Intellian

F4-A250-S

Marine FleetBroadband

Installation & Operation User Guide

Serial number of the product

This serial number will be required for all troubleshooting or service inquiries.

© 2020 Intellian Technologies, Inc. All rights reserved. Intellian and the Intellian logo are trademarks of Intellian Technologies, Inc., registered in the U.S. and other countries. The F4-A250-S is a trademark of Intellian Technologies, Inc. Intellian may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Intellian, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property. All other logos, trademarks, and registered trademarks are the property of their respective owners. Information in this document is subject to change without notice. Every effort has been made to ensure that the information in this manual is accurate. Intellian is not responsible for printing or clerical errors.

Disclaimer

The information in this user manual is subject to change without prior notice through a product life cycle. A printed version of the user manual is periodically updated and may contain inaccuracies or omissions compared to the recent product information. The most up-to-date information is available on our website at https://www.intelliantech.com.

Doc. No. UG-KF2001-V1.0

Table of Contents

Chapter 1. Precautions 9

1.1 Warnings, Cautions, and Notes 9

1.2 General Precautions 9

Chapter 2. Certifications 11

2.1 Certifications 11

Chapter 3. Introduction 12

3.1 Introduction of F4-A250-S 12

3.2 Features of F4-A250-S 12

3.3 Overview of FleetBroadband 13

3.3.1 BGAN Services 13

3.3.2 FleetBroadband Service Coverage 13

Chapter 4. Planning Installation 14

4.1 Selecting Installation Site 14

4.1.1 Avoiding RF Interference 14

4.1.2 RF Hazard Precautions 15

4.2 System Package 16

4.2.1 Above Deck Unit (ADU) / Antenna Unit 16

4.2.2 Below Deck Unit (BDU) 16

4.2.3 Packing List 17

4.3 System Cables 18

4.3.1 RF Cable (Connecting ADU - BDU) 18

4.3.2 DC Power Cable 19

4.4 Unpacking System Package 22

Chapter 5. Installing ADU 24

5.1 Antenna Dimensions 24

5.2 ADU Mounting Hole Pattern 25

5.3 Mast Designing (Installation Example) 26

5.4 Mounting Antenna 27

5.4.1 Mounting Antenna on Mast 27

5.4.2 Mounting Antenna on Pole (Optional) 27

5.5 Connecting RF Cable to Antenna 29

Chapter 6. Installing BDU 30

6.1 BDU Dimensions 30

6.2 Selecting BDU Installation Site 31

6.3 BDU Mounting Template 32

6.4 Mounting BDU 32

6.4.1 Direct Mounting Type 32

6.4.2 19-inch Rack Mounting Type (Optional) 33

6.5 Setting up SIM Card 34

6.5.1 Inserting SIM Card 34

6.6 Antenna System Configuration 35

6.6.1 Data sessions and voice calls 35

6.7 BDU Cable Connection 36

6.7.1 BDU Back Panel View 36

6.8 BDU Connector Pinout Guide 36

6.8.1 LAN Ports (RJ45) 36

6.8.2 Phone Port (RJ14 & 6P4C) 37

6.8.3 General Purpose Inputs/Outputs (GPIO) Connector 38

6.8.4 Power Connector (DC Power) 38

6.8.5 Connecting BDU to ADU (Antenna) 39

6.9 Grounding Stud 39

Chapter 7. Operating BDU 40

7.1 BDU Front Panel 40

7.2 Powering On System 41

7.3 Making POTS Phone Call 41

7.4 Using PoE Devices 42

7.4.1 Accessing Internet 42

7.5 Using Wireless Devices 42

7.5.1 Installing Mobile Application 42

7.5.3 Setting up Wi-Fi 43

7.5.2 Setting up New Extension (Optional) 43

7.5.4 Making Wireless Device Call 44

Chapter 8. Using AptusLX 45

8.1 Introduction 45

8.1.1 How to Access Internal Webpage of BDU 45

8.2 Main Page 46

8.2.1 Page Login 46

8.3 Top Menus 47

8.4 Account Menu 48
8.4.1 User 48
8.5 Dashboard 49
8.6 Status 50
8.6.1 Network 50
8.6.2 Wi-Fi 51
8.6.3 Phone/PBX 52
8.6.4 Data 53
8.6.5 SIM 54
8.6.6 Terminal info 55
8.6.7 External GPIO 56
8.7 Settings 57
8.7.1 Network 57
8.7.2 Wi-Fi 58
8.7.3 Firewall 59
8.7.4 Phone/PBX 60
8.7.5 Data 61
8.7.6 Satellite 62
8.7.7 SMS 63
8.7.8 Service Profile 64
8.7.9 Service User Group 66
8.7.10 Device Classification 67
8.7.11 Traffic Flow Template (TFT) 68
8.7.12 SIM 69
8.7.13 External GPIO 70
8.7.14 Restricted Dialing 71
8.7.15 Multi Voice 72
8.7.16 NSD 73
8.7.17 MST 74
8.8 Tools 75
8.8.1 Software Upgrade 75
8.8.2 Backup & Restore 77
8.8.3 Reset 78
8.8.4 Logs 79
8.8.5 Diagnostic 80
8.8.6 Support 83

Chapter 9. Specification 84
9.1 Technical Specification 84

9.2 Environmental Specification 86

Chapter 10. Warranty 87

10.1 Warranty Policy 87

Chapter 11. Appendix 88

11.1 Appendix A. Tightening Torque Specification 88

List of Figures

Chapter 4. Planning Installation 14

Figure 1: Potential RF Interference 14
Figure 2: RF Hazard Precautions 15
Figure 3: Above Deck Unit (ADU) / Antenna Unit 16
Figure 4: Below Deck Unit (BDU) 16
Figure 5: Unpacking System Package (with ADU & BDU Sub-package) 22
Figure 6: Unpacking BDU Package 22
Figure 7: Unpacking ADU Package 23

Chapter 5. Installing ADU 24

Figure 8: Antenna Dimensions 24
Figure 9: ADU Mounting Hole Pattern 25
Figure 10: Recommended Mast Design 26
Figure 12: Mounting Antenna on Mast 27
Figure 11: Installing 40A Pole Bushing inside Pole Tube 27
Figure 14: Installing Pole Bracket 28
Figure 13: Mounting Antenna on Pole Mounted Bracket 28
Figure 15: Connecting RF Cable to Antenna 29

Chapter 6. Installing BDU 30

Figure 16: BDU Dimensions (Direct Mounting Type) 30
Figure 17: BDU Dimensions (19-inch Rack Mounting Type_Optional) 31
Figure 18: BDU Mounting Template 32
Figure 19: Direct Mounting of BDU 32
Figure 20: Attach Connector Tray to BDU 33
Figure 21: Attach Rackmount Plate to BDU 33
Figure 22: Mount BDU Assembly into 19" Rack 34
Figure 23: F4-A250-S System with Connected Devices 35
Figure 24: BDU Back Panel View 36
Figure 25: LAN Ports (RJ45) Pinout 36
Figure 26: Phone Port (RJ14 & 6P4C) Pinout 37
Figure 27: Using Cable Splitter with RJ14 Phones 37
Figure 28: GPIO Connector Pinout 38
Figure 29: DC Power Connector Pinout 38
Figure 30: BDU to Antenna Cable Connection 39
Figure 31: Grounding Stud Connection 39

Chapter 7. Operating BDU 40
Figure 32: BDU Front Panel 40

Chapter 1. Precautions

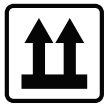
1.1 Warnings, Cautions, and Notes

WARNING, CAUTION, and NOTE statements are used throughout this manual to emphasize important and critical information. You must read these statements to help ensure safety and to prevent product damage. The statements are defined below.

