Honeywell

**Honeywell OneWireless**

# OneWireless
# Field Device Access Point
## User's Guide

R200
October 2010



**Release** 200 **Draft**

# Notices and Trademarks


**Release** 200 **October 2010**





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# About This Document

This document describes the procedure to configure, install, and operate the Honeywell Field Device Access Point (FDAP). The FDAP is one of the component of Honeywell's OneWireless network solution for industrial control.

## Release Information

| Document Name | Document ID | Release Number | Publication Date |
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| Field Device Access Point User's Guide - fdapug | | 200 | October 2010 |

| Document Category |
|---|
| |

## References

The following list identifies all documents that may be source of reference for material discussed in this publication.

| Document Title |
|---|
| OneWireless R200 Hardware Planning and Installation Guide |
| OneWireless R200 Wireless Device Manager User's Guide |

# Support and Other Contacts

### United States and Canada

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|---|---|
| Contact: | Honeywell Solution Support Center |
| Phone: | 1-800-822-7673<br>Calls are answered by dispatcher between 6:00 am and 4:00 pm Mountain Standard Time. Emergency calls outside normal working hours are received by an answering service and returned within one hour. |
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### Elsewhere

Call your nearest Honeywell office.

### World Wide Web

Honeywell Solution Support Online:

http://www.honeywell.com/ps

### Training Classes

Honeywell Automation College:

http://www.automationcollege.com

## Symbol Definitions

The following table lists the symbols used in this document to denote certain conditions.

| Symbol | Definition |
|---|---|
|  | **ATTENTION:** Identifies information that requires special consideration. |
|  | **TIP:** Identifies advice or hints for the user, often in terms of performing a task. |
|  | **REFERENCE -EXTERNAL:** Identifies an additional source of information outside of the bookset. |
|  | **REFERENCE - INTERNAL:** Identifies an additional source of information within the bookset. |
| **CAUTION** | Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process. |
|  | **CAUTION**: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.<br><br>**CAUTION** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual. |
|  | **WARNING**: Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.<br><br>**WARNING** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual. |

| Symbol | Definition |
|---|---|
|  | **WARNING, Risk of electrical shock**: Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible. |
|  | **ESD HAZARD:** Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices. |
|  | **Protective Earth (PE) terminal**: Provided for connection of the protective earth (green or green/yellow) supply system conductor. |
|  | **Functional earth terminal**: Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements. |
|  | **Earth Ground**: **Functional earth connection.** NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements. |
|  | **Chassis Ground**: Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements. |

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# 1. OneWireless System

## 1.1 Overview

Honeywell's OneWireless solution is a multi-application, multi-standard wireless network for industrial applications. It offers wireless coverage networks ranging from a simple wireless field instrument network to a completely integrated plant-wide multi-application wireless network. OneWireless R200 is based on a new wireless communication stack, a new software partitioning and physical topology, and a new software model.

The OneWireless network provides support for field instruments, actuators, and wireless-enabled applications within a single network. The solution optimizes plant productivity and reliability, improves safety and security, and ensures regulatory compliance. The OneWireless network seamlessly extends the process control network to a plant that has the capability to,

- Install battery-powered wireless field instruments to collect additional data to improve control strategies or conform to regulations at lower costs.
- Empowers a mobile workforce by providing remote access to process data and other plant-related information.
- Enhances plant security by cost effectively implementing wireless CCTV cameras.
- Improves personnel safety.
- Connects remote controllers to the central control system.

## 1.2 OneWireless network topology

The OneWireless network includes the following components:

- Wireless Device Manager (WDM)
- Field Device Access Point (FDAP)
- Field instruments
- Multinode

OneWireless network consists of an ISA100 compatible wireless sensor mesh network that can be installed as a stand-alone system or can be combined with an IEEE802.11 based backhaul. In addition to its own network offering, OneWireless R200 also supports third party backhaul mesh network. OneWireless network is the only backhaul mesh

network designed specifically for the process industry with wireless access points. It is capable of communicating with ISA100 field instruments as well as Wi-Fi clients.

The following diagram displays a typical OneWireless network.

