

KU-Band 90 cm Antenna with Universal Radio Assembly

Installation Guide

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Understanding safety alert messages

Safety alert messages call attention to potential safety hazards and tell you how to avoid them. These messages are identified by the signal words DANGER, WARNING, CAUTION, or NOTICE, as illustrated below. To avoid possible property damage, personal injury, or in some cases possible death, read and comply with all safety alert messages.

Messages concerning personal injury

The signal words DANGER, WARNING, and CAUTION indicate hazards that could result in personal injury or in some cases death, as explained below. Each of these signal words indicates the severity of the potential hazard.



DANGER indicates a potentially hazardous situation which, if not avoided, *will* result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Messages concerning property damage

A NOTICE concerns property damage only.



NOTICE is used for advisory messages concerning possible property damage, product damage or malfunction, data loss, or other unwanted results – but *not* personal injury.

Safety symbols

The generic safety alert symbol



calls attention to a potential personal injury hazard. It appears next to the DANGER, WARNING, and CAUTION signal words as part of the signal word label. Other symbols may appear next to DANGER, WARNING, or CAUTION to indicate a specific type of hazard (for example, fire or electric shock). If other hazard symbols are used in this document they are identified in this section.

Additional symbols

This document uses the following hazard symbols:



Indicates a safety message that concerns a potential electric shock hazard.



Indicates a safety message that concerns a potentially hazardous situation in which you could fall.



Indicates a safety message that concerns radio frequency (RF) energy.

Chapter 1

Overview

This installation guide explains how to assemble and install the Hughes Ku-Band 90 cm antenna. It is written for qualified installers who are familiar with satellite antenna installation practices and are capable of properly applying the information presented.

This chapter presents an overview of the 90 cm antenna, a summary of the steps used to assemble and install the antenna, and supplemental information on tasks related to antenna installation.



Only Hughes-certified installers may install or service Hughes antennas and their components. Installers must expressly acknowledge the Hughes requirements for Hughes installations.

Antenna description

This Hughes 90 cm antenna is designed for Ku-Band applications. Each terminal consists of an antenna assembly and a satellite modem. The satellite modem communicates with both the *satellite and the Network Operations Center (NOC)* using the antenna and radio assembly.

The antenna is connected to the satellite modem using a single or dual-cable intra-facility link (IFL) cable that carries both the transmit and receive signals.

[Figure 1](#) on page 8 shows the 90 cm antenna—with radio assembly—fully assembled.



Figure 1: Hughes 90 cm satellite antenna

Antenna installation summary

The basic steps and related tasks for assembling and installing the antenna are listed below. Perform the procedures in the order listed. For detailed information on each task, refer to the sections and/or other documents listed.

1. Explain the installation process to the customer.
2. Conduct a site survey with the customer to identify a suitable location for the antenna. Refer to [Select the installation site](#) on page 21 and/or the appropriate site preparation and mount installation guide
3. Install and apply power to the satellite modem.
Note: You must install the satellite modem before installing the antenna to determine the proper antenna pointing values (azimuth and elevation). Refer to the appropriate satellite modem installation guide.
4. Determine the most suitable method for mounting the antenna, then install the antenna mast.
Note: The antenna mast must be plumb. The antenna cannot be adjusted to correct for a mast that is not plumb. Refer to Chapter 3 – *Installing the antenna and radio*.
5. Assemble the antenna (Az/El mount, feed support arm, reflector, and other parts). Refer to Chapter 3 – *Installing the antenna and radio*
6. Install the radio assembly.
7. Install the antenna assembly on the mast. Refer to [Installing the antenna assembly onto the mast](#) on page 23.
8. Install the IFL cable between the satellite modem and the antenna. Refer to Chapter 4 – *Cabling and connections*.
9. Ground the antenna assembly. Refer to [Ground connections](#) on page 39.
10. Point the antenna.

When the antenna is properly pointed, you can commission the satellite modem as instructed in the appropriate IDU installation guide.

Antenna Assembly parts and recommended tools

This chapter identifies the main components and parts provided with the 90 cm Ku-band antenna kit. It also provides a list of required tools you will need to successfully perform the installation.



Figure 2: Antenna parts



Figure 3: Radio assembly

Antenna kit components

When you receive the antenna equipment, unpack and inspect the components and hardware to ensure that all parts have been received in good condition.



Metal components may contain sharp edges. Use care when unpacking and handling antenna parts.

If any parts appear to have been damaged in transit, immediately contact the freight carrier. If any parts appear to be missing or damaged, but not as a result of handling in transit, contact your dealer or distributor.

Note: To avoid potential damage, leave all components in their protective packages until required.

The main components of the antenna kit are:

- Az/EI mount assembly
- Reflector bracket
- Antenna reflector
- Feed support arm
- Feed Horn

The following sections describe and illustrate each component of the antenna kit.

Az/El mount assembly

The Az/El mount assembly, shown in [Figure 4](#), includes components that allow you to adjust the antenna elevation and azimuth—the Az/El canister, the elevation scale, and the azimuth and elevation adjustment tools. It also includes a grounding screw, used to ground the assembly to the grounding block.

The Az/El canister supports the antenna and secures it to the mast. The elevation scale is used to measure the angle of antenna elevation. The azimuth and elevation adjustment tools are used to finely adjust the azimuth and elevation of the reflector during antenna pointing.

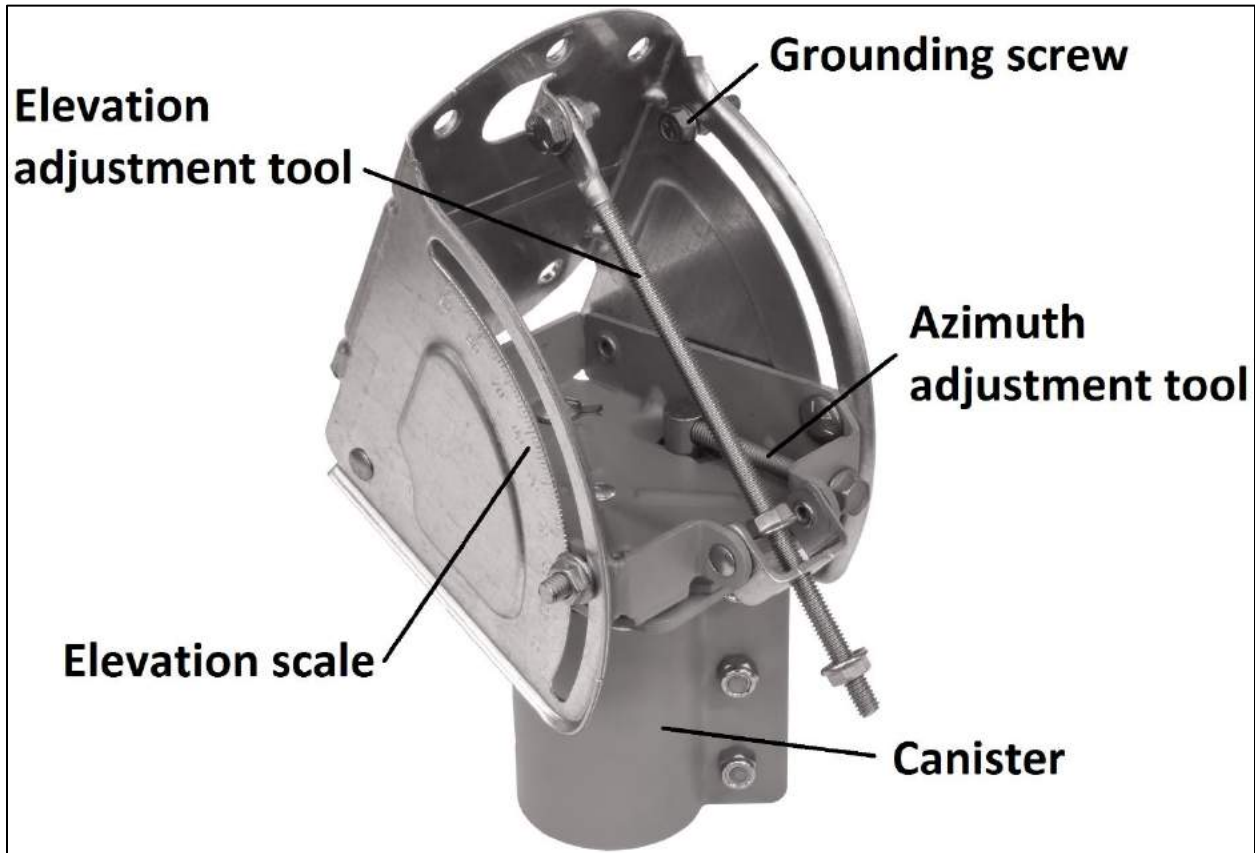


Figure 4: Az/El mount assembly

Reflector bracket

The reflector bracket shown in [Figure 5](#) attaches to the Az/EI mount and supports the antenna reflector.



Figure 5: Reflector bracket

Antenna reflector

The antenna reflector shown in [Figure 6](#) focuses the transmitted and received RF signals. It attaches to the reflector bracket.



Figure 6: Antenna reflector

NOTICE

Handle the antenna reflector with care to avoid bending it or causing other damage.

Feed support arm

Figure 7 shows the feed support arm, before assembly, which supports the radio assembly and feed horn.