	WARNING WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to equipment. It may also be used to alert against unsafe practices.
	NOTE A NOTE statement is used to notify people of installation, operation, programming, or maintenance information that is important, but not hazard-related.

1.2 General Precautions

Before you use the antenna, make sure that you have read and understood all safety requirements.

	**THIS WAY UP** • Place the boxes/crates on the floor with the arrow pointing up.
	FRAGILE • Since the Radome is fragile, handle it with care. Do not apply excessive pressure or shock. These may cause surface cracking or other damage.
	DO NOT STACK MORE THAN FOUR UNITS • Do not stack boxes/crates more than four units as there is a risk boxes/crates may fall and be damaged.
	KEEP DRY • Always make sure the antenna is stored on a dry surface in a dry, well-ventilated area. • The antenna is designed to withstand a normal rain shower; however, water resistance cannot be guaranteed if the antenna is submerged.

*** DO NOT SHIP VIA RAIL**: Ensure not to ship any system via Rail.

*** Shock Hazard:**

To minimize shock hazard and to protect against lightning, you must connect the equipment chassis and cabinet to an electrical ground. Make sure the system is correctly grounded and power is off when installing, configuring, and connecting components.

*** Do not operate in an explosive atmosphere:**

Do not operate the equipment in explosive environments or in the presence of flammable gases. Operating this equipment in such an environment causes a definite safety hazard.

*** Keep away from living circuits:**

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustment inside the equipment with any power supply turned on. Under certain conditions, dangerous potentials may exist in the power supplies even with the power cable removed. To avoid injuries, always remove the power and discharge a circuit before touching it.

Chapter 2. Certifications

2.1 Certifications

This device complies with part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) L'appareil ne doit pas produire de brouillage;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Changes or modifications made to this equipment not expressly approved by Intellian Technologies, Inc. may void the FCC authorization to operate this equipment.

Radiofrequency radiation exposure Information:

This equipment complies with RED and FCC, IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 2.3 m between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate 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 equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment 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 equipment and receiver.
- Connect the equipment 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.

Chapter 3. Introduction

3.1 Introduction of F4-A250-S

Intellian's FleetBroadband 250 maritime voice and data communication terminal connects to Inmarsat's global GEO L-band network, providing highly reliable, safe, and guaranteed service. Intellian's F4-A250-S provides up to 284 kbps IP data and 128 kbps streaming IP with VoIP service and SMS, compatible with the GSM network standard.

The F4-A250-S introduces the most competitive, highly efficient RF performance, and easy to install solutions that aim to satisfy customers' demand for a low cost of ownership in terms of deployment, installation, and efficient operation.

3.2 Features of F4-A250-S

Inmarsat Fleet Broadband Service

Intellian F4-A250-S provides simultaneous high-speed data and voice communication via satellite through the BGAN (Broadband Global Area Network).

BRM Integrated

BRM (BGAN Radio Module) is a proven solution by Inmarsat. Intellian F4-A250-S which BRM is integrated into is reliable and compatible with other BRM based products like the new GMDSS.

Enhanced Security

Intellian F4-A250-S suggests to monitor incoming and outgoing network traffic and to decide or block specific traffic based on a defined set of security rules.

Reliable Data Connectivity

The embedded LAN 1~4 ports allow various IP device connections for simple use such as SIP phones. A dedicated WAN port provides a solution for an alternative data connection, and the dedicated PoE port 1 and 2 allow IP device connections with PoE features.

Unlimited Back-up to Fleet Xpress Service

Fleet Xpress is a fully managed, streamlined broadband satellite communications service that promises to be a winning solution for many of the higher volume segments of the maritime market, such as commercial shipping. Reliability of Inmarsat's FleetBroadband network will complete the Fleet Xpress service with Intellian's Global Xpress product line-ups, the GX100NX, and GX60NX.

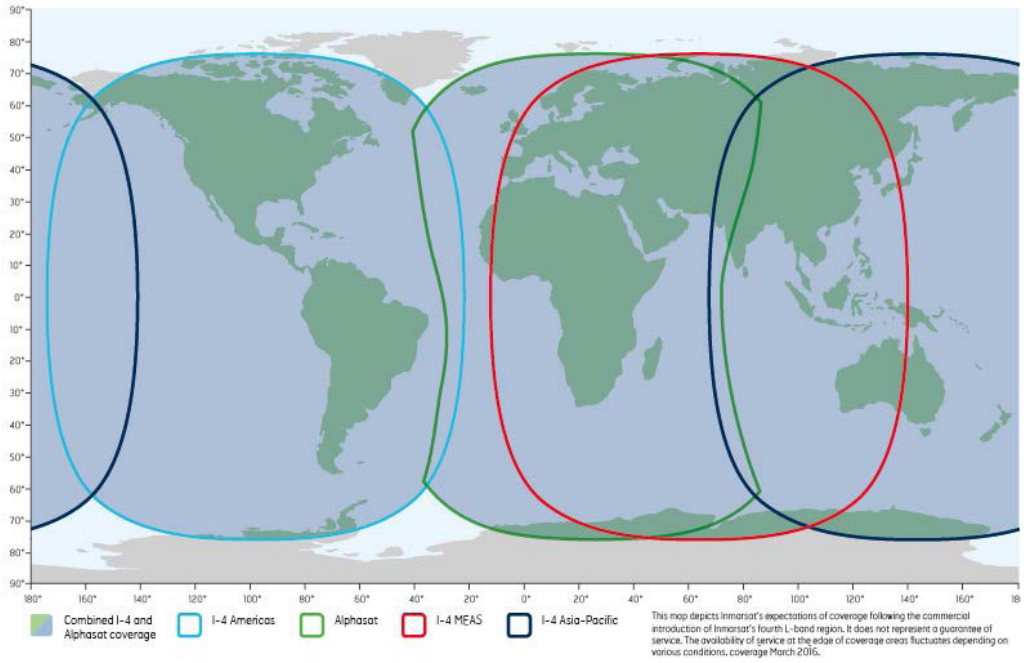
3.3 Overview of FleetBroadband

3.3.1 BGAN Services

The Broadband Global Area Network (BGAN) is a global Satellite Internet Network using portable terminals. The terminals are usually connected to a laptop computer to access broadband Internet in remote locations, where a line-of-sight to the satellite exists. The user can make phone calls, access the Internet, check e-mail, download files, or perform any other Internet activity using the terminals. The network is provided by Inmarsat and uses three geostationary satellites called I-4 to provide almost global coverage.

The map below shows the three I-4 satellite coverage regions.

3.3.2 FleetBroadband Service Coverage



NOTE

The above map depicts Inmarsat's expectations of coverage but does not represent a guarantee of service. The availability of service at the edge of coverage areas fluctuates depending on various conditions.

Chapter 4. Planning Installation

The antenna installation requires precaution and safety measures. Failure to follow the correct installation process may lead to injury of the installer and/or cause damage to the system. In order to maximize the performance of the system, a thorough review of this installation guide is strongly recommended, as well as executing the installation process as it is noted in this manual.

