Intellian

v150NX Ka

1.5 m Ka-Band
Maritime VSAT Antenna System

Installation & Operation User Guide

Serial number of the product

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

Disclaimer

The information in this user guide is subject to change without prior notice through a product life cycle. A printed version of the guide is periodically updated and may contain inaccuracies or omissions compared to the recent product information. The most up-to-date information can be readily accessible on our website at intelliantech.com.

Doc. No. UG-KV0019-V1.5

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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. 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** • Do not stack boxes/crates 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.

* **DO NOT STORE THE ANTENNA WRAPPED IN A TARP, TENT, VINYL, AND OTHERS:** To avoid damage to radome paint, do not use a cover on the radome. Using any type of cover may cause paint damage. Intellian radomes are designed to withstand exposure to rain, humidity, and sun/UV rays when assembled according to Intellian instructions, and when the supplied approved hardware and sealants are used. Under no circumstances should an Intellian radome be covered by any protective covering that adheres, bonds, or clings to the surface, whether by self-adhesion or tension.

Chapter 2. Certifications

FCC Part 15 Subpart B Declaration of Conformity (DoC)

We, Intellian Technologies, Inc. located at 18-7, Jinwisandan-ro, Jinwi-myeon (Chungho-ri), Pyeongtaek-si, Gyeonggi-do 17709 Korea declare under our sole responsibility that the product(s) described in the below to which this declaration relates is in conformity with the requirement of the FCC Part 15 Subpart B.

Product Information:

Product Name:	Intellian v150NX Ka, 150cm Ka-band Maritime Stabilized Antenna System

Test Result:

Standard	Test	Rule Section	Test Report Number	Result
FCC Part 15 Subpart B	AC Power line conducted emission	ANSI C63.4:2014	DREFCC1909-0245	Pass
	Radiation emissions below 1GHz	ANSI C63.4:2014	DREFCC1909-0245	Pass
	Radiation emissions above 1GHz	ANSI C63.4:2014	DREFCC1909-0245	Pass

Supplementary Information:

Notified Body Involved: (Testing Organization)	DT&C Co., Ltd. 42, Yurim-ro, 154 beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do 17402, Korea
Technical/Compliance File Held by:	Intellian Technologies, Inc. 18-7, Jinwisandan-ro, Jinwi-myeon (Chungho-ri), Pyeongtaek-si, Gyeonggi-do 17709 Korea
Place and Date of Issue:	Gyeonggi-do, Korea on September 9, 2019

Authority: **Kevin Eom / CTO, R&D**

Signature: 

Date: **November 08, 2019**

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Doc Number IT19-DC1108-02

RED Declaration of Conformity (DoC)

We, Intellian Technologies, Inc. located at 18-7, Jinwisandan-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 451-862, Korea declare under our sole responsibility that the product(s) described in the below to which this declaration relates is in conformity with the *essential requirements* and *other relevant requirements* of the Radio Equipment Directive (2014/53/EU).

Product Information:

Product Name(s):	Intellian v150NX Ka, 1.5m Ka-band Maritime VSAT Antenna System

To provide the presumption of conformity in accordance to Annex III(encompassing Annex II) of Directive 2014/53/EU; the following harmonized standards and normative documents are those to which the product's conformance is declared, and by specific reference to the essential requirements of Article 3 of the Directive 2014/53/EU.

2014/53/EU Article	**Standard(s) Applied in Full**	**Result**
SAFETY (Art 3.1.a)	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013	Pass
EMC (Art. 3.1.b)	EN 301 843-1	Pass
SPECRTUM (Art. 3.2)	EN 301-360 EN 301-459 EN 303-978	Pass

Supplementary Information:

Notified Body Involved: (Testing Organization)	DT&C Co., Ltd. 42, Yurim-ro, 154 beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do 17042, Korea
Technical/Compliance File Held by:	Intellian Technologies, Inc. 18-7, Jinwisandan-ro, Jinwi-myeon, Pyeongtaek-Si, Gyeonggi-Do 17709, Korea
Place and Date of issue:	Gyeonggi-do, Korea on 30 Oct 2019

Authority: **Kevin Eom / CTO, R&D**

Signature: 

Date: **08th Nov, 2019**

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Doc Number IT19-DC1108-01

UK-CA Declaration of Conformity

We, Intellian Technologies, Inc. located at 18-7, Jinwisandan-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 17709, Korea declare under our sole responsibility that the product(s) described in the below to which this declaration relates is in conformity with the *essential requirements* and *other relevant requirements* according to UK legislation Electrical Equipment (Safety) Regulations 2016 (S.I. 2016/1101).

Product Information:

Product Name(s):	Intellian v60Ka 2 65cm Ka-Band Maritime VSAT Antenna System Intellian v85NX Ka 85cm Ka-band Maritime VSAT Antenna System Intellian v100NX Ka, 105cm Ka-band Maritime VSAT Antenna System Intellian v150NX Ka, 150cm Ka-band Maritime VSAT Antenna System
Model Number(s):	V5-60K-U2XX V5-85K-U2XX V5-11K-U2XX V5-15K-U2XX

To provide the presumption of conformity in accordance to Annex III(encompassing Annex II) of Directive 2014/53/EU; the following harmonized standards and normative documents are those to which the product's conformance is declared, and by specific reference to the essential requirements of Article 3 of the Directive 2014/53/EU.

2014/53/EU Article	**Standard(s) Applied in Full**	**Result**
SAFETY (Art 3.1.a)	EN 62368-1	Pass
EMC (Art. 3.1.b)	EN 301 843-1	Pass
SPECTRUM (Art. 3.2)	EN 301-360 EN 301-459 EN 303-978	Pass

Authority: Yeonho.Kim
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Date: January 6, 2022

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Chapter 3. Introduction

3.1 Intellian v150NX Ka Introduction

Intellian v150NX Ka is a Ka-band 3-axis stabilized VSAT maritime antenna system. The v150NX Ka provides advanced VSAT solutions for Ka-band satellite services. v150NX Ka is equipped with a new mounting architecture RF module.

The antenna's 3-axis stabilized platform and advanced shock-resistant and vibration damping design of the Pedestal is fully optimized to withstand the demanding maritime conditions and to ensure reliable broadband communications.

The v150NX Ka is even more operator-friendly in that it combines Tx, Rx and DC power into one cable, simplifying installation. With the new radome design, the dome-on external single cable connection means that installers do not need to remove the radome during installation either.

Equipped with Intellian's next generation Antenna Control Software, "AptusNX", the v150NX Ka antenna can be easily accessed, monitored and controlled. This new simply configured tool can alert an operator to possible problems with its enhanced diagnostic capabilities and can also provide automatic alerts when preventative maintenance may be required.

The v150NX Ka is supplied with both cross-pol and co-pol feeds and comes equipped with LO Programmable LNB by standard.

3.2 Intellian v150NX Ka Features

Higher RF Performance

Intellian's highly efficient RF design delivers superior performance compared to other 1.5 m class systems, enabling higher data rates and global operation. The v150NX Ka has improved tracking precision and reliability in a streamlined mechanical design. The v150NX Ka system is supplied as standard with Mission Microwave Ka 50 W, 100 W.

Single Coaxial Cable

Combined Tx, Rx and DC power in a Single Cable solution, the v150NX Ka enables faster and reduced costs of installation. Dynamic Motor Brakes, eliminating the requirement of shipping brackets, and Dome-On external RF cable connection on the base allow easier and quicker installation without removing the radome.

Embedded Dual Antenna Mediator Function

Intellian's new ACU fully supports dual antenna operation without additional hardware such as a separate mediator, RF splitters and cables. Eliminate loss of signal due to blockage by using dual antenna systems.

AptusNX Intelligent Diagnosis

Intellian's all new integrated M&C platform AptusNX provides responsive web user interface to manage and control the antenna system regardless of device types. Installation Wizard in AptusNX automates functions for system configuration so that operators are minimally involved in system installation and operation, including automatic cable loss compensation, line-up test and auto diagnostics.

Chapter 4. Planning Installation

The antenna installation requires extreme precaution and safety measures given its size and weight. 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 system should be placed in an area onboard the vessel with little to no RF signal blockage. 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.

4.1.1 Minimize Satellite Blockage

Install the antenna in accordance with the following procedures to ensure maximum performance of the antenna. The ideal antenna site should have a clear view of the horizon or satellite with all around clearance. Make sure there are no obstacles within the EL range -15° to +110° from the center of the antenna. Obstacles can interrupt the satellite signal transmission and reception of the antenna.

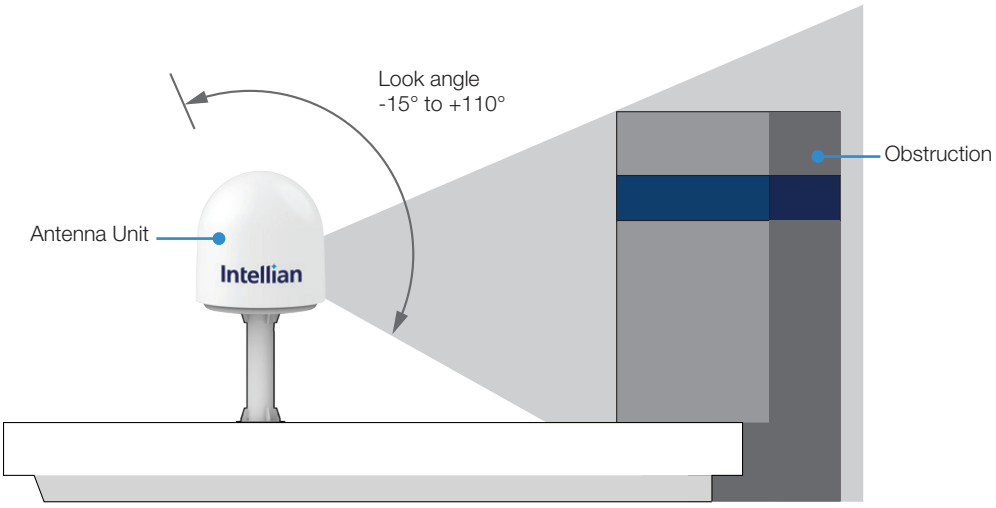


Figure 1: Elevation Limit of Obstacles

4.1.2 Avoid 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 15 feet (4.6 m) away from the radar.

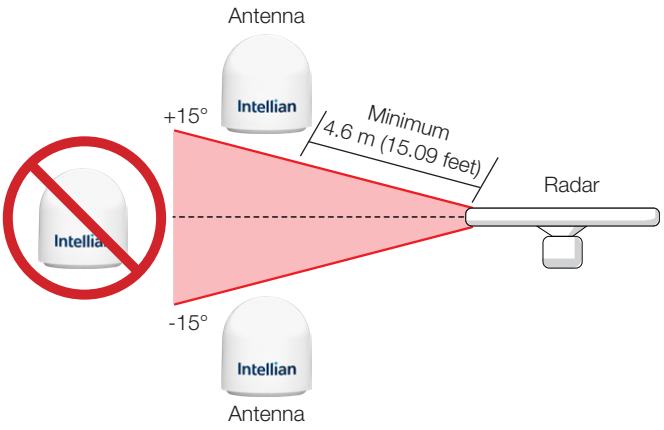


Figure 2: Potential RF Interference

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.

4.1.3 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 an improper use of the transmit equipment, may be hazardous to persons close to the above deck unit. Ensure the safety of personnel who work on 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 150 m (492 ft), based on a radiation level of 1 mW/cm² that applies under uncontrolled environment. No hazard exists >20° below the antenna's mounting plane.

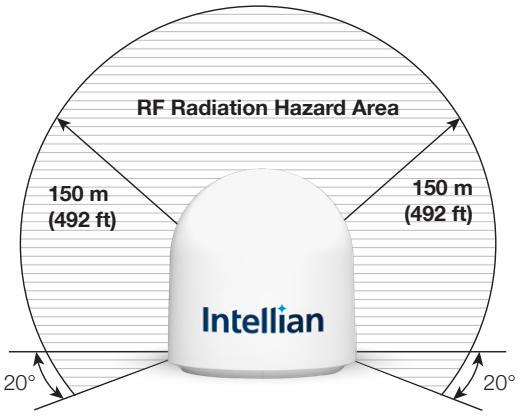


Figure 3: RF Radiation Hazard Area

4.2 System Package

4.2.1 Above Deck Unit (ADU)

The ADU includes an antenna pedestal inside a radome assembly unit. The pedestal consists of a satellite antenna main dish with RF components mounted on a stabilized pedestal. The radome protects the antenna pedestal assembly unit from the severe marine environment.

Figure 4: Radome and Pedestal

4.2.2 Antenna Control Unit (ACU)

Antenna Control Unit (ACU) controls Antenna system operation. The following functions are supported by ACU.

- High power supply for the high power BUC
- Mediator function included
- Spectrum analyzer function included
- OLED display
- USB Log download & Firmware upgrade (No PC required)
- Wi-Fi acess
- AptusNX Web application

Figure 5: Front Panel of ACU

Figure 6: Back Panel of ACU

4.2.3 Air-Conditioner (Optional)

v150NX Ka is designed to assemble a separate air-conditioner under the radome if necessary. For more detailed information for assembling the air conditioner refer to the **"12.3 Appendix C. Assembling Air-Conditioner (Optional)" on page 115**.

Figure 7: Standard Antenna

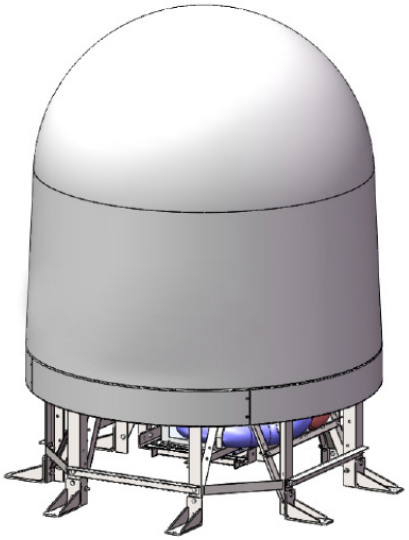


Figure 8: Air-Conditioned Antenna

4.2.4 Packing List

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

Item	Q'ty	Size	Description
Above Deck Unit (ADU)	1		Radome and Pedestal
Antenna Control Unit (ACU)	1	431 mm x 350 mm x 44.3 mm	Antenna Control Unit
Quick Installation Guide (QIG)	1		Installation guide
RF Hazard Sticker	1		Radiation safety distance (150 m) label
Mounting Template	1		Real size drawing of antenna mounting hole pattern
ACU Rack Mount Bracket	2		For installing ACU to 19-inch rack
Flat Head Screw	10	M4 x 12L	For mounting ACU Rack Mount Bracket on ACU
USB Cable (A to A)	1	1.8 m	To connect ACU (front panel left USB port) to PC
AC Power Cord (CEEE7/7)	1	1.5 m	ACU power cord (220 V)
RF Cable (F (M) to F (M))	2	1 m	To connect ACU to modem (Tx / Rx)
Modem Interface Cable (DB-9 (M) to RJ45)	1	1.5 m	To connect ACU to modem (iDirect Modem)
BUC Interface Cable (DB-9 (F) to RJ45)	1	1 m	To connect BUC Interface of ACU to BUC I/O of Modem
Ethernet Cable (RJ45 to RJ45)	2	1 m	To connect ACU to PC / network device
Wi-Fi Dongle	1		For Wi-Fi connection
Hex Bolt (BUMAX)	5	M12 x 80L	Bolt kit for antenna-deck (mast) assembly (1 spare set included)
Flat Washer (BUMAX)	5	M12	
Spring Washer (BUMAX)	5	M12	
Hex Head Wrench Bolt	5	M6 x 40L	Bolt kit for radome assembly (1 spare set included)
Spring Washer and Flat Washer	5	M6	
Cable Tie	50	140 mm	For mounting cables
Loctite 263	1	10 ml	

4.3 System Cables (Customer Supplied)

4.3.1 Antenna RF Cable (Customer Supplied)

Due to the signal loss across the length of RF coaxial cable on L-Band, it must only use the RF cables using the 50 Ω coaxial cable types for standard system installation. The use of different type of cables (75 Ω coaxial types etc.) can cause problems. If you need RF cables that run longer than the maximum cable length recommended, contact Intellian Technical Support for assistance.

Cable Requirements

Coaxial Cable Type	Connector	Max. DC Resistance	Attenuation @ 2 GHz	Max. Cable Length (≤ 16 dB loss @ 2 GHz)
LMR400	N (M) to N (M)	0.8 Ω	0.196 dB/m	60 m
LMR600			0.128 dB/m	100 m

Note
- Optimal tightening torque for N type RF connector: 1.5 N-m
- Maximum RF loss at 2 GHz: 16 dB including connectors

4.3.2 Gyrocompass Cable (Customer Furnished)

General types of gyrocompass cables are recommended for the compatible connection to Intellian antennas which are used in various environments of vessels.

Standard	NMEA 2000	NMEA 0183
Connector Type	Mini-C 5 pin connector	2 pin terminal block connector
Cable Type	5-wire single cable	2-wire cable with one enclosed shield cable
Heading Information	Supports PGN, 127250: Vessel Heading	Supports $HEHDT, baud rate 4800, format 8N1 as standard

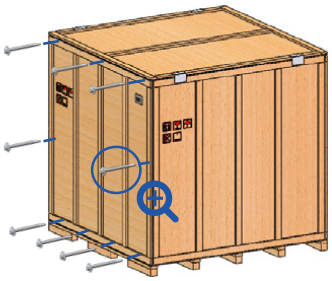
4.4 Unpacking System Package

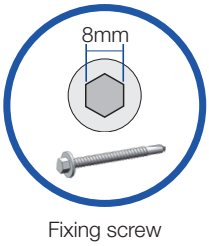
CAUTION
- The package box on the pallet should be lifted by a forklift.
- Follow the steps in order for easy and safe unpacking.

The pallet should be lifted by means of a forklift. To unpack the wooden crate, follow the procedure below.

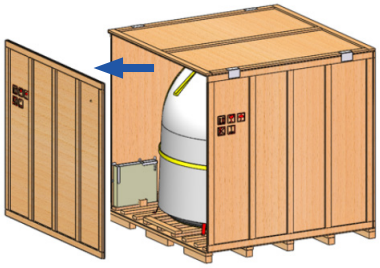
1. Remove the fixing screws (9 ea) from a front panel. Detach the front panel.