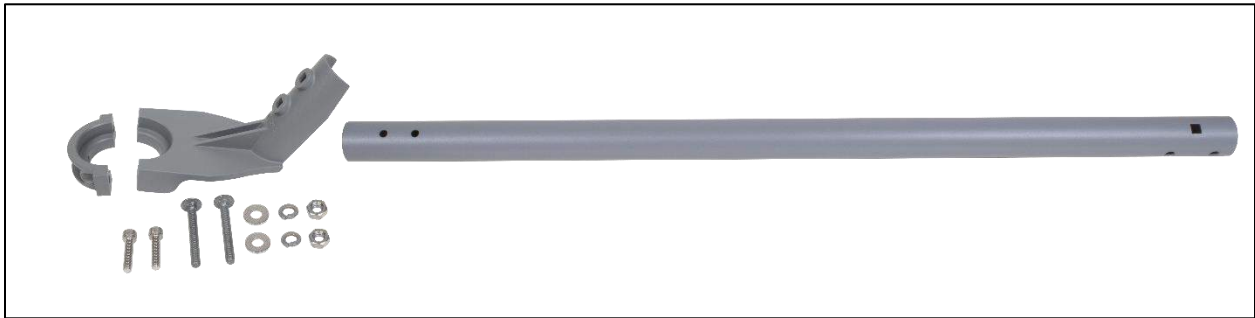


Figure 7: Feed support arm with hardware

Feed Horn

Figure 8 Shows the feed horn.



Figure 8: Feed horn

Small hardware parts list

Table 1 lists the small hardware parts included with the antenna kit.

Table 1: Small hardware parts

Hardware parts	Quantity	Listed parts are used to attach...	Illustration showing where parts are used
$\frac{5}{16}$ inch \times $\frac{3}{4}$ inch carriage bolts	5	Reflector bracket to Az/EI mount assembly	Figure 10 on page 23
$\frac{5}{16}$ inch hex flange nuts	5		
$\frac{5}{16}$ inch \times $\frac{3}{4}$ inch carriage bolts	5	Antenna reflector to reflector bracket	Figure 13 on page 25
$\frac{5}{16}$ inch hex flange nuts	5		
$\frac{5}{16}$ -18 \times 2- $\frac{1}{4}$ inch hex bolts	2	Installing the feed arm	Figure 14 on page 26
$\frac{5}{16}$ -18 carriage bolts	1		
$\frac{5}{16}$ -18 flat washers	5		
$\frac{5}{16}$ -18 hex nylock nut	3		
Boom arm plate	1		
Feed Horn Screws	4	Installing the feed Horn	Figure 19: Attaching the feedhorn and radio assembly Figure 19 on page 33
Feed Horn Split Lock Washers	4		
Feed Horn Gasket	1		

Radio assembly

The radio assembly shown in Figure 9 consists of the radio transmitter/receiver and waveguide adapter. This can be dual or single-IFL.

Note: The radio assembly is shipped separately from the rest of the antenna and may not arrive at the same time.



Figure 9: Radio assembly

Table 2: Radio assembly part numbers

Part number	Model name	Type	Description
1504363-0001	Radio Assy, 2W, Single-IFL, Univ, 4M	Pure type	Single IFL
1503927-0003	Assy, Radio, Ku Band Universal	Pure type	Dual IFL

Tools

Table 3 lists the tools recommended for assembling and installing the antenna.

Table 3: Required tools

Tools	Details
Socket wrench, $\frac{1}{2}$ inch (with 3 inch extension)	For $\frac{5}{16}$ inch bolts.
Open-end wrench, $\frac{1}{2}$ inch	For $\frac{5}{16}$ inch bolts. Two of the Az/El canister nuts are not accessible by socket wrench. Some nuts and bolts require a second wrench to prevent turning.
2 open-end or socket wrenches, $\frac{7}{16}$ inch	For $\frac{1}{4}$ inch bolts. Some nuts and bolts require a second wrench to prevent turning.
Torque wrench, foot-pounds	With $\frac{1}{2}$ inch and $\frac{7}{16}$ inch sockets, capable of measuring torque to 8 ft-lb.
Torque wrench, open-end, inch-pounds	$\frac{7}{16}$ inch, capable of tightening to 20 inch-lb, such as the Ripley model TW 207-AH-B torque wrench, which is present to 20 inch-lb. Used to connect IFL to the radio assembly or ground block.
3 mm ball-end hex wrench	For Allen screws on polarizer assembly (for adjusting circular polarization only).
Phillips-head screwdriver, $\frac{1}{4}$ inch	For screw used to secure antenna reflector to reflector bracket.
Bubble level	Used to ensure that the mast is plumb.
Compass	Used in determining proper antenna azimuth.
Dielectric grease	Used to prevent moisture contamination from occurring on coaxial cable connections.
Weatherproofing tape	Used to keep moisture away from cable connections.
Approved RG6 cable	Used for IFL between satellite modem and antenna.
UV-rated cable ties	Used to secure slack in cables to antenna mast.

Installing the antenna and radio

This chapter explains how to assemble and install the antenna, radio assembly, and associated hardware.



Before you install the antenna, read all safety information in [Understanding safety alert messages](#) on page 5.

General instructions for assembling the antenna



If you work on a roof, tower, or other high structure, or use a ladder or scaffold to access the work site, follow these precautions to prevent personal injury or death:

- Walk only on sound roof structures.
 - Ensure that the antenna assembly and installation surface are structurally sound so they can support all loads (equipment weight, ice, and wind).
 - Use safety equipment (e.g., a lifeline) appropriate for the work location.
 - Follow all manufacturer safety precautions for all safety and other equipment used.
 - Perform as many procedures as possible on the ground.
-



- To avoid electric shock, stay at least 20 ft away from power lines when there is a chance that you or the equipment you are using could accidentally come into contact with the power lines. Always look up and check for overhead lines before moving a ladder.
 - If any part of the antenna or mount assembly comes in contact with a power line, call the local power company to remove it. *Do not try to remove it yourself.* If the antenna reflector contacts electric power lines, you may be killed or seriously injured.
 - For pole mount installations, be sure to obtain information regarding underground utilities in the proposed location before digging.
 - Call a local company that marks underground utility lines before digging to avoid striking underground cables, pipes, or electric lines. Call 811 from anywhere in the United States to contact a local company that does this. You can also visit <http://call811.com/>.
-

Before you assemble the antenna, read these important instructions:

- Sequence of steps – When you assemble the antenna, *be sure to follow the instructions in this chapter in the order they are presented.*



For rooftop installations, assemble the antenna on the ground and then carry the fully assembled antenna up to the roof.

- Tightening hardware – *Do not tighten any nuts or other hardware until instructed to do so.* See [Table 4](#) for torque specifications.
- Torque – To ensure successful installation of the antenna, it is critical that you tighten all nuts and socket-head screws to the torque values shown in [Table 4](#).

Table 4: Torque specifications

Fastener or connector	Proper torque value
$\frac{5}{16}$ inch	15 ft-lb
$\frac{1}{4}$ inch	3 ft-lb
M4 wrench	19 in-lb

Select the installation site

The first and most important consideration when choosing a prospective site is whether the site can provide an acceptable line of sight (LOS) to the satellite. Choose a site where the antenna will be able to receive the strongest signal available. A clear, unobstructed view of the southern sky is necessary for proper transmission. Consider obstructions that may occur in the future, such as construction in the area, or the growth of trees.

Also, consider potential grounding sources when choosing a location. For guidance on grounding, see the documents listed in [Ground connections](#) on page 39.

As with any type of construction, a local building permit may be required before installing the antenna. It is the property owner's responsibility to obtain necessary permits and comply with local building codes.

Install the satellite modem

Note: You must install the satellite modem before installing the antenna to determine the proper antenna pointing values (azimuth, elevation, and tilt).

For installation instructions, refer to the appropriate installation guide for the satellite modem you are installing.

Determining the pointing values and polarization setting

Pointing values

Connect it to your laptop either wirelessly or by using an Ethernet cable, and then use your GPS receiver to calculate the exact latitude and longitude of the antenna site. See the appropriate antenna pointing guide for more information.

Polarization setting

At the satellite modem System Control Center, enter the installation parameters as presented in the satellite modem software, to obtain the required transmit polarization setting (either vertical polarization or horizontal polarization). Make a note of the required setting for reference when you install the radio. See the appropriate antenna pointing guide for more information.

Install the antenna mount

Before installing the antenna, you must first install a suitable antenna mount. If the system requires a pole mount installation, be sure to obtain information about any underground utilities in the proposed location. Have the appropriate utility company mark the location of any underground telephone wires, storm drains, and so on. Also, because soils vary widely in composition and load capacity, it may be necessary to consult a professional engineer to determine the appropriate foundation design. Refer to the ***Consumer Antenna Site Preparation and Mount Installation Guide*** (11040566-0001) for more information.

Installing the reflector bracket

Attach the reflector bracket to the Az/EI mount as shown in [Figure 10](#) on page 23.

1. Place the reflector bracket against the face of the Az/EI mount. Make sure the five hole patterns on the reflector bracket and Az/EI mount line up.