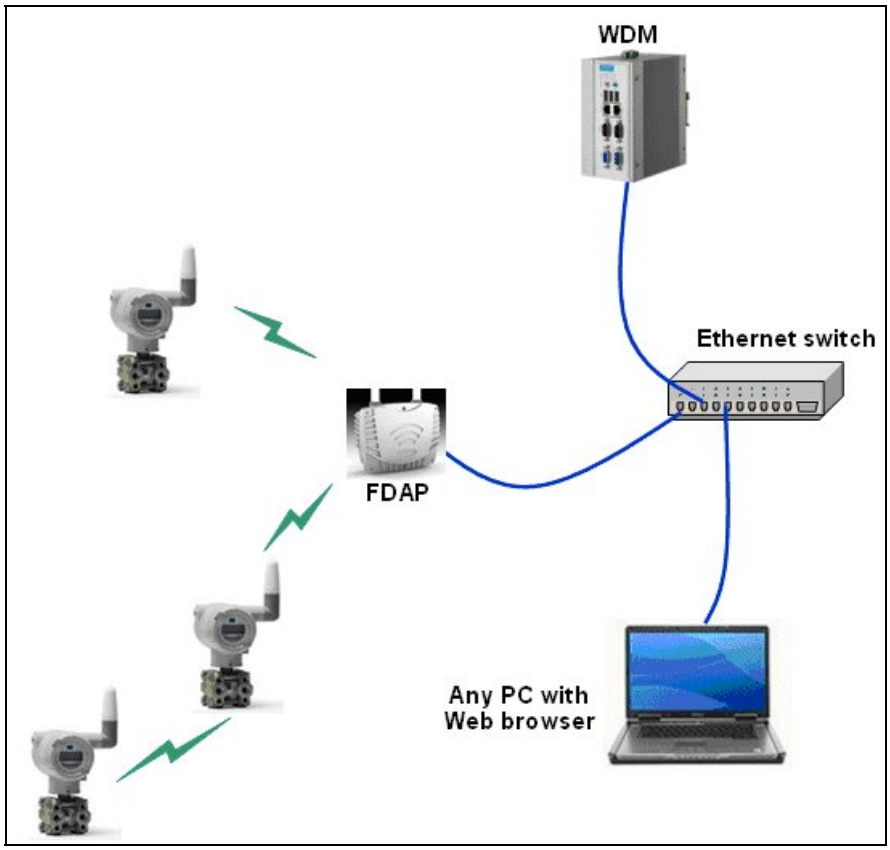


**Figure 1 – OneWireless network**

For more information about OneWireless network topologies, refer to the section "Planning the OneWireless Network" in *OneWireless Hardware Planning and Installation Guide*.

# 2. Agency Compliance Information

## 2.1 Compliance statements and restrictions

This section contains agency compliance information for Honeywell's OneWireless FDAP.

### FCC compliance statements

The Federal Communications Commission (FCC) compliance statements are as follows:

- This device complies with Part 15 of the FCC Rules and Regulations. Operation of the device is subject to the following two conditions:
  - This device may not cause harmful interference.
  - This device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply within the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiates radiofrequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user should correct the interference at their own expense.
- Intentional or unintentional changes or modifications must not be made to the FDAP unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and voids the manufacturer's warranty.

### Industry Canada (IC) compliance statements

The Industry Canada (IC) compliance statements are as follows:

- To reduce potential radio interference to other users, the antenna type and its gain must be chosen so that the equivalent isotropic radiated power (EIRP) is not more than that permitted for successful communication.
- Operation is subject to the following two conditions:
  - This device may not cause interference.

  - This device must accept any interference, including interference that may cause undesired operation of the device.

- This Class A digital apparatus complies with Canadian ICES-003.

### RF safety statement

To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied.

- Remote point-to-multi-point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 20cm from all persons.
- Remote fixed point-to-point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a
- Separation distance of at least 100cm from all persons.
- Furthermore, when using integral antenna(s) the FDAP unit must not be collocated with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.

### Agency approval marks

The following table describes the agency approval for the Honeywell's OneWireless FDAP.

| Symbol | Description |
|---|---|
| NEMA | The National Electrical Manufacturers Association (NEMA) mark means the enclosures are intended for use in indoors or outdoors to protect the enclosed equipment against splashing water, seepage of water, failing or hose directed water, and severe external condensation.<br><br>Type 4X and IP66 |
| FM APPROVED | The Factory Mutual® Approval mark means the equipment has been rigorously tested and certified to be reliable.<br><br>Class I, Division 1, Groups C & D<br><br>Class I, Division 2, Groups A, B, C & D<br><br>Class I, Zone 2, Ex nA IIC |
| CSA® | The Canadian Standards mark means the equipment has been tested and meets applicable standards for safety and/or performance.<br><br>Class I, Division 1, Groups C & D<br><br>Class I, Division 2, Groups A, B, C & D<br><br>Class I, Zone 2, Ex nA IIC |
| CE | The *conformité européenne* (CE) mark means that radio equipment used in the European Union is in accordance with the R&TTE Directive. The CE Mark and the notified body (NB) identification number are used when the NB is involved in the conformity assessment procedure. The alert sign must be used when a restriction on use (output power limit by a country at certain frequencies) applies to the equipment and must follow the CE marking.<br><br>R&TTE Directive 1999/5/EC<br><br>EMC Directive 2004/108/EC<br><br>LVD Directive 73/23/EEC<br><br>GP design guidelines EN 61010-1, |