4.1 Selecting Installation Site

The antenna should be placed in an area on-board of the vessel with an unobstructed view extending from (at least) -30° below the horizontal surface in all azimuth direction. When the antenna is transmitting, obstacles in way of the beam path will cause decreased satellite signal strength. The antenna unit should have direct line-of-sight with the desired satellite without any obstacles in the beam path. Certain minimum distances between the antenna and other onboard devices must also be considered during installation.

Do not place the antenna near to a funnel because smoke deposits can cause corrosion of the antenna. In addition, the deposit can result in any malfunction of the antenna.

Do not place the antenna where there is a direct spray of seawater to avoid percolating any water into the vent hole.

4.1.1 Avoiding RF Interference

Do not install the antenna near the high power shortwave radar. Most radar transmitters emit RF energy within an elevation range of -15° to +15°. For this reason, It is recommended to position the antenna at least 4.6 m (15.09 feet) away from any radars (s-band, c-band, and x-band radar up to 50kW).

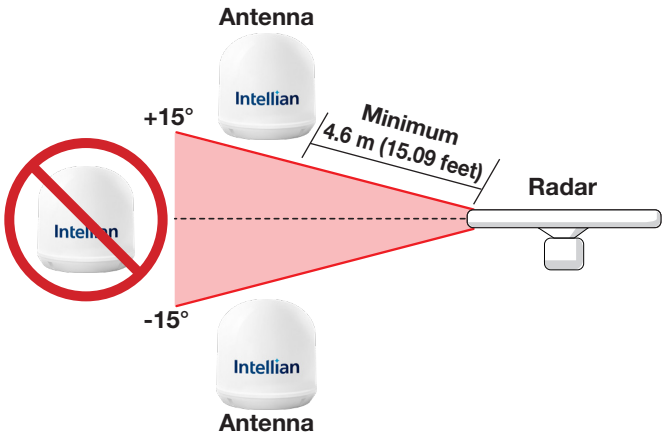


Figure 1: Potential RF Interference

WARNING

Never place the antenna in the beam path of the radar regardless of distance. The high power shortwave radar may impair its performance or damage the antenna.

4.1.2 RF Hazard Precautions

The antenna is designed to be used with radiation transmitting equipment manufactured by others. Exposure to RF radiation, including exposure associated with improper use of the transmitting equipment, may be hazardous to people who work close to the Above Deck Unit. Ensure the safety of personnel who work with in the system.

During transmission, ensure to keep the minimum safety distance. The recommended minimum safety distance to the reflector on the focal line is about 2.3 m (7.54 ft) based on a radiation level of 1 mW/cm2 that applies under an uncontrolled environment. No hazard exists >20° below the antenna's mounting plane.

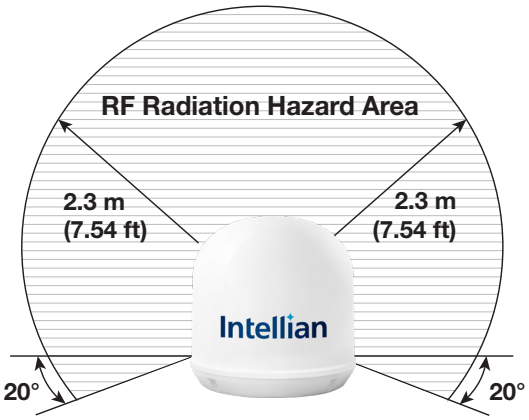


Figure 2: RF Hazard Precautions

4.2 System Package

4.2.1 Above Deck Unit (ADU) / Antenna Unit

The Above Deck Unit (ADU) of F4-A250-S consists of a medium-size maritime 2-axis stabilized BGAN antenna, active RF switch, BRM, and GNSS circuit.

The antenna unit is protected from a severe marine environment by a radome. The ADU and BDU are connected by a single coaxial cable which delivers RF signals and DC power.

Figure 3: Above Deck Unit (ADU) / Antenna Unit

4.2.2 Below Deck Unit (BDU)

The Below Deck Unit (BDU) supports voice and data communications in a marine environment. The BDU is the main control unit of an antenna system that monitors and controls the antenna operation through Intellian's web-based software. The BDU contains user interfaces and controls all communication between the ADU and the local communication devices such as phones, and computers, etc.

Figure 4: Below Deck Unit (BDU)

4.2.3 Packing List

Before beginning installation, make sure you have all the included components.

The ADU Package & BDU Package are provided in one box.

NOTE: The SIM card is provided by the service provider and may be packaged separately.

Above Deck Unit (ADU) Package

Description	Q'ty	Size	Remarks
Above Deck Unit (ADU)	1	291mm x 291mm x 294mm	Antenna Unit
LMR200 RF Cable (TNC/F-TNC/F Type)	1	25 m	To Connect ADU - BDU
Antenna Mounting Template	1		Antenna Mounting Template
Hex Bolt	5	M6 x 25L	To Mount Antenna on Mounting Surface (M6 Bolt Kit)
Spring Washer	5	M6	
Flat Washer	5	M6	

Below Deck Unit (BDU) Package

Description	Q'ty	Size	Remarks
Below Deck Unit (BDU)	1	315 mm x 190 mm x 42 mm	Below Deck Unit
DC Power Cable	1	1 m	BDU Power
Ethernet Cable (RJ45 / LAN)	1	1 m	To Connect BDU to PC
Wi-Fi Antenna	1		
Quick Installation Guide (QIG)	1		Quick Installation Guide
Tapping Screw	5	M5 x 16L	To Fix BDU (Direct Mounting Type)
Terminal Block	1	85 mm x 40 mm x 36 mm	For Inter-connection of Cables

19-inch Rack Mount Kit (Optional)

The 19-inch Rack Mount Kit can be purchased separately. When this kit is supplied, it is packaged in the BDU Package.

Description	Q'ty	Size	Remarks
AC Power Cord (USA)	1	1.5 m	BDU Power Cord (110 V)
AC Power Cord (CEEE7/7)	1	1.5 m	BDU Power Cord (220 V)
AD-DC Adaptor	1		BDU Power Adaptor (150 W)
Rackmount Plate	1		Kit for Rackmount Plate
Pan Head Screw (with Spring & Flat Washer)	5	M4 x 16L	
Connector Tray	1		Kit for Connector Tray
Flat Head Screw	4	M3 x 6L	

Antenna Pole Mount Kit (Optional)

The Antenna Pole Mount Kit can be purchased separately. When this kit is supplied, it is provided in a separate box.

Description	Q'ty	Size	Remarks
Pole Bracket	1		
Pole Tube	1		
Hex Bolt	5	M6 x 20L	For Inner Holes of Pole Bracket
Hex Bolt	5	M6 x 25L	For Outer Holes of Pole Bracket
Spring Washer	10	M6	
Flat Washer	10	M6	
40A (1½ inch) Pole Bushing	1		For Mounting Aantenn on 40A (1½ inch) Pole
Socket Set Screw	4	M12 x 12L	

4.3 System Cables

Make sure of the following before installing system cables.

1. All cables need to be well clamped and protected from physical damage and exposure to heat and humidity.
2. Don't use any acutely bent cable.
3. Use watertight glands or swan neck tubes on exposed bulkheads or deck heads where the cable passes through.
4. For installing cables longer than the recommended length, consult with Intellian Technologies first.