1-1 : 9 ea



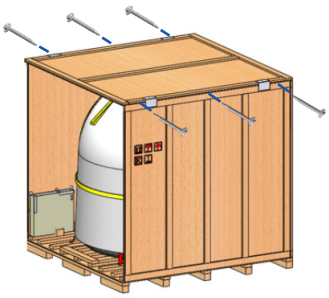


1-2

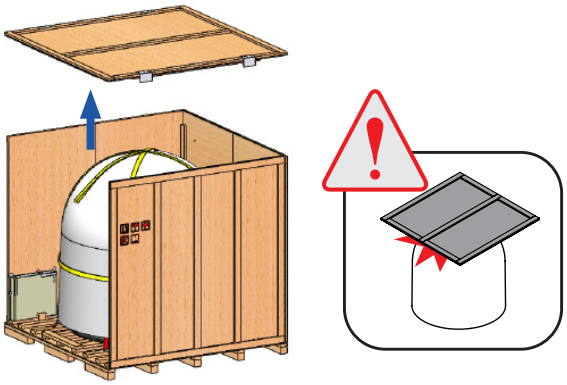


2. Remove the fixing screws (6 ea) from a top panel. Detach the top panel by using a forklift carefully.

2-1 : 6 ea

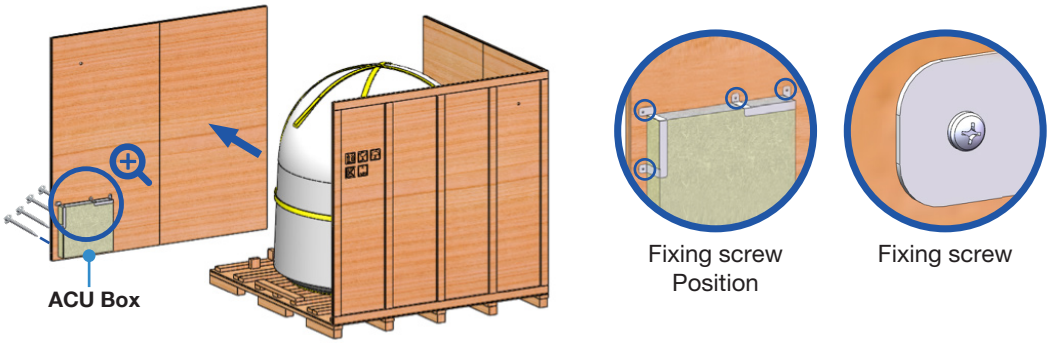


2-2



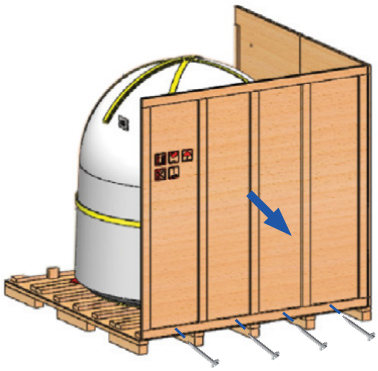
3. Remove the fixing screws (4 ea) from a left panel, then detach the left panel. Take out the ACU box that is located inside the panel.

3-1 : 4 ea



4. Remove the fixing screws (4 ea) from a right panel, then detach the right panel.

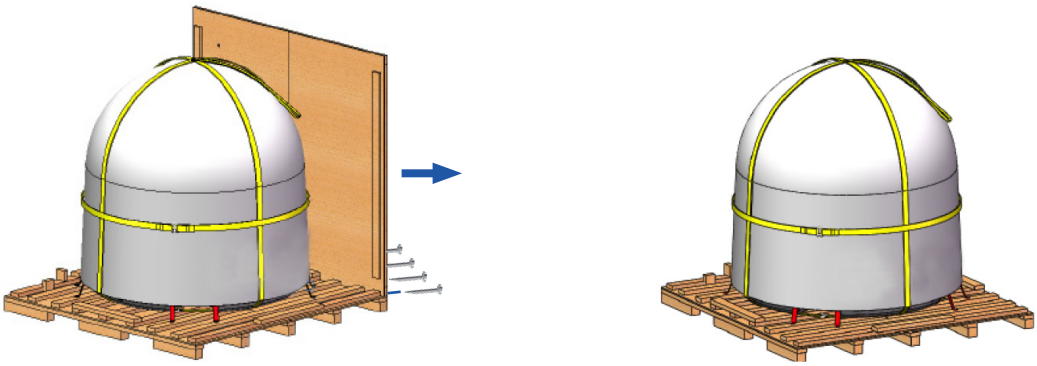
4-1 : 4 ea



5. Remove the fixing screws (4 ea) from a remaining back panel, then detach the back panel.

5-1 : 4 ea

5-2



Chapter 5. Installing Above Deck Unit (ADU)

5.1 Antenna Dimensions

Confirm the height and diameter of the antenna unit shown in the following figure before installing it. The mounting surface and overall space occupied by the antenna must be sufficient for the fully constructed radome on top of its base frame. Using a crane during the antenna installation is strongly suggested.

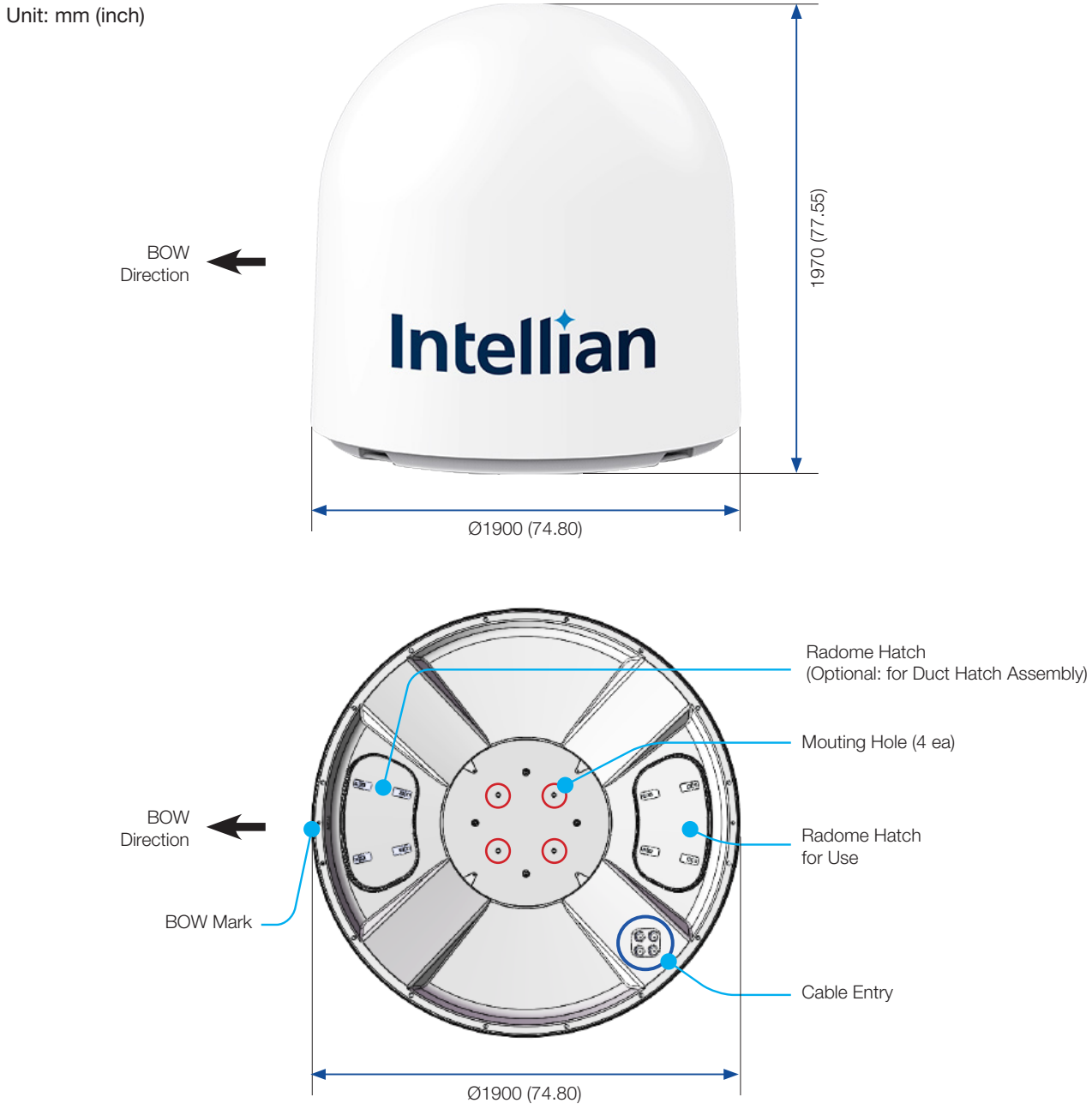


Figure 9: Antenna Dimensions

NOTE

Position the antenna with the BOW direction parallel to the center line of the ship.

5.2 Antenna 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.

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.

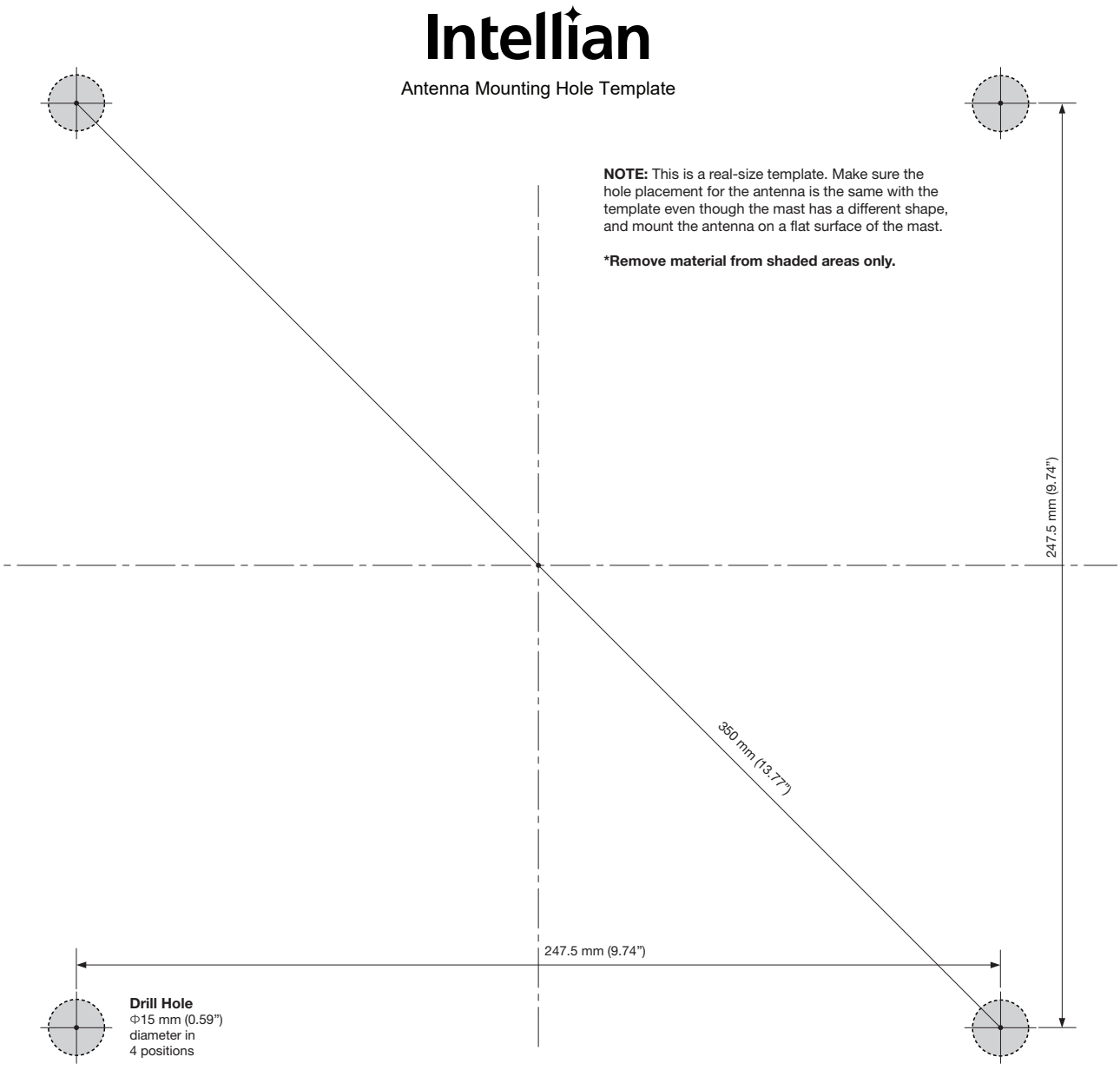


Figure 10: Antenna Mounting Hole Template

5.3 Designing Mast (Example Only)

The installation mast must be robust enough to prevent flex, vibration, and sway when an external force is exerted on the mast with antenna and radome. Refer to the following mast drawings for more details.

NOTE

- This is a general example of designing a mast. The shape of mast may differ depending on the ship's environment.
- Follow the installation recommended by Intellian for safety.

WARNING

- When designing a mast, consider the minimum and maximum thickness of the mast plate marked on the diagram (Min. 15.0 mm/ Max. 25.0 mm).
- To use the supplied bolts (M12 x 80L) for mounting antenna on a mast, the thickness of mast plate must be 15 ~ 25 mm. The minimum thickness of the mast plate is 15 mm. If the mast plate is thicker than 25 mm, the supplied antenna-mast mounting bolts can be too short to mount the antenna on the mast securely.

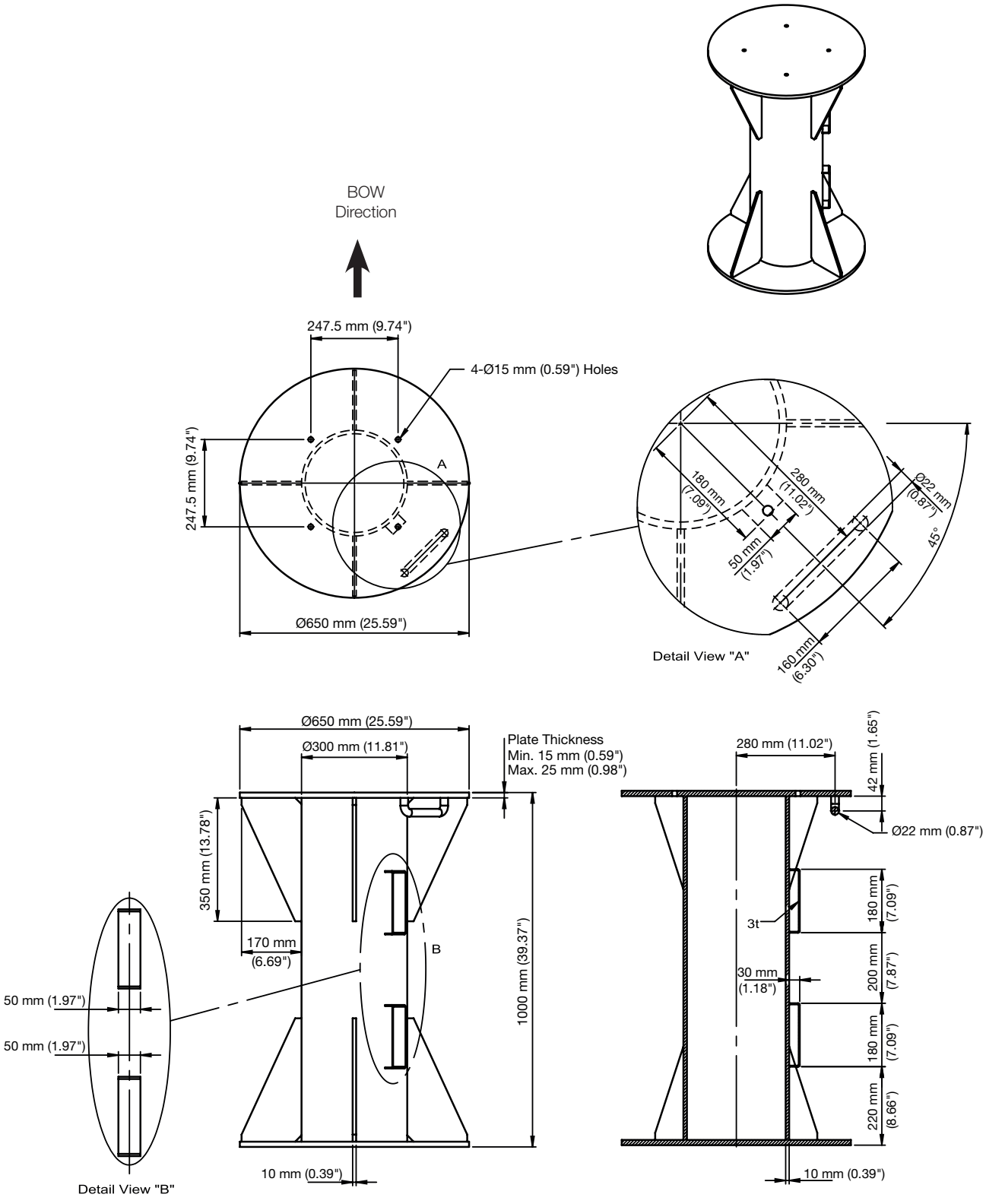


Figure 11: Figure: Recommended Size of Mast

5.4 Routing RF Cable on Mast (Example Only)

The cable must be routed from the antenna and through various areas of the ship to end up at the antenna control 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.

WARNING

Ensure that cable has been run through watertight fittings to prevent water entry into the vessel when installation is completed.

NOTE

This is a general example of routing cables on the mast. The routing method is may differ depending on the ship's environment.

Routing Cable on Outside of Mast

This method is generally recommended.

1. Route the cable from the gooseneck placed on the deck to the antenna as shown in the picture.
2. Maintain a sufficient cable length (at least 2 m) when routing the cable on the surface of the mast. After connecting the cable to the connector inside the radome, adjust the length and fix the cable on the cable brackets using cable ties.

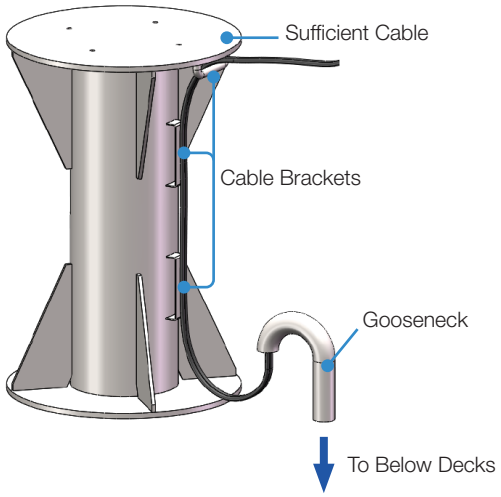
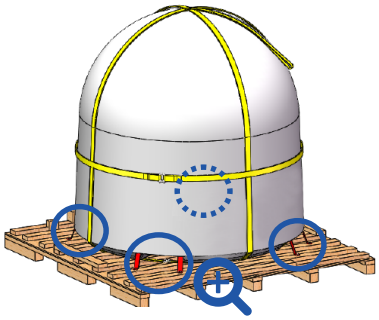


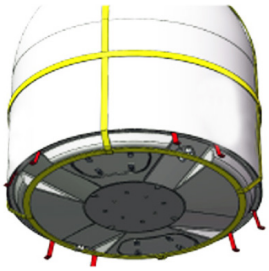
Figure 12: Routing Cable Through Outside of Mast

5.5 Removing Antenna from Wooden Pallet

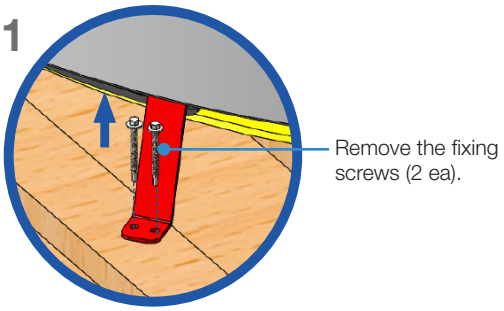
Eight radome brackets secure the antenna to the pallet. To remove the radome bracket, follow the procedures.

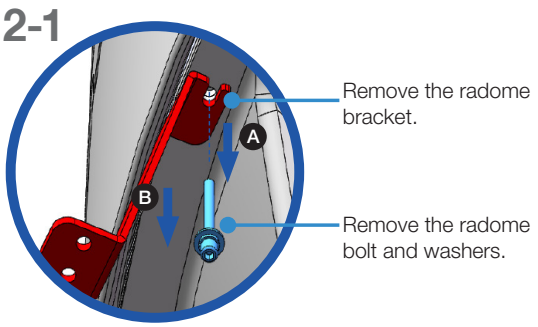
1. Remove the fixing screw (2 ea) on the radome bracket that secures the antenna to the pallet using a wrench.
2. Remove the radome bracket bolt (1 ea) using a wrench, then detach the radome bracket from the radome.
3. Find the supplied Hex Head Wrench Bolts (M6 x 40L), Spring Washers, and Flat Washers from the ACU box. Apply Loctite #243 on the bolt, and assemble the bolt and washers to the radome by turning it clockwise using a wrench. DO NOT reuse the removed bolt and washers.
4. Repeat the procedure to remove all four radome brackets.

