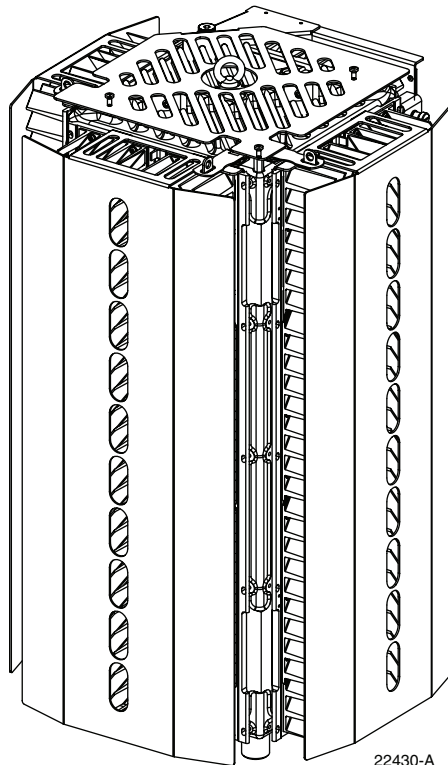




ADC FlexWave™ Universal Radio Head (URH) Remote Unit

Installation Instructions

ADCP-75-347 • Issue 1 • 04/2008



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REVISION HISTORY

ISSUE	DATE	REASON FOR CHANGE
1	04/2008	Original

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ADC Telecommunications, Inc.
P.O. Box 1101, Minneapolis, Minnesota 55440-1101
In U.S.A. and Canada: 1-800-366-3891
Outside U.S.A. and Canada: (952) 938-8080
Fax: (952) 917-1717

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ABOUT THIS MANUAL

This manual describes how to install and cable a URH Remote Unit in an outdoor environment such as pole or mast.

RELATED PUBLICATIONS

Listed below are related manuals, their content, and their publication numbers. Copies of these publications can be ordered by contacting the Technical Assistance Center at 1-800-366-3891, extension 73476 (in U.S.A. or Canada) or 952-917-3476 (outside U.S.A. and Canada). All ADC technical publications are available for downloading from the ADC web site at www.adc.com.

Title/Description	ADCP Number
ADC FlexWave™ Universal Radio Head (URH) Host Unit Installation Instructions	78-348
ADC FlexWave™ Universal Radio Head (URH) System User Manual	75-349
ADC FlexWave™ Universal Radio Head (URH) System EMS User Manual	75-350
ADC FlexWave™ URH Remote Unit Mounting Kit Installation Instructions	75-351

ADMONISHMENTS

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times.

These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.



Danger: *Danger is used to indicate the presence of a hazard that **will** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*



Warning: *Warning is used to indicate the presence of a hazard that **can** cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*



Caution: *Caution is used to indicate the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.*

GENERAL SAFETY PRECAUTIONS



Warning: *Wet conditions increase the potential for receiving an electrical shock when installing or using electrically-powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.*



Danger: *This equipment uses a Class 1 Laser according to FDA/CDRH rules. Laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not look directly into the optical transceiver of any digital unit or exposure to laser radiation may result. An optical power meter should be used to verify active fibers. A protective cap or hood MUST be immediately placed over any radiating transceiver or optical fiber connector to avoid the potential of dangerous amounts of radiation exposure. This practice also prevents dirt particles from entering the adapter or connector.*



Caution: *This system is a RF Transmitter and continuously emits RF energy. Maintain 3 foot (91.4 cm) minimum clearance from the antenna while the system is operating. Wherever possible, shut down the RAN before servicing the antenna.*



Caution: *Always allow sufficient fiber length to permit routing of patch cords and pigtailed without severe bends. Fiber optic patch cords or pigtailed may be permanently damaged if bent or curved to a radius of less than 2 inches (5.1 cm).*



Caution: *Exterior surfaces of the RU may be hot. Use caution during servicing.*



Caution: *Cooling fins on the Remote Unit may have sharp corners and edges, to prevent cuts and scrapes always wear gloves and appropriate protective clothing when handling the Remote Unit.*

STANDARDS CERTIFICATION

FCC: This equipment complies with the applicable sections of Title 47 CFR Part 15 (Host unit), Part 22 (800 MHz Cellular), Part 24 (1900 MHz - PCS), and Part 90 (800/900 - SMR).

IC: This equipment complies with the applicable sections of RSS-131. The term “IC:” before the radio certification number only signifies that Industry Canada Technical Specifications were met.

The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

Note: To comply with Maximum Permissible Exposure (MPE) requirements, the maximum composite output from the antenna cannot exceed 1000 Watts ERP (Cellular and SMR), the antenna cannot exceed 1640 Watts EIRP (PCS), and the antenna must be permanently installed in a fixed location that provides at least 6 meters (20 feet) of separation from all persons.

UL/CUL: This will be installed in a restricted access location. This equipment complies with NEMA Type 6, per UL and CUL 50, Standard for Enclosures for Electrical Equipment. This equipment provides the degree of protection specified by IP67 as defined in IEC Publication 529.

FDA/CDRH: This equipment uses a Class 1 LASER according to FDA/CDRH Rules. This product conforms to all applicable standards of 21 CFR Part 1040.

Caution: Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

LIST OF ACRONYMS AND ABBREVIATIONS

The acronyms and abbreviations used in this manual are detailed in the following list:

AC	Alternating Current
BTS	Base Transceiver Station
C	Centigrade
CM	Centimeter
CPU	Central Processing Unit
DART	Digital/Analog Radio Transceiver (DART board)
DAS	Distributed Antenna System
dB	decibel
dBc	The ratio (in dB) of the sideband power of a “signal” measured in a given bandwidth at a given frequency offset from the center frequency of the same signal, to the total inband power of the signal.
dB(FS)	decibels (Full Scale – digital reading)
dBm	decibels relative to 1mW
DC	Direct Current
Div	Diversity
EMS	Element Management System
ESD	Electrostatic Discharge
F	Fahrenheit
FCC	Federal Communications Commission
GPS	Global Positioning System
GUI	Graphical User Interface
HU	Host Unit
IC	Industry Canada
IF	Intermediate Frequency
IP	Internet Protocol
LED	Light Emitting Diode
LNA	Low Noise Amplifier
LPA	Linear Power Amplifier
LSE	Location Services Equipment
LVD	Low Voltage Disconnect
MUX	Multiplexer
OSP	Outside Plant
PA	Power Amplifier
PC	Personal Computer
PCI	Peripheral Component Interconnect bus
RDI	Remote DART Interface (RDI board)
RF	Radio Frequency
RU	Remote Unit
SeRF	Serialized RF (SeRF board)

SFP	Small Form-Factor Pluggable Optical Transceiver
SMA	Subminiature version A; Small form factor coaxial connector
UL	Underwriters Laboratories
VAC	Volts Alternating Current
VDC	Volts Direct Current
VSWR	Voltage Standing Wave Ratio
WDM	Wave Division Multiplex
WSP	Wireless Service Provider

1 DESCRIPTION

The FlexWave URH Remote Unit interfaces with the Host Unit and performs the optical to electrical conversions for transport to the antennas. A typical FlexWave URH system consists of a Host Unit (HU) and a Remote Unit (RU).

The RU is comprised of three RF doors and one common door on a single chassis. The doors are named left, right and front as viewed from the top of the chassis (Figure 1). The common door is necessary for all deployments. For normal operating conditions the host DART RF matches the remote. In simulcast mode the host DART RF matches the remote in the simulcast ratio.

