

Strix Outdoor Wireless System (OWS)

Field Installation



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FCC Notice

The enclosed wireless network device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This wireless network device has been tested and found to comply with the limits for a Class B 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 wireless network device generates, uses, and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this wireless network device does cause harmful interference to radio or television reception, which can be determined by turning the wireless network device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ▶ Reorient or relocate the receiving antenna.
- ▶ Increase the separation between the wireless network device and the affected receiver.
- ▶ Connect the wireless network device into an outlet on a circuit different from that to which the receiver is connected.
- ▶ Consult the dealer or an experienced radio/TV technician for help.

Other Notices

Industry Canada Notice

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

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

VCCI Notice

This is a Class B wireless network device based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this wireless network device is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the wireless network device according to the instruction manual.

European Community (EC) Directives and Conformity

This wireless network device is in conformity with the Essential Requirements of R&TTE Directive 1999/5/EC of the European Union.

Non-Modification Statement

Unauthorized changes or modifications to Strix devices are not permitted. Modifications to Strix devices will void the warranty and may violate FCC regulations.

RF Exposure Requirements

To ensure compliance with FCC RF exposure requirements, the antenna used for this wireless network device must be installed to provide a separation distance of a minimum of 2 meters (6.56 feet) or more from all persons, and must not be co-located or operated in conjunction with any other antenna or radio transmitter. Installers and end-users must follow these installation instructions.

Safety Warnings

This unit must be installed by a trained professional installer only. Read all safety warning before commencing an installation.

General Safety Warning



You can be killed installing this device!

You can be killed if any antennas come near electrical power lines. Carefully read and follow all instructions in this manual.

By performing these installation instructions, you may be exposed to hazardous environments and high voltage. Use caution when installing the Strix OWS product.

Electrical Power Warning



This unit must be installed by a trained professional installer only. Read the installation instructions before you connect the wireless network device to its power source.

Lightning Activity Warning



Do not connect or disconnect cables during periods of lightning activity.

A surge protective device meeting IEC 61000-4-5, Level 4 or IEEE C 62.41 A3/B3 requirements must be used to prevent potential damage from very high surges (for example, surges caused by lightning).

Explosive Device Proximity Warning



Do not operate your wireless network device near unshielded blasting caps or in an explosive environment.

Antenna Placement Warning



Do not locate any antenna near overhead power lines or other electric light or power circuits, or where the antenna can come into contact with such circuits. When installing antennas, take extreme care not to come into contact with such electrical circuits, as they can cause serious injury or death.

For the correct installation and grounding of antennas, please refer to national and local codes (for example, US:NFPA 70, National Electrical Code, Article 810; in Canada: Canadian Electrical Code, Section 54).

Ground Warning



You must ALWAYS install an external grounding wire. The ground connection must be complete before connecting power to the OWS enclosure—a simple continuity check between the enclosure and the ground termination point can confirm this. Grounding of the OWS must comply with National Electrical Code (NEC) requirements, unless local codes in your area take precedence over the NEC code.

Battery Caution



This product contains a non-rechargeable, non-user-serviceable lithium ion battery. Exercise caution to avoid shorting the terminals of this device.

Product Images

The images used in this document have been modified for clarity.

For additional information, please visit us at: <http://www.strixsystems.com>.

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OWS Field Installation

This field installation manual provides instructions for installing the Strix OWS 2400 and OWS 3600 products safely and is intended for trained technical professionals. You must read the “Safety Warnings” on page iii before commencing with the installation.

Theory of Operation

The Strix Systems, Access/One® Network OWS 3600 provides up to 3 independent channels of 802.11b/g support, and 3 independent channels of 802.11a support through its external connections. This configuration allows the installer to separate the client 802.11b/g traffic from the backhaul traffic which is carried through the 802.11a channels.