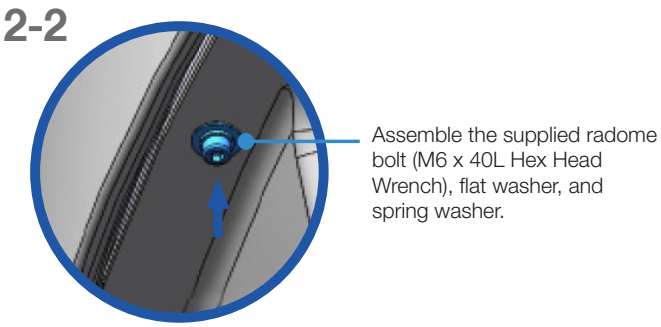




Radome Bottom View



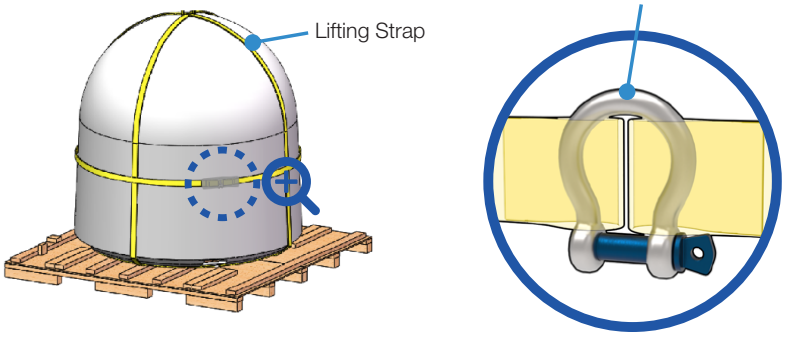




CAUTION

- Fully tighten the radome bolt.
- Use the radome bolt and washers supplied in the ACU box.
- DO NOT reuse the removed bolt and washers.

5. Check the condition of lifting straps, and make sure the shackles (2 ea) are tightened. Re-wrap the shackles with the existing protection to avoid radome damage.



WARNING

When lifting the antenna using the lifting straps, make sure to remove the securing radome brackets to separate antenna from the pallet.

5.6 Placing Antenna Above Mast

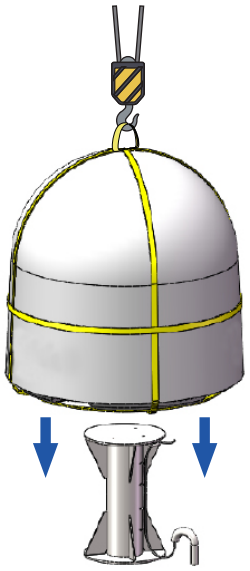
The Intellian antenna comes with the lifting straps pre-mounted from the factory. Check the condition of the lifting straps and ensure the shackle is tightened up. Lift and move the antenna above the mast using a crane, then carefully put the antenna down on the mast.

WARNING

When moving the antenna, it may sway by windy. Be careful when handling the antenna.

NOTE

Position the antenna with the BOW direction parallel to the center line of the ship.



5.7 Mounting Antenna on Mast

1. Bring M12 x 80L Hex Bolt sets (4 ea) for antenna-mast assembly from the ACU box.
2. Place the antenna on the mast and align the mounting holes of the antenna with those of the mast.
3. Before assembling bolts, apply Loctite #263 to the bolt threads to ensure the bolts are fastened firmly. Insert the bolts and washers from under the mast into the radome, and lightly tighten them by hand into the built-in nuts on the bottom of radome. Install 4 bolts in a criss-cross sequence as shown in the figure.
4. After installing all 4 bolt sets, fully tighten the bolts using a torque wrench.
5. After mounting the antenna on the mast, remove the lifting strap.

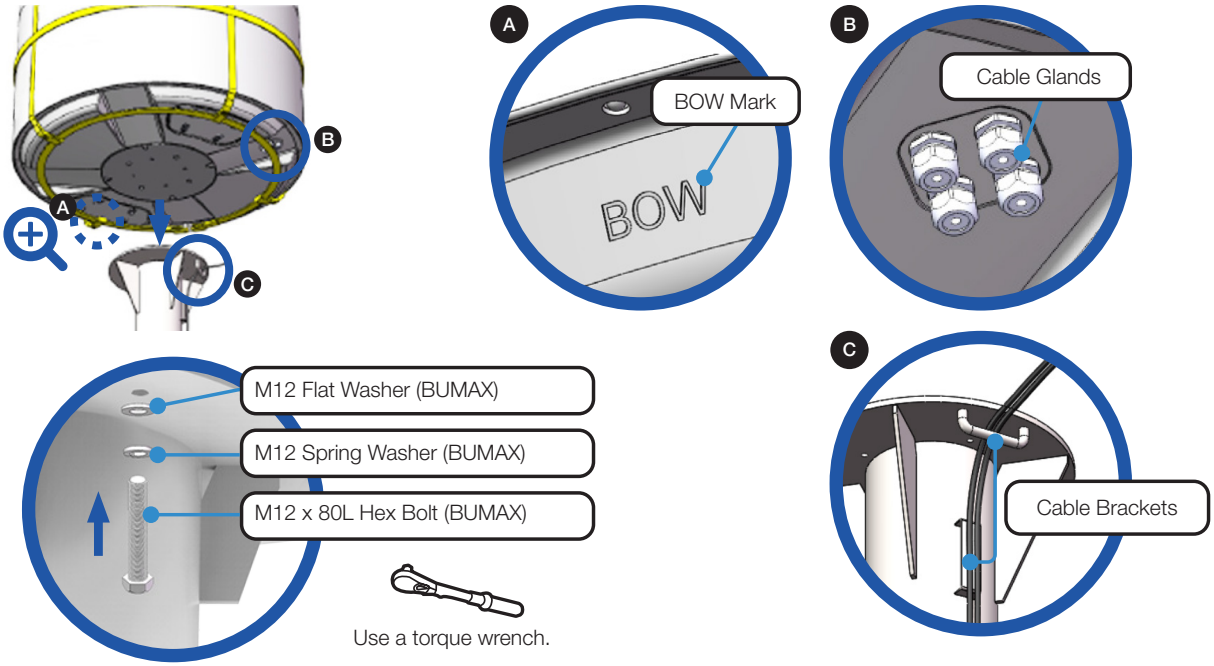


Figure 13: Installing Bolts for Antenna-Mast Assembly

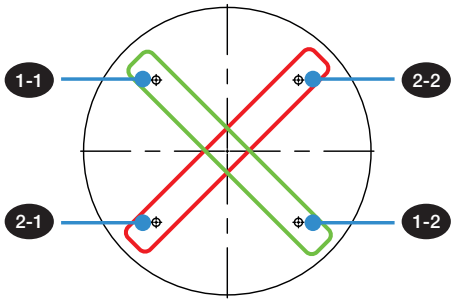


Figure 14: Installing Sequence of Bolts

NOTE

- Check the positions of Ⓐ BOW mark, Ⓑ cable glands, and Ⓒ cable brackets when mounting antenna on the mast.
- Make sure the cable from the mast is aligned with the cable entry on the bottom of antenna for stable connection.
- Refer to **"12.1 Appendix A. Tightening Torque Specification" on page 110** for the bolt tightening torque.

WARNING

If a bolt does not fit into the mounting hole when installing the bolt by hand, stop installing and check the bolt size. DO NOT tighten the bolts forcefully. It may cause damage to the inner threads of the mounting holes of antenna. In this case, the damage is not covered by the warranty.

5.8 Connecting RF Cable to Antenna

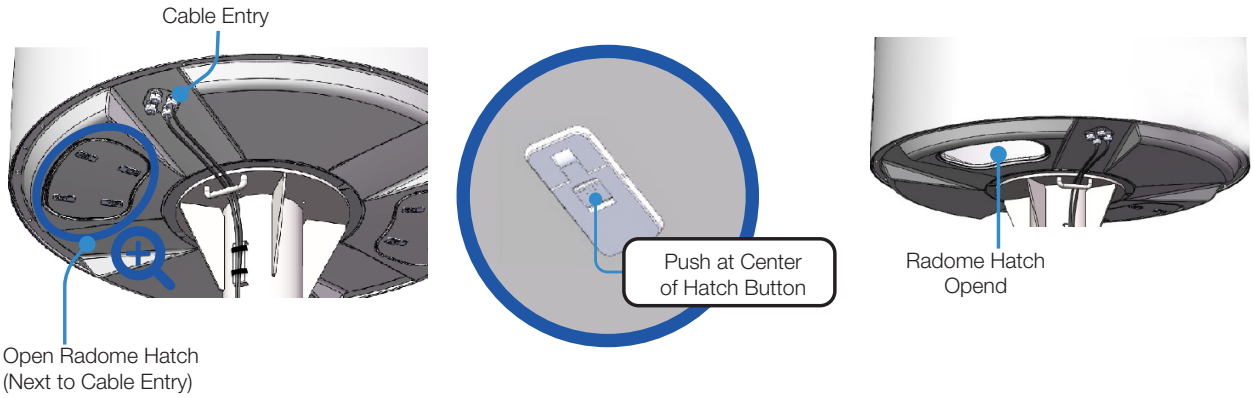
For the cable connection at each end, cable termination should be completed using proper tools. After connecting the cable to a connector inside the radome, adjust the cable length and securely fix the cable on cable brackets of mast by using cable ties.

NOTE

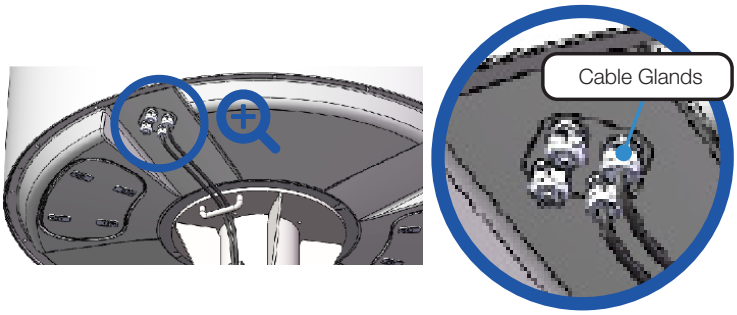
Make sure the followings before installing system cables.

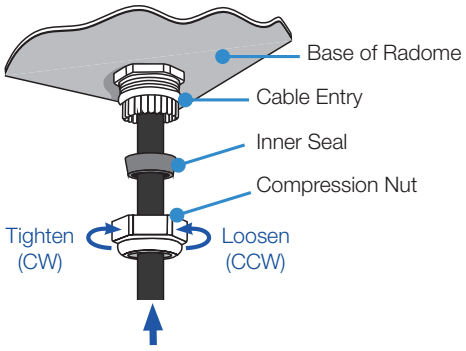
1. All cables need to be well clamped and protected from the physical damage and exposure to heat and humidity.
2. Don't use any acutely bent cable.
3. Use watertight glands or swan neck tubes at exposed bulkheads or deck heads where the cable passes through.
4. Install recommended size cables. Refer to **"4.3 System Cables (Customer Supplied)" on page 19** to see cable requirements.

1. Access the ADU module inside the radome through the radome hatch to connect the system cable. Make sure that there is a sufficient space to open the radome hatch underneath the ADU. Open the radome hatch located next to the cable entry by pushing at the center of the hatch button (4 ea). Keep the radome hatch in a safe place for the next step.



2. Insert the RF Cable come from the ACU into the radome (min. 1.8 m / max. 1.9 m) through the pre-installed cable gland at the base of radome. Initially, assemble cable gland temporarily to hold the cable in position. After finish the cable connection inside the radome, tighten the cable gland completely. Follow the cable gland assembly sequence as shown in the picture.



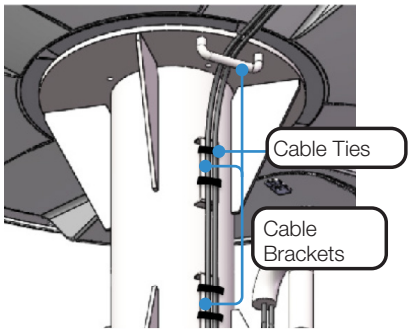


Cable Gland Assembly

NOTE

- To prevent cable damage, insert the RF cable into the radome through the cable gland.
- Terminate RF Cable with N (M) connector inside the radome after inserting the cable into the radome.
- Cable length inside the radome: Min. 1.8 m / Max. 1.9 m (from the cable entry of radome to the Power Switch Unit before the N connector termination)

3. Temporarily, tie the cables loosely on the cable bracket by using cable ties. After connecting the cables to cable connector on the Power Switch Unit inside the radome, adjust the cable length and then fix the cables on the cable brackets by using cable ties.



4. Terminate RF Cable with N (M) connector inside the radome. Intellian recommends using genuine cable connectors and tools. Refer to the cable termination instructions provided by the connector manufacturers.
5. Connect the RF Cable to the Power Switch Unit inside the radome. Connect the AC Power Cable to the cable connector on the Power Circuit Brake Box inside the radome. Ensure the cable is firmly fastened to the connector and fix it on cable mounts by using cable ties. When the cable is installed completely, turn on the power switch.
6. Fully tighten the cable gland at the base of radome which is assembled temporarily in the previous step. Then put the radome hatch in the right place and close it by pushing at the center of the hatch button (4 ea).

WARNING

Ensure that the power switch is off during installation. Turn on the power after install all the cables.

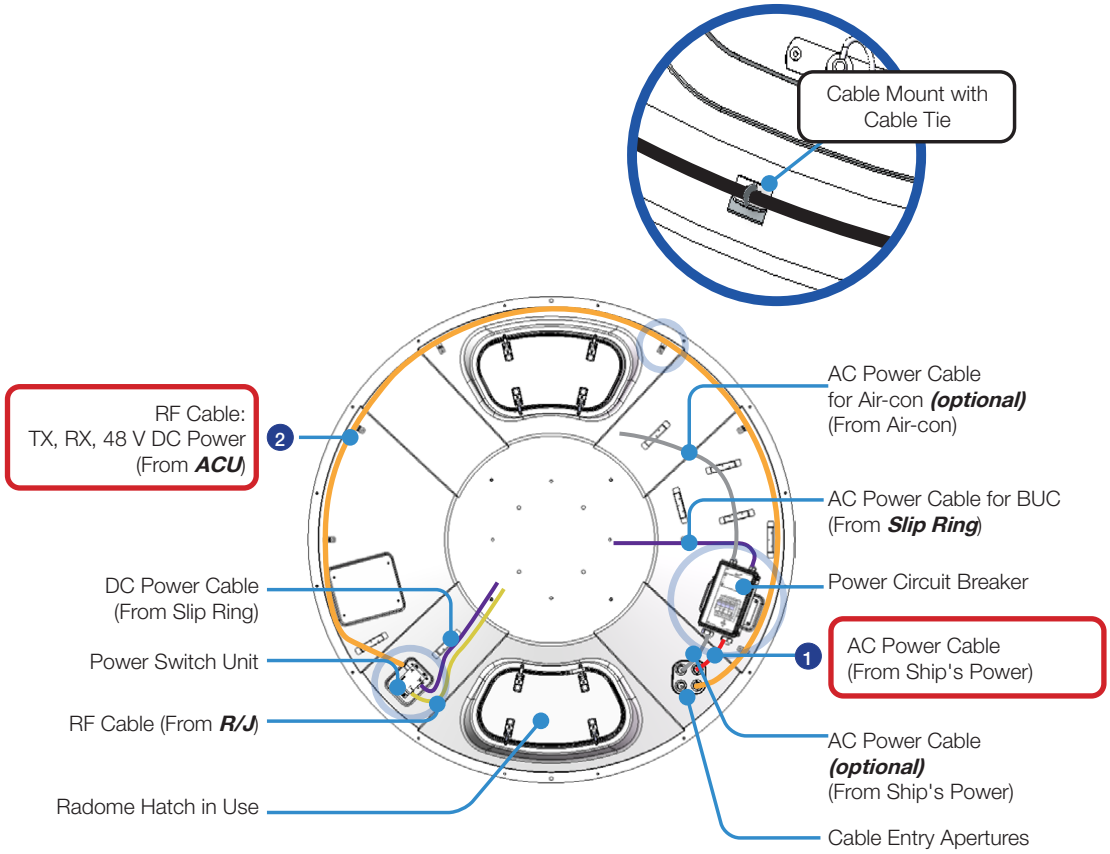


Figure 15: Cable Connection Inside Radome

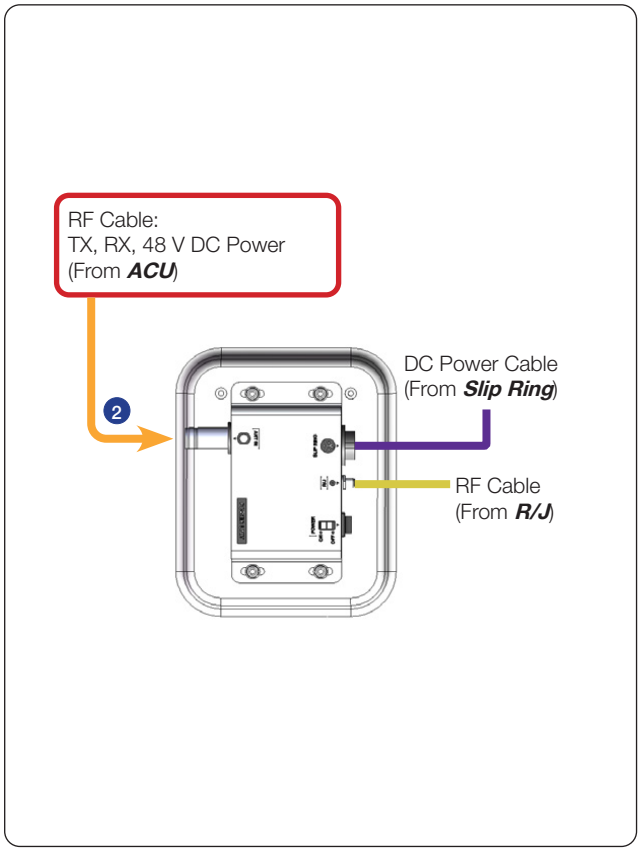


Figure 16: Cable Connections on Power Switch Unit

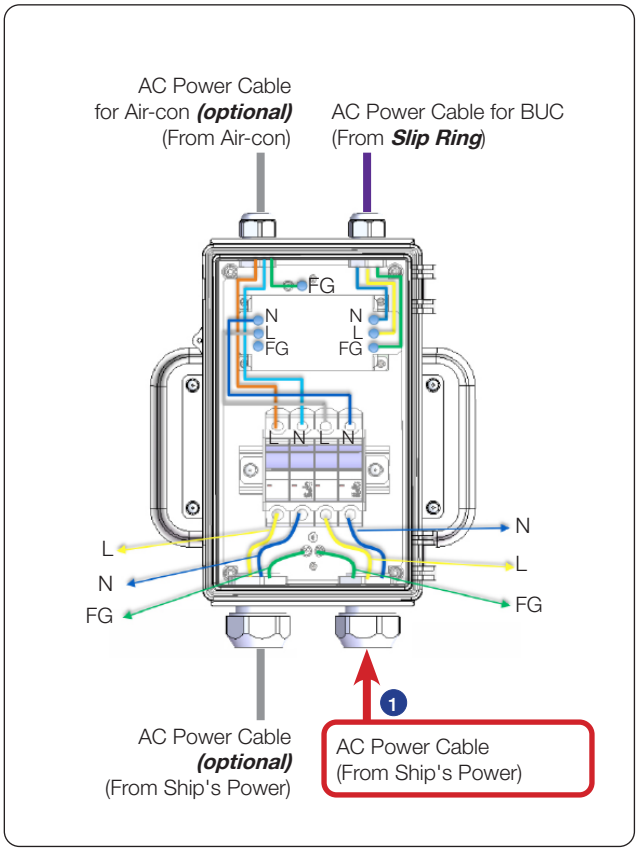


Figure 17: Cable Connections on Power Circuit Breaker

Chapter 6. Installing Below Deck Unit (BDU)

6.1 Selection of BDU Installation Site

The ACU should be installed below the deck in a location that is dry, cool and ventilated. The front panel of ACU should be easily accessible to users.