4.3.1 RF Cable (Connecting ADU - BDU)

Due to the signal losses across the length of the RF coax on L-Band, Intellian recommends the following 50 Ω coax cable types for standard system installations. Check the instructions from the cable supplier.

The table below shows the recommended cable types and maximum cable lengths for the antenna system.

Coaxial Cable Type	**@900MHz**	**@900MHz**	**loss 13.5 dB**	**Recommended Max. Cable Length**	**Bend Radius**
LMR200	32.6 dB/100 M	0.326 dB/1 M	38.2 M	35 M	Installation 12.7 mm (0.5 in.)
LMR300	19.9 dB/100 M	0.199 dB/1 M	62.5 M	60 M	Installation 22.2 mm (0.88 in.)
LMR400	12.16 dB/100 M	0.1216 dB/1 M	102.5 M	100 M	Installation 25.4 mm (1 in.)

* Maximum DC resistance of RF cable: 1.3 Ω
* RF loss at 900MHz: 13.5 dB incl. connector
* Optimal tightening torque for TNC-type connector: 1.5 N-m

4.3.2 DC Power Cable

You can supply DC power to the BDU in the following methods depending on the power supply available in the vessel. Intellian provides a DC Power Cable, an AC-DC Adapter (optional), and a Terminal Block for the power connections.

1. Connecting to Battery (default): Using the DC power cable (1 m), supply the DC power to the BDU from the battery. The power cable is installed with the Molex connector (P/No. 1716920204, Max. AWG 12). Use 1~2 m (3.28~6.56 ft) length wire for the power supply to prevent voltage drop. If you need a power cable longer than 2 m (6.56 ft) refer to the following table.

Cable length	Maximum Wire Size	
	AWG	mm2
5 m (16.40 ft)	13	2.62
10 m (32.80 ft)	11	4.17
20 m (65.61 ft)	9	6.63

* BDU Power Input Range: 10.8~30 V DC

2. Connecting to AC Power Source (optional): Using the AC-DC adapter (110~220V Input, 24 V DC output) and power cord, supply the DC power to the BDU from the AC power source. (You can find the AC-DC adapter in the 19-inch Rack Mount Kit).

NOTE

To connect multiple power cables from the power source, use a Terminal Block (supplied). Refer to "How to Use Terminal Block" for more details.

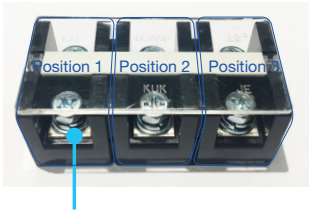
How to Use Terminal Block

WARNING

Turn off the power before installing the wire nut connector.

Intellian provides a 3-position double-row barrier terminal block as below.

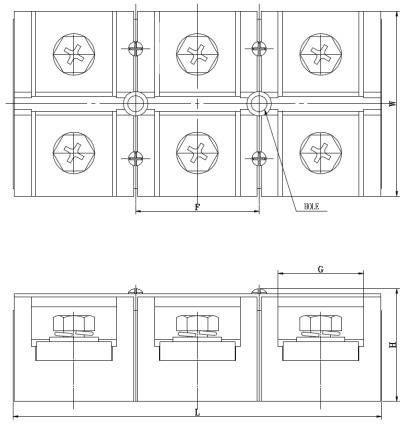
Terminal Block: KH-6060-3P



Barrier type terminal strip:
3 positions, 6 contacts

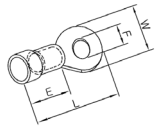
KH-6060-3P Specification	
Rated Voltage	600V
Rated Current	60A (250V)
Insulation Resistance	100MΩ min.
Dielectric Strength	2,500 VAC for 1min.
Wire	22mm²
Terminal Screw	M6

Terminal Blocks Dimension

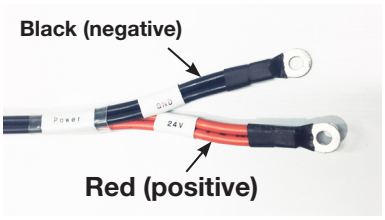
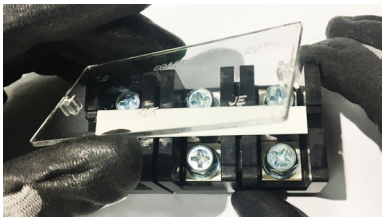
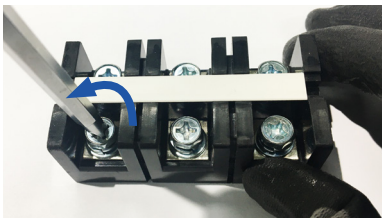
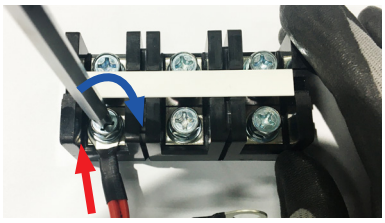
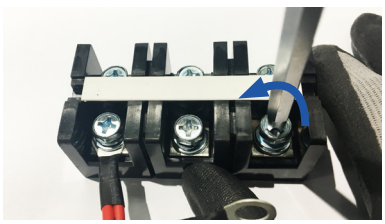
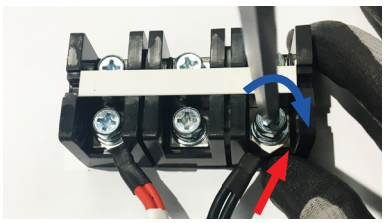
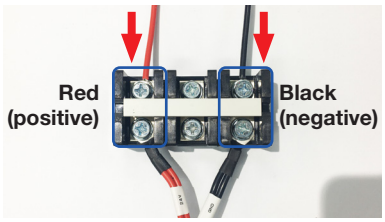
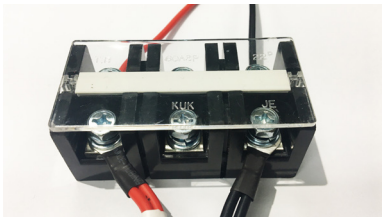


Rating/ Pole	F(mm)	G(mm)	Hole(Ø)	L(mm)	W(mm)	H(mm)	Weight
60A 3P	28	16	5.2	85	40	36	142g

Wiring Lug Dimension



E	14.5mm
F	Min. Ø6.1
W	Max. 16.8mm
L	35.5mm

	For the DC power wires, Red (positive) and Black (negative), you can connect each wire with other wires using the terminal block.
	1. Open the top cover of the terminal block.
 	2. Unscrew the 1st position terminal using a Phillips screwdriver. Insert the ring connector of the Red (positive) wire to the terminal and tighten the screw back into the terminal.
 	3. Unscrew the 3rd position terminal using a Phillips screwdriver. Insert the ring connector of the Black (negative) wire to the terminal and tighten the screw back into the terminal.
	4. Connect wires for distribution to the terminals on the opposite side of each connected wires. **CAUTION**: DO NOT switch positions of the Red (positive) and Black (negative) wires. Switching the polarity of power may damage the product.
	5. Close the top cover of the terminal block.

4.4 Unpacking System Package

Follow steps for easy and safe unpacking. The system package consists of two sub-packages that an ADU Package and a BDU Package.