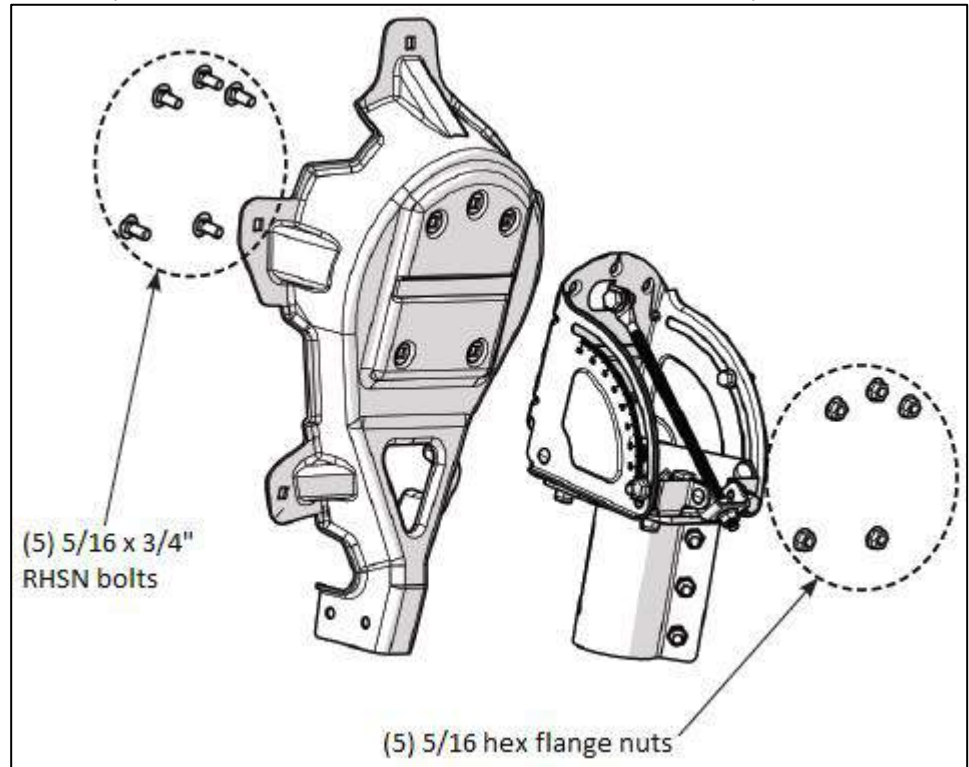


Figure 10: Attaching the reflector bracket

2. Insert five bolts ($\frac{5}{16}$ inch x $\frac{3}{4}$ inch) through the reflector bracket and into the corresponding holes in the Az/EI mount.
3. From the opposite side of the reflector bracket, place a hex flange nut on each bolt and tighten the nuts to a maximum torque of 15 ft/lbs.

Installing the antenna assembly onto the mast

Follow these steps to install the assembled antenna assembly onto the mast pipe:

1. Before you install the antenna onto the mast pipe, use a bubble level to ensure that the mast is plumb.

Check the mast at two perpendicular locations. See [Figure 11](#) on page 24.

Note: It is critical that the antenna mast is plumb. It is impossible to adjust the antenna to correct for a mast that is not plumb.

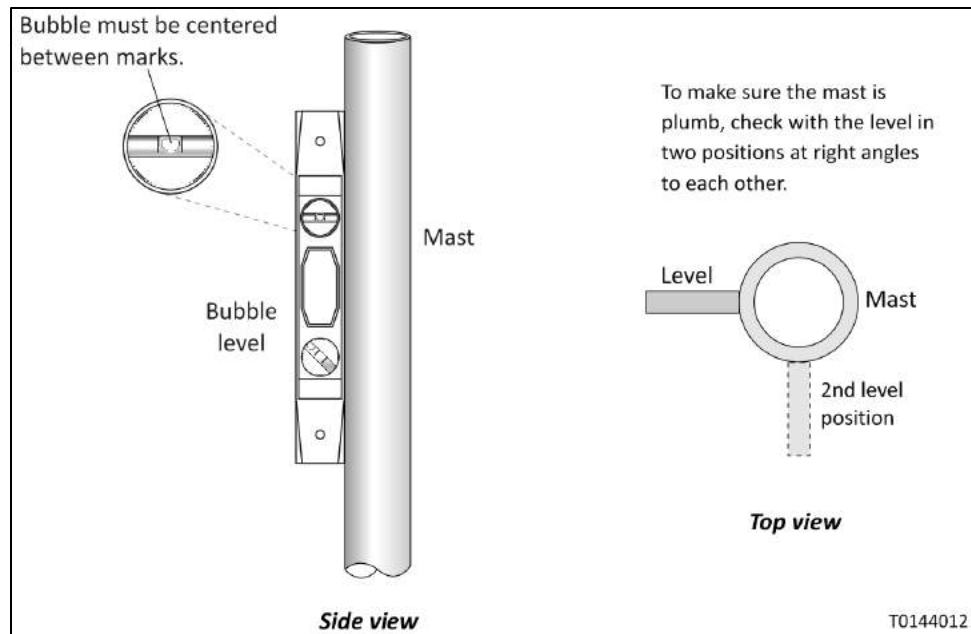


Figure 11: Making sure the mast is plumb

2. Slide the antenna assembly down onto the mast so the Az/EI mount fits onto the mast as shown in [Figure 12](#) on page 24.

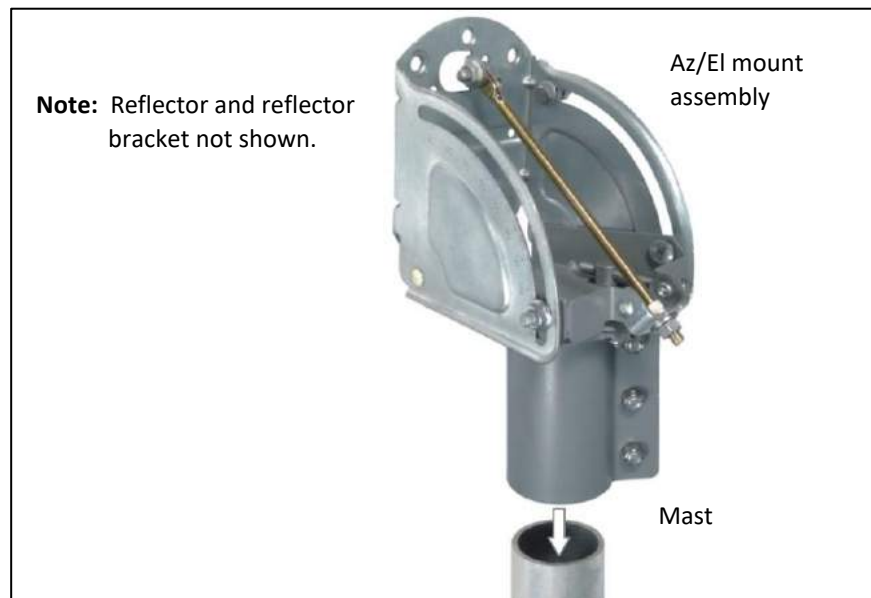


Figure 12: Installing the Az/EI mount assembly

3. Secure in place by hand tightening the flange nuts on the canister assembly.

Installing the antenna reflector

Follow the steps below to attach the antenna reflector to the reflector bracket.

1. Line up the holes on the reflector with the holes on the reflector support, as shown in [Figure 13](#).
2. Insert five carriage bolts ($\frac{5}{16}$ inch \times $\frac{3}{4}$ inch) into the holes in the reflector bracket and through the corresponding holes in the reflector, as shown in [Figure 13](#).

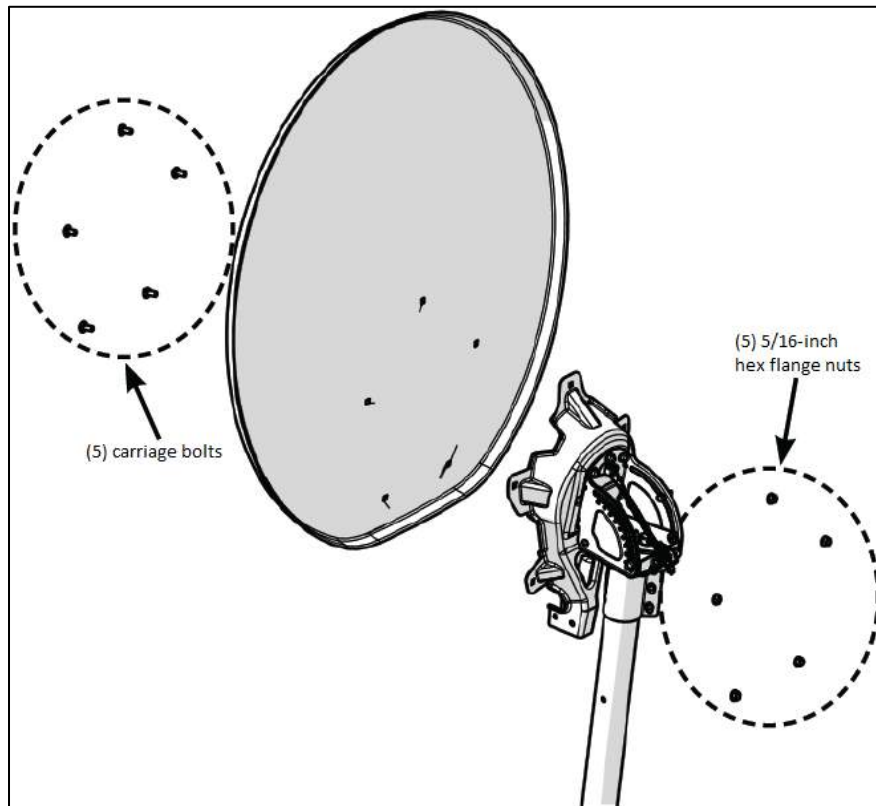


Figure 13: Attaching the antenna reflector

3. From the rear of the reflector back bracket, secure the five carriage bolts with five hex flange nuts ($\frac{5}{16}$ inch).
4. Tighten the five hex flange nuts to 8 ft-lb of torque.

NOTICE

Ensure that the carriage bolts are properly and firmly seated before tightening the nuts.

Installing the feed arm

To attach the feed arm:

1. Insert one carriage bolt ($\frac{5}{16}$ -18 inch x $2\frac{1}{4}$ inch) carriage bolt into the boom arm from the top.