6.2 ACU Dimensions

Confirm the dimension of the ACU before installing it.

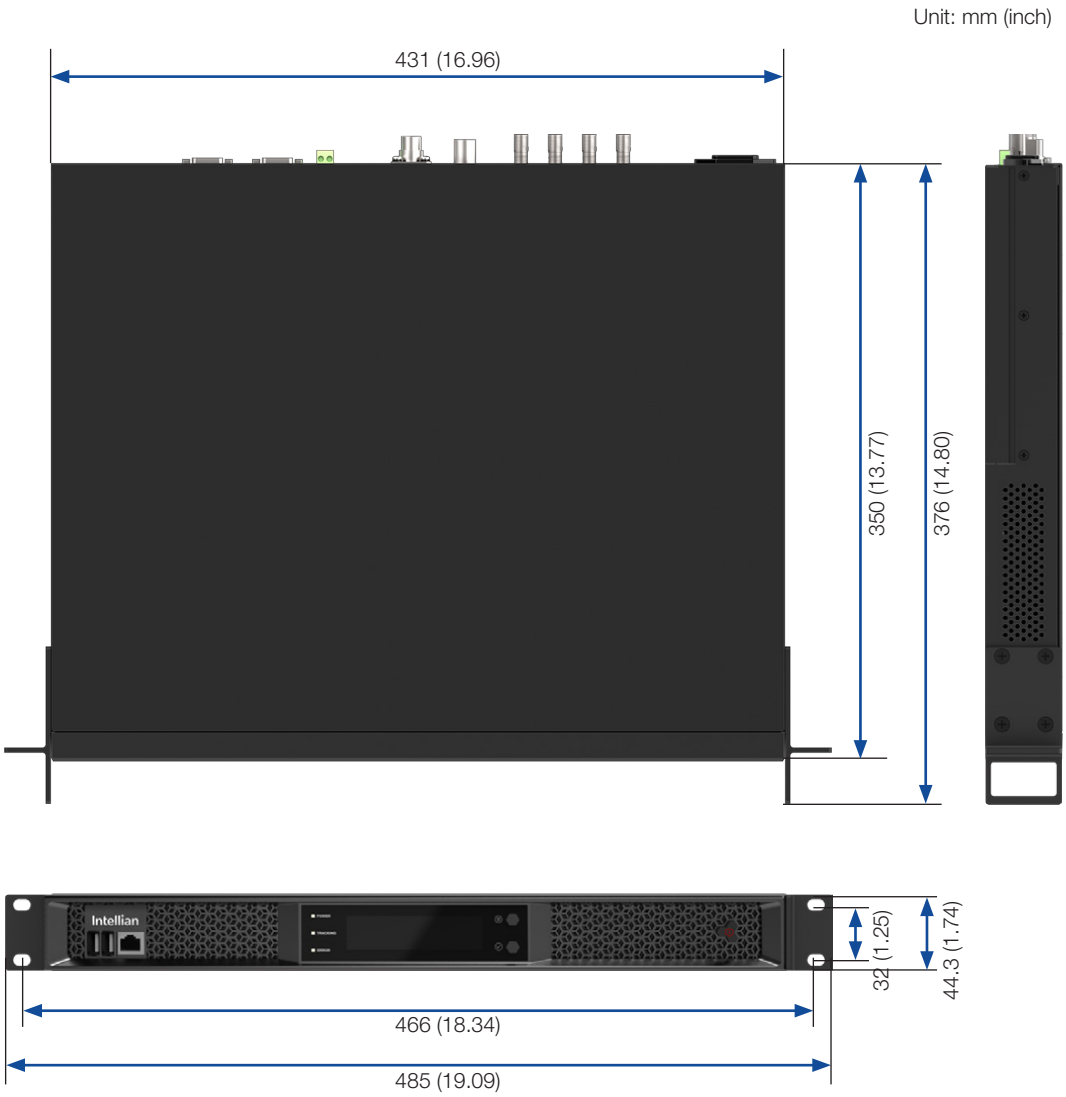


Figure 18: ACU Dimensions

6.3 Mounting ACU

Mounting ACU on 19-inch Rack

The ACU can installed to 19" rack using the two rack mount brackets which can be found from the ACU box. Attach the rack mount brackets to the sides of the ACU using flat head screws. Connect cables to the back side of the ACU.

Figure 19: 19-inch Rack Mount ACU

WARNING

Ensure that the cables connected to the ACU are long enough to prevent damage when the ACU is pulled out from the rack.

6.4 Antenna System Configurations

For the proper operation of the satellite communication system, the required components must be connected as shown in the figure. Separate purchase of a satellite modem, switch router and ship's gyrocompass may be needed.

6.4.1 Single Antenna System Configuration (Basic Antenna System)

The basic system consists of one VSAT antenna and one ACU. As shown in the configuration, connect the cables correctly.

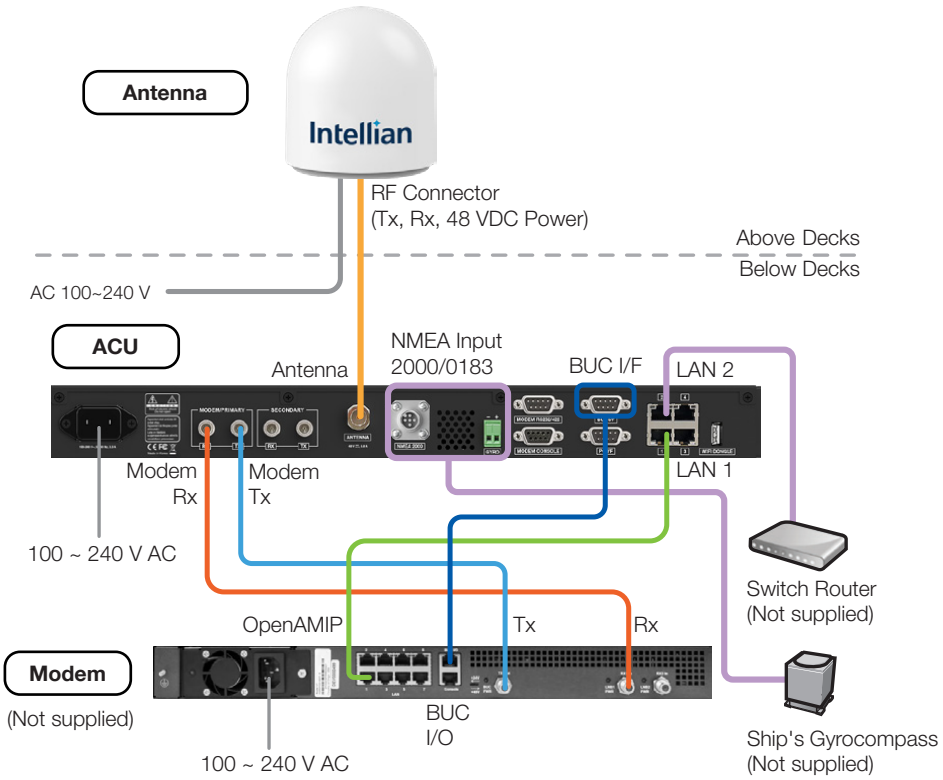


Figure 20: Single Antenna System Configuration

6.4.2 Dual Antenna System Configuration (Optional)

The dual system consists of two VSAT antennas and two ACUs. The ACUs have embedded Dual Antenna Mediator function, which is capable of controlling and managing two VSAT antenna systems simultaneously. As shown in the configuration, connect the cables correctly.

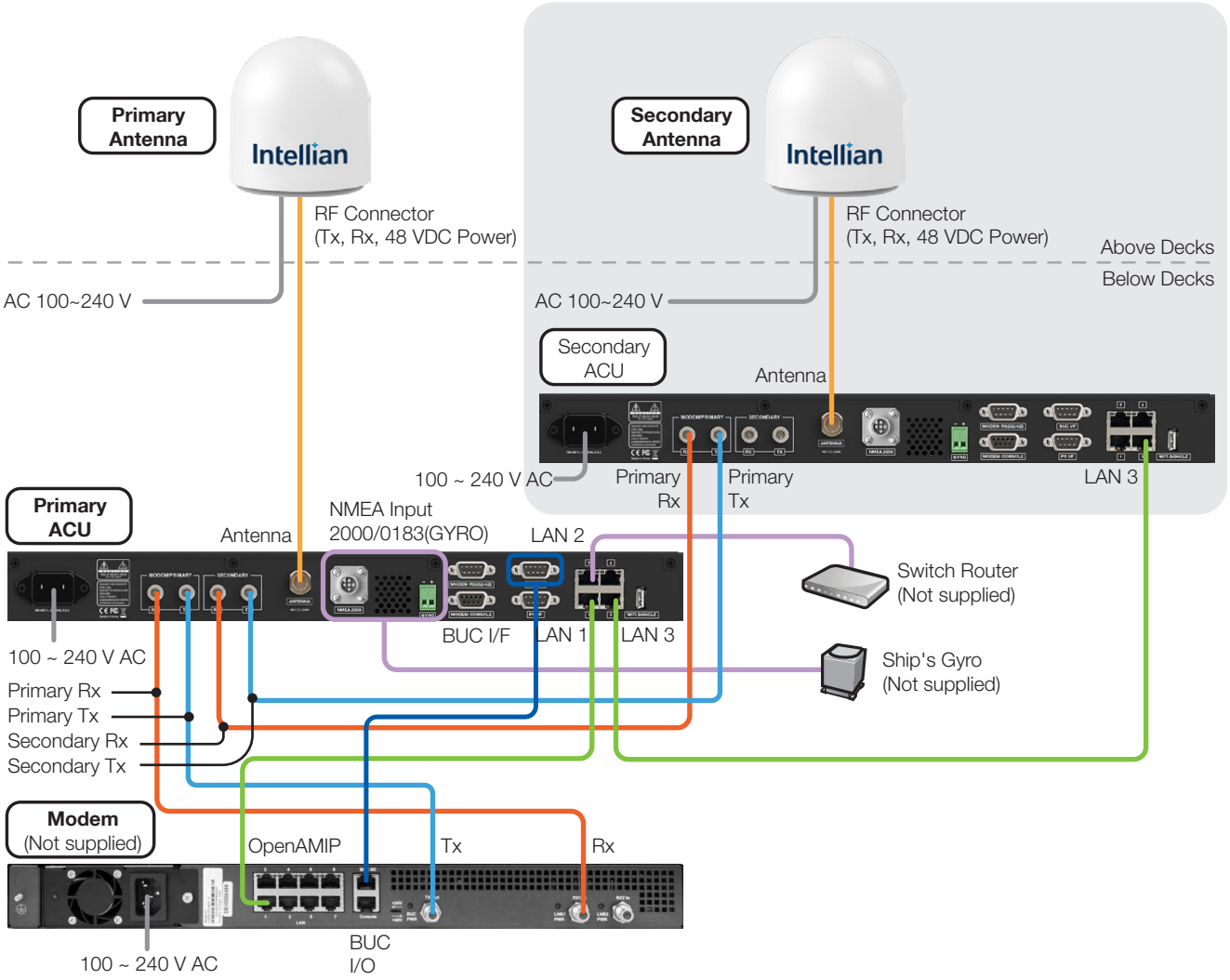


Figure 21: Dual Antenna System Configuration

NOTE

Refer to **"12.2 Appendix B. Starting Dual Antenna System (Optional)" on page 111** for more information.

6.5 ACU Cable Connection

6.5.1 ACU Back Panel Connectors

The following figure shows the ACU back panel.

Antenna Control Unit (ACU)

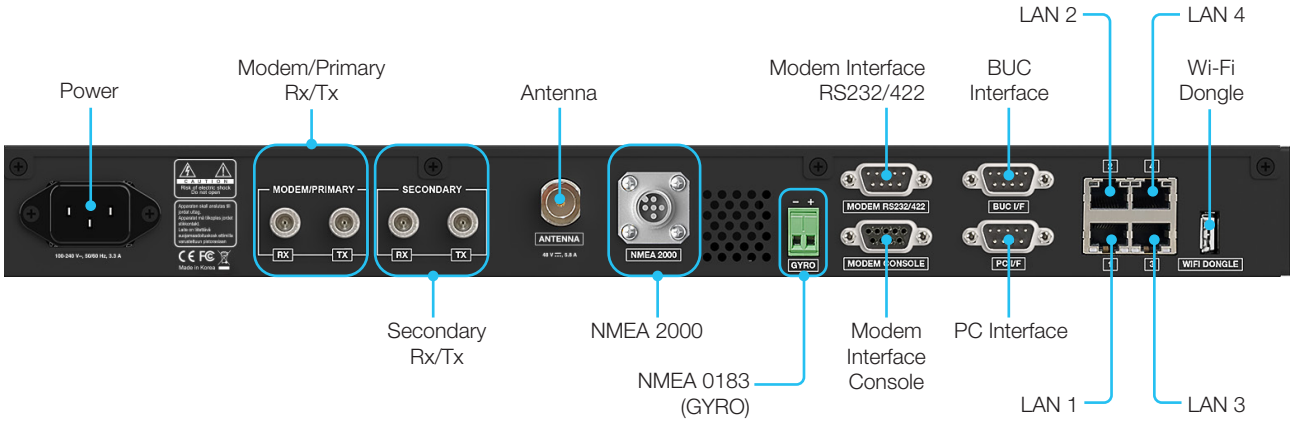
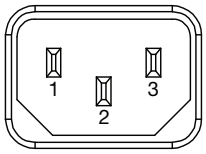


Figure 22: ACU Back Panel Connectors

6.5.2 ACU Connector Pinout Guide

Check the following connector pinout information applied to the connection ports of the ACU.

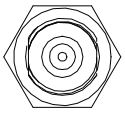
Power Connector



IEC 320 C14 Plug Male

Pin	Signal
1	NEUTRAL
2	GND
3	LIVE

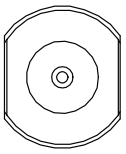
Modem / Primary / Secondary Tx and Rx Connectors



RF F Type Female

Conductor	Function
Inner	DATA
Outer	GND

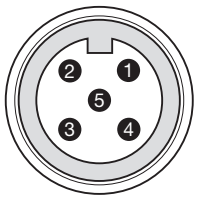
Antenna Connector



RF N Type Female

Conductor	Function
Inner	RX, TX, FSK, REFERENCE, POWER
Outer	GND

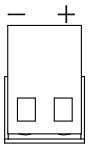
NMEA 2000 Input



Mini-C 5-Pin Male

Pin	Signal
1	N/C
2	N/C
3	N/C
4	NET-H (CAN-H)
5	NET-L (CAN-L)

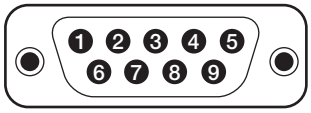
NMEA 0183 Input



2-Pin Terminal Block

Pin	Signal
-	HEADING GND
+	HEADING IN

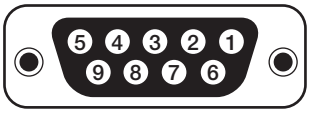
Modem Interface - RS232 & RS422 Connector



D-Sub 9-Pin Male

Pin	Signal
1	N/C
2	MODEM TX / MAX422 RX+
3	MODEM RX / MAX422 TX+
4	N/C
5	GND
6	N/C
7	MAX422 RX-
8	MAX422 TX-
9	N/C

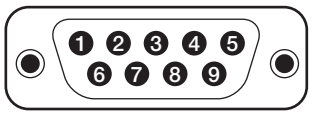
Modem Interface - Console Connector



D-Sub 9-Pin Female

Pin	Signal
1	GND
2	GPS_OUTA
3	MODEM_LOCK
4	MUTE 0
5	N/C
6	GPS_OUTB
7	EXM_AGC
8	MUTE 1
9	N/C

BUC Interface - RS232/RS422 Connector



D-Sub 9-Pin Male

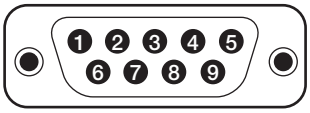
- For Ku-band - RS232

Pin	Signal
1	N/C
2	BUC RS232 RX
3	BUC RS232 TX
4	GND
5	GND
6	N/C
7	N/C
8	N/C
9	N/C

- For Ka-band (Optional) - RS422

Pin	Signal
1	BUC RS422 RX+
2	BUC RS422 RX-
3	BUC RS422 TX+
4	GND
5	GND
6	BUC RS422 TX-
7	BUC KEYLINE RX+
8	BUC KEYLINE RX-
9	N/C

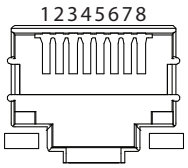
PC Interface - RS232 Connector



D-Sub 9-Pin Male

Pin	Signal
1	N/C
2	PC RX
3	PC TX
4	N/C
5	GND
6	N/C
7	IARM TO PC_ DBG_ TX
8	PC TO IARM_ DBG_ RX
9	N/C

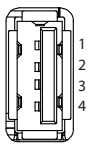
LAN Connectors (LAN 1~LAN 4)



RJ-45 Female

Pin	Signal
1	TX-
2	TX+
3	RX-
4	N/C
5	N/C
6	RX+
7	N/C
8	N/C

Wi-Fi Dongle Connector



USB A Female

Pin	Signal
1	+5 V
2	DATA-
3	DATA+
4	GND

6.5.3 Connecting Power to ACU

Connect the power cord from the power supply to the power connector (100~240 VAC) of ACU.

Figure 23: Connecting Power to ACU

6.5.4 Connecting ACU to Antenna

Connect an **Antenna RF cable (N to N)** (customer supplied) from the **ANTENNA (N) port** of the ACU to the **RF (N) port** of radome (antenna).

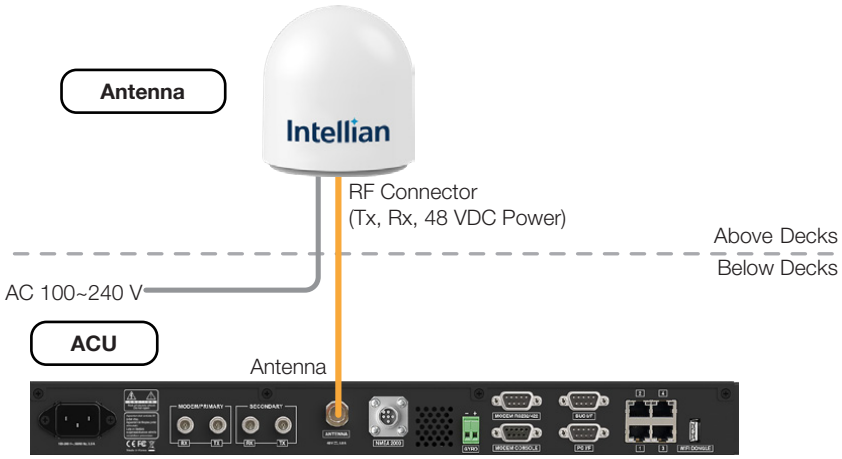


Figure 24: ACU to Antenna Cable Connection in Single Antenna System

6.5.5 Connecting ACU to Antenna in Dual Antenna System (Optional)

For the Dual Antenna System, the antenna system needs to be installed with two ACUs and two antennas.