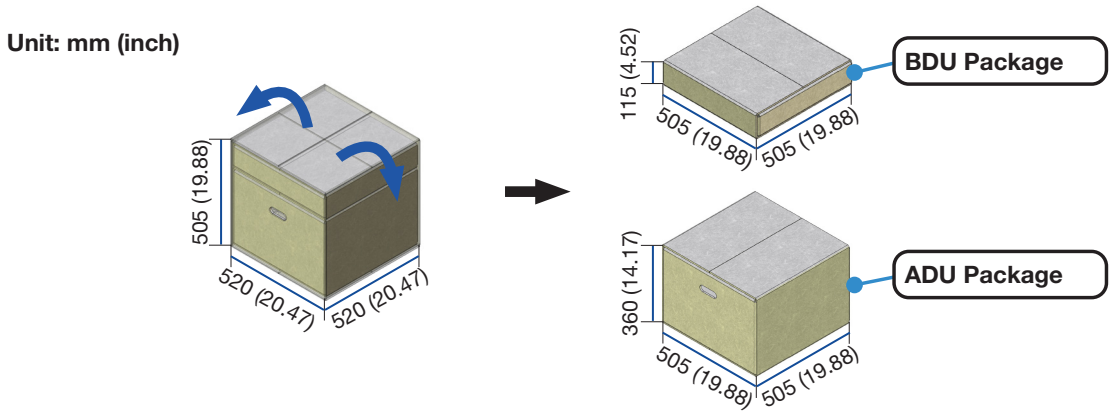


Figure 5: Unpacking System Package (with ADU & BDU Sub-package)

1. Remove the top cover and take out the BDU package including a Quick Installation Guide, a BDU Unit, a Wi-Fi Antenna, a DC Power Cable, an Ethernet Cable, a BDU Bolt Kit, and Wire Nut Connectors.

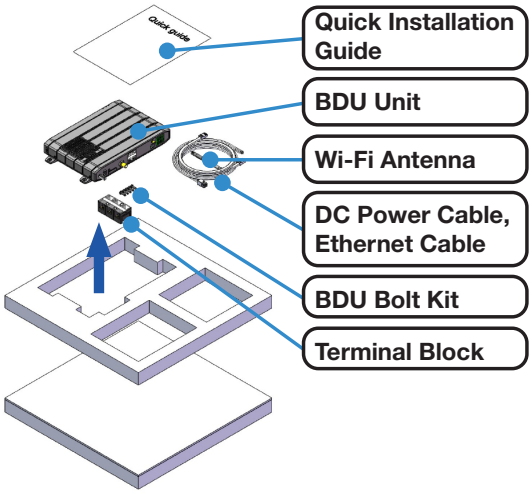


Figure 6: Unpacking BDU Package

2. Take out the ADU package including an Antenna Mounting Template, an ADU Bolt Kit, an RF Cable, and an ADU Unit.

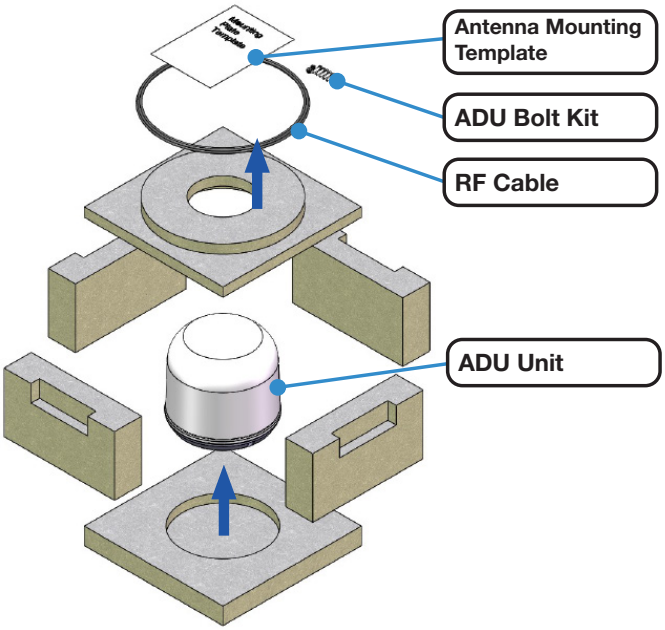


Figure 7: Unpacking ADU Package

Chapter 5. Installing ADU

5.1 Antenna Dimensions

Confirm the height and diameter of the antenna unit shown in the following figure before installing it.

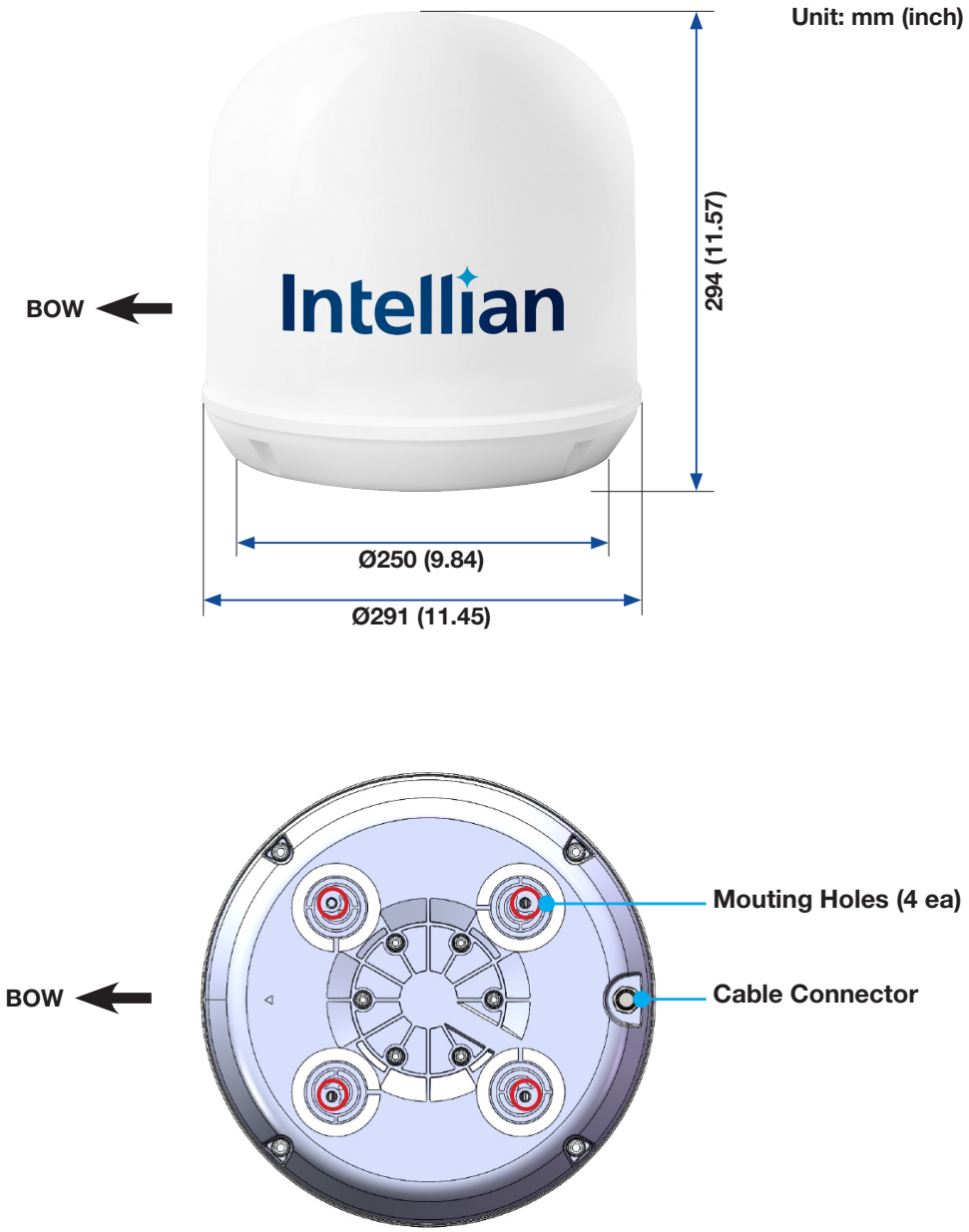


Figure 8: Antenna Dimensions

5.2 ADU Mounting Hole Pattern

Use the supplied mounting template when drilling mounting holes on the mast. The hole placement for the antenna must match the mounting hole pattern on the template.