As shipped from the factory, the OWS 3600 is self-configuring and self-healing. In addition, multiple configuration options are possible and the installer should refer to the Access/One® Network User's Guide (part number 210-0008-01) for detailed information about these configurations.

Important Safety Information

The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to RF electromagnetic energy emitted by FCC certified equipment. All Strix products, including the OWS, meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. The proper operation of this wireless device, according to the instructions found in this manual and the associated Access/One® Network software User's Guide, result in user exposure that is substantially below the FCC recommended limits.

The following are guidelines to ensure safe operation of the Strix OWS product:

- ▶ Do not touch or move the antenna(s) while the unit is transmitting or receiving.
- ▶ Do not hold any component containing a radio such that the antenna is very close to or touching any exposed parts of the body—especially the face or eyes—while transmitting.
- ▶ Do not operate the OWS or attempt to transmit data unless the antenna is connected, otherwise the wireless module(s) may be damaged.
- ▶ Usage in specific environments:
 - ▶ Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment, unless it is a type especially qualified for such use.
 - ▶ The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors or such environments.
 - ▶ The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA).
 - ▶ The use of wireless devices in hospitals is restricted to the limits set forth by each hospital.
- ▶ The Strix OWS must only be used with Strix-approved components and antennas.

Planning Your Installation

To ensure safe and durable wiring, the installation of the Strix OWS must follow the appropriate electrical and building codes. Observe the National Electrical Code (NEC) requirements, unless local codes in your area take precedence over the NEC code.

Local Guidelines

The Strix OWS is a radio device and therefore susceptible to interference that can reduce throughput and range. Follow these simple guidelines to optimize product performance:

- ▶ Install the OWS in an area where trees, buildings, and large steel structures do not obstruct radio signals to and from the antenna(s). Direct line-of-sight operation is always best.
- ▶ Install the OWS away from microwave ovens or other devices operating in the 2.4 GHz range.
- ▶ Install the OWS away from other possible source of 2.4 GHz WLAN interference, such as cordless phones, home surveillance equipment, frequency-hopping (FHSS) and DSSS Local Area Network transceivers (non-802.11b), electronic news gathering video links, radars, amateur radios, land mobile radio services, local government sties (for example, law enforcement), fixed microwave services, local TV transmission, and private fixed point transmitters.

Site Surveys

Due to variations in product configuration, placement, and the physical environment, each installation is unique. Before installing the Strix OWS, we recommend that you perform a site survey to determine the optimum placement of the product to achieve the best possible range, coverage and network performance. Consider the following points:

- ▶ **Data Rates**—Sensitivity and range are inversely proportional to data bit rates. The maximum wireless range is achieved at the lowest data rate. A decrease in receiver threshold sensitivity occurs as wireless data increases.
- ▶ **Antenna Type and Placement**—Using the correct antenna configuration is a critical factor when trying to maximize wireless range. As a general rule, the range increases in proportion to the antenna height and gain.
- ▶ **Physical Environment**—Clear or open areas offer better wireless coverage than closed or filled areas. The less cluttered the operating environment, the greater the range.
- ▶ **Obstructions**—A physical obstruction, such as a building or tree, can block or hinder wireless services. Avoid placing antennas in locations where there is an obstruction between the sending and receiving antennas.
- ▶ **Building Materials**—Wireless penetration is influenced by the building materials used in construction. For example, drywall construction permits greater range than concrete blocks. Steel and alloy materials can be a barrier to wireless signals.
- ▶ **Diversity**—The Strix OWS supports RX diversity, which requires two antennas.

Power Source

The Strix OWS supports both AC and DC input power.

OWS Enclosure Installation

This section provides instructions for mounting the OWS enclosure.