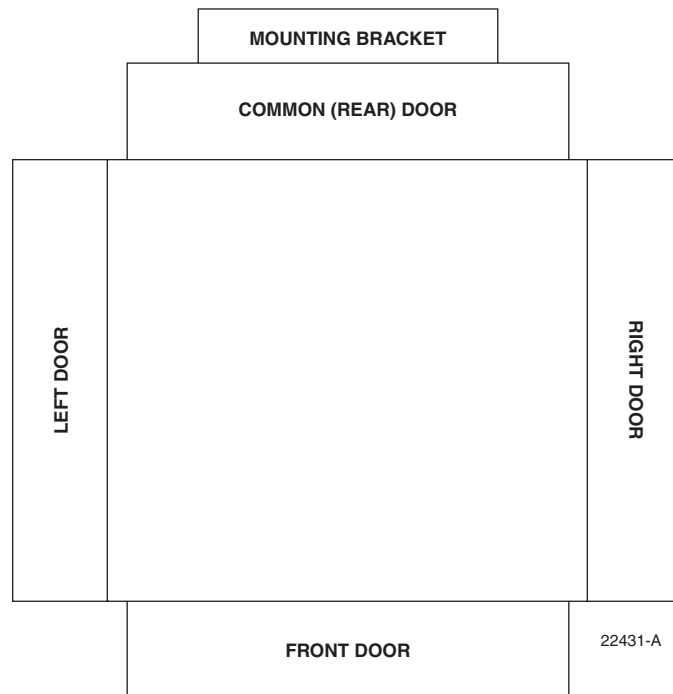


Figure 1. RU Door Locations Top View

1.1 RF Spectrums

The following RF spectrums are supported:

Cellular 800 A

- TX: 869-880, 890-891.5 MHz
- RX: 824-835, 845-846.5 MHz

Cellular 800 B

- TX: 880-890, 891.5-894 MHz
- RX: 835-845, 846.5-849 MHz

PCS 1900 (Supports only 35 MHz contiguous per door)

- TX: 1930-1990 MHz
- RX: 1850-1910 MHz

SMR/ESMR 800/900 MHz

- TX: 851-869, 935-940 MHz
- RX: 806-824, 896-901 MHz

RF spectrums may be changed by replacing a door on the RU. Additional RF spectrum options may be supported through new spectral allocations by means of pluggable RF boards.

The URH Remote Unit, shown in [Figure 2](#), consists of an environmentally-sealed unit and various electronic modules that are housed within the unit. Excess heat is dissipated using a passive cooling system which eliminates the need for external cooling fans. Solar shields are included and installed over the left, right, and front door. The low profile design of the unit requires minimal real estate for installation. The RU may be mounted on a pole or a flat surface. Separate antennas (not provided) connect to the RU.

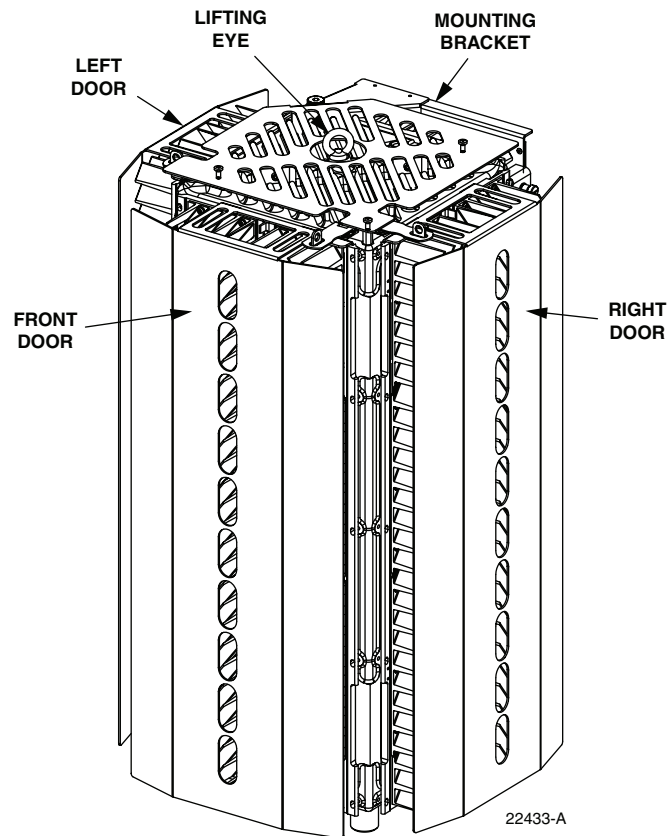


Figure 2. URH Remote Unit

Each RU door is factory configured to order, fully tested assembled and shipped as a single unit ready for deployment. Three solar shields are included and one must be installed over the left, right, and front door.

A fiber connector cable assembly is provided with 10 meters of environmentally hardened cable and 1 meter of exposed, un-terminated single-mode 900µm optical fiber sufficient for splicing in an OSP splice tray.

A power connector cable assembly is provided with 15 feet (4.6 m) of environmentally hardened cable allowing power junction termination.

The FlexWave RU, supports or provides the following basic functions:

- Provides RF interface (antenna port) for the antennas.
- Accepts AC power input.
- Provides a visual indication of unit status
- Optical backhaul of digitized RF

1.2 Primary Components

The remote is comprised of three doors and one common door on a common chassis. A bracket that allows the chassis to pivot is secured to the chassis at the left rear corner. This bracket is secured to the top and bottom right rear corner of the chassis with two capscrews. The RU doors are factory configured to order, fully tested assembled and shipped as a single unit ready for deployment. Three solar shields are included and installed over each door. The RU houses the electronic assemblies, controls RF emissions, seals out dirt and moisture, and provides passive cooling. The antenna cable connectors, fiber connectors, AC power connector, and the unit status indicator are located on the bottom of the unit.

1.3 Mounting

The FlexWave URH RU should be mounted on a utility pole, mast, or on a flat surface. A mounting kit is available for each unit. Installation consists of securing the bracket to the mounting surface and then hanging the unit from the bracket. The bracket may be attached to a variety of surfaces such as wood, concrete, or steel. The FlexWave URH RU should be mounted in a restricted access location only.

1.4 Fault Detection and Alarm Reporting

The FlexWave URH RU detects and reports fault and alarm information. RU has a single red STATUS LED on the bottom. At startup, LED is turned “ON” prior to being controlled by the SeRF processor. After startup, unique patterns are displayed to show the current status. [Table 1](#) defines the patterns displayed for the different conditions. Different sets of patterns may be defined based upon a pattern “code”. In this release (Software Version 1.1), the “code” can not be provisioned and is assumed to be zero. When more than 1 condition exists, the pattern for the condition with the higher priority is displayed. The highest priority is a “0”, with higher numeric values having a lower priority. Fault and alarm information is also available using the FlexWave URH GUI.

Table 1. LED Codes

CONDITION	PRIORITY	CODE = 0
System Startup. Processor is not in control.	N/A	Solid ON
No Condition. In service, operating normally.	N/A	Solid OFF
Minor Alarm	1	Solid OFF
Major Alarm	0	Solid OFF
Waiting to Connect to Host	3	Solid OFF
Downloading software	4	Solid OFF

1.5 FlexWave URH RU Dimensions

The basic dimensions of the URH RU are shown in [Figure 3](#).

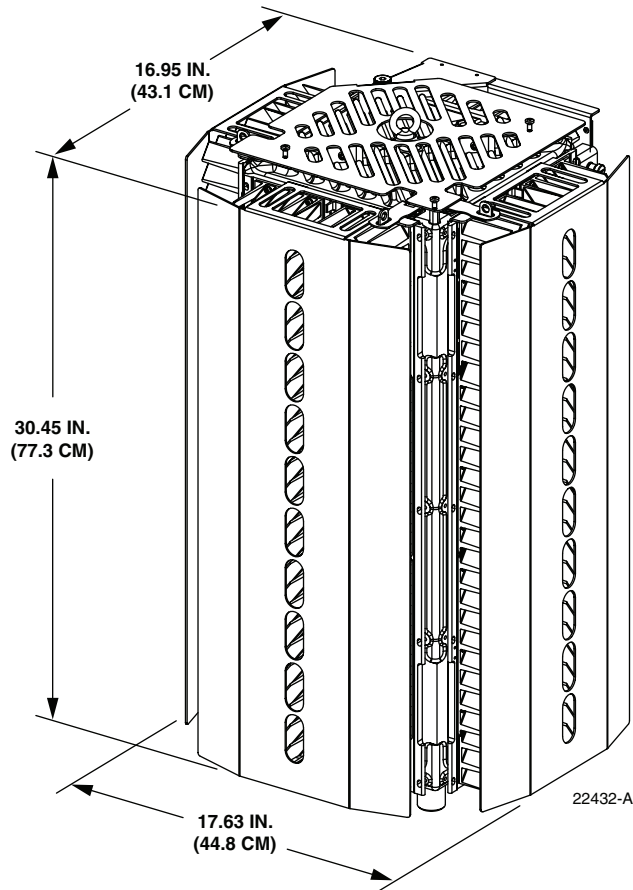


Figure 3. URH RU Dimensions

1.6 Wavelength Division Multiplexer System

The Wavelength Division Multiplexer (WDM) system is an accessory product that is used when it is desirable or necessary to combine the forward and reverse path optical signals from one URH system onto a single optical fiber. Each WDM system consists of a host module and a remote module.