| Symbol | Description |
|---|---|
| | Pollution degree 2 |
|  | The Ex mark means that the equipment complies with the requirements of the European standards that are harmonized with the 94/9/EC Directive (ATEX Directive, named after the French "ATmosphere EXplosible").<br><br>CMRI & SA : Ex nA IIC |
| ATEX | The **AT**mosphères **Ex**plosibles (ATEX) mark means equipment and protective systems can be used in potentially explosive atmospheres.<br><br>ATEX II 3G EEx nA IIC |
|  | The Federal Communications Commission (FCC) mark means the equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.<br><br>FCC Part 15 Subpart B<br><br>FCC Part 15 Subpart C<br><br>FCC Part 15 Subpart E |
|  | The C-Check mark means that it is a certification trade mark registered to ACMA (Australian Communications and Media Authority) in Australia under the Trade Marks Act 1995 and to RSM in New Zealand under section 47 of the NZ Trade Marks Act. The mark is only to be used in accordance with conditions laid down by ACMA and RSM. This mark is equal to the CE Mark used in the European Union.<br><br>AS NZS 4771-2000 |
| IC | The Industry Canada (IC) mark means the wireless radio of this device complies with RSS 210 Industry Canada. This Class B digital complies with Canadian ICES-003.<br><br>RSS-210, Issue 6 and RSS-Gen, Issue 1<br><br>ACMA: AS NZS 4771-2000 |

## 2.2 Declarations of conformity and regulatory information

This section contains the Declaration of Conformity (DoC) statement for the FDAP device and the countries it is intended to be used in. For a complete list of compliant models, contact Honeywell.

### FDAP device DoC statement

Following is Honeywell's Declaration of Conformity (DOC) for the OneWireless FDAP device.

<Information Required>

### Intended country usage

The following table lists the countries in which the Honeywell FDAP device is intended to be used.

| Country | ISO 3166 2 letter code | Country | ISO 3166 2 letter code |
|---|---|---|---|
| ***North America*** | | | |
| United States | US | Canada | CA |
| ***Australia and New Zealand*** | | | |
| Australia | AU | New Zealand | NZ |
| ***European Union*** | | | |
| Austria | AT | Latvia | LV |
| Belgium | BE | Liechtenstein | LI |
| Bulgaria | BG | Lithuania | LT |
| Cyprus | CY | Malta | MT |
| Czech Republic | CZ | Netherlands | NL |
| Denmark | DK | Norway | NO |
| Estonia | EE | Poland | PL |
| Finland | FI | Portugal | PT |
| France | FR | Romania | RO |
| Germany | DE | Slovakia | SK |
| Greece | GR | Slovenia | SI |
| Hungary | HU | Spain | ES |
| Iceland | IS | Sweden | SE |
| Ireland | IE | Switzerland | CH |
| Italy | IT | United Kingdom | BG |

# 3. About FDAP

## 3.1 FDAP description

The Field Device Access Point (FDAP) is a key component to the Honeywell OneWireless system, a secure wireless network for industrial applications. It is a ruggedized industrial radio device intended for use in hazardous location to provide wireless connectivity for wireless sensor networks. It serves as a gateway between the wired DCS network and wireless field instruments as depicted in Figure 1.

FDAP uses IEEE 802.15.4 standard based Direct Sequence Spread Spectrum (DSSS) technology. FDAP has two IEEE 802.15.4 radios which enhances communication in a complex multi-path environment and in large communication areas. It has an Ethernet interface for connection to the backbone network and an ISA100 radio. It is a standalone, pole mountable, intrinsically-safe device, suitable for use in Class I, Division 1, and Zone 1 hazardous locations. It is normally installed in the same area where industrial field instruments are installed. FDAP is the Routing Access Point for ISA100 field instruments. It connects the ISA100 network to the wired network. It operates at 24V DC and 110/120V AC power, 10/100 Gigabit Ethernet and has dual antennas for diversity.

FDAP is an industrial meshing access points providing secure and reliable wireless coverage for ISA100.11a field instruments only. Once deployed in the field, FDAPs self-discover and self-organize into a managed, secure, and redundant wireless field instrument mesh network. It acts as a bridge between the sensor network and the wireless or wired infrastructure (backhaul). It allows you to achieve wired-like performance using wireless field instruments. With FDAPs, wireless field instruments do not have to route data from other field instruments. You get five years or more battery life from the field instruments at one-second update rate. The FDAP receives and transmits ISA100.11a data simultaneously using the entire 15 channels available on the 2.4 GHz ISM band as defined in IEEE 802.15.4.

## 3.2 Types of FDAPs

There are two types of FDAPs. They are: standalone FDAP and embeddable FDAP.

### Standalone FDAP

The standalone FDAP has a radio board and an autonomous power subsystem that operates within a range of AC/DC inputs. Standalone FDAP implements IEEE 802.15.4 radio only. FDAP hardware is designed using intrinsically safe (IS) design technique and it can used in Div1/Zone1 environment. The IS design does not support all power options. FDAP is therefore available in two models – IS and non-IS. The standalone

FDAP has an infrared interface for device provisioning which is accessible outside the enclosure.

### Embedded FDAP

Embedded FDAP is an FDAP embedded in Multinode product. In Embedded FDAP, the field device radio is embedded in Multinode. It also has an optional power converter which can adapt to the host power supply. It has an infrared interface for device provisioning which is accessible outside the enclosure. If you need backward compatibility with FHSS field instrumentation, use Multinode with embedded FDAP.