The lower radome has an industry-standard mounting hole with four mounting points. This hole pattern is compatible with other companies' mounting holes. Use the mounting holes to secure the antenna to the desired mounting surface.

Intellian offers the Antenna Pole Mount Kit (separate purchase) that uses holes (with M6 Bolts) to mount the antenna on a pole.

WARNING

When reusing an existing mast, check the condition of holes on the mast and make sure those are proper to use compared to the hole locations and sizes printed on the mounting template.

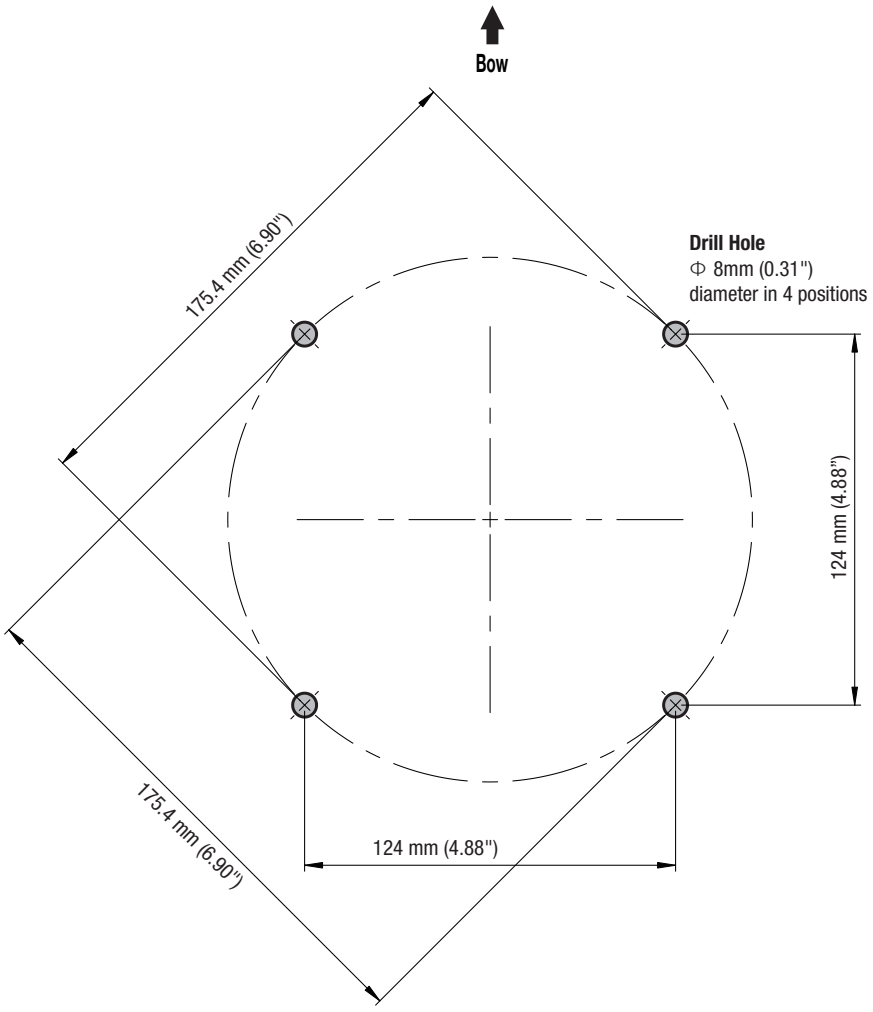


Figure 9: ADU Mounting Hole Pattern

5.3 Mast Designing (Installation Example)

The installation mast must be robust enough to prevent flection, vibration, and sway when an external force is exerted on the mast with antenna and radome. Intellian strongly recommends installing the antenna less than 1200mm (47") above the deck. The flange thickness must be at least 8 mm. Refer to the following mast drawing for more details.

