface	10/100 Mbps Ethernet, auto-sensing

Number of Supported ISA100 Wireless and WirelessHART Field Instruments	*FDAP as an access point (connected to a high-speed backbone[2]):* 10 ISA100 Wireless or 8 WirelessHART Field Instruments at 0.5 second reporting rate OR 5 ISA100 Wireless and 4 WirelessHART Field Instruments at 0.5 second reporting rate 25 ISA100 Wireless or 25 WirelessHART Field Instruments at 1 second reporting rate OR 12 ISA100 Wireless and 12 WirelessHART Field Instruments at 1 second reporting rate 50 ISA100 Wireless or 50 WirelessHART Field Instruments at 2 seconds reporting rate OR 25 ISA100 Wireless and 25 WirelessHART Field Instruments at 2 seconds reporting rate80 ISA100 Wireless Field Instruments at 5 seconds or 80 WirelessHART Field Instruments at 4 seconds reporting rate OR 40 ISA100 Wireless and 40 WirelessHART Field Instruments at 5 seconds and 4 seconds reporting rate respectively 100 ISA100 Wireless Field Instruments at 10 seconds or slower or100 WirelessHART Field Instruments at 8 seconds or slower reporting rate OR 50 ISA100 Wireless and 50 WirelessHART Field Instruments at 10 seconds and 8 seconds or slower reporting rate respectively *FDAP as a router (routing data to another ISA100 Wireless or WirelessHART device):* 5 ISA100 Wireless or 4 WirelessHART Field Instruments at 0.5 second reporting rate OR 3 ISA100 Wireless and 2 WirelessHART Field Instruments at 0.5 second reporting rate 12 ISA100 Wireless or 12 WirelessHART Field Instruments at 1 second reporting rate OR 6 ISA100 Wireless and 6 WirelessHART Field Instruments at 1 second reporting rate 25 ISA100 Wireless or 25 WirelessHART Field Instruments at 2 second reporting rate OR 12 ISA100 Wireless and 12 WirelessHART Field Instruments at 2 second reporting rate 40 ISA100 Wireless Field Instruments at 5 seconds or 40 WirelessHART Field Instruments at 4 seconds reporting rate OR 20 ISA100 Wireless and 20 WirelessHART Field Instruments at 5 seconds and 4 seconds reporting rate respectively 50 ISA100 Wireless Field Instruments at 10 seconds or slower or 50 WirelessHART Field Instruments at 8 seconds or slower reporting rater OR 25 ISA100 Wireless and 25 WirelessHART Field Instruments at 10 seconds or slower and 8 seconds or slower reporting rate respectively
Number of Supported Enraf FlexLine Radar Gauges / Wireless Field Interface (WFI)	*FDAP as an access point (connected to a high-speed backbone[3]):* 13 Enraf FlexLine Radar Gauges / WFI *FDAP as a router (routing data to another ISA100 device):* 10 Honeywell Enraf FlexLine Radar Gauges / WFI with 1 second publication rate with input only channels 5 devices with 1 second publication rate with both input and output channels

Field Expandable Wireless IO (FEWIO)	50 FEWIOs per WDM 3 Modbus slaves per FEWIO Maximum 100 Modbus registers per FEWIO at 30 seconds or slower update rate Maximum 16 Modbus registers per FEWIO at 1 second update rate Maximum 999 Modbus registers per WDM
Maximum Number of Wireless Network Hops Between an Access Point and a Field Device	4 Hops
Warranty	1 Year
ECCN	5A002 ENC

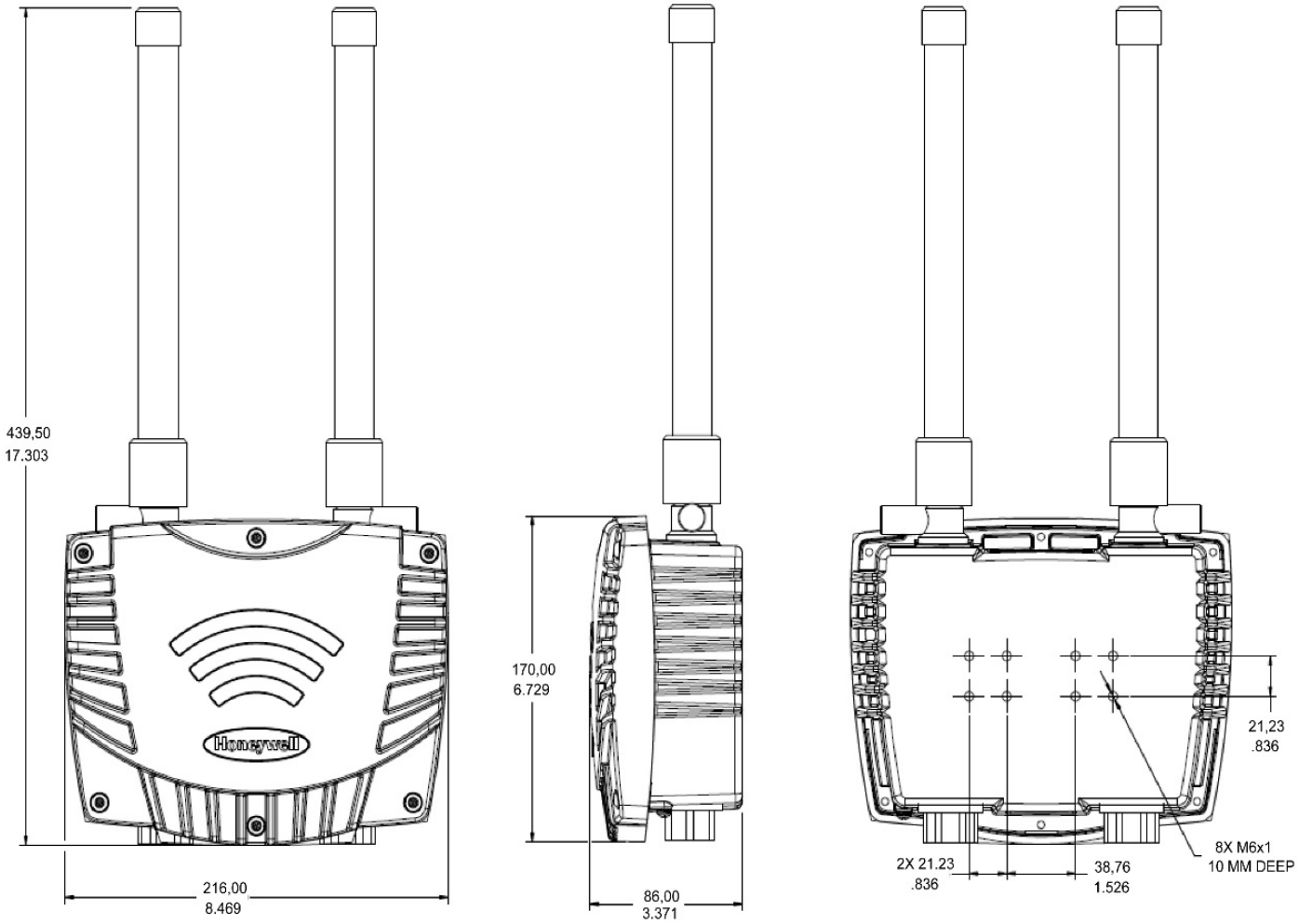
[1] **No external power converter required when used with AC power input**