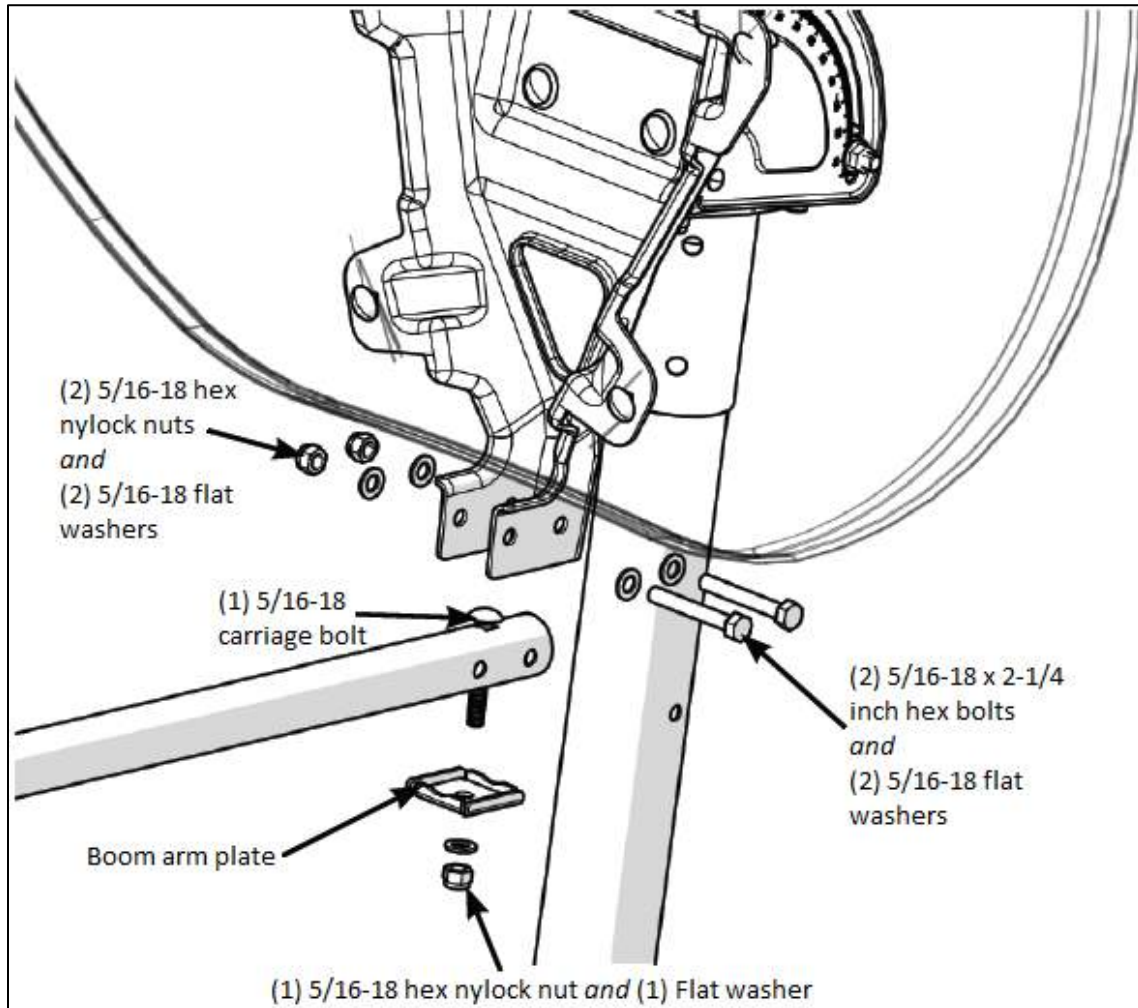


Figure 14: Attaching the feed arm

2. Place the boom arm to align with the back bracket holes and secure with two hex bolts ($\frac{5}{16}$ -18 inch x $2\frac{1}{4}$ inch), two flat washers ($\frac{5}{16}$ -18 inch) and two hex nylock nuts ($\frac{5}{16}$ -18 inch).
3. Attach the boom arm plate to the boom arm and back bracket by aligning the carriage bolt ($\frac{5}{16}$ -18 inch) into the hole in the plate and secure using flat washer ($\frac{5}{16}$ -18 inch) and hex nylock nut ($\frac{5}{16}$ -18 inch).

NOTICE

Attach the feed arm assembly exactly as described in this section.

This completes assembly of the antenna. Depending on the antenna orientation and mount, the antenna should look similar to the one shown in [Figure 1](#) on page 8.

Next you must route the IFL between the antenna and the satellite modem. See Chapter 4 – *Cabling and connections*.

Installing the universal Radio Assembly

This section explains how to install the universal radio assembly. The single-IFL radio is used as an example in this chapter. This information applies to both single and dual-IFL radios

Note: The default shipping configuration of the universal radio assembly is configured for the vertical transmit polarization position as shown in [Figure 15](#).



Figure 15: Universal radio assembly in the default shipping configuration

Setting the universal radio transmit polarization

The sections below describe how to set the universal radio transmit polarization. If a change to horizontal polarization is not required, proceed to [Attaching the feedhorn](#) on page 31.

Changing the universal radio to horizontal transmit polarization

To change the transmit polarization on the universal radio to horizontal, follow the steps below:

1. Remove the four M4-0.7 X 12mm hex-head screws
2. Rotate the feed horn adapter 90 degrees to the left as shown in [Figure 16](#).

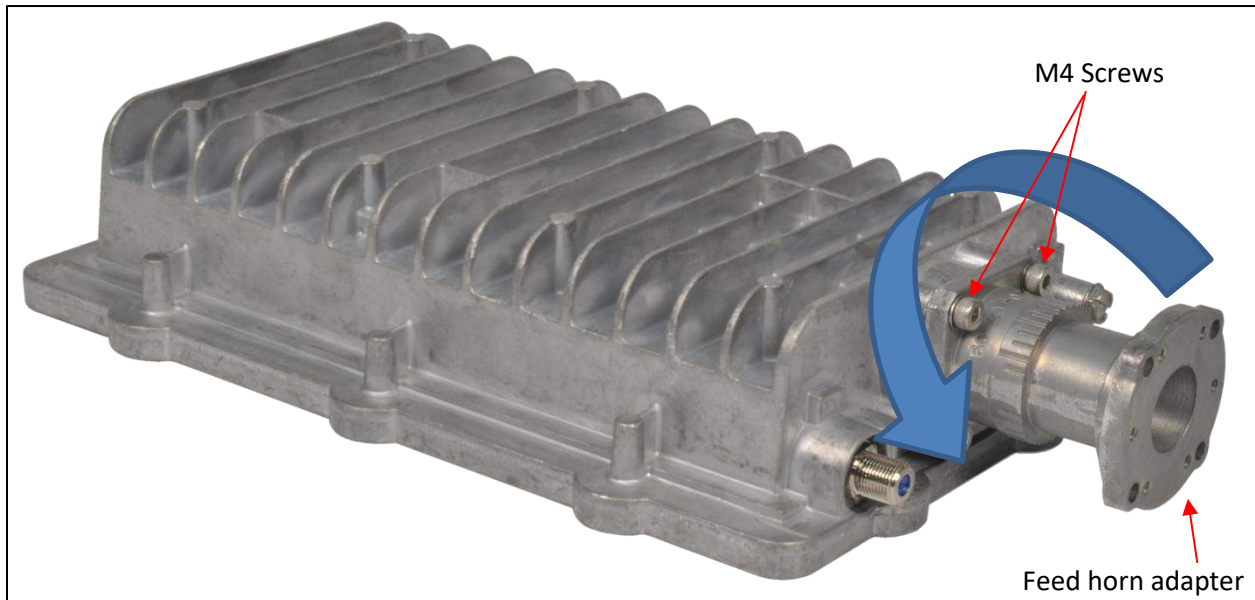


Figure 16: Changing the radio to horizontal transmit polarization

3. Replace and tighten the screws.

Note: The 0° degree mark on the waveguide spacer should now be at the top as shown in [Figure 17](#).