Mounting the OWS on a Vertical Pole

Parts Required

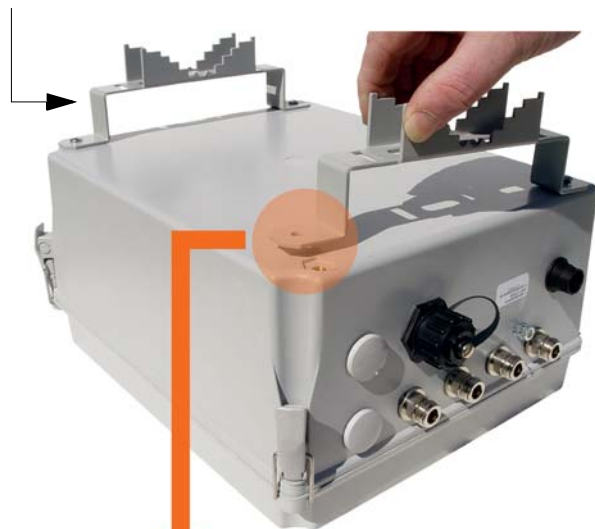
- ▶ OWS enclosure
- ▶ Pole
- ▶ 2 vertical mounting brackets
- ▶ 4 screws, for attaching the mounting brackets to the OWS enclosure
- ▶ 2 U-bolt assemblies, for mounting the OWS enclosure to a standard 1 7/8 inch diameter steel pole
- ▶ 2 straps, for mounting the OWS enclosure to a pole with a diameter greater than 1 7/8 inches

Tools Required

- ▶ Flat blade screwdriver
- ▶ 7/16 inch nut wrench

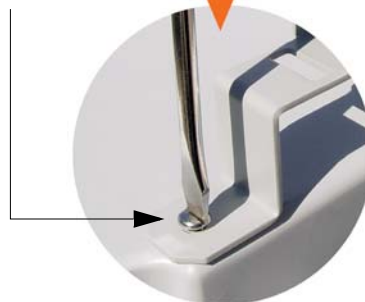
1. Attach the vertical mounting brackets (2) to the OWS enclosure.

Mounting Brackets (x2)



2. Secure the vertical mounting brackets to the OWS enclosure with the four screws (2 for each bracket).

Screws (x4)

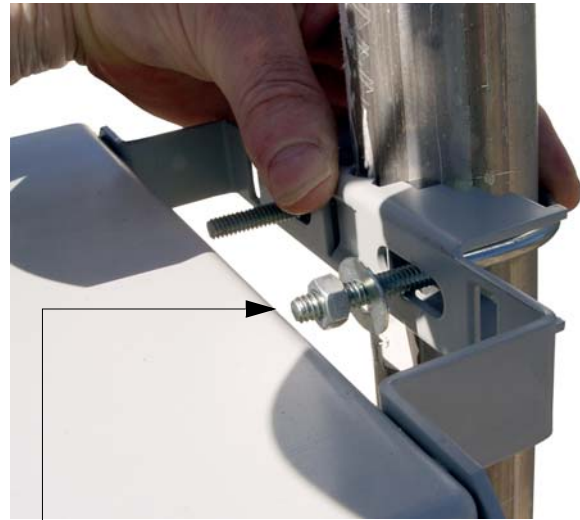


Tighten all four screws to 10–12 lbf.ft (1.38–1.66 kgf.m).

3. For a standard 1 7/8 inch diameter steel pole installation, use the 2 U-bolt assemblies to attach the enclosure to the pole via the vertical mounting brackets—*finger tighten only*.

If installing the OWS on a wider pole (for example, a utility pole), go directly to Step 7—skip Steps 3 through 6.

Tip: You may find it easier to loosely attach the U-bolts to the brackets, then slide the completed enclosure assembly over the pole (instead of holding the enclosure against the pole and attaching each U-bolt separately).



U-Bolt Assembly (x2)

Includes:

- ▶ U-bolt
- ▶ Washers (2)
- ▶ Nuts (2)



4. Adjust the OWS enclosure to the desired position on the pole (up and down or rotational).



5. Use a 7/16 inch nut wrench to tighten the U-bolts (4 nuts) and secure the OWS enclosure in place.

Tighten all four nuts to 10–12 lbf.ft (1.38–1.66 kgf.m).