At the HU there is a WDM chassis that contains the WDM modules at the RU the WDM is built into the fiber patch cord. The WDM system is available as an accessory item.

1.7 Antenna Cable Connections

The TX0/RX0 antenna cable connections are through 50-ohm N-type female connectors. The RU includes an internal duplexer which allows a single antenna cable to carry both forward and reverse path RF signals between the antenna and the RU. The RX1 diversity antenna cable connections are through 50-ohm N-type female connectors.

An externally-mounted lightning surge suppressor is available as an accessory. The surge/ antenna connector on the lightning suppressor is an N-type female connector. The URH Remote Unit must be properly grounded for the lightning surge suppressor to function properly.

1.8 Powering

The FlexWave URH is powered by 100 to 240 VAC (nominal 120 or 240 VAC), 50 to 60 Hz power. The AC power is supplied through a 15-foot (4.6m) three-wire power cable that is provided with the unit. The power cable connects to a mini 3-pin AC power connector mounted on the bottom of the RU. The power cable is rated for indoor or outdoor use and must **not** be placed within electrical conduit as this will impede the cooling of the cable during usage.

The stub end of the power cable must be routed to an external junction box (not provided) for connection to the AC power source. A circuit breaker rated at 15 Amps (120 VAC) should be used to provide overcurrent protection for the FlexWave URH power circuit. It is also recommended that an external AC outlet (not provided) be installed near the FlexWave URH RU to power test equipment and power tools.

1.9 Grounding

A grounding threaded hole (hex socket capscrew and washer provided by installer) is located on the bottom of the unit for connecting a grounding cable to the unit. A #6 copper wire terminated with a ring terminal must be provided to link the unit to an earth ground source.



Caution: For proper and safe equipment operation, an approved earth ground connection must be provided.

1.10 Cooling

Passive cooling of the electronic assemblies is provided by conducting excess heat from the internal electronic components to the aluminum enclosure. The heat is then dissipated by

radiation to the external fins where convection air flow over the enclosure’s external fins cools the unit. An alarm is generated if a high temperature condition occurs within the enclosure.

1.11 Lightning Surge Suppressor (Accessory)

An external lightning surge suppressor is available separately for the RU. It is recommended that a lightning surge suppressor be installed at each antenna port to reduce the chance of damage to electronic components should a lightning strike occur. The lightning surge suppressor antenna port is an N-Type female connector.

1.12 User Interface

The Remote Unit user interface consists of the connectors (RF and fiber), RJ-45 connector, and LED that are provided on the bottom of the unit. The RU user interface points are indicated in [Figure 4](#) and described in [Table 2](#).

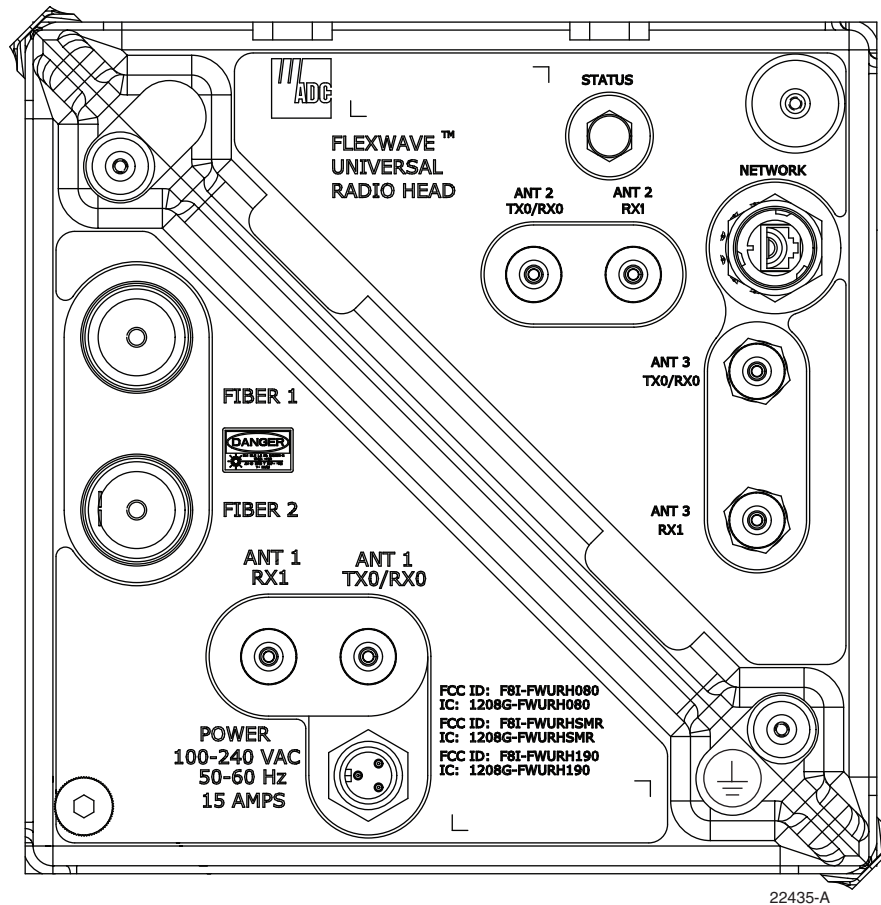



Figure 4. FlexWave URH Remote Unit User Interface

Table 2. FlexWave URH Remote Unit User Interface

USER INTERFACE DESIGNATION	DEVICE	FUNCTIONAL DESCRIPTION
FIBER 1	BX5 Duplex Female single-mode non-angled UPC fiber (>50 dB return loss *)	Connection point for the OSP cable from the Host unit.
FIBER 2	BX5 Duplex Female single-mode non-angled UPC fiber (>50 dB return loss *)	Spare
ANT 1 TXO/RXO	N-Type 50-Ohm female RF coaxial connector	Left door connection point for transmit RF power and primary receive to/from the antenna.
ANT 1 RX1	N-Type 50-Ohm female RF coaxial connector	Left door connection point for diversity receive for RF power from the antenna.
ANT 2 TXO/RXO	N-Type 50-Ohm female RF coaxial connector	Right door connection point for transmit RF power and primary receive to/from the antenna.
ANT 2 RX1	N-Type 50-Ohm female RF coaxial connector	Right door connection point for diversity receive for RF power from the antenna.
ANT 3 TXO/RXO	N-Type 50-Ohm female RF coaxial connector	Front door connection point for transmit RF power and primary receive to/from the antenna.
ANT 3 RX1	N-Type 50-Ohm female RF coaxial connector	Front door connection point for diversity receive for RF power from the antenna.
Network	Sealed RJ-45 female connector	Connection point for communication with the entire connected network: host, remote, and ENET connected devices at the remote.
Status	Red LED (off, Flashing red)	Indicates if RU is powered and normal (off) or if a major fault is detected (flashing red).
100/240 VAC 50–60 HZ 15 AMPS	Sealed 3-wire AC power connector	Connection point for the AC power cord.
	Socket head screw	Connection point for grounding unit.
* – ADC connector specification		

2 UNPACKING AND INSPECTION



Caution: *Cooling fins on the Remote Unit may have sharp corners and edges, to prevent cuts and scrapes always wear gloves and appropriate protective clothing when handling the Remote Unit.*

This section provides instructions for opening the shipping boxes, verifying that all parts have been received, and verifying that no shipping damage has occurred. The basic RU includes the following items:

- Remote Unit
- Solar Shields

- Fasteners, cables, and mounting bracket as specified in [Table 3](#) and Unit Mounting Kit Installation Instructions (ADCP-75-351)

The following accessories may also be shipped with the RU:

- Lightning surge suppressors

Unpack and inspect the various components as follows:

1. Inspect the exterior of the shipping container(s) for evidence of rough handling that may have damaged the components in the container.
2. Unpack each container while carefully checking the contents for damage and verify with the packing slip.
3. If damage is found or parts are missing, file a claim with the commercial carrier and notify ADC Customer Service. Save the damaged cartons for inspection by the carrier.
4. Refer to [Section 8 Customer Information and Assistance](#) if you need to contact ADC.
5. Save all shipping containers for use if the equipment requires shipment at a future date.

3 MOUNTING PROCEDURES

Detailed instructions for mounting the FlexWave URH RU are in the Remote Unit Mounting Kit Installation Instructions (ADCP-75-351). Refer to this document when mounting the FlexWave URH Remote Unit. After mounting the RU come back to this document for the remainder of the installation procedure.