1. Connect an **Antenna RF cable (N to N)** (customer supplied) from the **ANTENNA (N) port** of the Primary ACU to the **RF (N) port** of Primary Antenna.
2. Connect another **Antenna RF cable (N to N)** (customer supplied) from the **ANTENNA (N) port** of the Secondary ACU to the **RF (N) port** of Secondary Antenna.

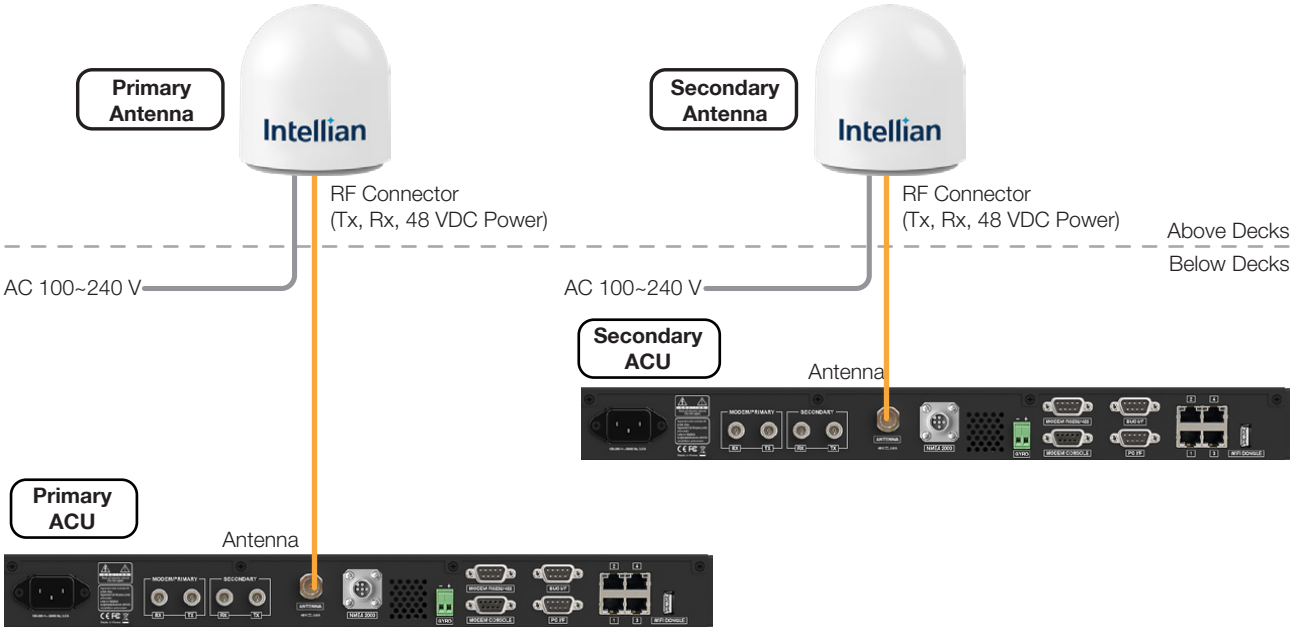


Figure 25: ACU to Antenna Cable Connection for Dual Antenna System

6.5.6 Connecting Primary/Secondary ACUs in Dual Antenna System (Optional)

For the Dual Antenna System, the antenna system needs to be installed with two ACUs and two antennas.

1. Connect a **RF cable (F to F)** from the **Secondary Rx (F) port** of the Primary ACU to the **Primary Rx (F) port** of Secondary ACU.
2. Connect another **RF cable (F to F)** from the **Secondary Tx (F) port** of the Primary ACU to the **Primary Tx (F) port** of Secondary ACU.
3. Connect an **Ethernet cable** between the **LAN 3 (RJ45) ports** of each Primary and Secondary ACUs.

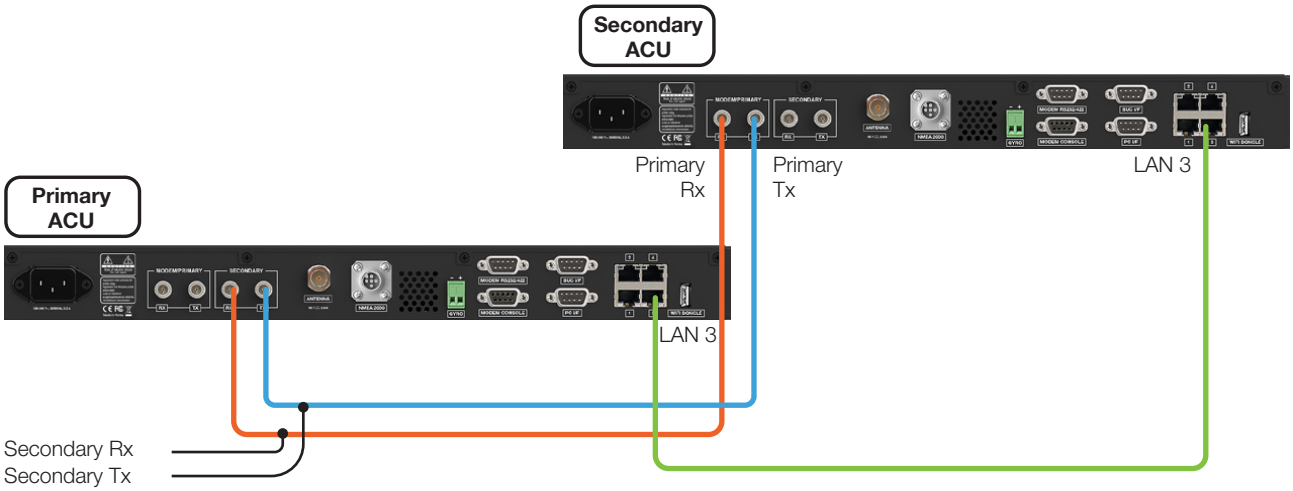


Figure 26: Primary and Secondary ACU Cable Connection in Dual Antenna System

6.5.7 Connecting ACU to Modem

1. Connect a **RF cable (F to F)** from the **MODEM Rx (F) port** of the ACU to the **Rx (F) port** of the modem.
2. Connect another **RF cable (F to F)** from the **MODEM Tx (F) port** of the ACU to the **Tx (F) port** of the modem.
3. Connect the **BUC Interface cable (DB-9 to RJ45)** from the **BUC I/F (DB-9) port** of the ACU to the **BUC I/O (RJ45) port** of the modem.
4. When using the OpenAMIP modem protocol, connect an **Ethernet cable** from the **LAN 1 (RJ45) port** of the ACU to a **LAN (RJ45) port** of the modem.

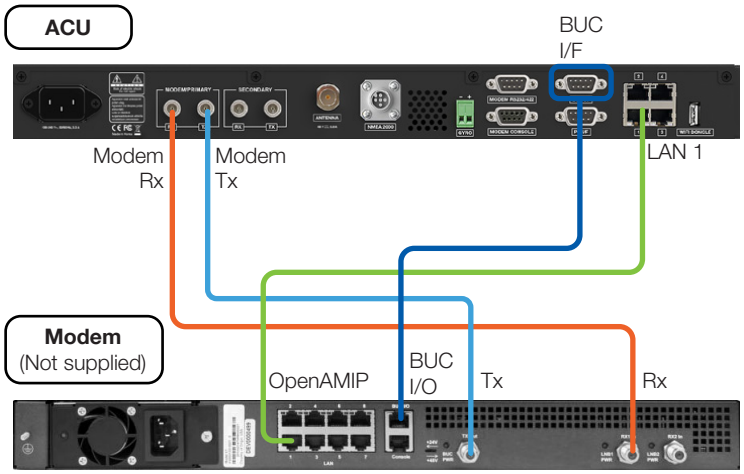


Figure 27: ACU to Modem Cable Connection

6.5.8 Connecting ACU to Switch Router

Connect an **Ethernet Cable** from the **LAN 2 (RJ45) port** of the ACU to a **LAN (RJ45) port** of the Switch Router.

Figure 28: ACU to Switch Router Cable Connection

6.5.9 Connecting ACU to Ship Gyrocompass

For satellite tracking, connect a gyrocompass used on ship to the antenna system through the gyrocompass interface of the ACU. Intellian ACU supports NMEA 0183 and NMEA 2000 gyrocompass inputs. If the gyrocompass has a different output standard, a compass converter should be used to supply the required NMEA input. The NMEA 2000 gyrocompass needs to be purchased separately. Refer to **"6.5.2 ACU Connector Pinout Guide" on page 39** for pin configuration.

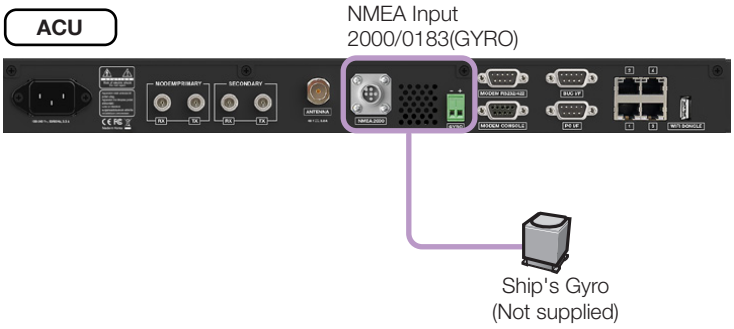
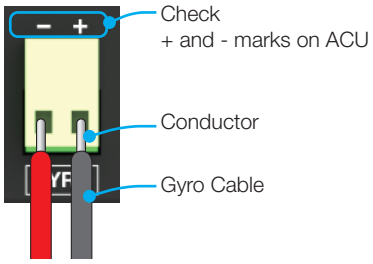


Figure 29: ACU to Ship's Gyrocompass Cable Connection

How to Connect NMEA 0183 Gyrocompass Cable

1. Using a Phillips screwdriver, loosen the two screw terminals by rotating them counterclockwise.
2. Strip wires up to 5 mm (0.2"). Do not solder the cables.
3. Insert conductor of gyro cable to the terminal block. The polarity of the terminal is indicated on the ACU with + and - marks. After checking the polarity, connect the cables correctly.



4. Fully tighten the screws by rotating them clockwise to clamp the wires securely.
5. Insert the terminal block with gyro cables to the **NMEA 0183(GYRO) port** of ACU.

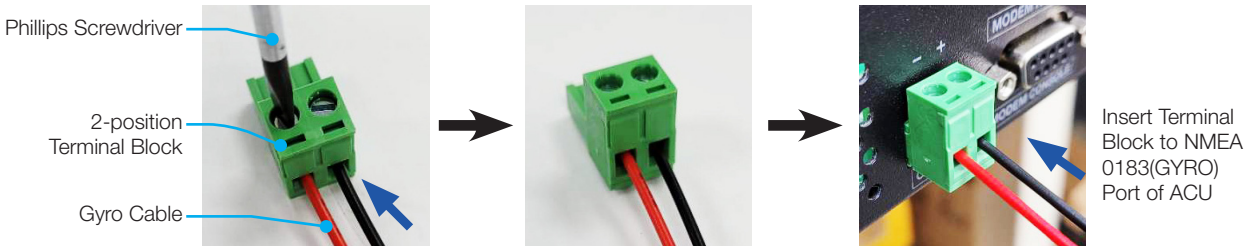


Figure 30: NMEA 0183 Gyrocompass Cable Connection

6.6 ACU to PC Communication Setup

You can establish the data communication between the Antenna Control Unit (ACU) and PC using one of the following methods.

6.6.1 TCP/IP Connection

Connection through Front Panel Management Port

The network is automatically configured by DHCP with no additional PC IP configuration.

1. Connect an Ethernet cable from the Management LAN port on the front panel of ACU to a LAN port of PC.
2. The network connection is established automatically.
3. Use the following IP address to access Intellian ***AptusNX*** page.

- **IP Address: 192.168.2.1 (Default)**

Figure 31: Front Panel Management LAN Port Connection

6.6.2 USB Connection

Using Right Side USB Port on ACU Front Panel

Connect a USB memory stick to the right side USB port on the front panel of ACU for the log download, backup/restore antenna settings, and firmware upgrade.

Using Left Side USB (Serial) Port on ACU Front Panel

Connect the supplied USB Cable (A to A) from the left side USB (serial) port on the front panel of ACU to PC for monitoring and controlling the antenna system.

NOTE

- The left side USB port is only for certified engineers' use only.
- Accessing AptusNX and iARM upgrade are NOT supported through the serial USB connection.

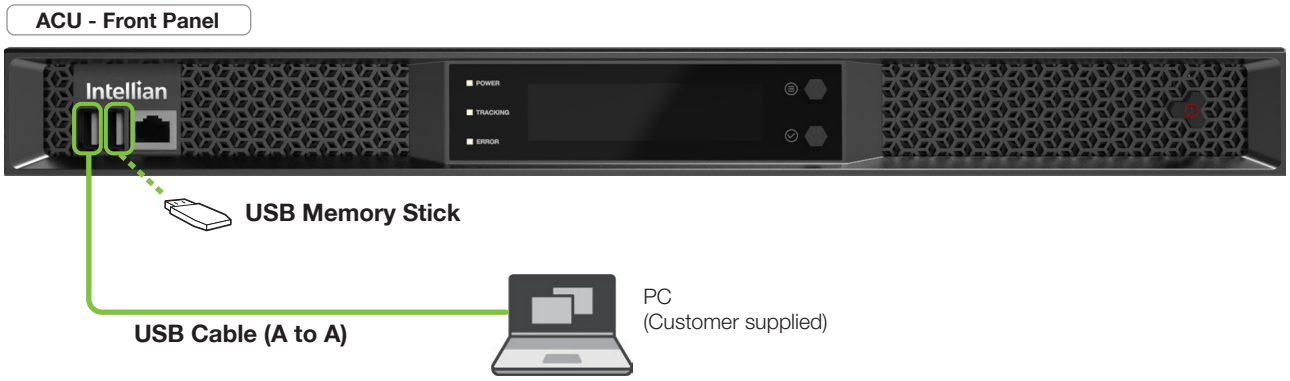


Figure 32: Front Panel USB Port Connection

6.6.3 Wi-Fi Connection

Connection through Wi-Fi Dongle

Intellian provides the Wi-Fi Dongle for Wi-Fi connection. You can connect PC to the ACU via Wi-Fi for easy management and control whenever you are on the vessel.

1. Connect an Ethernet cable from the Management LAN port on the front panel of ACU to a LAN port of PC. The network connection is established automatically.
2. Find the Wi-Fi Dongle from the ACU box. Plug the Wi-Fi Dongle into the USB port on the back panel of ACU.

Figure 33: Back Panel Wi-Fi Dongle Connection

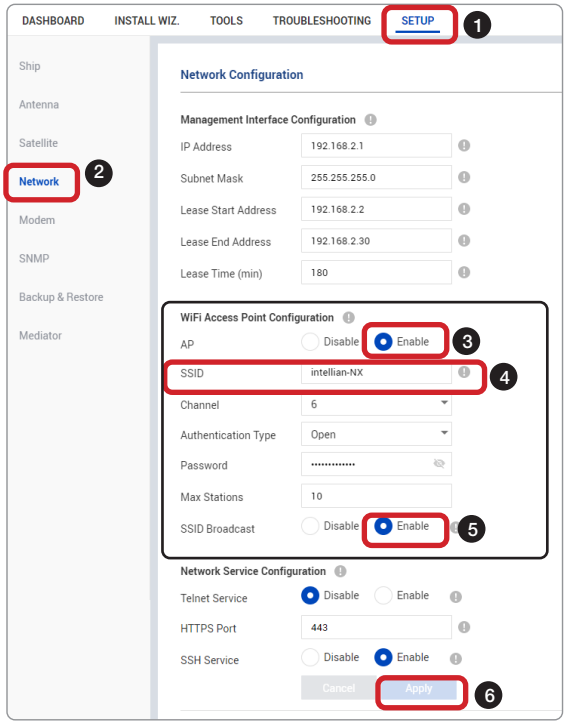
3. Use the following IP address to access Intellian AptusNX page.

- **IP Address: 192.168.2.1 (Default)**

4. Log into the AptusNX by typing in User Name and Password. If this system has not been changed from the factory default:

- **User Name: intellian**
- **Password: 12345678**

5. Select the **SETUP** on the main menu, then select the **Network** menu. Under the **Wi-Fi Access Point Configuration**, choose **Enable** for the **AP**. If you don't want to use Wi-Fi connection, choose **Disable** for the **AP**.
6. Check the **SSID** (Wi-Fi AP Name) information.
7. Choose **Enable** for the **SSID Broadcast** to show the **SSID** (Wi-Fi AP Name) information.
8. Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.
9. After a reboot, connect to the Wi-Fi.



Chapter 7. Operating Install Wizard

7.1 Turning On System

Make sure the antenna has a clear view of the sky. Press the **POWER** button on the front panel of the Antenna Control Unit (ACU), then wait a few minutes for system startup. Once the antenna finds the satellite, the **POWER** indicator will turn Green.

7.2 Accessing AptusNX

The network is automatically configured by DHCP with no additional PC IP configuration.

1. Connect an Ethernet cable from the Management LAN port on the ACU front panel to a LAN port of PC.
2. The network connection is established automatically.
3. Use the following IP address to access Intellian ***AptusNX*** page.

- **IP Address: 192.168.2.1 (Default)**

4. Log into the ***AptusNX*** by entering User ID and Password.

- **User ID: intellian (Default)**
- **Password: 12345678 (Default)**

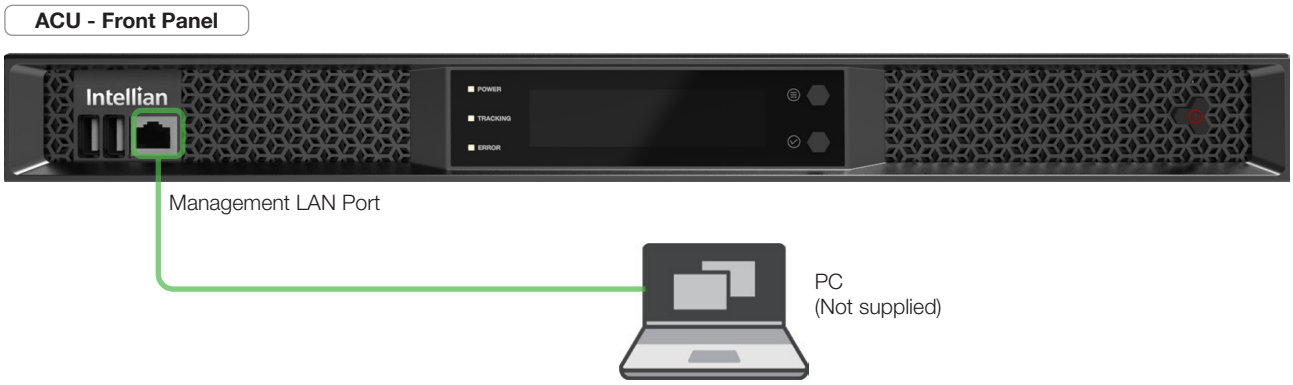
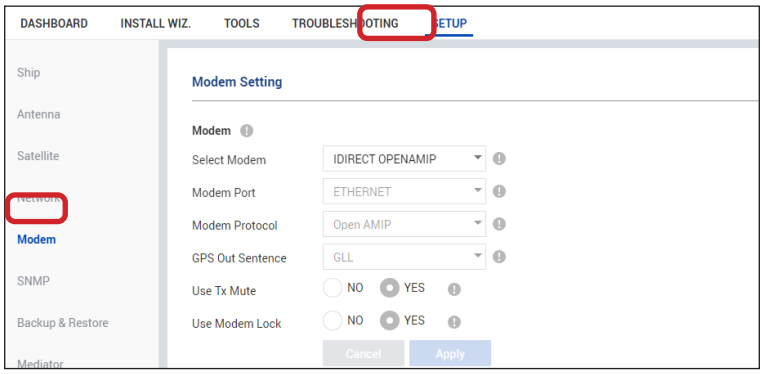


Figure 34: Front Panel Management LAN Port Connection

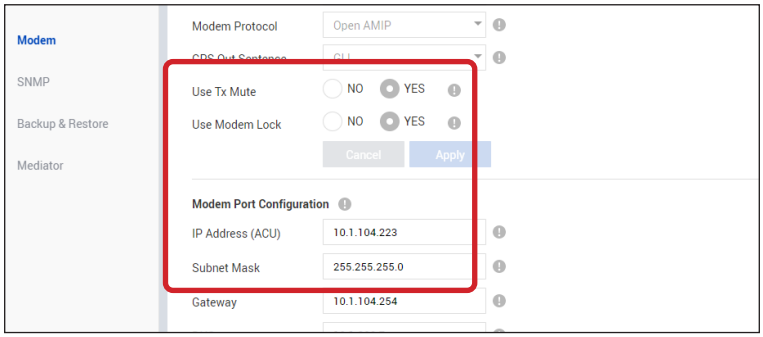
7.3 Modem Configuration

Before starting installation wizard, set up the modem configuration.