When tightening the U-bolts, ensure that the bolts are not twisted—the ends of each U-bolt should be protruding through the bracket evenly (the same distance).



Tighten (4 places)

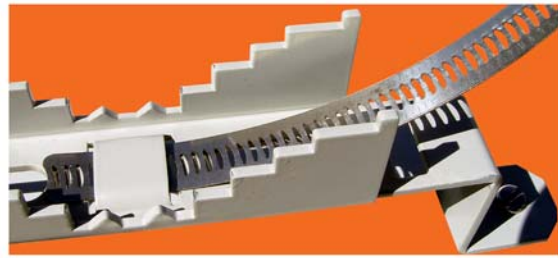
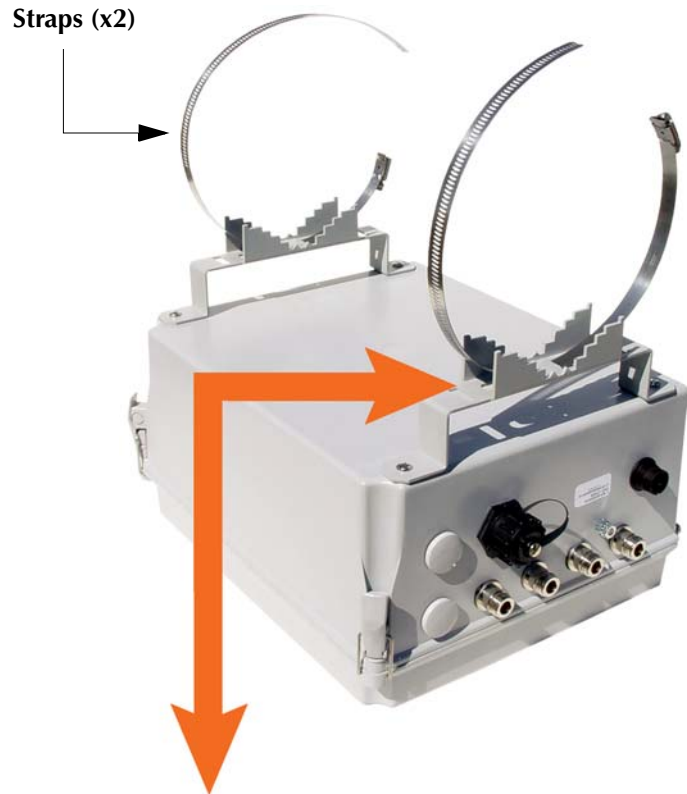
6. Check that the U-bolts are tight and that the OWS enclosure is securely anchored to the pole.



- For poles wider than 1 7/8 inch diameter, use two straps (hose clamps)—*not provided*. Feed one strap through each of the vertical mounting brackets.

Recommended straps:

Type 301 SS with Type 305 SS screw, 3.125 x 6 inches, available from McMaster-Carr (part number 54155K36).



- Loosely attach the OWS enclosure to the pole with the 2 straps.

Adjust the enclosure to the desired position on the pole (up and down or rotational). Use a flat blade screwdriver or 5/16 inch nut driver to tighten both straps to 10–12 lbf.ft (1.38–1.66 kgf.m).



Antenna Installation

This section provides instructions for installing and connecting antennas.

Antenna Warning



Antennas must be installed by a trained professional installer only.

Do not locate any antenna near overhead power lines or other electric light or power circuits, or where the antenna can come into contact with such circuits. When installing antennas, take extreme care not to come into contact with such electrical circuits, as they can cause serious injury or death.

For the correct installation and grounding of antennas, please refer to national and local codes (for example, US:NFPA 70, National Electrical Code, Article 810; in Canada: Canadian Electrical Code, Section 54).