Caution: *It is the installer's responsibility to verify that the wall or pole will support the weight of the mounting bracket, remote unit with components. The weight of a fully loaded remote unit is 197 pounds (89.4 kg). Use appropriate means to safely lift and handle the RU during unpacking and installation.*

4 INSTALLATION PROCEDURES

This section provides procedures for installing and connecting antenna cables, fiber cables, and AC power cables; and installing the shields. Installation of the RU may proceed separately from the installation of the corresponding Host Unit. When the installation of the RU is completed, refer to the appropriate manuals (see Related Publications section) for the system turn-up and test procedures.



Danger: *Wet conditions increase the potential for receiving an electrical shock when installing or using electrically-powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.*

4.1 Installation Overview

Installation of the RU consists of the following basic steps:

- ▶ **Note:** To insure that all connectors and ports remain dust-free during installation, leave all dust caps and dust protectors in place until directed to remove them.
1. Connecting the fiber cables.
 2. Connecting the antenna coaxial cables to the RU antenna ports.
 3. Installing the AC power cable and connecting it to the RU power port.
 4. Installing the shields.

4.1.1 Installation Hardware Provided with RU

The installation hardware that **is provided** with the RU is listed in [Table 3](#).

Table 3. Remote Unit Installation Hardware

ITEM	QUANTITY
AC Power Cable (15 feet/4.6m)	1
Quad Fiber Cables	1
Solar Shields	3
3/8-inch hex standoff	3
3/8-inch 10-32 phillips screw	3
#10 split washer	3

4.1.2 Tools and Materials Required

The following tools are required in order to complete the procedures in this instruction:

- #6 metric socket key or 7/32-inch hex key wrench
- Wire cutters
- Wire stripper
- Compression pliers for splicing grounding cable
- Tools for installing exterior AC circuit
- Tool kit for attaching N-Type connectors to coaxial cable

The following materials are required in order to complete the installation procedures:

- #6 AWG (4 mm) copper wire and splice
- #10 ring terminal for attaching #6 grounding wire to bottom of unit
- Connector for attaching #6 grounding wire to approved earth ground source
- Junction box, conduit, fasteners, connectors, and wire to install an exterior AC circuit.
- N-Type male connectors

4.2 Network Cable Installation

The RU provides a network port allowing communications with the internal processor and transfer of service data to the optical protocol allowing IP servicing between the host and remote(s). This port is customer accessible for monitoring the interface with the connected host and ENET connected devices at the remote. The Network port is 10/100/1000 BASE-T/TX (802.3ab compliant) MDI and requires a minimum of CAT 5 cable.

The network cable must be terminated with a hardened RJ-45 male connector for connection to the Network port. The maximum cable length is 300 feet (91.4 m).

Use the following procedure to install the Network cable:

1. Remove the dust cap from the RJ-45 connector located at the bottom of the RU as shown in [Figure 5](#).

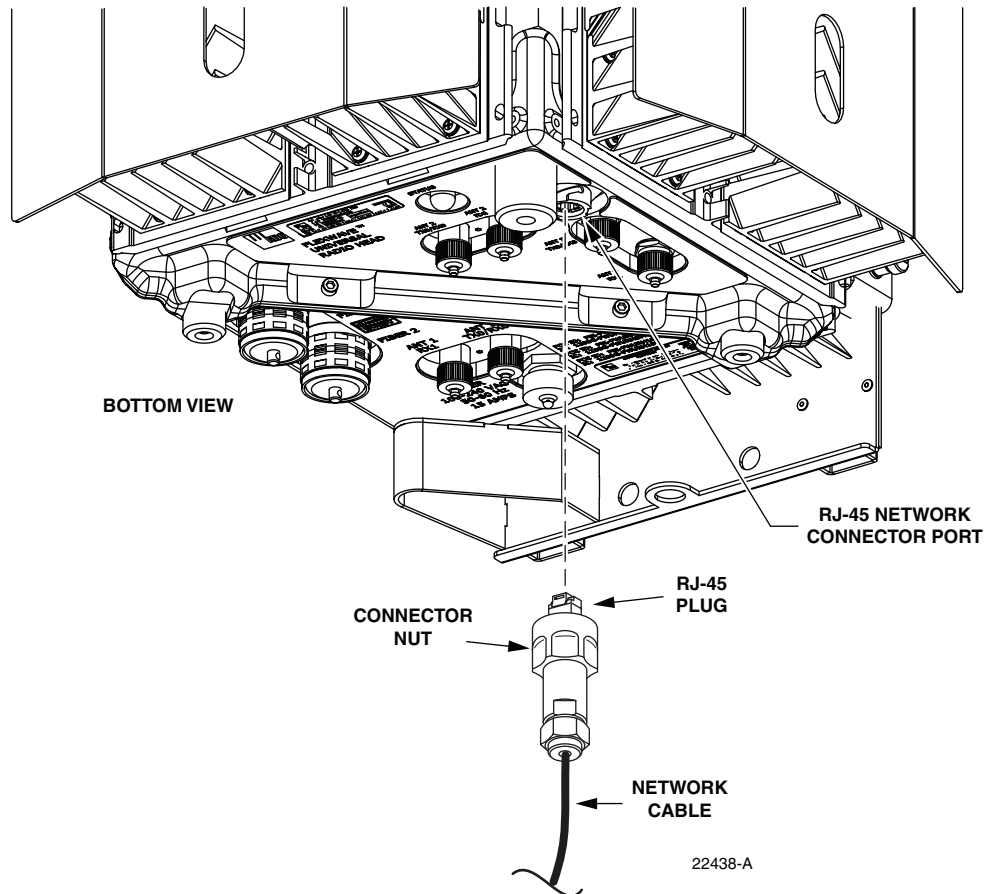


Figure 5. Network Cable Installation

2. Route the network cable from the network connection to the underside of the RU.
3. Align the plug end of the RJ-45 cable connector with the RJ-45 port receptacle and then insert the cable plug into the port receptacle.

4. Slide the connector nut up to the port until it engages the connector locking mechanism.
5. Tighten the connector nut in a clockwise direction (if necessary, use a wrench or pliers to grip the connector nut) until it snaps past the detent position and locks into place.

► **Note:** It may be necessary to apply 30 to 50 lbs/force-inches (3.4 to 5.6 Nm) of torque to the connector nut in order to turn it past the detent position.

4.3 Quad Fiber Cable Installation

URH Remote Unit is shipped a 10 meter of environmentally hardened cable with 1 meter of exposed, un-terminated single-mode 900µm optical fiber sufficient for splicing in an Outside Plant (OSP) splice tray. The fiber cable connector is a BX5 4-port fiber connector.

Use the following procedure to install the fiber cables:

1. Remove the dust cap from the BX5 connectors located at the bottom of the RU as shown in [Figure 6](#).
2. Remove the dust cap from the fiber cable BX5 connector (FIBER 1).
3. Align the plug end of the BX5 cable connector with the BX5 port receptacle and then insert the cable plug into the port receptacle.
4. Slide the strain relief boot over the connector.

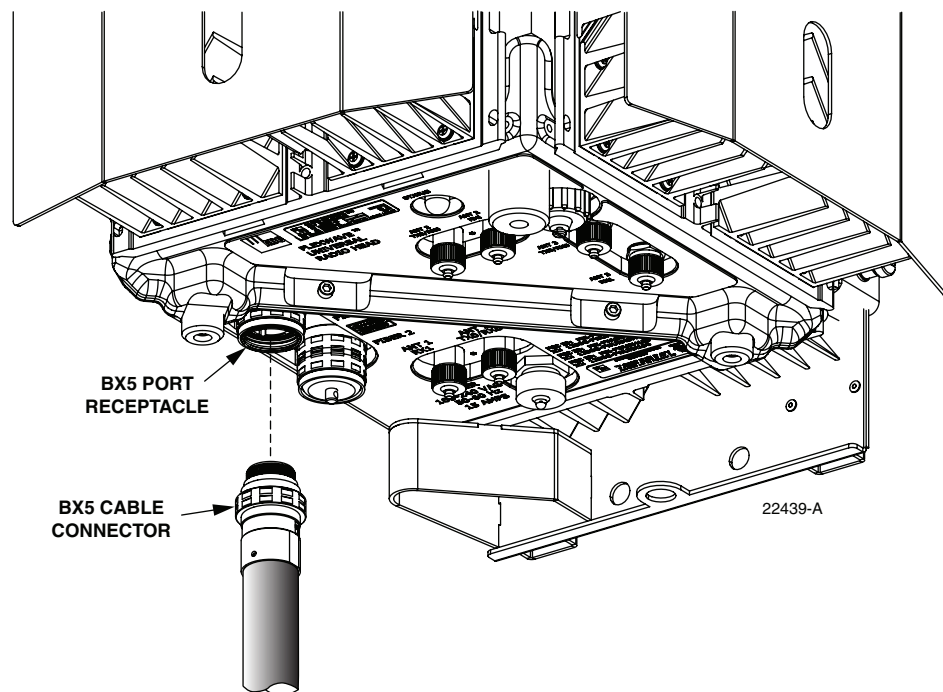


Figure 6. Fiber Cable Installation

5. Route the fiber cable from the underside of the RU to the OSP box.

- **Note:** Observe the fiber numbers and their positions in the quad cable connector. See [Figure 7](#). The fibers at the other end of the fiber cable are numbered with the same numbering scheme.
- Secure fiber cable in place following local practices.