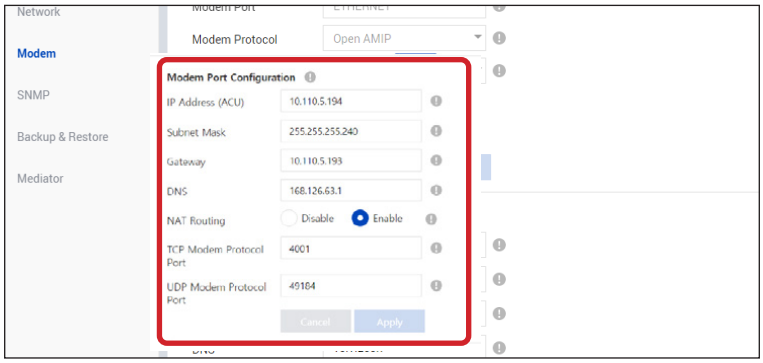
1. After accessing the ***AptusNX*** main page, go to the **SETUP ➔ Modem** on the main menu then follow these steps.



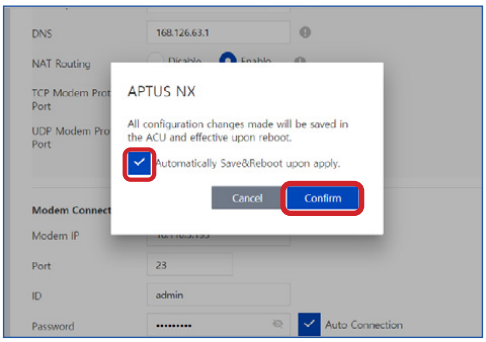
2. Select your modem type from the **Select Modem** drop-down list for loading a pre-configuration of modem. The setting parameters related to the modem interface will be set automatically once the modem type is selected. If you select **USER SETTING** from the **Select Modem** drop-down list, the settings can be changed manually. Click the **Apply** button.



3. Enter the modem setting values to configure the modem. Refer to the information provided by your service provider. Click the **Apply** button.



4. On the pop-up window, select the checkbox if you want the system to perform the **iARM Save & Reboot** automatically. Then, click the **Confirm** button.



5. Reboot the system.

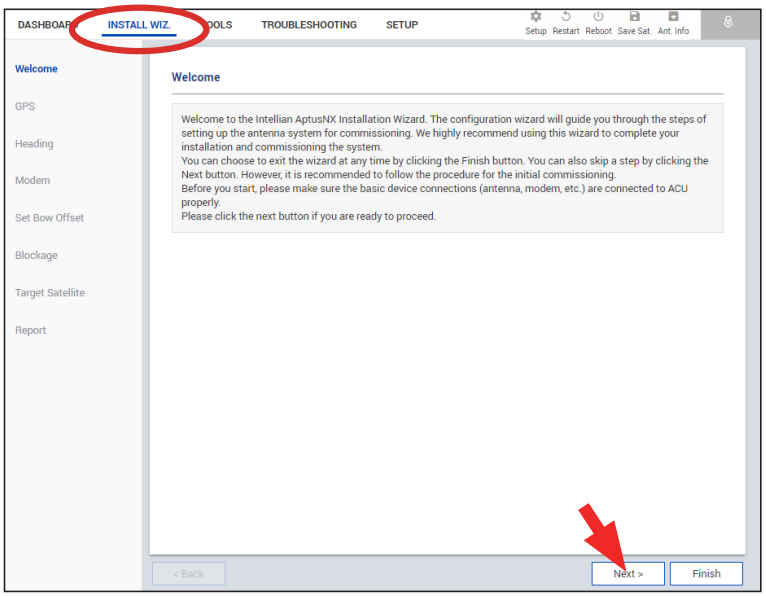
7.4 Starting Install Wizard

The Install Wizard will give you a guide by going through the steps of setup for the antenna system commissioning. We highly recommend using this wizard to complete the installation and commissioning of the system. You can exit the wizard at any time by clicking the **Finish** button. You can also skip steps by clicking the **Next** button. Before you start, make sure the basic devices (antenna, modem, etc) are connected to the ACU properly. After accessing the ***AptusNX*** main page, go to the **INSTALL WIZ.** on the main menu then follow these steps.

NOTE

Refer to **"Chapter 9. Using AptusNX" on page 73** for detailed description of each function.

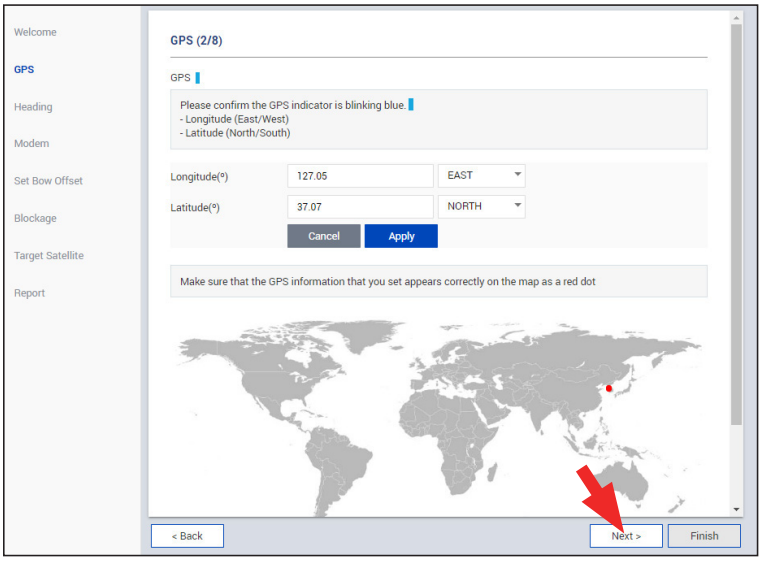
✓ Welcome Page



Welcome message is displayed.

Click the **Next** button.

✓ Step 1: GPS

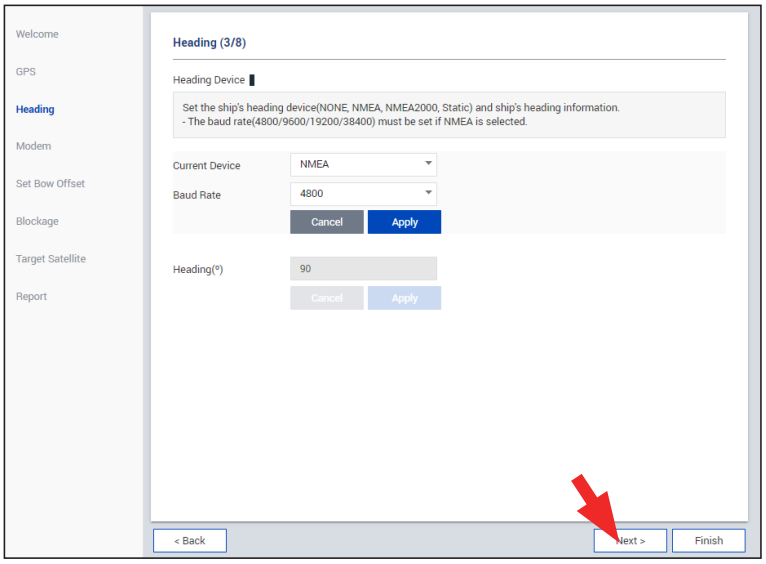


Set the GPS position of the vessel for the satellite searching. Check the GPS status connected to the antenna system. The colored indicator next to the title shows the GPS status. Make sure the GPS indicator is Blue (blinking).

- Blue (blinking): The system received a correct GPS signal.
- Red: The GPS signal is abnormal, or the received value is incorrect (Error).
- Black: The system has not received any GPS signal. You can enter the GPS value manually to set the GPS position.

Click the **Next** button to go to the next step.

✓ Step 2: Heading



Set the ship's heading device. The colored indicator next to the title shows the heading device connection status.

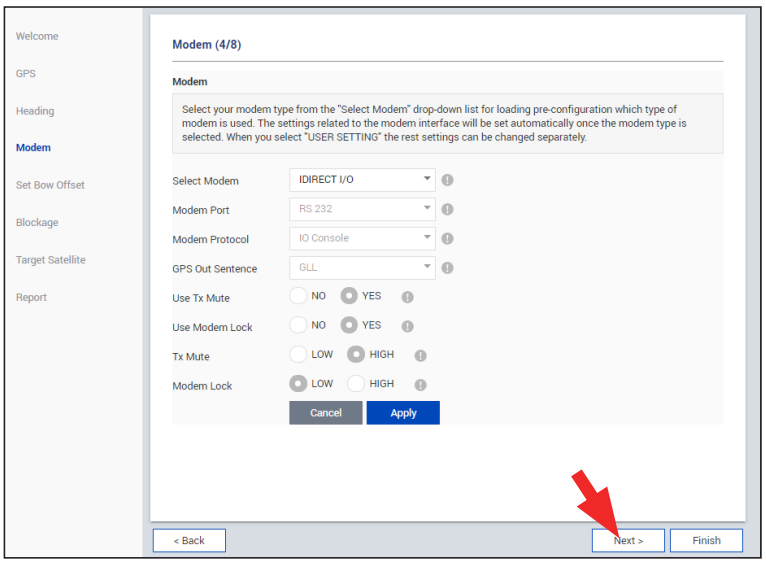
- Blue: Ship's heading device is connected.
- Black: Ship's heading device is not connected.

If a gyrocompass is connected, choose the device type from the **Current Device** drop-down list. Then, click the **Apply** button. If no gyrocompass is connected, choose **NONE** for the **Current Device** from the drop-down list. Then, click the **Apply** button.

NOTE: Skip "Step 4: Set Bow Offset" if no gyrocompass is connected.

Click the **Next** button to go to the next step.

✓ Step 3: Modem



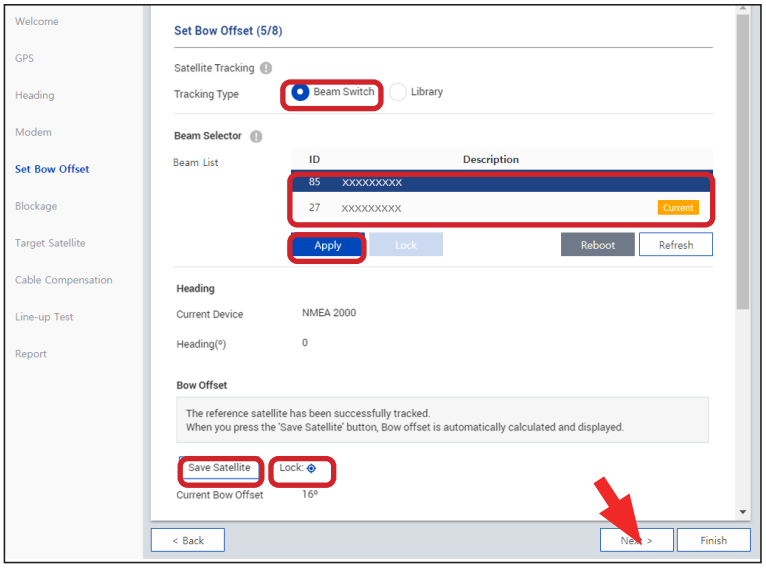
Select your modem type from the **Select Modem** drop-down list for the modem configuration. The setting parameters related to the modem interface will be set automatically once the modem type is selected. If you select **USER SETTING** from the **Select Modem** drop-down list, the settings can be changed manually.

Click the **Next** button to go to the next step.

✓ Step 4: Set Bow Offset

For setting BOW offset, select one of two satellite tracking types and a trackable satellite.

(Option 1: Using Beam Switch Type)



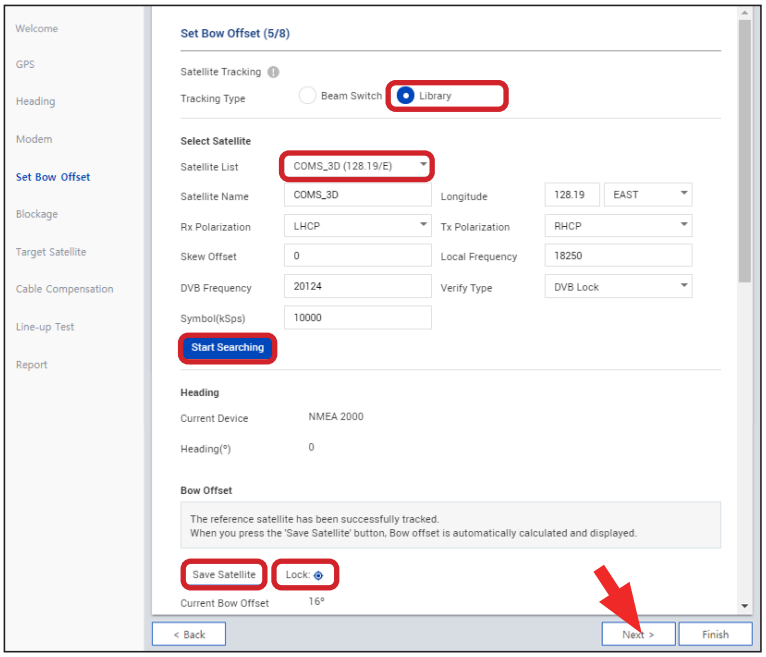
- **Step 1**: Choose the **Beam Switch** for the **Tracking Type**.
- **Step 2**: Select a satellite under the Beam List, then click the **Apply** button.

Wait while the antenna terminal tracks the satellite.

- **Step 3**: Make sure the **Lock** is on**,** then click the **Save Satellite** button in the **Bow Offset** menu to save the BOW offset information to ACU.

Click the **Next** button to go to the next step.

(Option 2: Using Library Type)



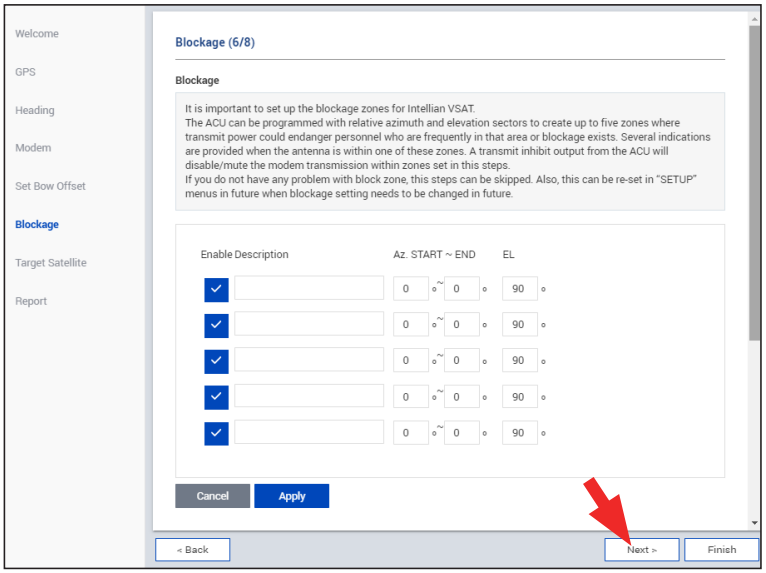
- **Step 1**: Choose the **Library** for the **Tracking Type**.
- **Step 2**: Select a satellite under the **Satellite List**, then click the **Start Searching** button.

Wait while the antenna terminal tracks the satellite.

- **Step 3**: Make sure the **Lock** is on**,** then click the **Save Satellite** button in the **Bow Offset** menu to save the BOW offset information to ACU.

Click the **Next** button to go to the next step.

✓ Step 5: Blockage



It is important to set up the blockage zones for Intellian VSAT. The VSAT system can be programmed with relative azimuth and elevation sectors to create up to five zones for the transmission mute. The **AZ START** is the relative azimuth angle where the blockage starts, and the **AZ END** is the relative azimuth angle where the blockage ends (Range: 0 ~ 360). The **EL** is the elevation angle where the blockage is set (Range: 0 ~ 90). The blockage is activated below the elevation angle.

Click the **Next** button to go to the next step.

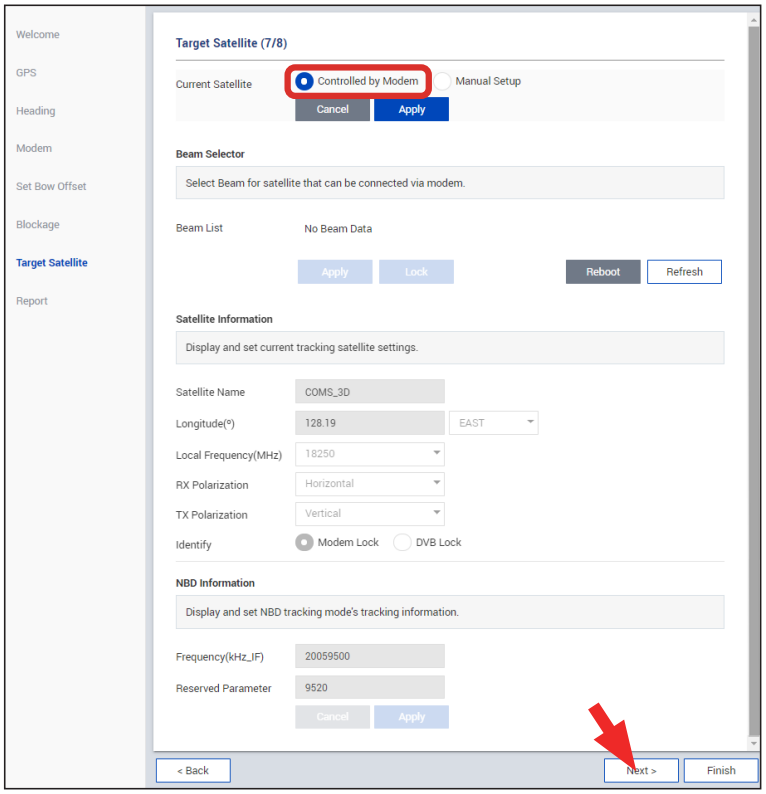
✓ Step 6: Target Satellite

Set the target satellite to track. There are two methods for selecting a target satellite.

NOTE

The following images in this step show when the system is using the Open AMIP modem.