### FDAP as field router

FDAP can be used as a field router (FR). If FDAP is not connected to the physical ethernet, it functions as a line powered FR. FDAP as line powered FR option can be useful for extending field mesh into hazardous environments where normal infrastructure nodes are not suitable.

## 3.3 FDAP Models

There are two models of FDAPs. They are: FDAP1 certified for Class 1 Div 2 areas and FDAP2 certified for Class 1 Div 1 areas.

| FDAP Model | Model Numbers |
|---|---|
| FDAP certified for Class 1 Div 1 Areas | FDAP1 |
| FDAP certified for Class 1 Div 2 Areas | FDAP2 |

## 3.4 Physical description of FDAP

The FDAP has a rugged die-cast aluminum enclosure for outdoor use. The primary subassemblies of the enclosure are the base housing and the cover. The enclosure and all auxiliary components are designed for IP66 and NEMA Type 4X ratings for protection against contact with dust and powerful water jet from all directions. The enclosure has two antenna ports for receiver spatial diversity in the FDAP radios. The antenna holes use type N threaded bulkhead RF connectors which is inherently watertight to MIL-STD-202, method 106. The ½" rigid conduit hub has a gasket to seal out water and dust. A rigid conduit hub, internal and external ground studs, and removable cover are provided for field installation. Externally accessible IR port and status LEDs allows you to commission the FDAP and get status information, respectively. The IR port and LED holes are covered with an outdoor rated adhesive backed Lexan™ label. The enclosure can mounted on a pole or on wall.

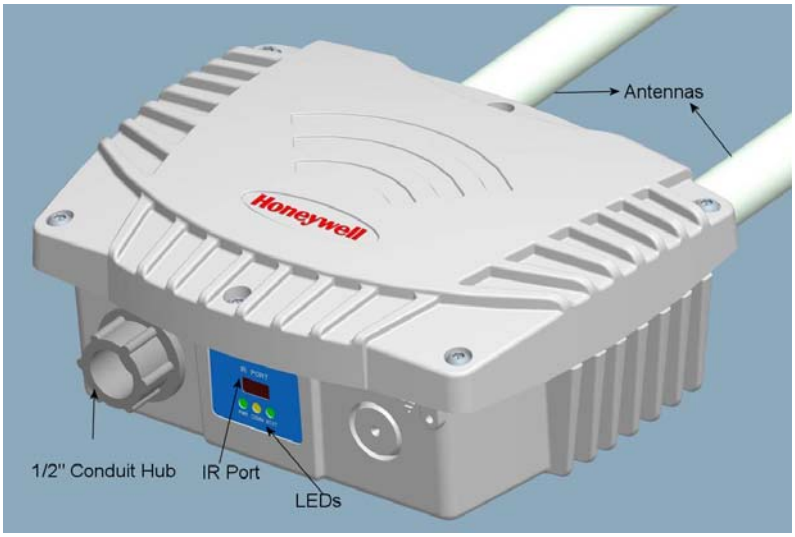


**Figure 2 – Physical description of FDAP**

### FDAP enclosure

The FDAP enclosure is rugged and compact. The enclosure measures approximately 20 cm x 13 cm x 7 cm (L x W x H). The heavy ribbing of the enclosure provides large surface area for heat sinking, stiffens the cover and housing to minimize deflection, and reduces number of screws for the cover. The FDAP enclosure assembly also includes

auxiliary components such as mounting plates, labels, gaskets, and fasteners. The enclosure is powder coated for additional protection against outdoor elements.

### IR ports

The FDAP features a conveniently located IR port used in device commissioning. IR port is capable of data rates of up to 115.2 KBaud and has a range of 20 cm and beam width of 20 degrees. IR port is used to communicate with a Provisioning Handheld device used to commission the FDAP in the field.

### Antennas

The FDAP uses dual antenna diversity to improve communication reliability in severe multi-path environment and communication range. Dual antenna diversity increases ISA100 coverage range by 1.5 times over Multinodes or wireless field instruments acting as a repeater. It reduces infrastructure cost and cost per wireless I/O.

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

### LED indicators

| LED | Description |
|---|---|
| Power LED (Green) | Indicates that the power is supplied to FDAP. When the FDAP is powered ON, this LED gets ON automatically. |
| Status LED/Heart Beat LED (Green) | Indicates the software status of FDAP factory image. The Status LED blinks ON/OFF once every second to indicate that the FDAP factory firmware is in working condition. |
| Status LED (Yellow) | Indicates the data received/transmitted on Ethernet, IR, RF depending on the test running. |
| Comm LED (Green) | Indicates the Ethernet Link Activity.<br>• The LED is steady when there is a valid Ethernet link but no data activity.<br>• The LED blinks when there is data activity on the Ethernet link. |
| Comm LED (Yellow) | Indicates that the data is received/transmitted on RS485 interface. |

## 3.5 Features of FDAP

The features of FDAP are:

- **24V DC or 110/230V AC powered**: FDAP operates at 24V DC or 110/230V AC and provides better latency than battery based wireless sensor mesh network. It has an improved wireless sensor battery life and you get 10 years transmitter battery life by 1 sec update rate. Enable the use of wireless field instruments for applications requiring fast update rates (less than 10 seconds) and short latency (less than 250 ms) and in areas where Wi-Fi radios are not allowed.
- **Dual antenna diversity**: FDAP has dual antennas for diversity and helps to improve read rate success in multi-path environment and range. It improves range and data availability. It increases ISA100 coverage range by 1.5 times over Multinodes or routing wireless field instruments. It enables a 450 meters connection with wireless field instruments with standard integral antennas.
- **10/100 Gigabit Fast Ethernet**: FDAP has 10/100 Gigabit Fast Ethernet and connects wireless sensor network to wired network and connects ISA100 network to the wired network. It forms a self-forming, self-healing ISA100.11a mesh network and connects network to the wired or wireless network.
- **Class 1 Div 2 and Div 1 Enclosure**: FDAP is Class 1 Div 2 and Div 1 Enclosure and it has lower cost than Multinode for sensor only application. It supports O and G applications.
- **Reduced Cost**: FDAP reduces wireless field instrument cost, infrastructure cost, and cost per wireless I/O. Reduces number of ISA100.11a routing devices to offer wireless coverage for ISA100.11a field instruments
- **Access Points**: FDAP acts as a routing access points for wireless field instruments and it is designed for sensor-only network for monitoring applications segment.

## 3.6 FDAP specifications

**Table 1 – FDAP specifications**

| Specification | Description |
|---|---|
| Enclosure | Physical dimensions: 20 cm x 13 cm x 7 cm (L x W x H). |
| Power requirements | 24 VDC +/- 10% at 5 Watts |
| Hardware | • CPU<br>• Flash<br>• SDRAM |
| Multiple Standards/Field Protocols | ISA100.11a |
| External Ports and connections | 2 X external antenna ports for 2.4 GHz ISA100.11a field instruments |
| Internal Connections | • 1 X 10/100 Mbps auto negotiation Ethernet port<br>• 1 X shielded power cable<br>• 1 X grounding cable |
| Mechanical Shock | 4G |
| Data Rates and Modulations | • Radio: 250 Kbps, DSSS/ OQPSK<br>• Wire: 10/100 Mbps Fast Ethernet |
| Frequency band and operating channels | Unlicensed ISM Band (2.4 – 2.483 GHz)<br>15 DSSS channels for ISA100.11a |
| Security | 128-bit AES encryption |
| Transmit Power (maximum) | DSSS: 18dBm* |
| Receive Sensitivity (Typical) | DSSS (2.4 GHz): -95dBm@250kbps |
| Network Interface | 10/100 Mbps Ethernet, autosensing |

| Specification | Description |
|---|---|
| Maximum number of field instruments | • 20 ISA100.11a Field Instruments at 1 second reporting rate<br>• 80 ISA100.11a Field Instruments at 5 seconds or more reporting rate |
| Environmental | **Operating Temperature**: -40ºC to +75ºC (-4°F to +140°F)<br>**Others**:<br>• Transportation and Storage Temperature: -40ºC to +85 ºC<br>• Operating Humidity: 0~100% non-condensing<br>• Transportation and Storage Humidity: 0~100% non-condensing |

For more information about FDAP specifications, refer to Honeywell Online Support.

## 3.7 FDAP security

Security is a primary concern for the process automation industry. The security concern is heightened when communicating process data over a shared physical layer such as over the air. OneWireless network protects plant information and ensures safe operations with industry standard 128-bit encryption at the mesh, Wi-Fi and wireless field instrument level. The FDAP offers a robust embedded ISA100 security and Infrared security.

### Embedded ISA100 security

To reduce security threats, ISA100.11a requires all process data to be 128-bit encrypted. The data is encrypted and decrypted at the FDAPs, field instrument, and WDM level to provide end-to-end security for the process data.

The FDAPs self-discover other neighboring ISA100.11a routing devices, such as Multinodes, and routing ISA100.11a field instruments, to form a reliable and secure ISA100.11a based wireless mesh network. Honeywell's intelligent wireless routing algorithm enables a FDAP to dynamically identify the best route to send data to and from wireless field instruments. This algorithm enables the field instrument mesh network to dynamically re-optimize itself when FDAPs are added to or removed from the network.

### Infrared security

In addition to data encryption, ISA100 standard requires each FDAP to be authenticated before joining the network. OneWireless network supports over the air and infrared authentication key distribution. OneWireless network relies on a more secured infrared authentication key distribution method as it requires users to be physically next to the FDAP to add it to the network.