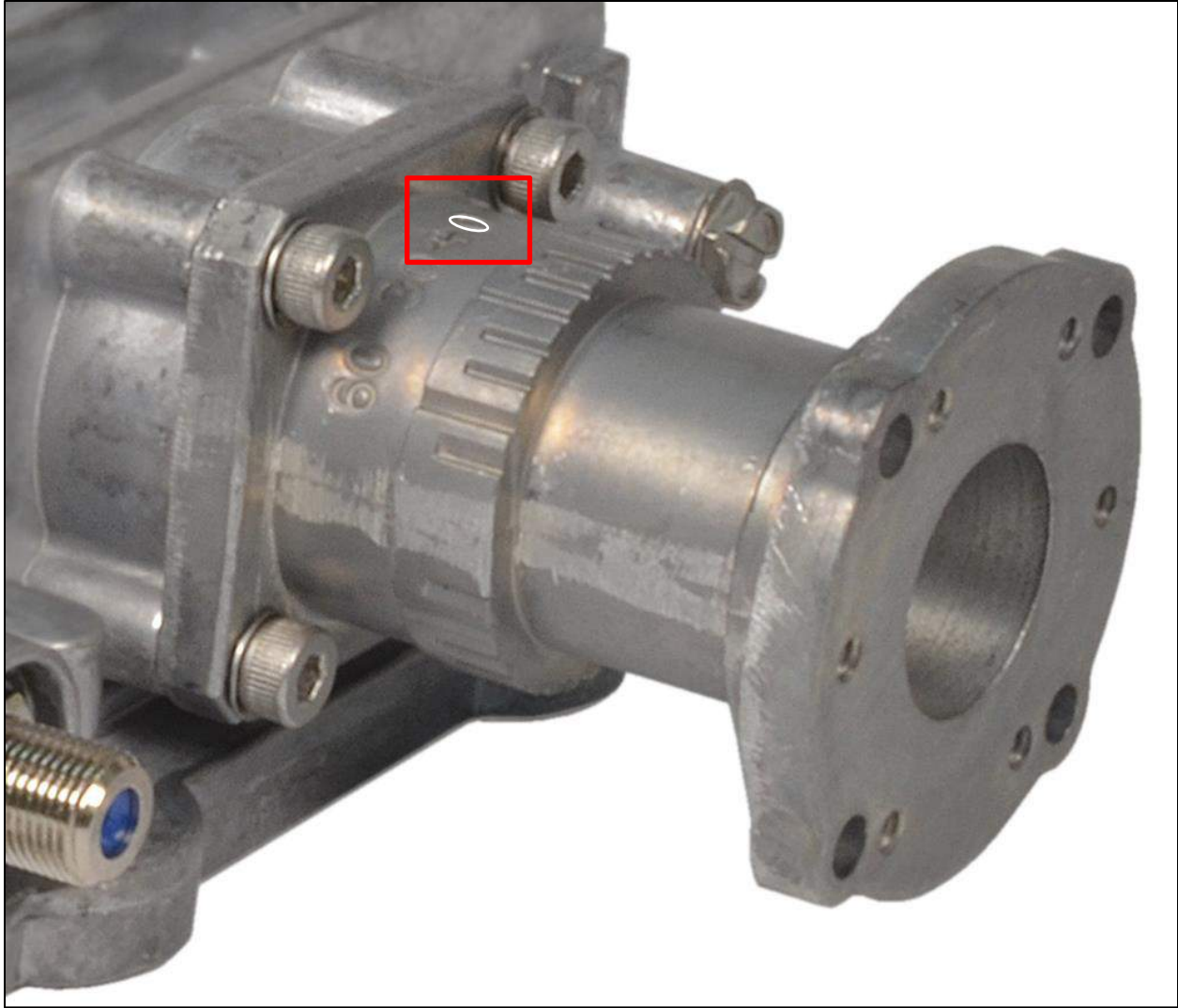


Figure 17: single IFL radio in horizontal transmit polarization

Attaching the feedhorn

You must use the hardware kit indicated in [Table 1](#) for the feed horn. To attach the feedhorn to the radio assembly, refer to [Figure 19](#) and follow the steps below:

NOTICE

- Do not remove the transparent moisture seal on the small end of the feedhorn. However, if the seal is damaged, wrinkled, or loose, remove it.
- Do not remove the protective packing material from the feedhorn until you finish installation of the radio assembly.
- Failure to properly install the feedhorn could allow moisture to accumulate inside the radio and/or feedhorn, causing damage to the equipment.

1. Place the O-ring (0.9 inch inside diameter) in the groove as shown in [Figure 18](#).

Note: The O-ring is shipped in a bag that contains five socket-head cap screws for attaching the feedhorn. Four screws are required; one is an extra part.
Make sure the O-ring remains in the O-ring groove.



Figure 18: O-ring in feedhorn groove

2. Insert the four socket-head cap screws through the back of the flange on the radio assembly and into the small end of the feedhorn as shown in [Figure 19](#).

Note: Make sure the 0 on the feed horn's range bar is aligned with the 0 on the radio assembly adapter ([Figure 23](#)). If not, you will not be able to set the offset rotation using the feed horn range bar.

3. Tighten the screws.

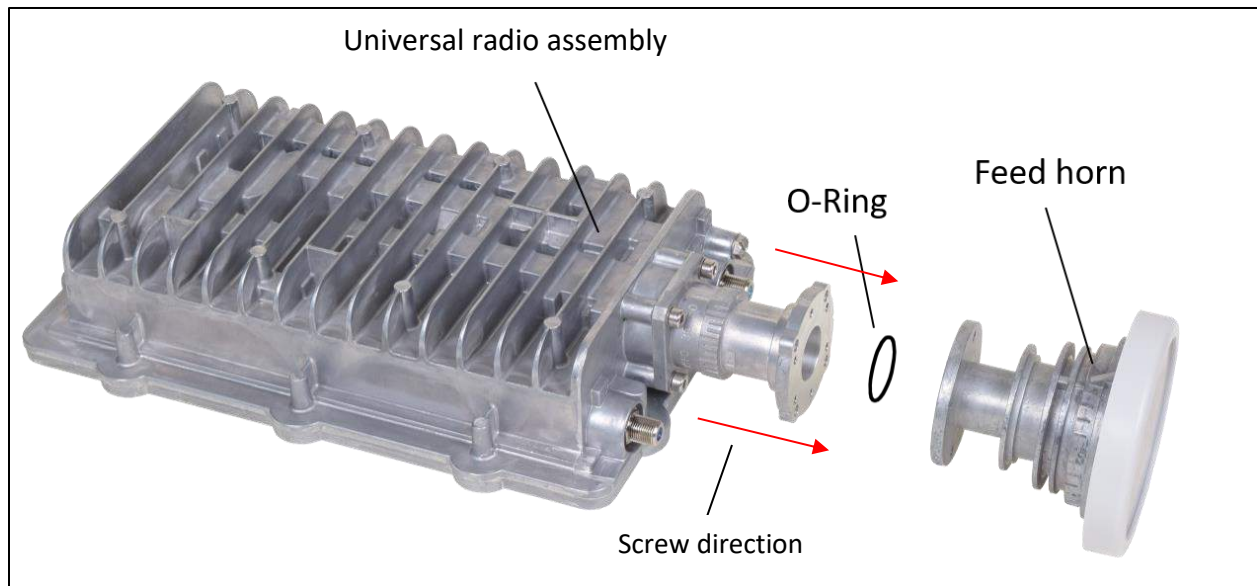


Figure 19: Attaching the feedhorn and radio assembly

Mounting the universal radio assembly on the feed support arm

Place the feedhorn into the cradle of the top bracket, as shown in [Figure 20](#).

1. Align the top bracket as shown in [Figure 20](#).

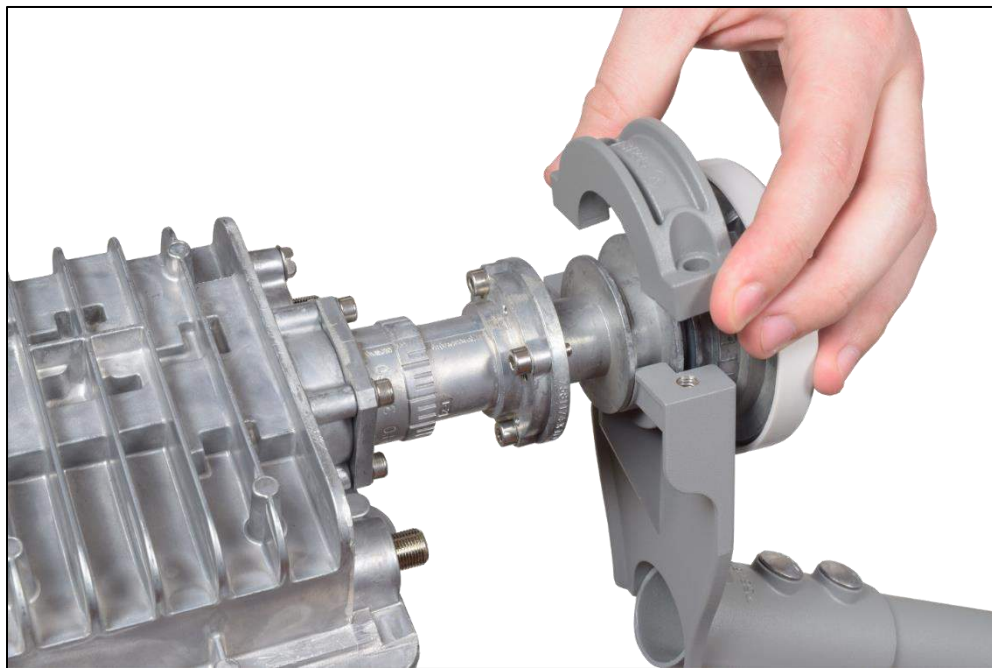


Figure 20: Securing the radio – Step 1

2. Install the two $\frac{1}{4}$ " hex bolts and tighten as shown in [Figure 21](#).

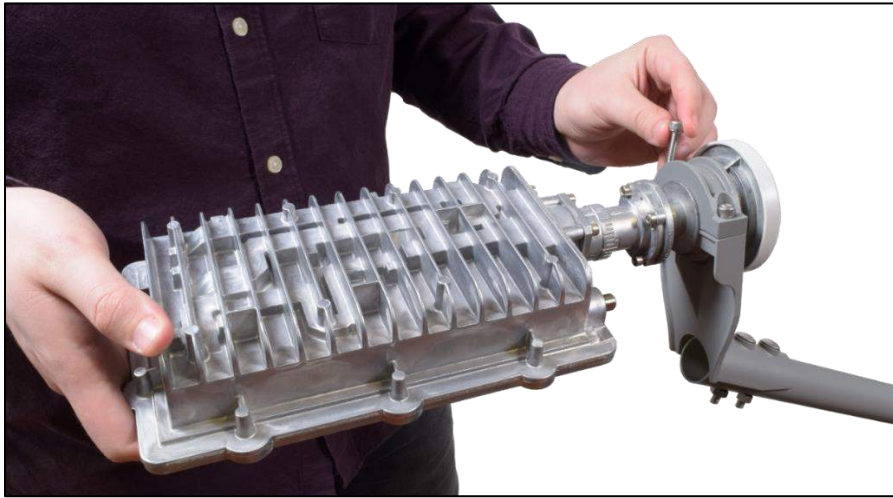


Figure 21: Securing the radio – Step 2

Setting the universal radio polarization offset

To set the Polarization offset on the universal radio, follow the steps below:

1. On the feed support arm, loosen the two bolts on the top bracket.
2. Rotate the radio assembly as shown in [Figure 22](#). For example, to set the radio polarization at $+30^\circ$, rotate the radio assembly to the right of the + sign on the feed horn until the $+30^\circ$ mark coincides with the marker on the top bracket. The range bar is located on the feed horn as shown in [Figure 23](#).