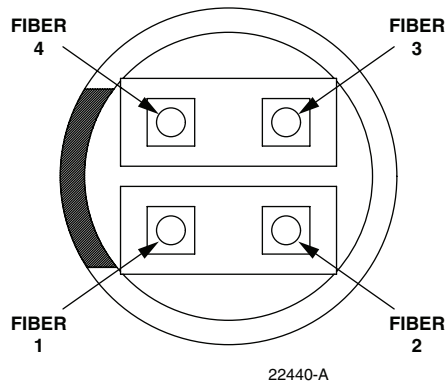


Figure 7. Fiber Locations

4.4 Antenna Cable Installation

Coaxial antenna cables must be routed from the antenna to the URH RU. The cables must be terminated with an N-Type male connector for connection to the RU antenna port or the lightning surge suppressor (accessory).

- **Note:** To comply with Maximum Permissible Exposure (MPE) requirements, the maximum composite output from the antenna cannot exceed 1640 Watts EIRP and the antenna must be permanently installed in a fixed location that provides at least **6 meters** (20 feet) of separation from all persons.

Refer to [Table 2 on page 7](#) for relationship between antenna number and the unit doors. Use the following procedure to install the antenna cable(s):

- Remove the dust cap from the N-type female connector located on the underside of the unit as shown in [Figure 8](#).
- If specified, connect a lightning surge suppressor (accessory) to the antenna port.
- Connect a ground wire to the lightning surge suppressor. Connect the ground wire to an approved earth ground.
- Route the coaxial antenna cable from the antenna to the underside of the RU.
- Cut the antenna cable to the required length and terminate with an N-type male connector.
- Connect the antenna cable to the lightning surge suppressor or to the antenna port.
- Repeat the above steps for the remaining antenna cables.

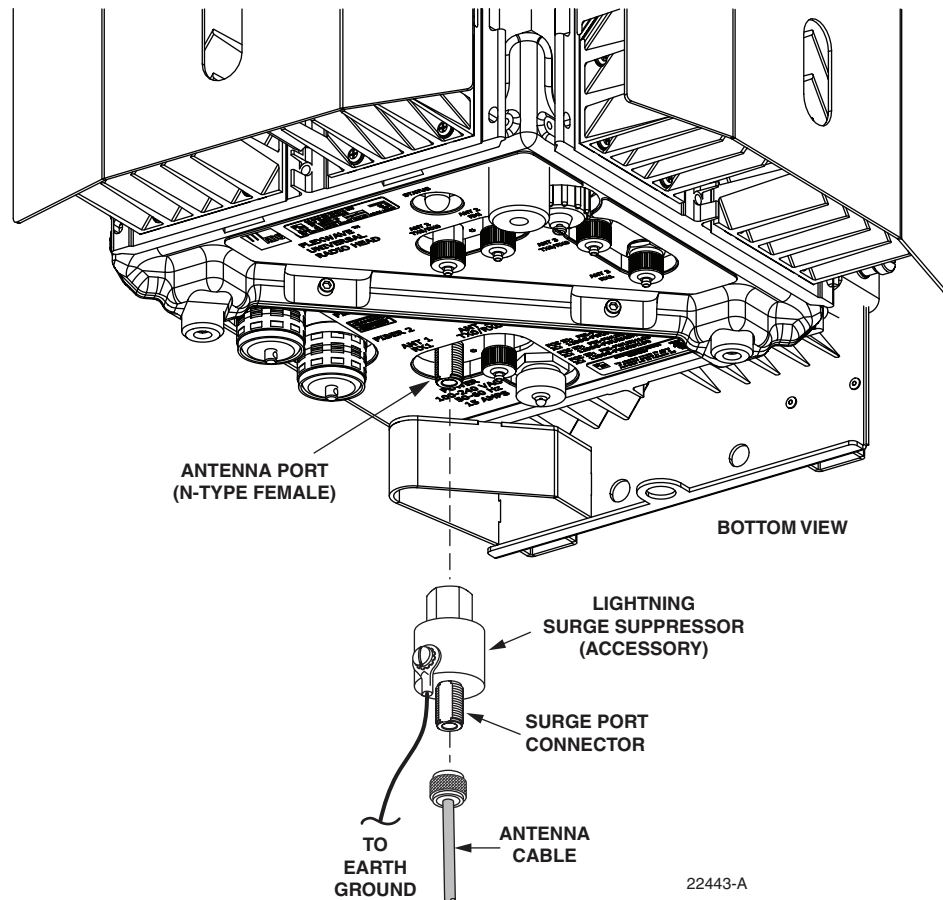


Figure 8. Connecting Antenna Cable to Antenna Port

4.5 Ground Wire Installation

A socket head capscrew with washer is provided on the underside of the cabinet for attaching a #6 copper grounding wire to the unit. A #6 AWG copper wire terminated with a ring terminal should be used to connect the unit to an approved grounding source. Avoid sharp bends in the ground wire. Use the following procedure to install the grounding wire:



Caution: For proper and safe equipment operation, an approved earth ground connection must be provided. The recommended minimum wire size is #6 AWG copper wire.

1. Locate a #6 AWG (4 mm) copper grounding wire long enough to reach an approved earth ground.
2. Locate the grounding point provided on the underside of the unit as shown in [Figure 9](#).
3. Remove the socket-head capscrew and flat washer from the unit using a #6 metric key or a 7/32-inch hex key wrench.
4. Secure the ring terminal end of the grounding wire to the unit using the screw and washer removed in [Step 3](#). Tighten securely.

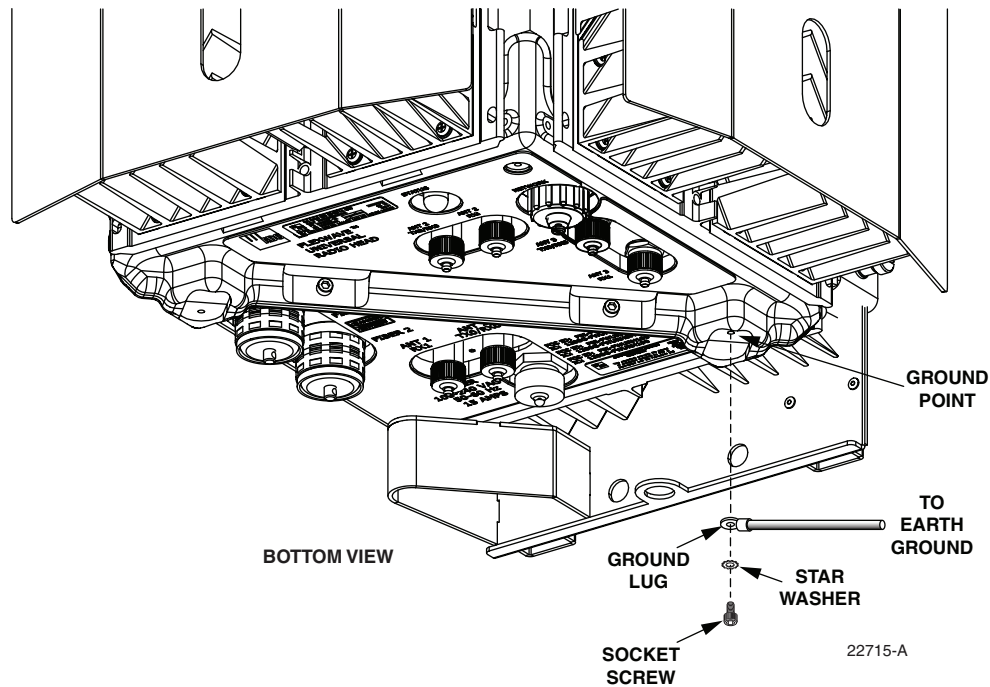


Figure 9. Connecting Grounding Cable to Unit

5. Route the free end of the grounding wire to an approved earth ground source.
6. Cut the ground wire to length and connect it to the earth ground source as specified by local code or practice.