The authentication keys are generated and managed by the WDM. A Provisioning Handheld device is used to upload the authentication keys from the WDM and download keys to FDAPs using infrared media. The infrared media is used to send an authentication key from the Provisioning Handheld to the FDAP. Therefore, all Provisioning Handhelds and FDAPs offered by Honeywell feature IR ports. The FDAP features a conveniently located IR port for use in device commissioning. The keys are encrypted when distributed over the network. Once a key is deployed to a FDAP it is validated by the WDM before the FDAP can join the OneWireless network. Key deployment is onetime activity which means that devices can rejoin the network after power down or other service interruptions without re-keying the device. OneWireless supports a key rotation mechanism to enable a secure network. Once the devices join the network, a master key is assigned to each device which can be rotated on a timely basis. The key rotation period can be configured from the WDM UI.

# 4. FDAP Installation

## 4.1 Overview

To plan and install FDAPs in a wireless network, it is essential understand the tasks involved in it.

## 4.2 Prerequisites for installation

Network planning, RF site survey, FDAP placement, and analysing power requirements are the prerequisites for FDAP installation. These tasks must be completed before installing the FDAPs in the wireless network.

- **Network site planning** must be completed to understand how a wireless network can be built and supported for your application using OneWireless components. These components consist of wireless device manager, FDAP, wireless field instruments, and Multinode.
- **RF site survey** must be completed by a qualified professional. The RF survey is essential for building wireless network architecture. Perform the required site survey and it should include the following tasks:
  - RF spectrum analysis must be conducted on the 2.40-2.49GHz band and 5.7-5.9 GHz band (if available to be used) to detect any potential RF interference. Strong interference sources must be addressed (removed, avoided or minimized) before the installation. Note that some frequencies may not be available for use in some locations and countries.
  - A point-to-point 2-node mesh must be staged in various locations to measure the RF propagation ability in the site. Received Signal Strength Indicator (RSSI) can serve as an indicator of the RF environment. TCP/IP throughput testing and UDP/IP throughput and packet drop rate testing must be conducted in all selected locations to measure the quality of the signal strength in the site.
  - Site survey must be conducted after the factory system starts operating so that maximum possible interference can be measured and addressed.
- **FDAP placement** must be determined after the completion of the network planning and RF survey activities.
- **Power requirements** for network must be identified. Wired cable runs that provide DC power to the FDAP must be determined.
- **Ethernet cable runs** must be determined for FDAP and/or any other wired nodes in the network.

## 4.3 FDAP installation tasks

You need to follow the preinstallation requirements, physically mount, and install the FDAP on site. The location of all FDAPs must be determined to ensure optimum operation in a wireless network. FDAPs can be installed where power is available. Follow the tasks listed in Table 2 to complete a FDAP installation.

**Table 2 – FDAP installation tasks**

| Step | Action |
|---|---|
| **1** | Inspect the FDAP and associated hardware. |
| **2** | Identify the FDAP site locations. |
| **3** | Select proper antenna type and seal the antenna connections. |
| **4** | Install the lighting arrestors (if installation site is outdoors). |
| **5** | Assemble and mount the FDAP. |
| **6** | Install the FDAP based on the Ethernet connection.<br><br>If ethernet cable is connected, it acts as a FDAP and if the ethernet cable is removed it acts as line powered FR. |
| **7** | Construct conduit and cable runs for power and Ethernet. Connect power and Ethernet cabling. |
| **8** | Provide grounding to FDAP. |
| **9** | Power on FDAP in the network.<br><br>The installation of FDAP is complete at the installation site. |

### Inspecting FDAP and associated hardware

Examine whether the FDAP and the associated hardwares like antennas and mounting brackets are damaged. Ensure that all the hardwares that are necessary for completing installation for each FDAP are available.

### Identifying FDAP site locations

After the completion of network site planning and RF survey activities, the site locations for FDAPs are identified. Locations can be mapped so that site preparation for the FDAP can be started. For more information, refer to Prerequisites for installation.

### Connecting antennas

Antennas play critical role in the setup and operation of wireless mesh systems. Depending upon the results of the site survey and the requirements of the installed environment, proper antenna type (omni-directional vs. directional, low-gain vs. high gains, and so on) must be determined.

The various types of antennas offered with FDAP enhances the field instruments' wireless coverage in multi-path environment.

After all the antennas are installed, the connections must be sealed to protect them from the external environment.

### Outdoor protection kit

If any portion of the FDAP (enclosure, antennas, cables, and so on.) is to be mounted outdoors, it is recommended that you use the Outdoor Protection Kit with the installation. This kit contains lightning arrestors and ground cables designed for installation with FDAP.

**ATTENTION**

If the system is mounted outdoors where CE Mark certification is required, use of the Outdoor Protection Kit (or equivalent) is mandatory.

An outdoor protection kit must be used for preventing the lightning damage, when the FDAP is mounted outdoors. The outdoor protection kit contains the following items.

- Three lengths (10, 12 and 18-inches) of 10AWG wire with #8 ring terminal on one end and a #10 ring terminal on the other end.
- Two lightning arrestors, with Type N Male-to-Female, or two Reverse Polarity Type N (RPN) Male-to-Female connectors for the mesh and AP radio antennas.
- One Lightning arrestor, Type N Male-to-Female connectors for Field I/O radio antenna.

### Installing lighting arrestor

A lightning arrestor must be installed between the antenna and the FDAP antenna connector when the unit is installed outdoors.