Caution



Do not apply power to the transmitter until the antenna is connected, otherwise permanent damage may result.

Caution



When the unit is operation, avoid standing directly in front of the antenna. Strong RF fields are present when the transmitter is ON.

Recommended Antennas

Strix recommends the following antenna configurations:

- ▶ One 802.11 omni antenna and one 802.11b/g omni antenna, directly connected to the OWS enclosure. The remaining unused antenna ports must be terminated with a 50 ohm terminator.
- ▶ Three 802.11b/g 120 degree sector antennas attached to the pole above the OWS enclosure, and up to three directional 802.11a antennas for fixed point-to-point backhaul connections with other Strix Systems Access/One® Network devices.

Notes About Antenna Installation

Read the following notes before installing any antenna.

- ▶ The system installer should always ensure that antenna radiation patterns do not overlap.
- ▶ A sector antenna should point towards the center of the sector covered by the antenna.
- ▶ Fixed point-to-point backhaul antennas should point towards the desired Strix Systems Access/One® Network device intended for the backhaul connection.
- ▶ Unused antenna ports must be terminated with a 50 ohm terminator.
- ▶ Only Strix Systems antennas may be used with the Access/One® Network OWS 3600.
- ▶ Only one antenna may be used on each antenna port.
- ▶ Depending on the selected antenna(s) for your application, it may be necessary to configure the output power of your OWS 3600. Please refer to the Access/One Network User's Guide for details on configuring output power. It is the installer's responsibility to ensure the output power is set correctly for the chosen antenna(s). Operation of the OWS 3600 in a manner other than as represented here is a violation of FCC rules.

The following are the maximum power settings for each antenna type:

Maximum Power Settings by Antenna / Band			
Antenna	2.4 GHz	5.25 - 5.35 GHz	5.725 - 5.85 GHz
12 dBi Omni (2.4 GHz)	Full	N/A	N/A
16.4 dBi Sector	Full	N/A	N/A
12 dBi Omni (5.15 - 5.85 GHz)	N/A	Quarter (-6 dBm)	Full
23 dBi Directional	N/A	Minimum (0 dBm)	Full
29 dBi Parabolic Reflector	N/A	Minimum (0 dB)m	Full

Grounding the OWS Enclosure

This section provides instructions for grounding the OWS enclosure.

Grounding Caution



You must ALWAYS install an external grounding wire. The ground connection must be complete before connecting power to the OWS enclosure—a simple continuity check between the enclosure and the ground termination point can confirm this. Grounding of the OWS must comply with National Electrical Code (NEC) requirements, unless local codes in your area take precedence over the NEC code.

Parts Required

- ▶ Ground wire assembly (with ring terminator)—must be 18 gauge AWG wire, or greater

Tools Required

- ▶ 3/16 inch nut wrench
- ▶ Wire stripper (if necessary)

1. Connect the ground wire to the ground terminal on the bottom of the OWS enclosure.

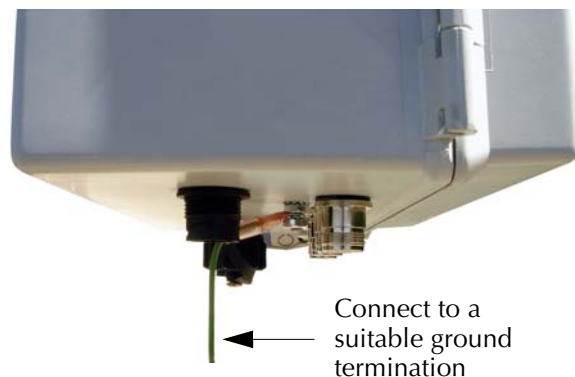
Make sure the lock washer is in place and that the nut is securely fastened.



Ground Wire

2. Connect the other end of the ground wire to a grounding strap attached to a grounded surface, such as a cold water pipe (or other suitable ground termination point, compliant with NEC and local standards).