4.6 AC Power Wiring Installation

A 20-foot connectorized 3-wire cable (also available in lengths of 40, 60, or 100 feet) is provided for the AC power connections. The connectorized end of the cable connects to the AC power port located on the bottom of the unit. The stub end of the cable must be routed to an external junction box (not provided) for permanent connection to the AC power system wiring.

The AC power source must supply between 100 and 240 VAC, 50 or 60 Hz, single-phase power through a circuit breaker or fuse. The AC power cable provides three wire leads for line, neutral, and ground connections. The power cable is rated for indoor or outdoor use and must not be placed within electrical conduit as this will impede the cooling of the cable during usage. The electrical junction box and any conduit, wire, and fittings required must be provided by the installer.

- **Note:** All electrical work must comply with local codes and requirements. A locally licensed electrical contractor is best qualified to perform this work. For additional information, consult with the ADC Technical Assistance Center.



Danger: Use extreme caution when working with high voltage AC power. Ensure all power is disconnected before working on power circuits.

Use the following procedure to install the AC power wiring:

1. Locate the AC power cable that is provided separately with the remote unit.
2. Route the power cable between the AC power port, located on the underside of the remote unit and the nearest AC power junction box as shown in [Figure 10](#). It may be necessary to install a new junction box if an existing junction box is not available.
3. Secure the cable between the AC power port and the AC power junction box per local practice. Leave sufficient slack in the cable to allow it to be easily connected and disconnected from the AC power port.

► **Note:** The power cable is rated for indoor or outdoor use and must not be placed within electrical conduit as this will impede the cooling of the cable during usage. The cable run distance to the AC power source must not exceed 100 feet.

4. Install any AC power supply wires that may be required between the AC junction box and the AC circuit breaker box.

► **Note:** It is recommended that an AC outlet be installed near the remote unit for powering tools and test equipment. This outlet must include a GFCI device for protection.

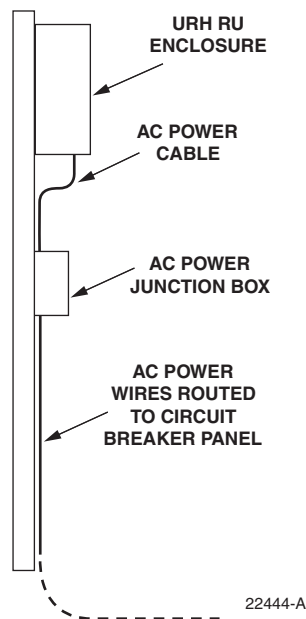


Figure 10. Typical AC Power Cable Routing

► **Note:** An appropriate disconnect device, as well as branch circuit protection, must be provided as part of the installation.

5. Connect the AC power cable wires to the AC power supply wires. Refer to [Figure 11](#) to identify the color code and wire designations.

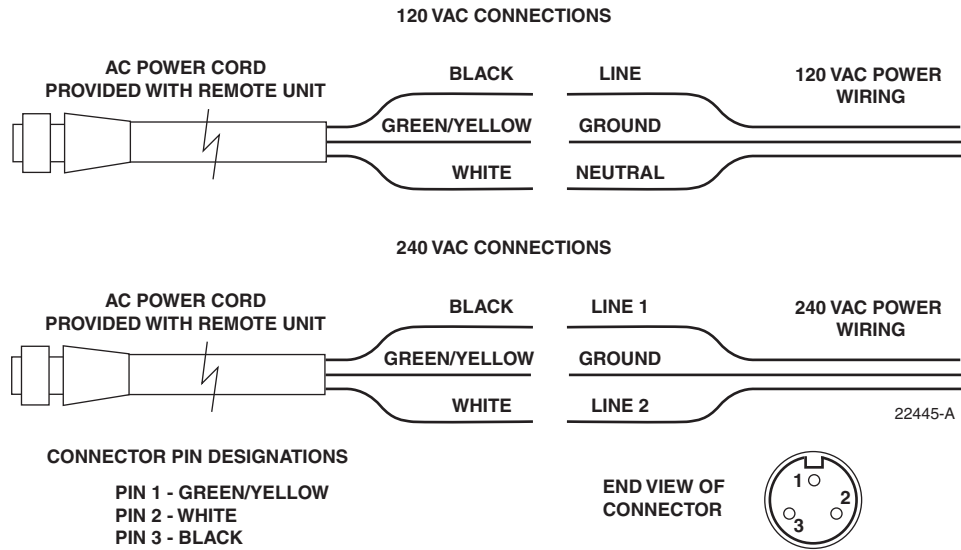


Figure 11. AC Power Cable Connections

6. At the AC box, connect the AC power supply load wires to a circuit breaker or fuse.



Caution: For proper and safe equipment operation, an approved earth ground connection must be provided and maintained.

7. Connect the ground wire to an approved earth ground.
8. Place the circuit breaker in the ON position and then test the connectorized end of the AC power cable for proper voltage levels and correct polarity.
9. When testing is complete, place the circuit breaker in the OFF position.
10. Remove the dust cap from the AC power port located on the bottom of the remote unit as shown in [Figure 12](#).



Danger: While trying to connect the AC power cable to the remote unit AC power port, it is possible for the line terminal on the cable connector to contact the ground pin on the power port. If the AC cable is energized, this will result in a direct short to ground for the AC power. To avoid possible personal injury and equipment damage, always turn the AC power **off** before connecting the AC power cable to the AC power port.

11. Connect the power cable connector to the AC power port.
12. Tighten coupling nut until the green band at the top of the connector body is visible.

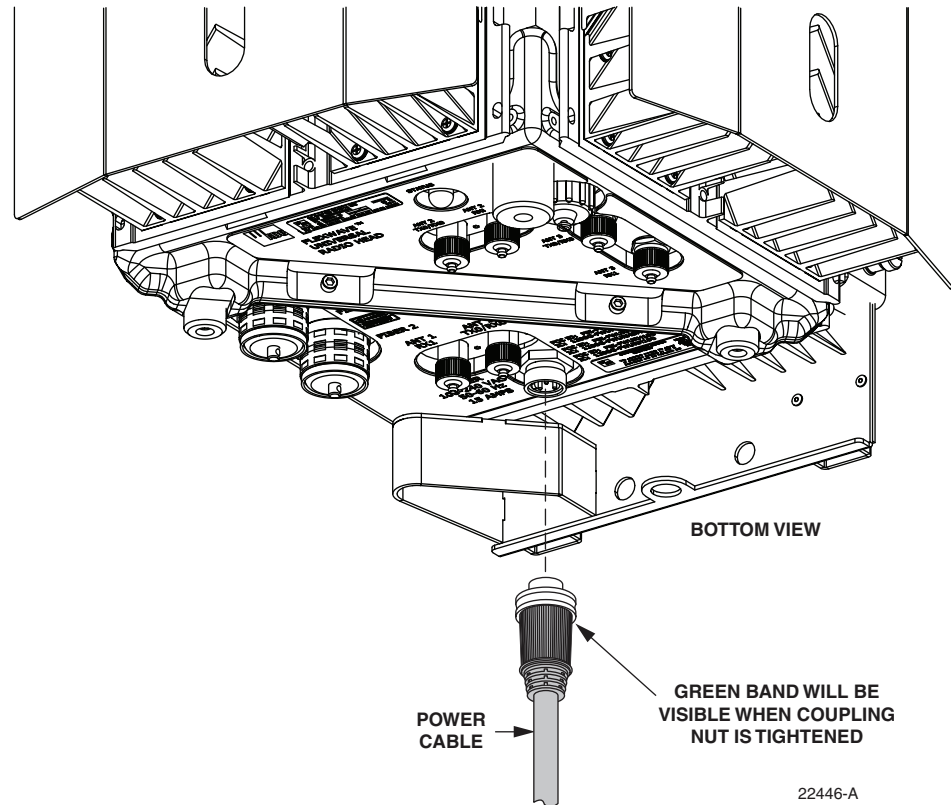


Figure 12. Connecting AC Power Cable to Remote Unit

4.7 Solar Shield Installation

A set of shields is provided with the URH RU. The shields primarily reduce the effects of solar loading on the aluminum unit. The shields also prevent accidental contact with surface areas of the unit that under extreme service conditions may become hot enough to cause burns. Install the three 3/8-inch hex standoffs as shown in [Figure 13](#). Secure the two side shields and the front shield to the standoffs using the three 3/8-inch 10-32 phillips screws and three #10 split washers provided.