[2] **Field Instruments with input channels only**

[3] **These limits are for applications using Enraf Interface protocol tunnel. When Enraf Interface protocol tunnel is disabled, capacity limits as specified for ISA100 Wireless instruments apply**

Technical Drawing

Units: mm [inches]



Model Selection Guide

Honeywell

Section 13
Page: WNM-11
Effective Date: December 7, 2020

OneWireless Field Device Access Point

Model Selection Guide
34-XY-16-92 Issue 16

Model Selection Guide with Price Data

Honeywell Proprietary

Instructions

- Select the desired key number. The arrow to the right marks the selection available.
- Make one selection from Table I. Select Table II options as desired.

Key Number	I	II	III	IV	V	VI
_____	- _____	- _____	- __	- __	- ____	- _

List Price equals the sum of all prices for all selections made.

KEY NUMBER

Description	Part Number	Selection	Avail.
Field Device Access Point with Class 1 Div 2 certification (i.e. 24VDC and 120/230V AC power input)	51198665-200	FDAP2	•
Field Device Access Point with Class 1 Div 1 certification (24VDC power input)	51198665-100	FDAP1	•

TABLE I - DSSS Antenna 1 Options

None	N/A	F0 __ __	•
5 dBi Integral Omni	51506534-101	F1__ __	•
8 dBi Remote Omni	50018414-001	F8__ __	•
with No Integral Lightning Surge Arrestor	N/A	__ 00 __	•
with Integral Lightning Surge Arrestor	51202383-200	__ SA __	•
with Remote Lightning Surge Arrestor	51202359-100	__ RS __	•
No Cable	N/A	__ __ 00	•
1 m (3.2 ft) Cable	50018278-001	__ __ 01	•
3 m (9.8 ft) Cable	50018278-003	__ __ 03	•
10 m (32 ft) Cable	50018278-010	__ __ 10	•

TABLE II - DSSS Antenna 2 Options

None	N/A	F0 __ __	•
5 dBi Integral Omni	51506534-101	F1__ __	•
8 dBi Remote Omni	50018414-001	F8__ __	•
with No Integral Lightning Surge Arrestor	N/A	__ 00 __	•
with Integral Lightning Surge Arrestor	51202383-200	__ SA __	•
with Remote Lightning Surge Arrestor	51202359-100	__ RS __	•
No Cable	N/A	__ __ 00	•
1 m (3.2 ft) Cable	50018278-001	__ __ 01	•
3 m (9.8 ft) Cable	50018278-003	__ __ 03	•
10 m (32 ft) Cable	50018278-010	__ __ 10	•

TABLE III - Options

None	N/A	00	•
Wall mount kit	51202381-501	WM	•
Pole mount kit for 6.35 cm (2 1/2") max diameter pole	51196557-502	PM	•

The minimum value of orders acceptable for Honeywell is USD 500. Handling fee is the amount of the difference between USD 500 and the actual purchase price.

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TABLE IV - Destination Country / Region	Part Number	Selection	Avail.
North America, Canada	N/A	NA	•
Latin America	N/A	SA	•
Europe, Middle East, Africa	N/A	EU	•
Asia Pacific	N/A	AP	•

TABLE V

Factory Use		0000	•

TABLE VI - Radio Firmware

Radio version OW R3XX (Latest in R3XX will be supplied)	N/A	1	•
Radio version OW R2XX (Latest in R2XX will be supplied)	N/A	2	•

NOTES:

1. **No power supply required.**
2. **Electronic documentation is mandatory.**
3. **If you need a different supported version of OneWireless Radio on the FDAP, submit a note in the manufacturing notes.**

The minimum value of orders acceptable for Honeywell is USD 500. Handling fee is the amount of the difference between USD 500 and the act purchase price.

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For More Information

Learn more about Honeywell's OneWireless solutions, visit www.honeywellprocess.com or contact your Honeywell Account Manager.

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