### Mounting the FDAP

The assembled FDAP, complete with antennas and lightning arrestors (if required), is now ready to be mounted in its site location.

The FDAP can be wall mounted or pole mounted using the hardware mounting kit supplied with the unit. The FDAP enclosure can be mounted on a 2-inch pole or on a wall using the appropriate mounting kit.

### *Pole mounting*

When pole mounting the FDAP, you can assemble and install the mounting hardware at the site. The mounting kit includes the following items.

- Mounting plate
- U-bolts with nuts
- Screws (to attach the FDAP to the mounting plate)

The pole mounting kit comprises a mounting plate, U-bolts and nuts as shown in Figure 3. When using the mounting plate for pole installation, secure the FDAP to the bracket using the screws supplied with the bracket kit. The FDAP can be mounted to the left or to the right of the pole using the same mounting hardware. It can also be mounted inline with the pole. However, doing so without care can put the integral antennas too close to the pole and cause RF communication problem. For inline mounting the FDAP integral antennas must be on top of the mounting pole.

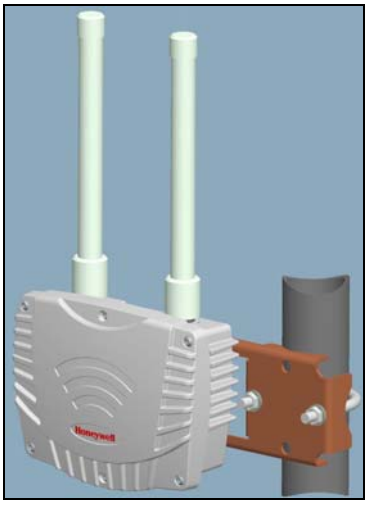

**Figure 3 – Pole mounting**

### *Wall or flat surface mounting*

The wall mounting kit comprises a wall mounting plate and four screws as shown in Figure 4. If the FDAP is to be wall mounted, it can be secured to the wall with screws at each corner of the enclosure. Both mounting plates fasten to four threaded bosses on the back of the FDAP. The FDAP must not be mounted on metallic walls because the integral antennas will be too close to the wall and cause RF propagation problems.

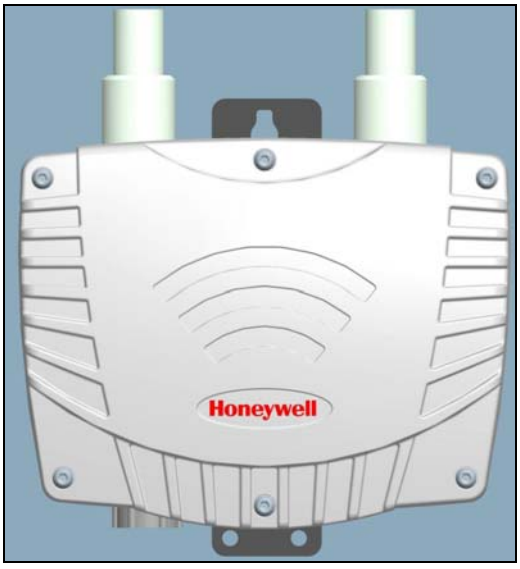


**Figure 4 – Wall mounting**

## Powering up the FDAP

You must ensure that the FDAPs are earthed/grounded properly by a certified and authorized personnel, and that it conforms to all applicable codes and regulations.

The materials required to provide a proper earth or ground are defined by local regulations, and must be obtained locally to ensure that the correct safety environment is achieved.

Power cabling from the plant must run through the conduit to the junction box installed at the FDAP installation site. If the FDAP is connected to a wired Ethernet, you must run the Ethernet cabling from the control system through the conduit to the FDAP site.

The power cabling, green/yellow grounding wire, and Ethernet cables from the FDAP must be run through conduit to the junction box. Note that, when installation is complete,

all cabling must be routed through the conduit and must be enclosed within the junction box.

After all the FDAPs are installed and connected at their site locations, turn on the FDAPs to verify the wireless network communications.

# 5. FDAP Configuration

## 5.1 Overview

Once you receive the FDAP and the associated hardware and physically inspected them for any damaged components. You must perform an initial configuration of the unit. This must be performed before the installation of FDAP in the network at its designated physical location. In addition, the FDAP must be given a security key to associate it with the wireless network in which it is installed and operated. Once the unit is set up and the authentication is completed, the FDAP joins the network and starts communicating.

FDAP require little 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. You can configure the FDAP by using OneWireless application (WDM UI). For more information about the WDM UI, refer to *OneWireless Wireless Device Manager User's Guide*.

## 5.2 Provisioning a FDAP

You can send provisioning information (security, wireless) from Provisioning Handheld to the FDAP using IR communication link or using over the air provisioning (ISA100).

Before you provision a FDAP, ensure that you have completed the provisioning of WDM and Provisioning Handheld. For more information about the provisioning of WDM and Provisioning Handheld, refer to *OneWireless Wireless Device Manager User's Guide*.