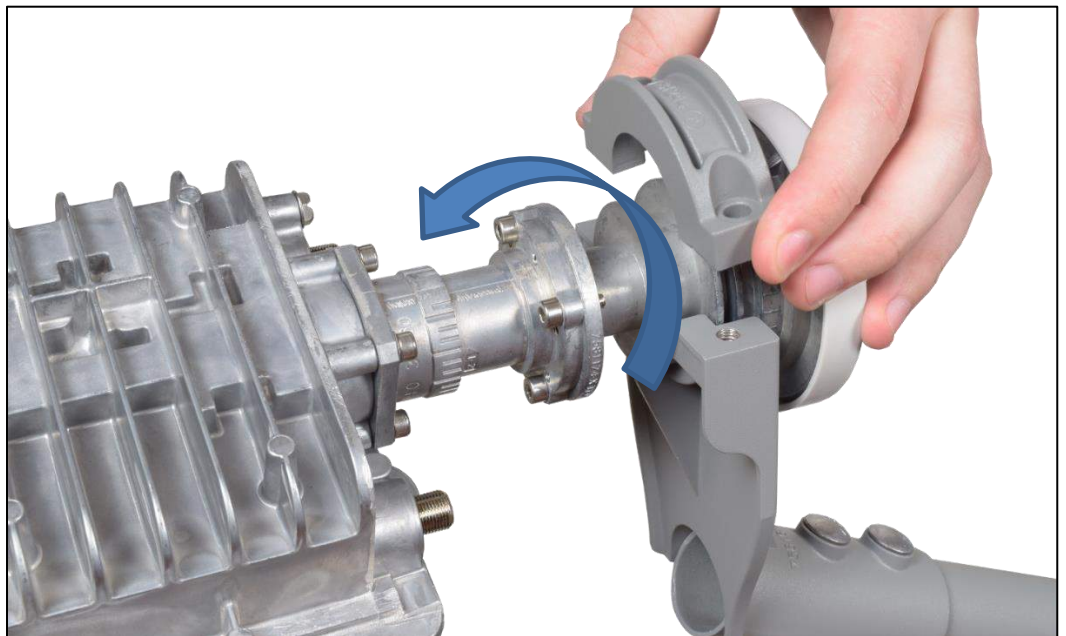


Figure 22: Rotate the radio assembly



Figure 23: Feed horn range bar

3. Tighten the screws.
4. The complete assembly as shown in [Figure 24](#).



Figure 24: Fully assembled antenna with universal radio

Cabling, connections, and grounding

This chapter illustrates where the antenna IFL connector is located, describes how to route the IFL cable at the antenna, and explains how to connect the IFL cable to the radio assembly. You must connect this cable before you can point the antenna at the satellite.

Note: Examples are shown with a single-IFL radio. This information applies to dual-IFL radios, except they require two IFL cables.

Cabling requirements

For a list of approved coaxial cable types for the IFL cable that runs between the antenna and the satellite modem, see the Hughes FSB, ***IFL Cable, Approved List (with lengths) for Jupiter/HTXXXX Domestic Installations*** (FSB_120909_01). The FSB lists the maximum cable length for each approved cable type for all relevant radio types.

Because the requirements and conditions for each installation site may vary, you must use your own judgment and best practices to determine how to route and connect the IFL cable.

NOTICE

Coaxial cables and connectors can corrode if exposed to moisture. Use only compression type connectors and weatherproof them with dielectric grease and weatherproof them using dielectric grease.

Note: For connector and ground block requirements, see the Hughes FSB, ***HNS Broadband Requirements for RG-6 and RG-11 IFL Cable Connectors, Ground Blocks and Ground Block Location*** (FSB 50518_01).

Routing the IFL cable at the antenna

1. Insert one end of the IFL cable into the feed support arm and thread it through the feed support arm until it comes out the opposite end, as shown in [Figure 25](#).



Figure 25: IFL cable configuration (shown with single IFL radio)

2. Leave an adequate coiled service loop (6 ft to 10 ft) and use UV-resistant cable ties to secure it to the mast, boom arm bracket, or Az/EI mount, providing a minimum cable length of 25 ft between the radio and the satellite modem.

Note:

- Do not leave the service loop lying on roof or other mounting surface.
- Do not block access to the azimuth and elevation adjustment nuts on the Az/EI mount assembly.
- Be sure to run a grounding wire from the Az/EI plate to the ground block.

3. Coil any additional cable and secure with UV-resistant cable ties, which are black in color.

Note: The dual IFL radio will have two IFL cables routed to the radio assembly.

NOTICE

Where the IFL cable connects to the radio or to a ground block, tighten the cable connector to 20 inch-lb. *Overtightening the radio connector can result in damage to the radio assembly.*

Connecting the IFL cable

This section explains how to connect the IFL cable to the radio assembly at the antenna.

NOTICE

All outdoor F-connector threads must be coated with dielectric grease before connecting them to the radio or ground block. See Hughes FSB **HNS Broadband Requirements for RG-6 and RG-11 IFL Cable Connectors, Ground Blocks and Ground Block Location** (FSB 050518_01).

Connect the IFL cable to the radio as follows:

1. Ensure that the satellite modem is powered off and its power cord is unplugged from the outlet.
2. Apply a small amount of dielectric grease to the inside of the IFL cable connector.
3. Connect the IFL cable to the connector on the radio, as shown in [Figure 26](#).
4. Tighten the cable connector to 20 in-lb.
5. When the IFL cable is properly connected to both the radio and the satellite modem, reapply power to the satellite modem as instructed in the satellite modem installation guide.

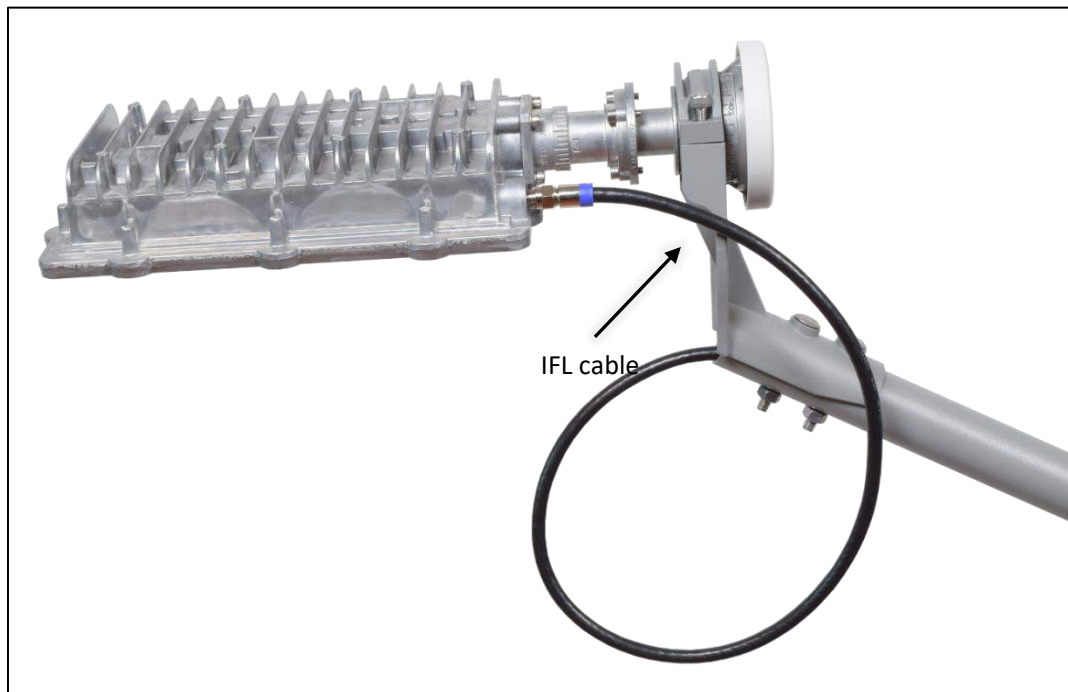


Figure 26: Hughes-approved IFL cable connector (shown with single IFL radio)

Note: The dual IFL radio will have two IFL cables connected to the radio assembly.

NOTICE

Hughes connectors, in conjunction with the dielectric grease on the F-connector threads, provide weatherproofing for outdoor connections. These connectors should be used in new installations, upgrades, and any repairs.

Outdoor connectors on radios and ground blocks that are in areas with corrosive environments (e.g. salt air) may need additional weatherproofing, such as weatherproofing tape or a weather boot filled with dielectric grease. For additional information on weatherproofing the connection, see [Weatherproof the cable connections](#) on page 47.

Ground connections



Properly ground the antenna assembly in accordance with all local and national electrical codes.

The antenna assembly must be grounded. For grounding information, refer to your training, best grounding practices, Hughes Field Service Bulletin (FSB) ***HNS Broadband Requirements for RG-6 and RG-11 IFL Cable Connectors, Ground Blocks and Ground Block Location*** (FSB 050518_01), and applicable parts of the National Electrical Code (NEC).