On pole-mounted OWS enclosures, if the pole (or pole stand) is already grounded, you may use one of these items as the ground termination point.



Connecting the Power Cord

This section provides instructions for configuring the power cord for either AC or DC operation, and connecting the power cord to the OWS enclosure.

Parts Required

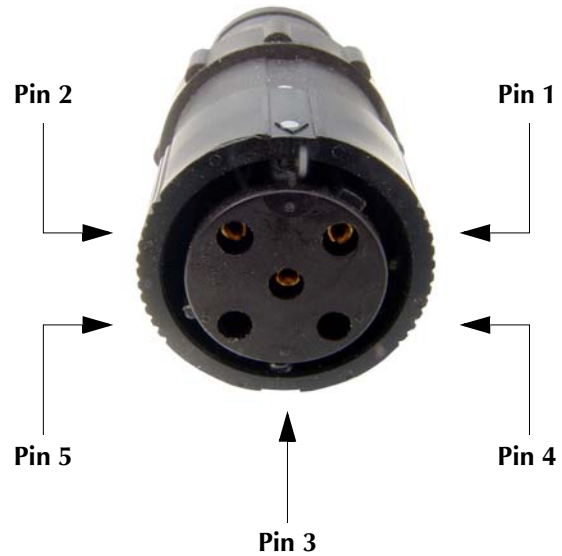
- ▶ AC or DC power cord, cut to the desired length (not supplied)
- ▶ AC/DC plug assembly

Tools Required

- ▶ Wire stripper

1. Review the pin connections.

- ▶ Pin 1 – AC Line
- ▶ Pin 2 – AC Neutral
- ▶ Pin 3 – Ground
- ▶ Pin 4 – DC Negative (-)
- ▶ Pin 5 – DC Positive (+)



AC example shown

2. Assemble the plug and connect the plug to the power cord for the electrical configuration you need, either AC or DC.



3. Align the white dots on the plug and the enclosure's power receptacle.



4. Turn the collar of the plug clockwise (1/4 turn) to make the connection.

The connection is locked when you feel and hear a click.



5. Install an appropriate AC or DC connector at the other end of the power cord.

The connector you use at the other end of the power cord depends on the power source you are connecting to.

Connecting the Ethernet Cable

This section provides instructions for configuring the CAT5 Ethernet cable.

Parts Required

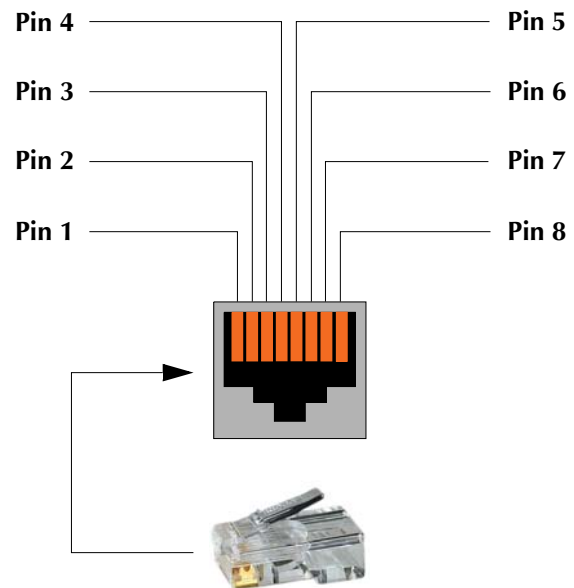
- ▶ Plenum-rated CAT5 Ethernet cable, cut to the desired length (not supplied)
- ▶ RJ45 plug assembly

Tools Required

- ▶ Wire stripper
- ▶ Continuity checker

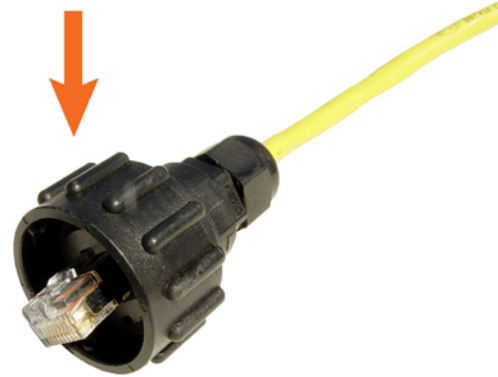
1. Review the pin connections.