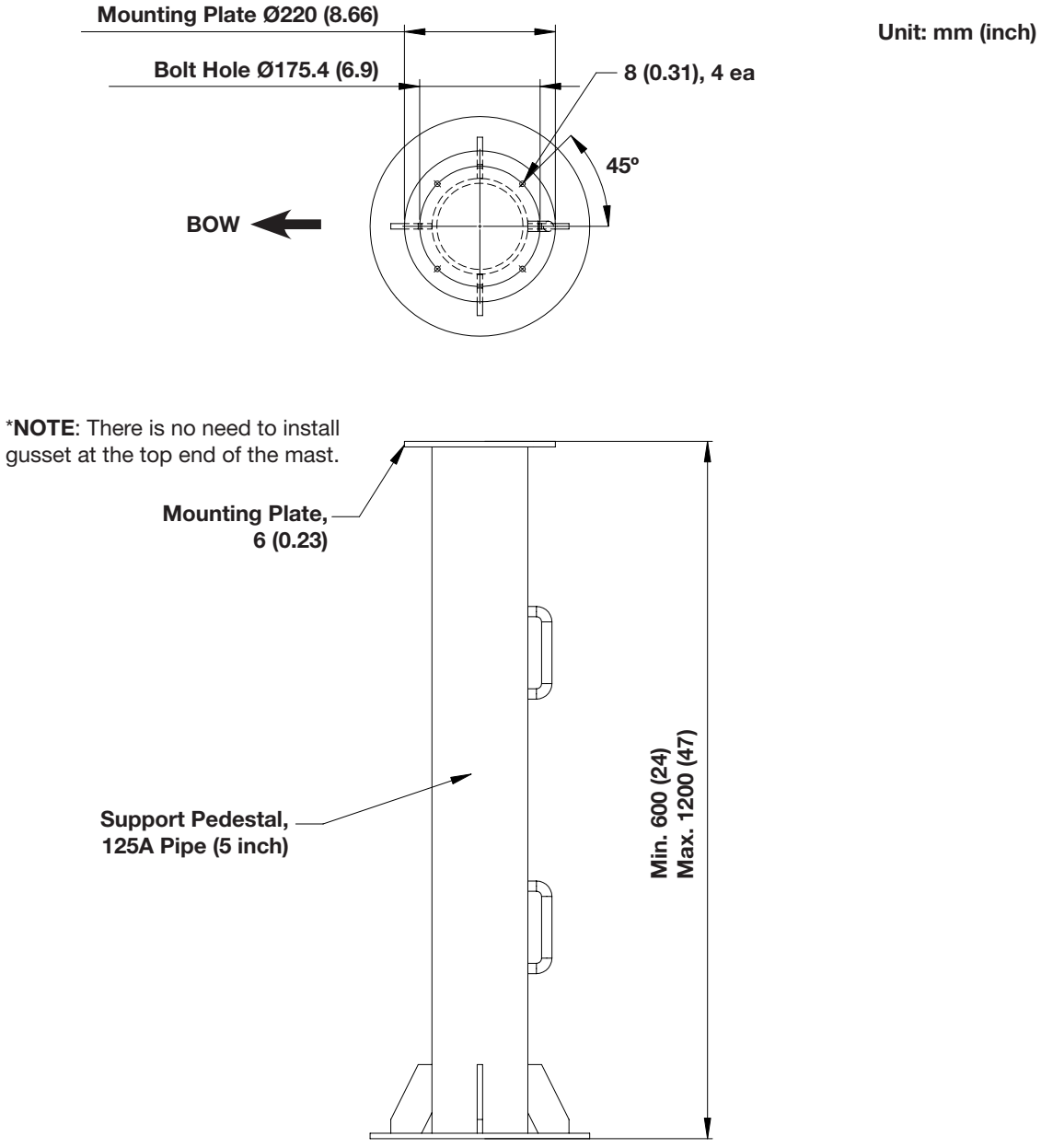


Figure 10: Recommended Mast Design

5.4 Mounting Antenna

The lower radome has an industry-standard mounting hole with four mounting points. This hole pattern is compatible with other companies' mounting holes. Use the mounting holes to secure the antenna to the desired mounting surface. Bring the provided Antenna Mounting Template and the ADU Bolt Kit from the ADU package. Create the appropriate hole pattern in the desired mounting surface.

5.4.1 Mounting Antenna on Mast

Check the position of Ⓐ the antenna's cable connector and BOW direction. Lift the antenna above the mounting surface using hands and carefully put the antenna down in place. Before assembling bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly. Insert Ⓑ the bolts and washers from under the mast into the radome then fasten them to the nuts assembled inside the radome using the torque wrench.

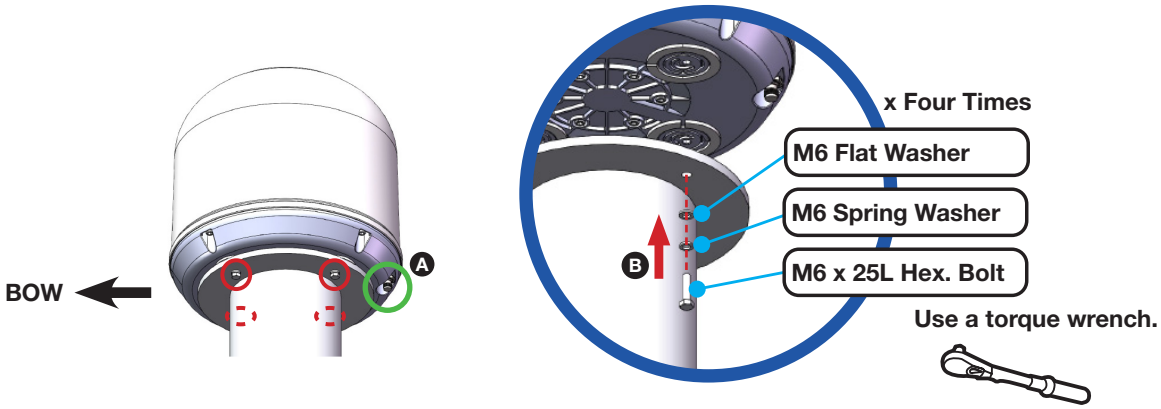


Figure 12: Mounting Antenna on Mast

5.4.2 Mounting Antenna on Pole (Optional)

Intellian offers the Antenna Pole Mount Kit (separate purchase) to mount the antenna on the pole. The kit is designed to work on 40A pole. The kit has mounting holes that match the inner hole with M6 bolts on the bottom of the antenna.

Name	Diameter (inch)	External Diameter (mm)
40A	1½	48.6

1. When mounting antenna on the 40A pole, the 40A pole bushing needs to be installed inside pole tube additionally. Ⓐ The position between holes of the pole tube must be aligned with the BOW direction. Place the 40A pole bushing inside pole tube, then tighten them on the top end of the 40A pole using bolts. Before assembling bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.
   *The pole tube Inner Diameter is Ø52 mm.

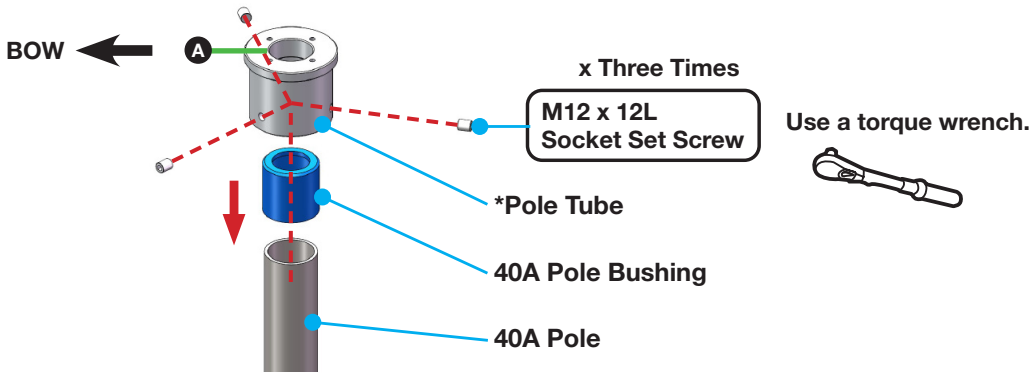


Figure 11: Installing 40A Pole Bushing inside Pole Tube

2. Ⓐ The position between end of legs of the pole bracket must be aligned with the BOW direction. Place the pole bracket onto the pole tube then tighten them using bolts. Before assembling bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.

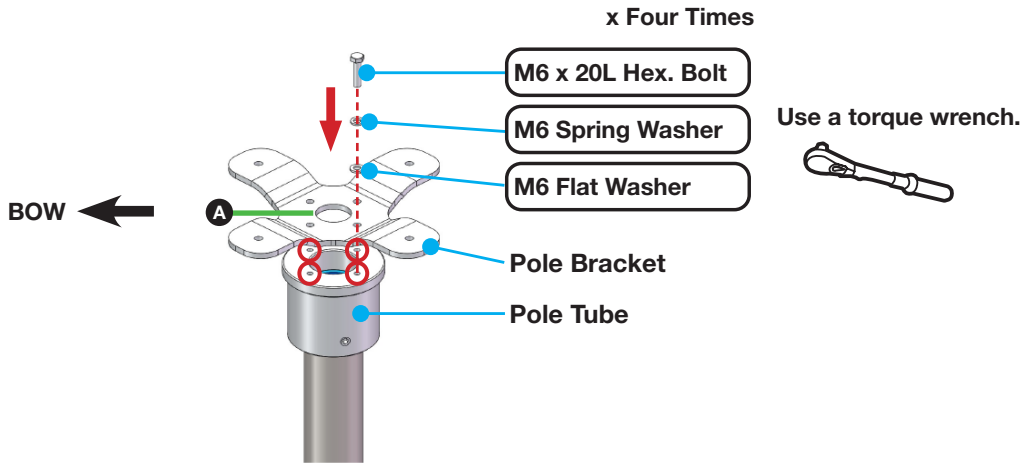


Figure 14: Installing Pole Bracket

3. Check the position of Ⓐ the antenna's cable connector and BOW direction. Place the antenna on the pole-mounted bracket then tighten them using bolts. Before assembling bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.