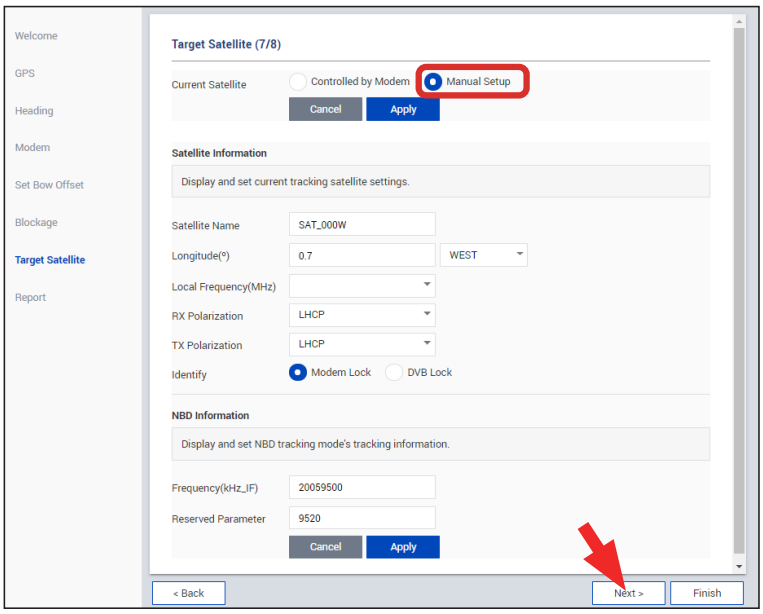
(Option 1: Using Satellite Controlled by Modem)



This method is generally recommended. After setting the modem connection in the **"Step 3: Modem"**, select the **Controlled by Modem** for the **Current Satellite**. Then, the current satellite and NBD information will be displayed automatically.

Click the **Next** button to go to the next step.

(Option 2: Using Manual Setup)



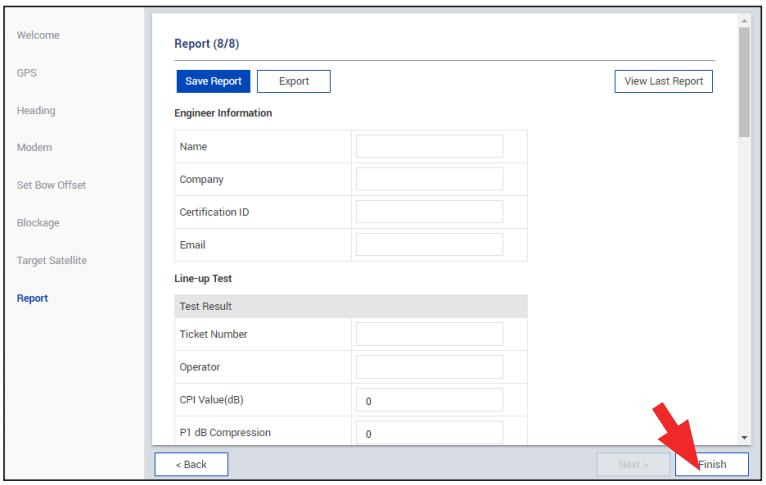
If you did not set the modem connection, select the **Manual Setup** for the **Current Satellite**. Then enter the satellite and NBD information manually to track a satellite. Click the **Apply** button.

Click the **Next** button to go to the next step.

✓Step 7: Report

NOTE

The following image shows when the system is using the Open AMIP modem.
In case of using other modems, the displayed items on the Report may change.



The configuration report is displayed.

You can save the results to the ACU by clicking the **Save Report** button and download the report file (.json) by clicking the **Export** button. Click the **View Last Report** button to check the recently saved report information including the saved date and time.

After complete the steps, click the **Finish** button.

Chapter 8. Operating ACU

8.1 ACU Front Panel View

The following figure shows the ACU front panel.

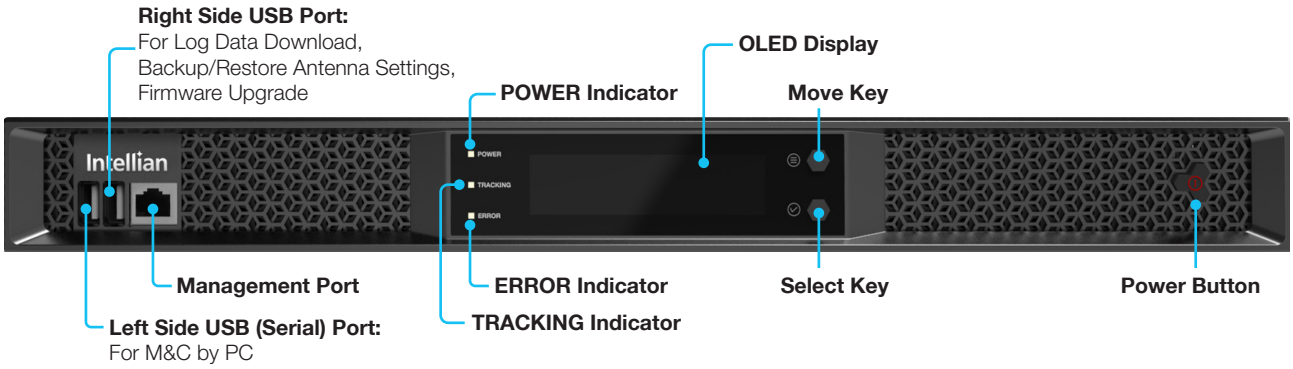


Figure 35: ACU Front Panel View

The following table shows the function of each touch key.

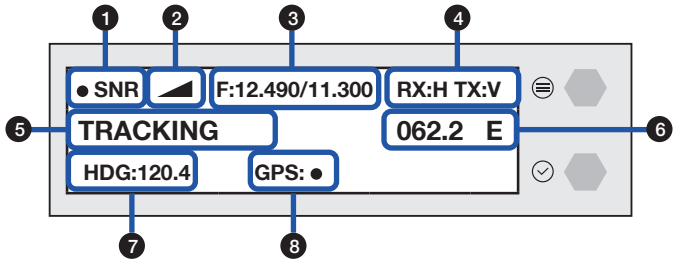
Touch key	Function
Power Button	Powers on/off the ACU.
Move Key	Moves to the desired screen.
Select Key	Selects the desired screen.

The following table shows status indicators on the ACU.

LED Display	Color	Description
POWER	Steady Green	The ACU is powered on.
	Off	The ACU is powered off.
ERROR	Steady Red	The antenna is in error.
TRACKING	Steady Green	The antenna is in tracking mode.

8.2 ACU Display Menu

The following figure shows the ACU display menu.

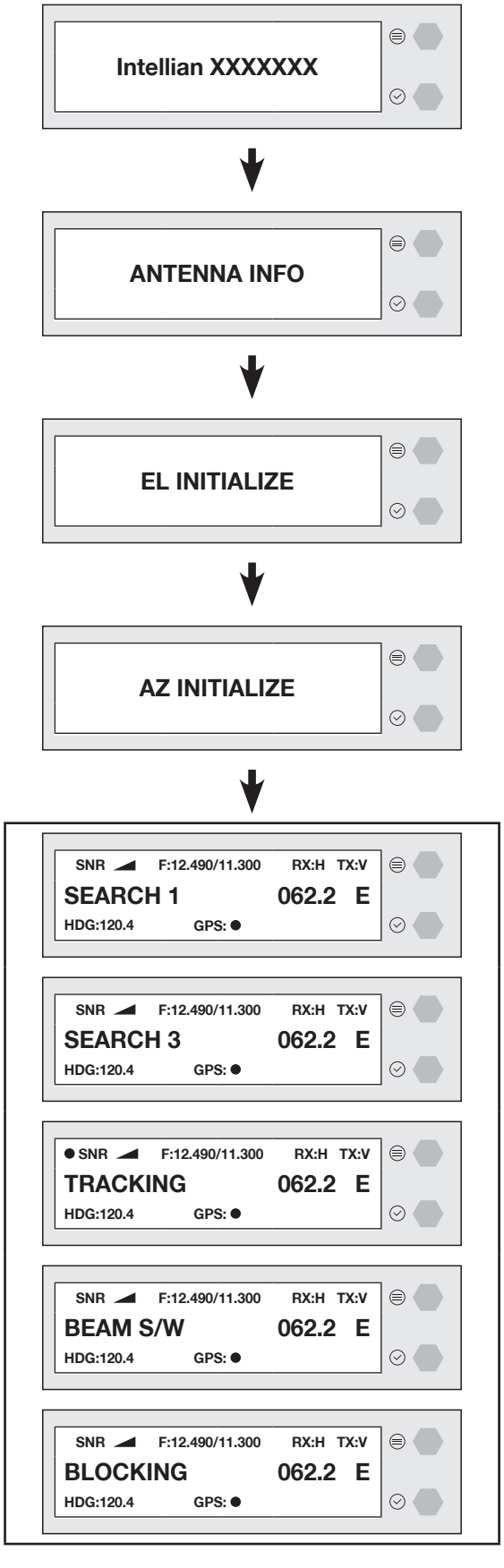


The following table shows the function of each touch key.

No.	Item	Description
①	Satellite Lock	Displays the satellite lock status.
②	Signal Level	Displays the antenna signal level.
③	Frequency Information (Target/LNB Local)	Displays the frequency information (Target / LNB Local).
④	Polarization	Displays the Rx/Tx polarization (H: Horizontal / V: Vertical).
⑤	Antenna Status	Displays the antenna status (Tracking / Search / Setup).
⑥	Target Satellite	Displays the target satellite (E: East / W: West).
⑦	Heading Information	Displays heading information (e.g. gyrocompass).
⑧	GPS Lock	Displays the GPS lock status.

8.3 Startup

With the system is installed and power is applied, the ACU display will show the following sequence.



✓ **Startup**

Intellian's model name is displayed.

✓ **Initialize Antenna Information**

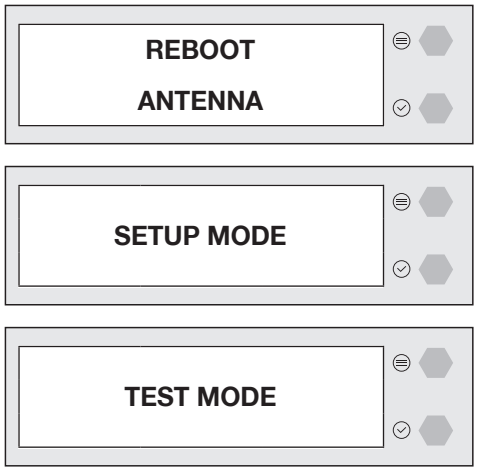
✓ **Initialize Elevation Angle**

✓ **Initialize Azimuth Angle**

✓ **Antenna's Status**

Search 1 (Global Search), Search 3 (Local Search), Tracking, Beam Switching, Blocking

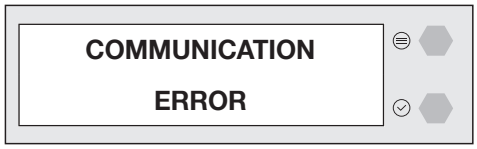
When the antenna is controlled by AptusNX, the ACU displays the control mode status.



✓ **Control Mode Status**

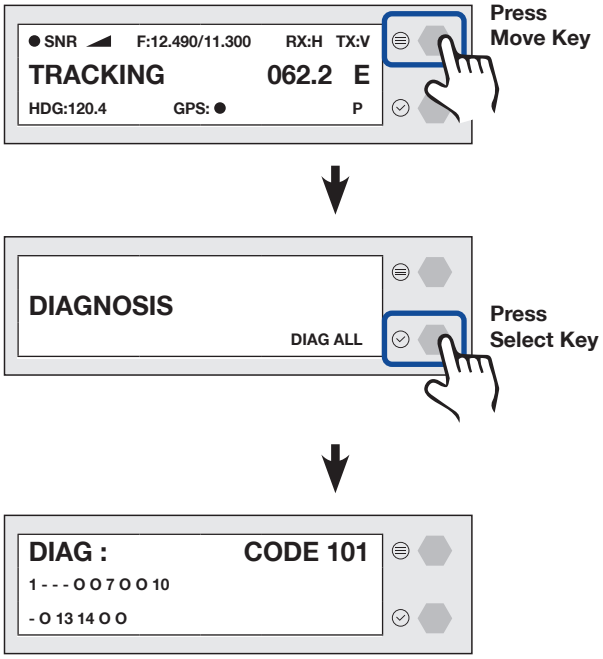
Reboot Mode, Setup Mode, Test Mode

If the antenna does not communicate with ACU, the **COMMUNICATION ERROR** is displayed.



8.4 Diagnosis

Executes antenna Diagnosis test and shows the real-time diagnosis result.

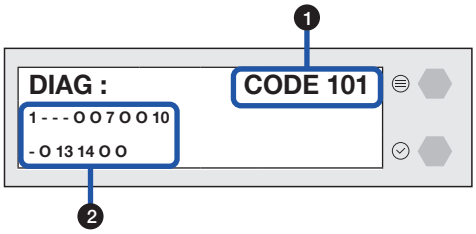


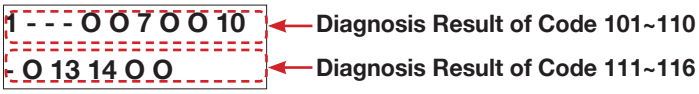
✓ **Main Display**

✓ **Diagnosis Display**

✓ **Diagnosis Result Display**

Refer to the diagnosis codes for the test results.

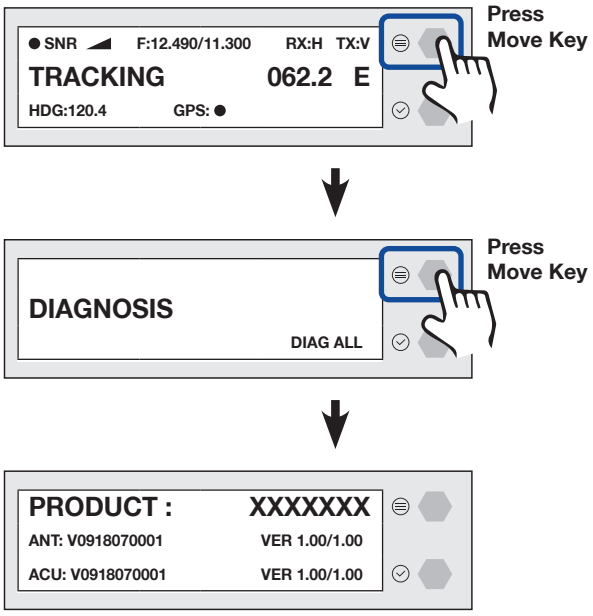


<table>
<tr><th>No.</th><th>Item</th><th>Description</th></tr>
<tr><td>①</td><td>Diagnosis Code</td><td>Displays the diagnosis code.
<table>
<tr><th>Code</th><th>Test</th></tr>
<tr><td>101</td><td>The data communication between the antenna and the ACU is tested.</td></tr>
<tr><td>102</td><td>The azimuth axis is tested.</td></tr>
<tr><td>103</td><td>The elevation axis is tested.</td></tr>
<tr><td>104</td><td>The cross-level axis is tested.</td></tr>
<tr><td>105</td><td>Not Available</td></tr>
<tr><td>106</td><td>Not Available</td></tr>
<tr><td>107</td><td>The rate sensor is tested.</td></tr>
<tr><td>108</td><td>Not Available</td></tr>
<tr><td>109</td><td>Not Available</td></tr>
<tr><td>110</td><td>The LNB / NBD is tested.</td></tr>
<tr><td>111</td><td>The LNB pol motor is tested.</td></tr>
<tr><td>112</td><td>Not Available</td></tr>
<tr><td>113</td><td>The antenna power is tested.</td></tr>
<tr><td>114</td><td>The ACU power is tested.</td></tr>
<tr><td>115</td><td>Not Available</td></tr>
<tr><td>116</td><td>The home sensor is tested.</td></tr>
</table></td></tr>
<tr><td>②</td><td>Diagnosis Result</td><td>• An example of diagnosis result:
 

- ' - ' : The test was passed.
Code 102, 103, 104 and 111 were passed.
- Last 1 or 2 digits of diagnosis code : The test was failed.
Code 101, 107, 110, 113 and 114 were failed.
- ' O ' : The test was not performed.
Code 105, 106, 108, 109, 112, 115 and 116 were not performed.</td></tr>
</table>

8.5 Antenna Information

Displays the Antenna/ACU serial number, PCU/STAB/ACU/i-ARM Version of the product.



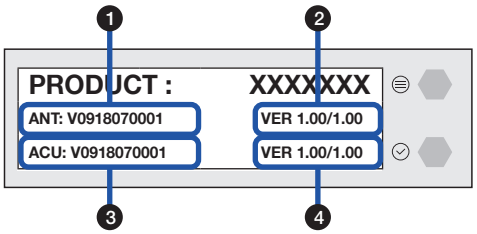
✓ **Main Display**

✓ **Diagnosis Display**

✓ **Antenna Information Display**

Product model name and antenna/ACU serial numbers are displayed.

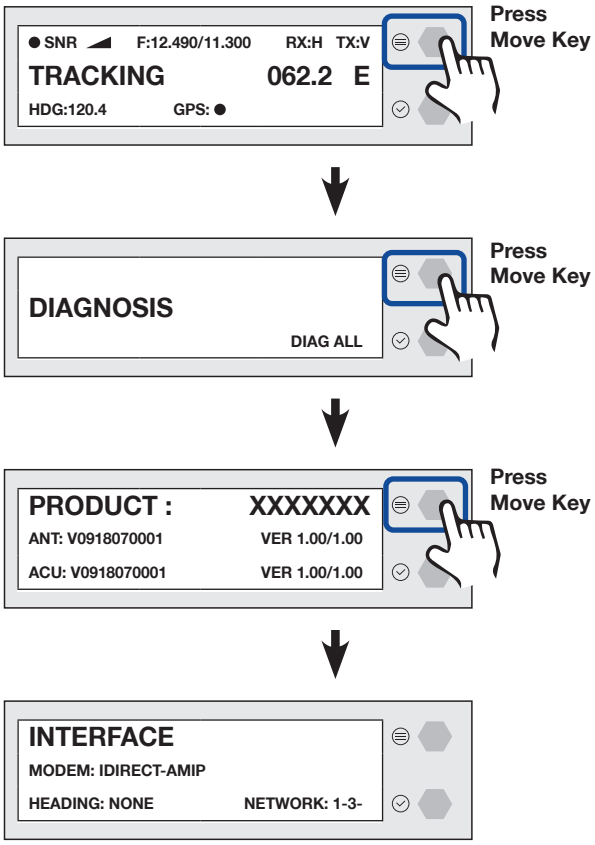
Refer to the Antenna Information display.



No.	Item	Description
①	Antenna Serial Number	Displays the Antenna serial number. The serial number is displayed depending on the product.
②	PCU Version/ STAB Version	Displays the PCU version / Stabilizer version.
③	ACU Serial Number	Displays the ACU serial number. The serial number is displayed depending on the product.
④	ACU Version/ i-ARM Version	Displays the ACU version / i-ARM version.

8.6 Interface Information

Displays the modem/heading type in use and the network connection status.



✓ **Main Display**

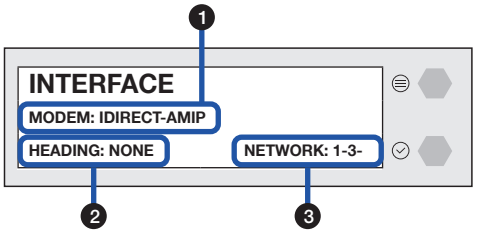
✓ **Diagnosis Display**

✓ **Antenna Information Display**

Product model name and antenna/ACU serial numbers are displayed.

✓ **Interface Information Display**

Refer to the Interface Information.