- ▶ Pin 1 – TXD+ (TX Data)
- ▶ Pin 2 – TXD- (TX Data)
- ▶ Pin 3 – RXD+ (RX Data)
- ▶ Pin 4 – Not used
- ▶ Pin 5 – Not used
- ▶ Pin 6 – RXD- (RX Data)
- ▶ Pin 7 – Not used
- ▶ Pin 8 – Not used



2. Assemble the RJ45 plug/cable.
 - ▶ Item 1 – Shielded RJ45 plug
 - ▶ Item 2 – Gasket seal
 - ▶ Item 3 – Plug holder
 - ▶ Item 4 – Coupling ring
 - ▶ Item 5 – Seal assembly

When assembling the plug, take care not to lose the gasket seal (item 2)—it must be in place when the assembly is complete.



3. Install an RJ45 plug at the other end of the cable.

4. Perform a continuity check on each pin to verify that the cable has been assembled correctly.

5. Unscrew the protective cap, then connect the Ethernet cable to the OWS enclosure.

Turn the coupling ring clockwise (1/4 turn) to make the connection.

The connection is locked when you feel and hear a click.



Powering Up the OWS

This section provides instructions for powering up the OWS from both an AC and DC power source.

Safety Warning



The OWS must be grounded, and the door of the OWS enclosure must always be closed before applying power to the unit.

Powering Up from an AC Power Source

Important Note (AC Power)



AC input: 100 – 240 VAC (50/60 Hz) at 1.0 Amp maximum, supplied by a separate branch circuit with 2 Amp over-current protection (2 Amp circuit breaker).

The OWS must always be grounded before applying power to the unit—see “*Grounding the OWS Enclosure*” on page 9.

1. Verify that the AC service voltage is 120 VAC to 240 VAC.
2. Check that the power is turned OFF at the designated circuits.
3. If necessary, install 1/2 inch liquid-tight conduit from the power source to within 3 feet of the OWS.
4. Connect the conduit to a junction box. The conduit and junction box must be IEEE/ANSI compliant and suitable for outdoor use.
5. Turn ON the Strix OWS and verify that the unit is functioning.

Powering Up from a DC Power Source

Important Note (DC Power)



DC input: 12 – 24 VDC at 9.0 Amp maximum, supplied by an external separate 250 VA power-limited (or less) and isolated DC source with 15 Amp over-current protection (15 Amp circuit breaker).

The OWS must always be grounded before applying power to the unit—see “*Grounding the OWS Enclosure*” on page 9.

1. Verify that the DC service voltage is 12 VDC to 24 VDC.
2. Check that the power is turned OFF at the designated circuits.
3. If necessary, install 1/2 inch liquid-tight conduit from the power source to within 3 feet of the OWS.
4. Connect the conduit to a junction box. The conduit and junction box must be IEEE/ANSI compliant and suitable for outdoor use.
5. Turn ON the Strix OWS and verify that the unit is functioning.