Power on the FDAP and connect FDAP to the WDM through LAN1 port of WDM.

**TIP**

If you are using multiple FDAPs, you can use an Ethernet switch to connect the FDAPs to the WDM.

For information about the procedure to provision a FDAP, refer to *OneWireless Wireless Device Manager User's Guide*.

## 5.3 Viewing FDAP details

You can view the FDAP details in the Property Panel by selecting the required FDAP from the list of devices in the Selection Panel of the WDM UI.


**Figure 5 – FDAP details**

You can view the following details:

- **Access Point Summary**: This option enables you to view and enter the FDAP summary details like name and description.
- **Device Management**: This option enables you to view the following details:
  - **Identification**: You can view identification details like Tag Name, Vendor, Model, Serial, and Radio Revision. You can rename the Tag Name.
  - **Address**: You can view address details like Address, Short Address, and IP6 Address.
  - **Status**: You can view status details like Power supply status, Restart Count, Uptime, Drop Offs, and Reset Counts.
  - **Device Role**: You can view the device role details like provisioning device, security manager, access point, and so on.
- **Data Layer Management**: You can view the Radio Power Level, Neighbor Diagnostics, and Channel Diagnostics.
- **Radio Diversity**: You can view the Error Distribution Counter, Correction Gain, Redundancy Gain, Diversity Operation, and Reset Statistics.
- **Notes**: This option enables you to enter notes regarding the FDAP.

## 5.4 Upgrading firmware of FDAP

After configuring and provisioning FDAP, you can upgrade the FDAP firmware.

For information about the procedure to upgrade a firmware for FDAP, refer to *OneWireless Wireless Device Manager User's Guide*.

# 6. FDAP Monitoring

## 6.1 Overview

The status and performance of FDAPs operating in a wireless network can be monitored in a number of ways.

- The **Monitoring** tab in the WDM UI enables you to monitor FDAPs that are commissioned in the network.
- The **Reports** tab in the WDM UI enables you to view and generate custom reports about connectivity, configuration, alarms, notes, and device health of the FDAPs in a network.

## 6.2 Verify connectivity using maps

Network services engineer verifies the mesh connectivity and FDAP connectivity in the WDM UI. You can visually inspect network topology map and connectivity. You can navigate to the device in the topology map and check the link signal quality and connectivity. In addition, you can examine device communication statistics information like Receive Signal Quality Index (RSQI) and Receive Signal Strength Index (RSSI).

## 6.3 Monitoring using alarms

You can monitor active alarms generated by FDAPs. The Active Alarms tab lists the device type, priority, location, source, and time when the alarm was generated. You can also export the alarm log created for a time period.

For information about the procedure to monitor device using alarms, refer to *OneWireless Wireless Device Manager User's Guide*.

## 6.4 Monitoring using reports

You can generate and view various reports about connectivity, configuration, alarms, notes, and device health of FDAPs in a network.

You can generate and view the following reports:

- Connectivity Report
- Battery Life Report
- Device Health Reports

### Device Health Report

Device health report allows maintenance technicians to tag suspected devices for maintenance inspection. The report includes battery health, devices that lost communication with the system.

For information about reports, refer to *OneWireless Wireless Device Manager User's Guide*.

## 6.5 System logs

The system log contains events logged in the system. You can view and export log details.

For information about system logs, refer to *OneWireless Wireless Device Manager User's Guide*.

# 7. FDAP Maintenance

## 7.1 Overview

FDAP does not have any user-serviceable parts inside the FDAP enclosure; any failure within the FDAP requires a hardware replacement. Any maintenance required is limited only to the external enclosure surface, cable connections, antennas, and the firmware. A failed unit must be returned to Honeywell for maintenance, repair, or replacement.

## 7.2 Replacing a FDAP

Failed FDAP is highlighted on the topology map and it needs to be replaced; and determine the cause of failure by reviewing the logs and alarms. Failed device alarm is generated and points to the FDAP that failed, and you can identify the FDAP to be replaced from the list of troubled devices. Once the replacement is done, the system automatically generates “device replaced” log entry/event.

For information about the procedure to replace a FDAP, refer to *OneWireless Wireless Device Manager User’s Guide*.

## 7.3 Deleting a FDAP

The failed FDAP is highlighted on the topology map. You can to remove a failed FDAP from the network. Once you remove the FDAP, the system automatically generates “device removed” log entry/event.

For information about the procedure to remove a FDAP, refer to *OneWireless Wireless Device Manager User’s Guide*.

# 8. Troubleshooting

## 8.1 Overview

The FDAP doesnot contain any user-serviceable parts inside the FDAP enclosure, any failure within a FDAP requires a replacement of the FDAP.

If a fault or a failure is indicated or suspected in a FDAP in the network, there are many ways to diagnose a problem. You can:

- Monitor using alarms
- Monitoring using reports
- System logs

### FDAP failure indications

Failure indication may be signaled through the FDAP status LEDs.

### Restarting FDAP

You can restart the FDAP if a failure is suspected.

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