Antenna mast

Ground the antenna using the grounding screw on the Az/El mount. For specific grounding procedures, refer to the documents listed above.

Radio

Although the radio contains a ground screw on its front face, use of this ground screw is optional. The radio is grounded through the shield in the coaxial cable and the ground block, and no additional grounding is necessary. For additional grounding procedures, see the documents referenced above.

Pointing

This completes the installation. You must now point the antenna. See the appropriate antenna pointing guide for details. For mechanical adjustments specific to this antenna, see Chapter 5 – *Adjusting antenna azimuth and elevation*.

Adjusting antenna azimuth and elevation

This chapter explains how to adjust the antenna azimuth and elevation for optimum transmission and reception. It explains mechanical adjustments only. For explanation of the pointing process for this antenna, you must follow the procedures as described in the relevant pointing guide.

Note: When acquiring a signal, start with the azimuth and maximize the signal, then make minor adjustments to the elevation.

NOTICE

Do not pull on the antenna reflector or feed support arm to make pointing adjustments. Doing so could cause permanent damage to the antenna. Instead, use the adjustment mechanisms and procedures described in this chapter.

Adjusting azimuth

Figure 27 illustrates how you adjust antenna azimuth by moving the antenna horizontally, from side to side.

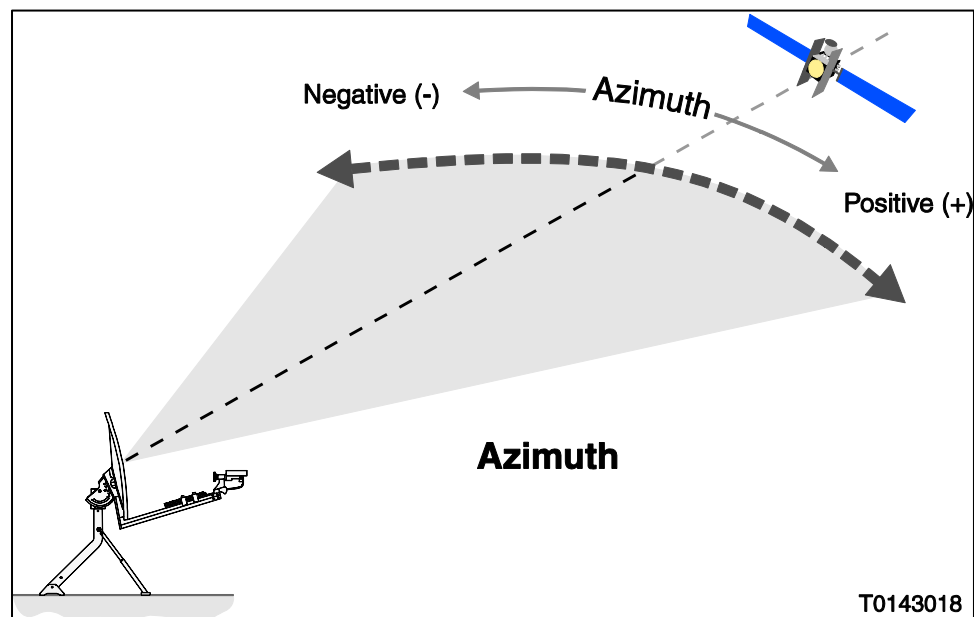


Figure 27: Adjusting antenna azimuth

Checking the azimuth base starting position

Before making any azimuth adjustments, ensure that the azimuth lockdown bolts are centered in the curved slots in the azimuth base. See [Figure 28](#).

If the bolts are not centered in the slots:

1. From underneath the azimuth base, ensure that the four $\frac{5}{16}$ inch azimuth lockdown nuts are loose.
2. Use a $\frac{1}{2}$ inch wrench to turn the fine azimuth adjustment bolt until the lockdown bolts are centered in the curved slots.

You should not have to turn the two inner nuts on the adjustment bolt, but if they are loose, tighten them.

Leave the lockdown nuts loose so you can adjust azimuth.

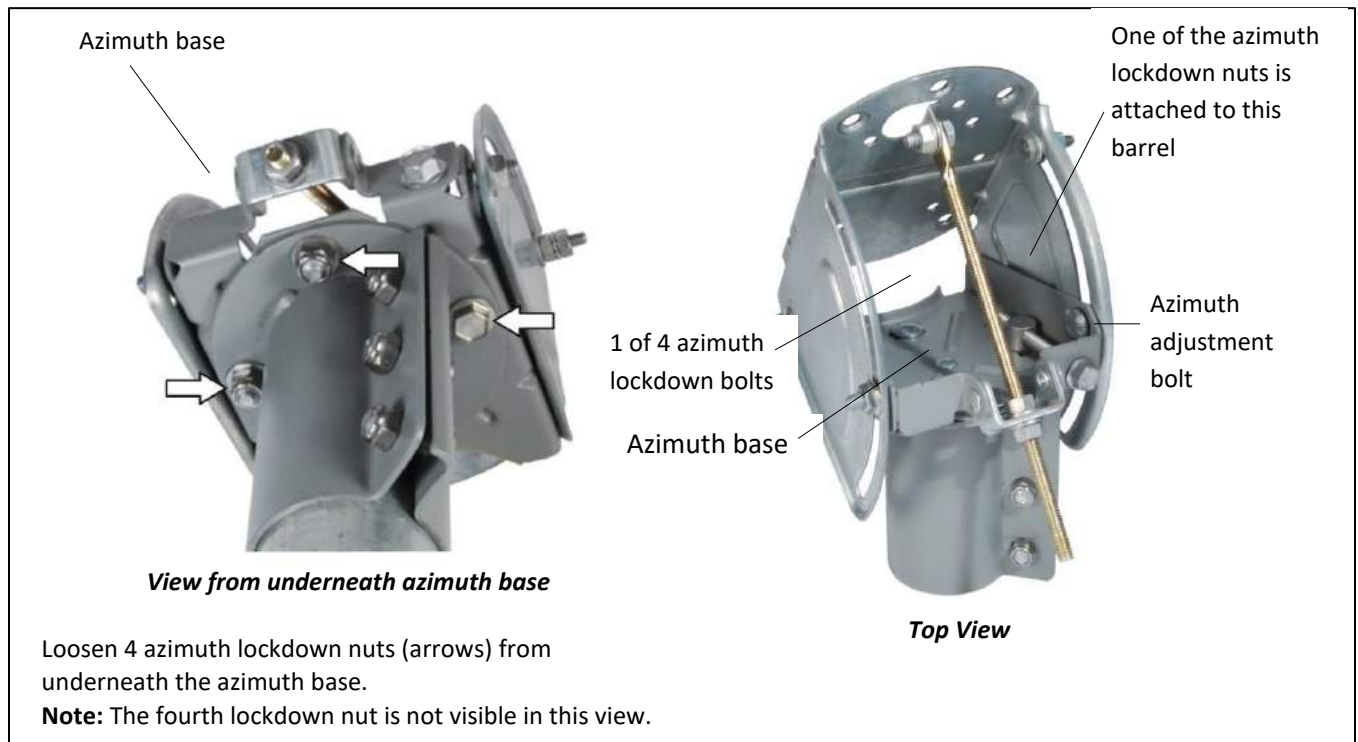


Figure 28: Checking the azimuth base starting position

Coarse azimuth adjustment

Make coarse azimuth adjustment as follows:

1. Loosen the three Az/El canister nuts (arrows in [Figure 29](#)) enough to allow the antenna assembly to rotate freely on the mast.

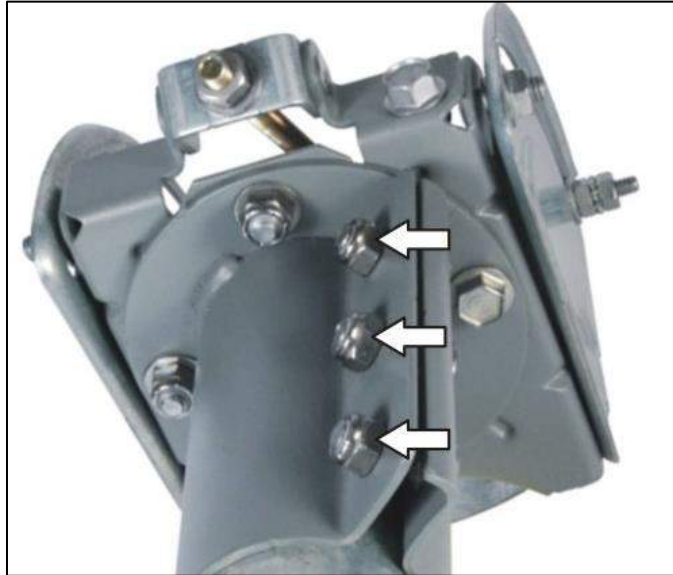


Figure 29: Az/El canister nuts

2. Holding the reflector bracket, point the antenna reflector as accurately as possible in the direction indicated in OASIS or on the installation reference sheet.
3. Lock down the Az/El canister by fully tightening the three canister nuts.

Fine azimuth adjustment

For fine azimuth adjustment, use the azimuth adjustment bolt:

1. Ensure that the Az/El canister nuts are tight enough to prevent the antenna from rotating on the mast.
2. Using a $\frac{1}{2}$ inch wrench, rotate the azimuth adjustment bolt shown in [Figure 28](#) on page 42 in either direction to achieve the desired azimuth angle.

NOTICE

Do not pull on the antenna reflector or feed support arm to make pointing adjustments. Doing so could cause permanent damage to the antenna. Instead, use the adjustment mechanisms and procedures described in this chapter.