Warning: *Cooling fins on the Remote Unit have sharp corners and edges, to prevent cuts and scrapes always wear gloves and appropriate protective clothing when handling the Remote Unit.*

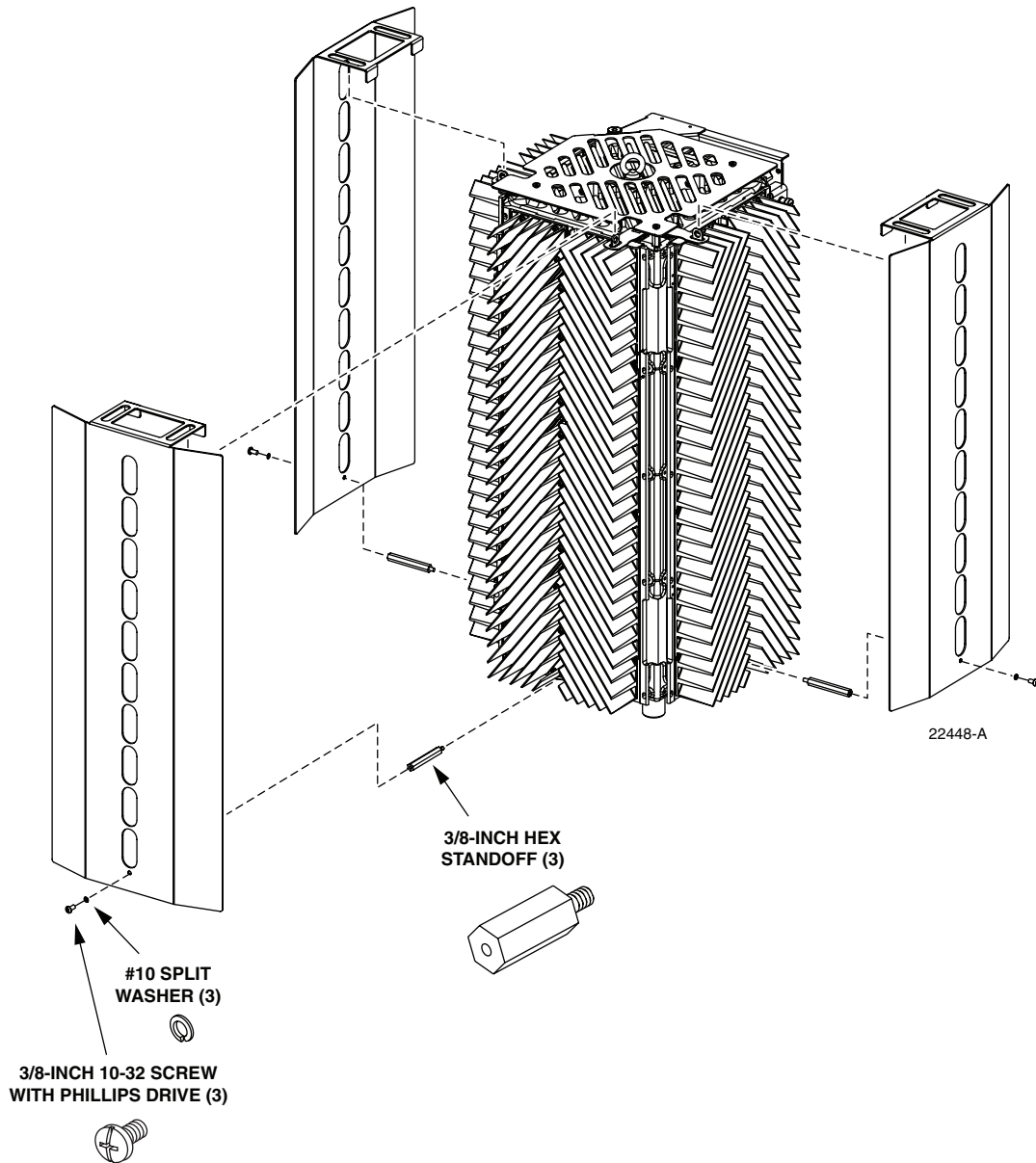


Figure 13. Solar Shield Installation

4.8 Touch-Up Painting

A brush-in-cap type bottle of paint is available for touching-up nicks and scratches in the factory coat of paint. Lightly sand the area to be painted and then clean it thoroughly to remove and dirt, dust, or foreign matter. Shake the paint bottle until thoroughly mixed and then apply a light coat of paint to the damaged area using the small brush attached to the cap. Wait until the paint is dry and apply a second coat if necessary. When finished painting, replace the paint bottle cap and tighten securely.

4.9 Power-Up and Testing

When the installation is complete, refer to the applicable publications for the system turn-up and test procedures. To verify that the remote unit is ready to be placed into service, place the AC breaker in the closed (on) position and observe the LED indicator light on the bottom of the remote unit. The LED indicator should turn **red** immediately following power-up. The LED will continue to stay red for up to 30 minutes following the initial power-up during which time the remote unit will synchronize with an external clock source. When the remote unit timing has been synchronized, the LED will turn off.

4.10 URH Remote Unit Replacement

URH Remote Unit doors may be replaced or changed if there is a failure or a different RF spectrum is needed. Failure of any door component will require replacement of the entire door. The unit mounting hardware, the various cables, and any attached antenna systems may be reused with the replacement door.

5 INSTALLING REMOTE UNIT ON THE MOUNTING BRACKET



Caution: *It is the installer's responsibility to verify that the wall or pole will support the weight of the mounting bracket, remote unit with components. The weight of a fully loaded remote unit is 197 pounds (89.4 kg). Use appropriate means to safely lift and handle the RU during unpacking and installation.*



Warning: *Cooling fins on the Remote Unit have sharp corners and edges, to prevent cuts and scrapes always wear gloves and appropriate protective clothing when handling the Remote Unit.*

Use the following procedure to secure the FlexWave URH RU to the mounting bracket.

1. Hang the RU from the mounting bracket as shown in [Figure 14](#). The tear drop slots in the rear side of the RU fit into the two mounting posts at the top of the mounting bracket.
2. Place a 3/8-inch flat washer and 3/8-inch flat washer on each hex bolt.
3. Insert a 3/8 x 1-inch hex bolt through each hole in the pivot bracket located at the bottom of the RU.
4. Thread bolts into mounting bracket and tighten securely.