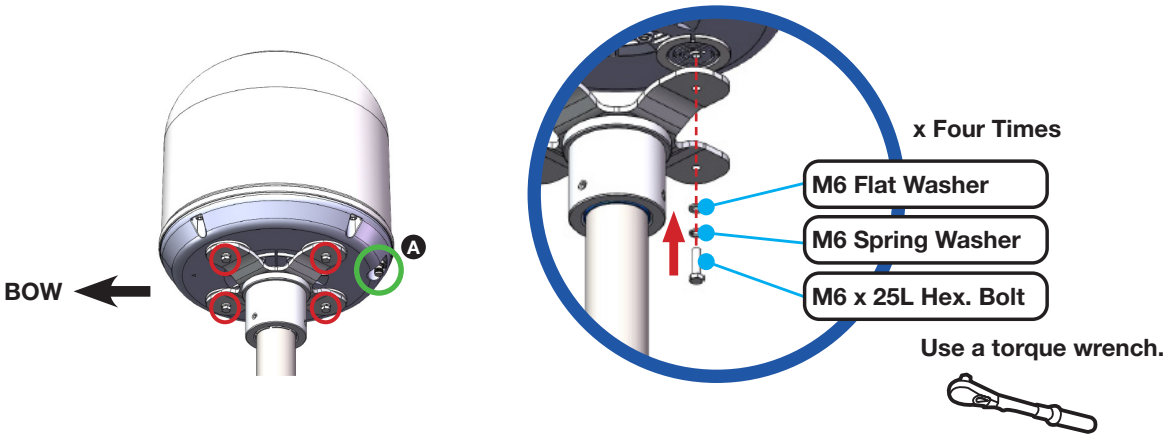


Figure 13: Mounting Antenna on Pole Mounted Bracket

5.5 Connecting RF Cable to Antenna

The cable must be routed from the antenna and through various areas of the ship to end up at the Below Deck Unit. When pulling the cables in place, avoid sharp bends, kinking, and excessive force. After placement, seal the deck penetration gland and tie the cable securely in place. The cable bracket must be installed on the mast to fix the relevant cable. The gooseneck must be installed on the side of the mast to protect the relevant cable against water. The supplied RF cable connector has the rubber grommet to protect inside the ADU from any water.

1. The RF cable is connected to the **Antenna** port of the BDU. Route the RF cable from the gooseneck placed on the deck to the antenna.
2. Maintain a cable length at least 2 m considering service loops when routing the cable on the mast. Connect the RF cable to the cable connector on the radome bottom, adjust the length, and fix the cable position along the routing path using cable ties on the cable brackets. Since the cable connector at the radome bottom is waterproofed at the factory, there is no need to work waterproofing.

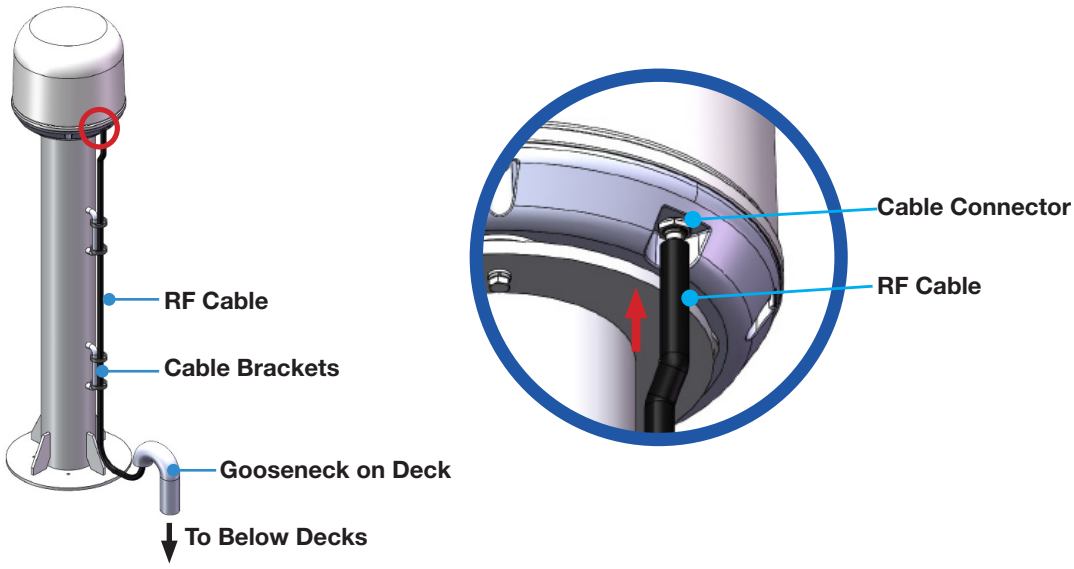


Figure 15: Connecting RF Cable to Antenna

Chapter 6. Installing BDU

The Intellian offers two versions of BDU installation, one can be installed to the surface of the wall or desktop, and one can be installed to the 19-inch rack frame using the BDU Rack Mount Kit (separate purchase).

6.1 BDU Dimensions

Confirm the dimension of the BDU before installing it.

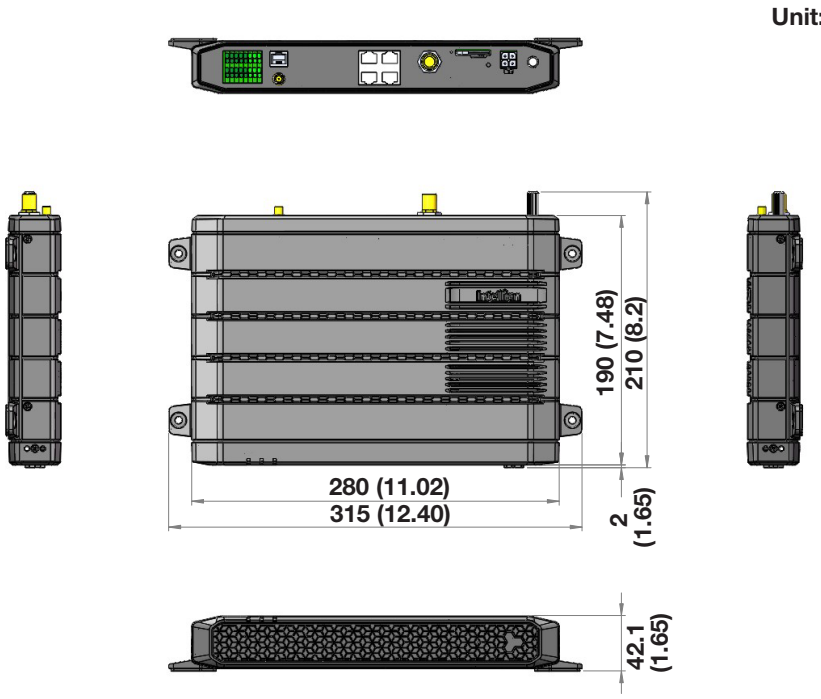


Figure 16: BDU Dimensions (Direct Mounting Type)