3. When the azimuth is set as desired, tighten the four azimuth lockdown nuts under the azimuth base.

Adjusting elevation

Figure 30 illustrates how to adjust the antenna elevation by moving the antenna up and down relative to the horizon.

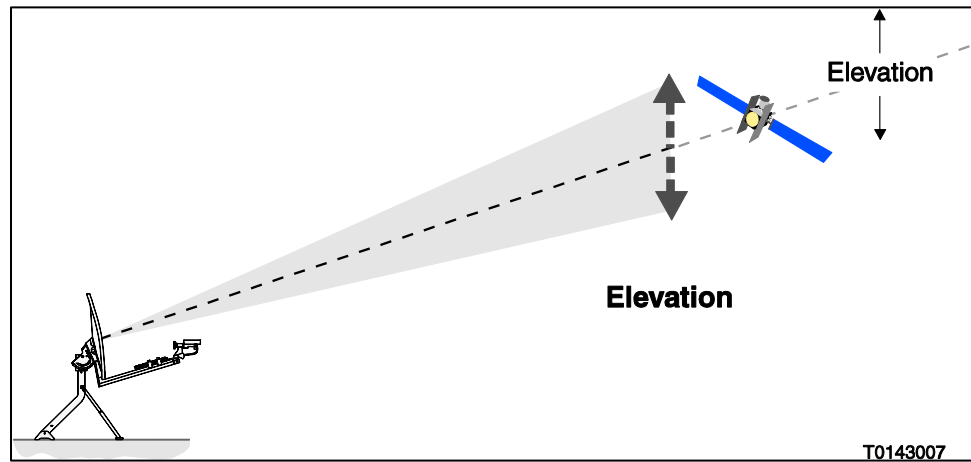


Figure 30: Adjusting antenna elevation

To adjust antenna elevation:

1. Loosen the elevation lockdown nuts on each side of the Az/El mount. See Figure 31.

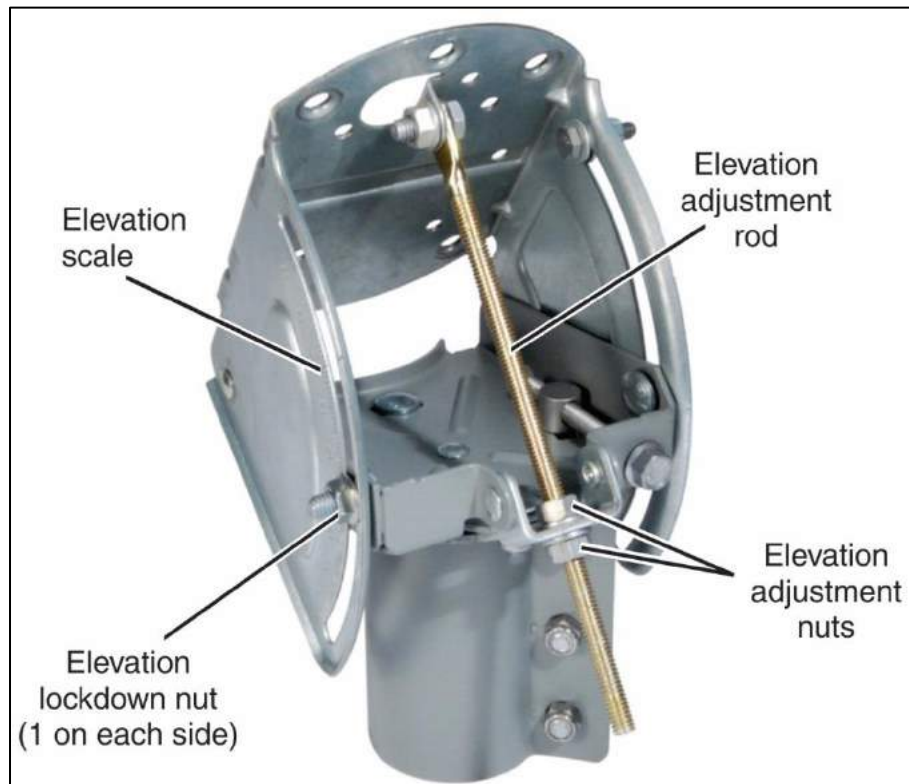


Figure 31: Elevation adjustment components

2. Loosen the top elevation adjustment nut and spin it counter-clockwise until it is an inch or two up the elevation adjustment rod.
3. Use the lower nut to adjust the elevation.

The black line shown in [Figure 32](#) on page 45 points to the elevation value on the elevation scale. For example, the antenna shown in the figure is adjusted to 26°.

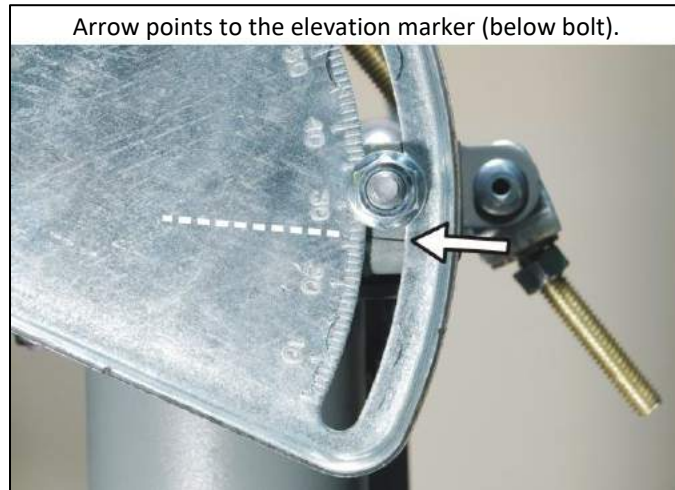


Figure 32: Elevation marker

4. Spin the top elevation adjustment nut clockwise until it is snug against the base plate.
5. Secure the coarse elevation setting by tightening the two elevation lockdown nuts on either side of the Az/EI mount.

Appendix A

Weatherproofing

Additional weatherproofing of cable connectors is typically performed in locations with a corrosive atmosphere, such as area along the Atlantic coast with salt air. Weatherproofing is not a standard part of the installation process for most locations.

Weatherproof the cable connections

Hughes connectors, in conjunction with the dielectric grease on the F-connector threads, provide weatherproofing for outdoor connections. These connectors should be used in new installations, upgrades, and any repairs.

Outdoor connectors on radios and ground blocks that are in areas with corrosive environments (e.g. salt air) may need additional weatherproofing, such as weatherproofing tape or a weather boot filled with dielectric grease ([Figure 33](#)).

Note: If you use any cable ties, they must be resistant to ultraviolet radiation. These are typically black in color.

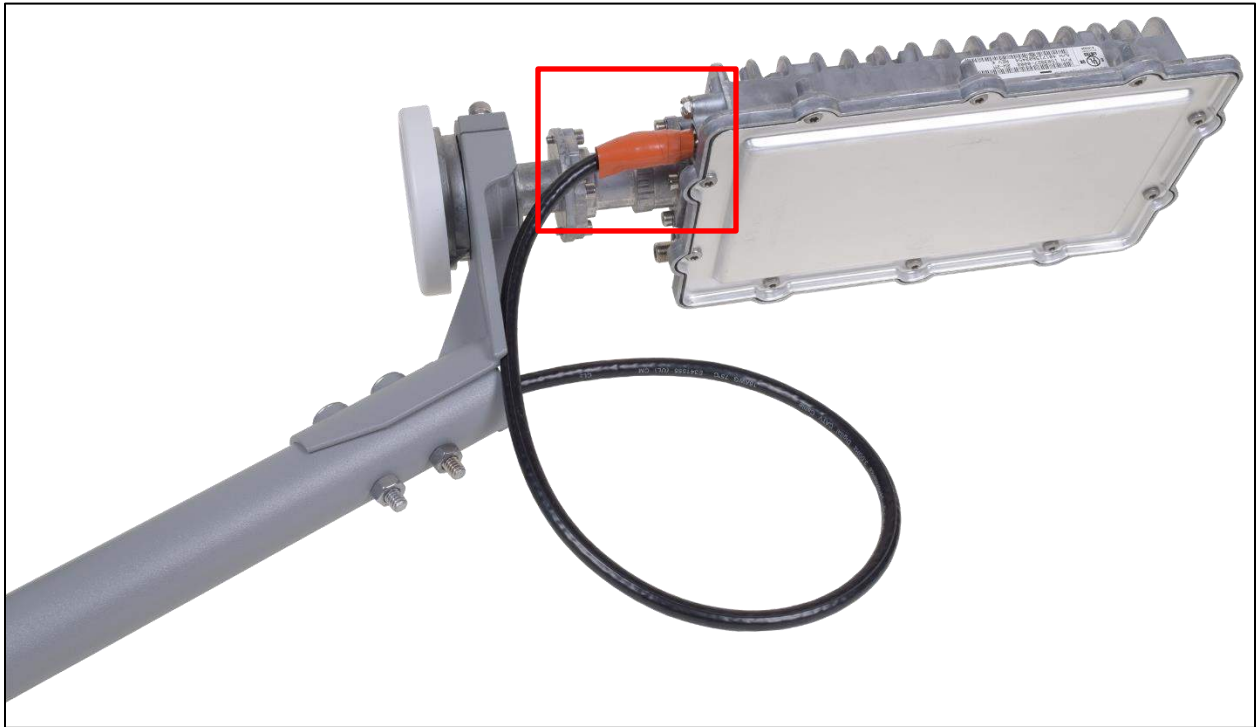


Figure 33: Hughes-approved IFL cable connector with additional weatherproofing