OVS Product Specifications

WIRELESS

- ▶ Wireless Standards: IEEE 802.11a/b/g
- ▶ Frequency Bands:
 - 802.11a
 - 5.25 - 5.35 GHz
 - 5.725 - 5.850 GHz
 - 802.11b/g
 - 2.4 - 2.4835 GHz (Americas, FCC)
- ▶ Data Rates (Mbps):
 - 6, 9, 12, 18, 24, 36, 48, 54 (802.11a/b/g)
 - 12, 18, 24, 36, 48, 72, 96, 108 (802.11a Turbo)
- ▶ Wireless Medium:
 - 802.11a – OFDM, 802.11b/g – DSSS
- ▶ Modulation:
 - 802.11a: BPSK, QPSK, 16 QAM, 64 QAM
 - 802.11b/g: DBPSK, DQPSK, CCK
- ▶ Operating Channels:
 - 802.11a
 - 12 (Americas, FCC), includes 3 turbo channels
 - 802.11b/g
 - 11 (Americas, FCC)
- ▶ Transmit Power:
 - Configuration dependent—contact Strix
- ▶ Receiver Sensitivity:
 - Configuration dependent—contact Strix
- ▶ LO (crystal) Frequency Stability:
 - +/-10PPM within normal op. range of 0° to 55°C

ELECTRICAL

- ▶ Power Input:
 - Auto-sensing 120/240 VAC, 50/60 Hz, single phase, with ANSI/IEEE C62.41 category C3 integrated branch circuit protection
- ▶ AC Power Consumption:
 - 25W typical, 90W maximum
- ▶ DC Input:
 - 12/24V, 9A maximum

PROTECTION CIRCUITS

- ▶ Antenna Lightning Protection (optional):
 - < 9µj for 6kV/3kA @ 8/20µs waveform
- ▶ Electrical Protection:
 - ANSI/IEEE C62.41, UL 1449 2nd edition; 10kA @ 8/20 µs waveform, 36kA per phase; L-L, L-N, L-PE
- ▶ Data Protection:
 - EN61000-4-2 Level 4 ESD Immunity
 - EN61000-4-5 Level 4 AC Surge Immunity
 - EN61000-4-4 Level 4 Elect. Fast Transient Burst Immun.
 - EN61000-4-3 EMV Field Immunity

ENVIRONMENTAL

- ▶ Operating Temperature: -30°C to +55°C
- ▶ Storage Temperature: -45°C to +85°C
- ▶ Humidity: 10% to 90% non-condensing
- ▶ Weather Rating: IP67 weather tight
- ▶ Wind Survivability: ≤165 mph
- ▶ Wind Loading (165 mph): <1024 newtons
- ▶ Salt/Fog/Rust Resistance: Mil-STD-810F 509.4
- ▶ Shock & Vibration:
 - ESTI 300-192-4 spec T41.E
 - Class 4M3 and Mil-STD-810
- ▶ Transportation: ISTA 2A and Mil-STD-810

PHYSICAL

- ▶ Dimensions:
 - 3600 Series: 14" high x 12" wide x 8" deep (without accessories)
 - 2400 Series: 12" high x 10" wide x 6" deep (without accessories)
- ▶ Weight:
 - 3600 Series: 16.5lbs (7.48 Kg)
 - 2400 Series: 14.5lbs (6.58 Kg)
- ▶ NEMA 4 rated for outdoor enclosures

SECURITY

- ▶ Authentication:
 - 802.1x support, including RADIUS client, EAP-MD5, EAP-TLS, and PEAP-TTLS, WPA
- ▶ Encryption:
 - IEEE 802.11i (WPA2) with AES, and WEP

REMOTE MANAGEMENT

- ▶ Web, CLI and SNMP interfaces
- ▶ Supports BOOTP, DHCP, Telnet, SSH, HTTP, HTTPS, and FTP
- ▶ SNMP: MIB II, 802.11 MIB, and Strix private MIBs

APPROVALS

- ▶ FCC CFR47 Part 15, Class B
- ▶ Industry Canada RSS210
- ▶ EN60950 cTUVus Listed I.T.E
- ▶ UL 579/IEC 60529 IP67, rated for outdoor use
- ▶ UL 1449 2nd edition / IEC 60664-1
- ▶ CAN/CSA-C22.2 60950-00
- ▶ VCCI Class B

WARRANTY

- ▶ One year parts and labor



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