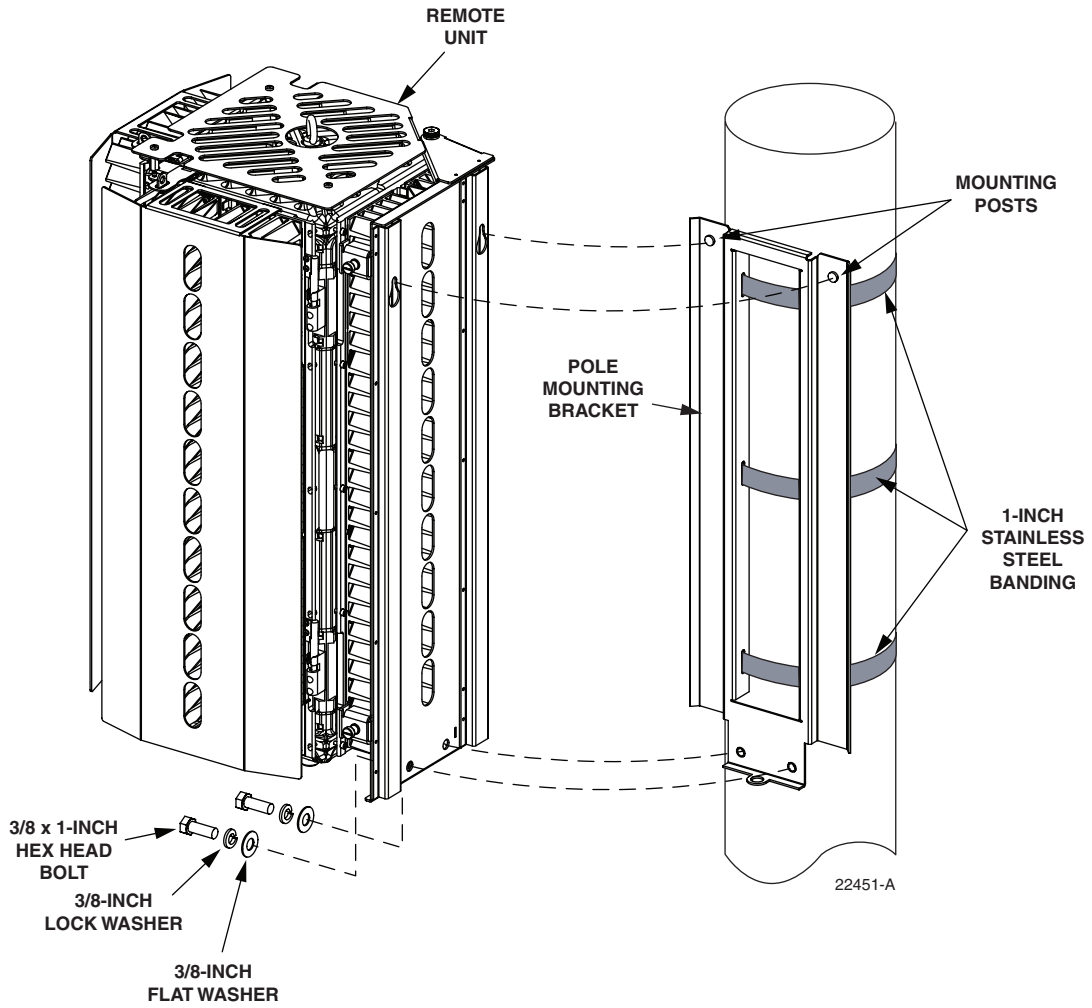


Figure 14. Securing Remote Unit To Pole

6 SPECIFICATIONS

The specifications for the FlexWave URH Remote Unit are listed in [Table 4](#).

Table 4. URH RU Specifications

PARAMETER	SPECIFICATION	REMARKS
Physical/Environmental/ Electrical		
RU dimensions (H×W×D)	30.45 × 17.63 × 16.95 inches (77.3 × 44.8 × 43.1 cm)	
Mounting	Pole/Wall	
Weight	197 lbs (89.4 kg)	With solar shields installed
Weather resistance	IP.67	Indoor or outdoor installation
Operating temperature	−40° to +50° C (−40° to +122° F)	10–90% Humidity non-condens- ing
Storage temperature	−40° to +85 C (−40° to +185° F)	
RJ	Sealed RJ-45 female connector	
AC power connector	Sealed 3-pin AC power	
Antenna cable connector	50 ohm N-Type (female)	50 ohms input/output impedance
Lightning suppression (for antenna cable connector)	20 kA IEC 1000-4-5 8/20 μs wave- form	Provided by external lightning surge suppressor (accessory)
Voltage input	100 to 240 VAC, 50 to 60 Hz	Operating range 90 to 265 VAC
Power consumption	See Table 5 and Table 6 .	
Current rating	Calculate based on power consump- tion and operating Voltage. See Section 7.1 Power Calculation .	Maximum fuse size 20 Amps.

7 POWER CONSUMPTION

7.1 Power Calculation

Review the Remote Unit order to determine the number of DARTs, number of power supplies, and the number of SFPs. Use this information to find the power consumption for the doors from [Table 5](#) and [Table 6](#) when used.

Use the following formula to determine the maximum power consumption and then determine the circuit breaker or fuse to use.

Enter the power consumption in the spaces provided:

Rear door power consumption from [Table 5](#) _____ Watts

Front door power consumption from [Table 6](#) _____ Watts

Additional SFP's _____ x 1.25 _____ Watts

_____ TOTAL POWER CONSUMPTION

To determine the current (Amperes) requirements divide the total Watts by the input Voltage:

$$\frac{\text{Watts}}{\text{Volts}} = \text{Amps}$$

Once you have calculated the current (Amps) draw determine the circuit breaker or fuse size based on local codes and practices. Circuit breaker or fuse size must be 20 Amps or less.

Table 5. Rear Door Power Consumption

CONFIGURATION			WATTS		
	SUPPLY #1	SUPPLY #2	NOMINAL	MAX.	
TWO POWER SUPPLIES (ONE DOOR)	SeRF Power Supply not shared *	Power Supply Connected to:	6W - 1 DART Door	231	235
			6W - 2 DART Door	254	259
			20W - 1 DART Door	330	368
			20W - 2 DART Door	353	392
TWO POWER SUPPLIES (TWO DOORS)	SeRF Power Supply shared with 6W - 1 DART Door *	Power Supply Connected to:	6W - 1 DART Door	426	431
			6W - 2 DART Door	449	455
			20W - 1 DART Door	525	564
			20W - 2 DART Door	548	588
	SeRF Power Supply shared with 6W - 2 DART Door *	Power Supply Connected to:	6W - 1 DART Door	449	455
			6W - 2 DART Door	471	479
			20W - 1 DART Door	548	588
			20W - 2 DART Door	570	612
	SeRF Power Supply shared with 20W - 1 DART Door *	Power Supply Connected to:	6W - 1 DART Door	525	564
			6W - 2 DART Door	548	588
			20W - 1 DART Door	624	698
			20W - 2 DART Door	646	721
SeRF Power Supply shared with 20W - 2 DART Door *	Power Supply Connected to:	6W - 1 DART Door	548	588	
		6W - 2 DART Door	570	612	
		20W - 1 DART Door	646	721	
		20W - 2 DART Door	669	745	

* – Power Consumption calculated for a SeRF with one SFP populated. Add 1.25 Watts for each additional SFP.

Table 6. Front Door Power Consumption

CONFIGURATION		NOMINAL (W)	MAX. (W)
ONE POWER SUPPLY (THREE DOORS)	Power Supply connected to 6W - 1 DART Door	195	196
	Power Supply connected to 6W - 2 DART Door	218	220
	Power Supply connected to 20W - 1 DART Door	294	329
	Power Supply connected to 20W - 2 DART Door	316	353

8 CUSTOMER INFORMATION AND ASSISTANCE



PHONE:

U.S.A. or CANADA

Sales: 1-800-366-3891
 Extension 73000
 Technical Assistance: 1-800-366-3891
 Connectivity Extension: 73475
 Wireless Extension: 73476

EUROPE

Sales Administration: +32-2-712-65 00
 Technical Assistance: +32-2-712-65 42

EUROPEAN TOLL FREE NUMBERS

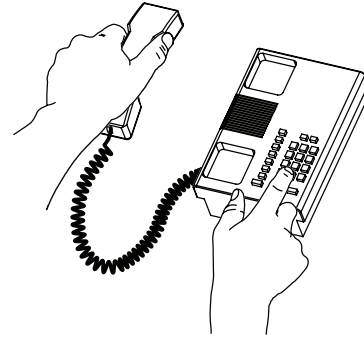
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 UK: 0800 960236
 Spain: 900 983291
 France: 0800 914032
 Italy: 0800 782374

ASIA/PACIFIC

Sales Administration: +65-6294-9948
 Technical Assistance: +65-6393-0739

ELSEWHERE

Sales Administration: +1-952-917-3000
 Technical Assistance: +1-952-917-3475



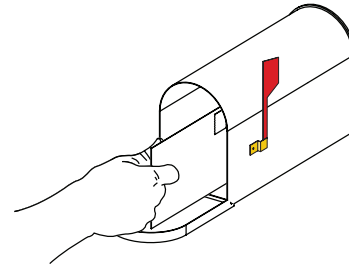
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WRITE:

ADC Telecommunications (S'PORE) PTE, LTD;
100 Beach Road, #18-01, Shaw Towers.
Singapore 189702.

ADC Telecommunications, INC
PO Box 1101,
Minneapolis, MN 55440-1101, USA

ADC European Customer Service, INC
Belgicastraat 2,
1930 Zaventem, Belgium



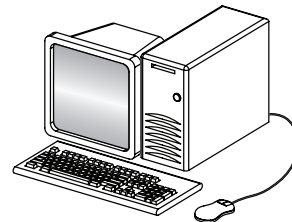
PRODUCT INFORMATION AND TECHNICAL ASSISTANCE:

connectivity.tac@adc.com

wireless.tac@adc.com

euro.tac@adc.com

asiapacific.tac@adc.com



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