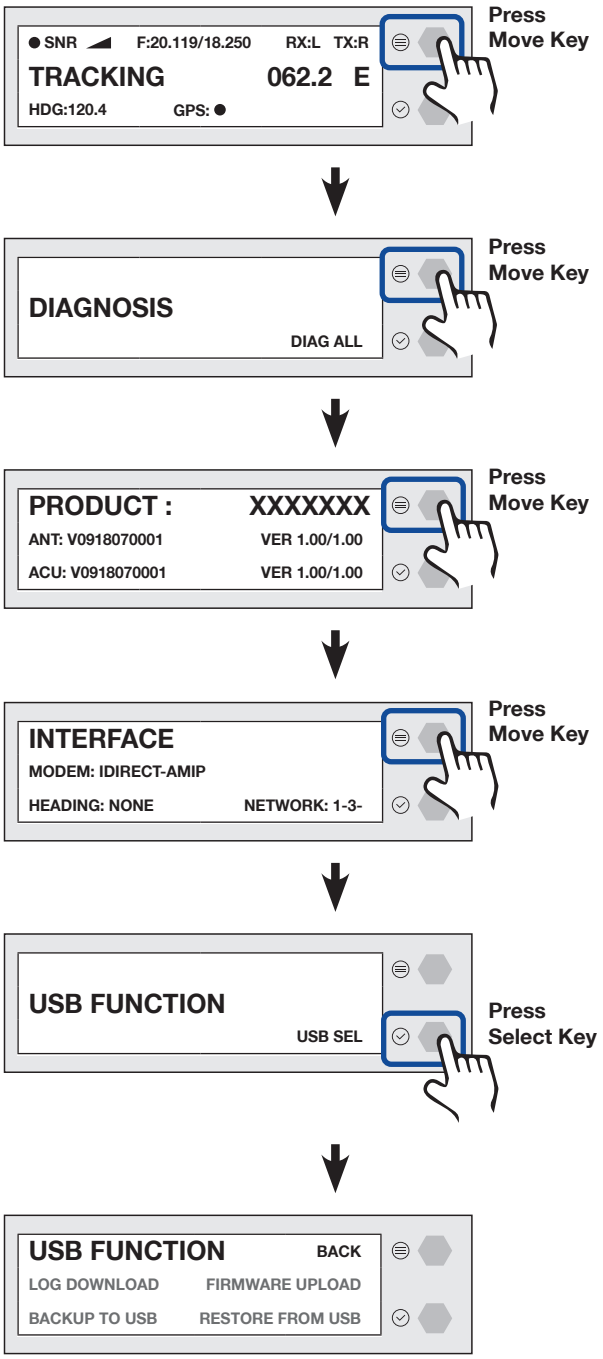
No.	Item	Description
①	MODEM	Displays the modem type in use. (IDIRECT-AMIP, SATLINK-SERIAL, IDIRECT I/O, SATLINK-VACP, NEWTEC AMIP, COMTECH I/O, ELEKTRIKOM AMIP, USER SETTING, COMTECH ROSS, GILAT-SE-II, HUGHES, IP STAR)
②	HEADING	Displays the heading type in use (NONE, NMEA0183, STATIC, NMEA2000).
③	NETWORK	Displays the network connection status with the ACU. • An example of network result: 1-3- - ' - ' : the network is not connected. - ' 1~4 ' : the number (1~4) of connected ACU port to network.

8.7 USB Function

To use this function, a USB Memory Stick must be connected to the USB port (the right side USB port on the front panel of the ACU). The USB Function supports the four menus (Log Download, Firmware Upload, Backup To USB, Restore From USB). For detailed information about each function, refer to the next page.

NOTE

The USB function is activated only when a memory stick is detected on the front panel USB port (right side).



✓ **Main Display**

✓ **Diagnosis Display**

✓ **Antenna Information Display**

Product model name and antenna/ACU serial numbers are displayed.

✓ **Interface Information Display**

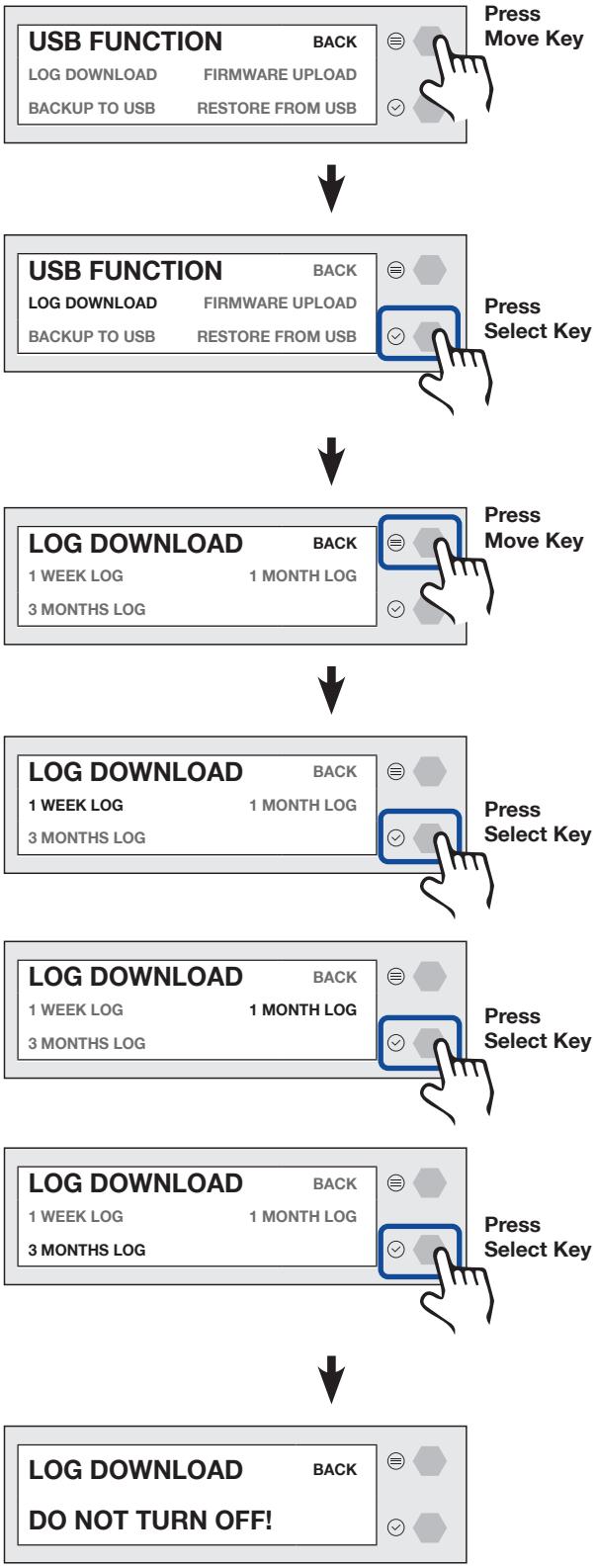
✓ **USB Function Display**

The USB function is activated only when a memory stick is detected on the front panel USB port (right side).

✓ **USB Function Menu Display**

8.7.1 Log Download

Downloads all data logs to the USB memory stick



✓ **USB Function Menu Display**

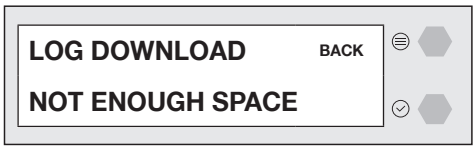
✓ **Log Download Menu Display**

✓ **Download Log File to USB**

Select one of three options: 1 WEEK LOG / 1 MONTH LOG / 3 MONTHS LOG.

✓ **Download Process Display**

If there is not enough free space on the USB drive, **NOT ENOUGH SPACE** message is displayed.

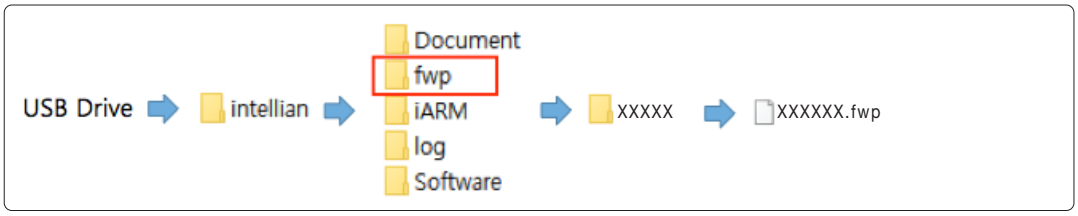


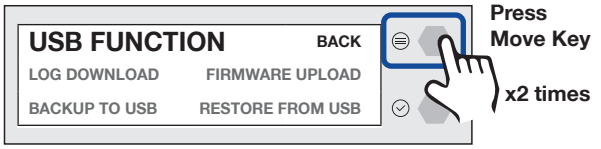
NOTE

If you want to go back to the previous screen, select the **BACK** option then press the **Select** key.

8.7.2 Firmware Upload

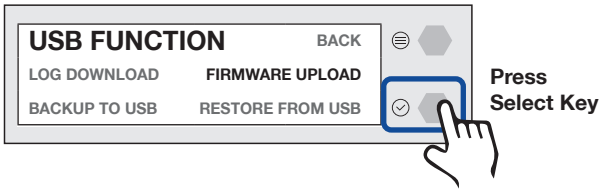
To use Firmware Upload function, you must follow the folder structure guide to configure the folders properly. It supports up to FAT32. The antenna system is upgraded with the FWP file in the designated folder of a USB memory stick.



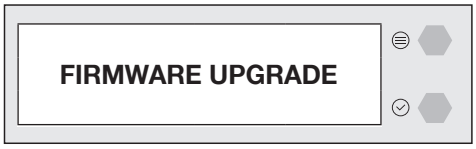


Press Move Key x2 times

✓ **USB Function Menu Display**



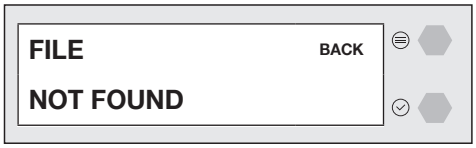
Press Select Key



✓ **Upgrade Firmware to Antenna System**

If the firmware file in USB is in invalid format, **INVALID FILE FORMAT** message is displayed.

If any firmware file is not available on the USB drive, **FILE NOT FOUND** message is displayed.

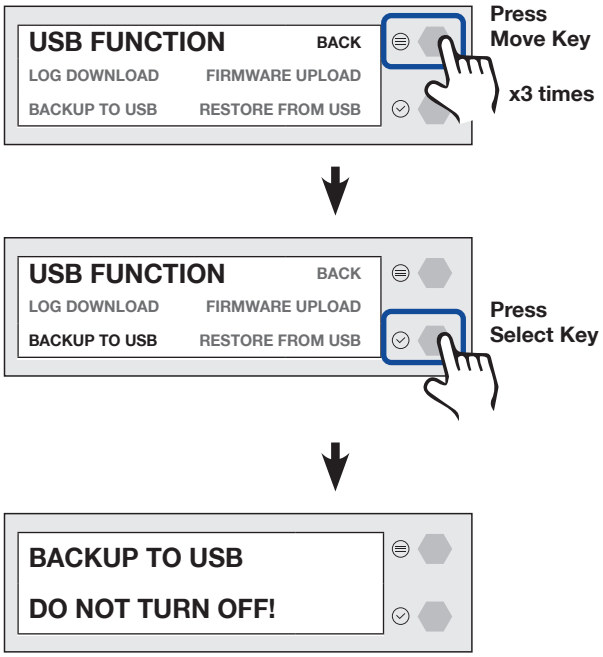


NOTE

If you want to go back to the previous screen, select the BACK option then press the Select key.

8.7.3 Backup to USB

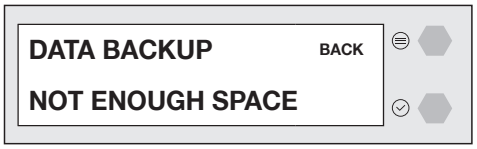
Backs up the antenna setting files to the USB.



✓ **USB Function Menu Display**

✓ **Back up Antenna Setting files to USB**

If there is not enough free space on the USB drive, **NOT ENOUGH SPACE** message is displayed.

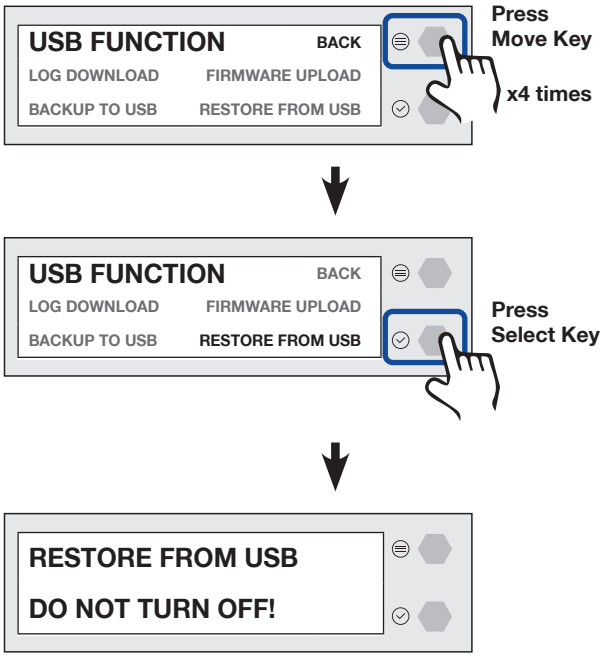


NOTE

If you want to go back to the previous screen, select the **BACK** option then press the **Select** key.

8.7.4 Restore From USB

Restores the antenna setting by using the setting files saved in USB.



✓ **USB Function Menu Display**

✓ **Restore Antenna Setting files**

NOTE

If you want to go back to the previous screen, select the **BACK** option then press the **Select** key.

Chapter 9. Using AptusNX

9.1 Introduction

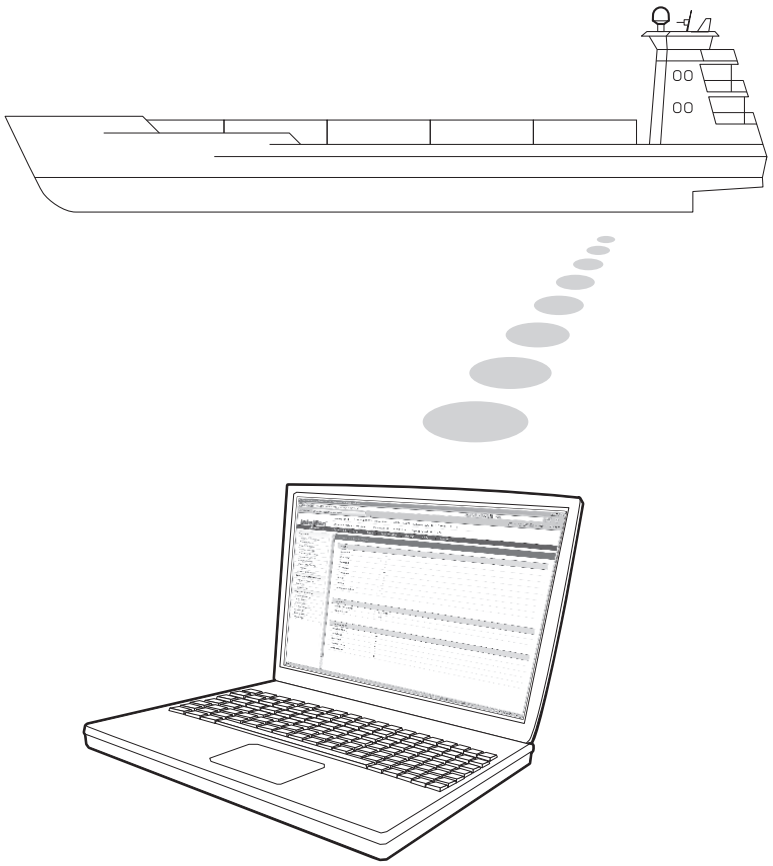
With the embedded ***AptusNX*** software, the antenna can be monitored, controlled, and diagnosed remotely from anywhere, anytime through TCP/IP protocol. It saves your time and cost generated by various maintenance activities such as operating firmware upgrades, tracking parameter resets, and system diagnosis, etc..

9.2 Accessing AptusNX for ACU

1. Connect an Ethernet cable from the Management LAN port on the front panel of the ACU to a LAN port of PC. This method is generally recommended.
2. Enter the ACU IP address (**Default: 192.168.2.1**) into the address bar of web browser to login into the internal HTML page of ACU.

NOTE

AptusNX works on Internet Explorer 11 or higher (Windows 7 or higher editions), Firefox, Microsoft Edge and Chrome web browsers.

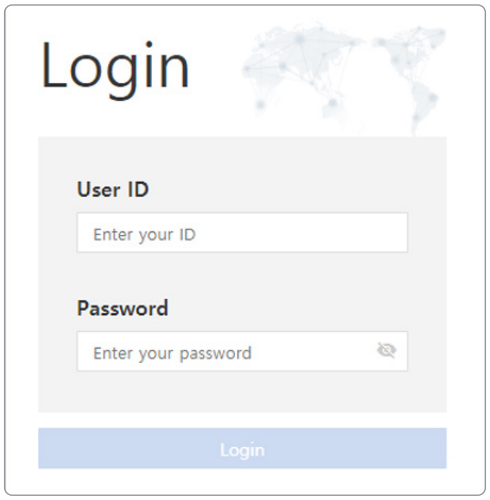


9.3 Main Page (Page Login)

The Intellian software Aptus provides different user access levels to protect the system for safe operation. Depending on the user level, the accessible range of function in the software can be limited.

Log into the ACU by typing in User ID and Password. The followings are the factory default values.

User Type	User ID	Password	Access Authority
Admin	**intellian**	**12345678**	All menus for monitoring and setting
	captain	**12345678**	All menus for monitoring and setting Assigns permissions to users
User	**guest**	**guest**	Limited menus for monitoring (Dashboard, Tools, Troubleshooting)

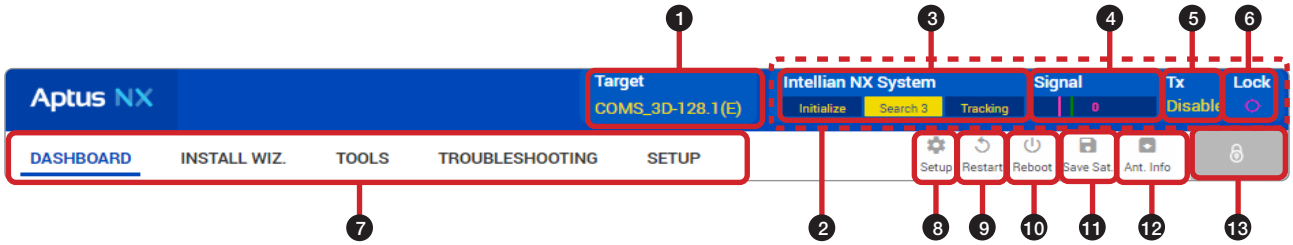


NOTE

After entering with the default password, the user must change the default password to a new password for security.

9.4 Top Menus

Once you log in, the following information and menus are displayed.



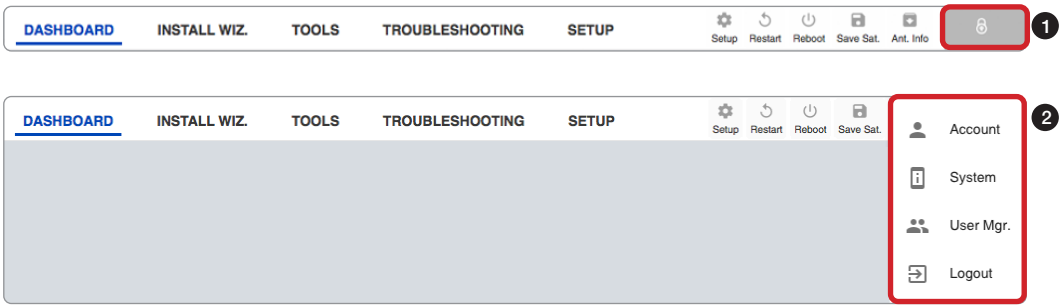
No.	Item	Description
①	Target Satellite	Displays the name of the targeted satellite.
②	Quick Status Screen Area	When clicking this top menu area (marked as red dots), the "Quick Status Screen" appears. You can quickly monitor each status of the five items (Enable Mode, Blockage, Pointing, Modem Lock, LNB Rotate) through the screen (Blue: enable, Black: disable).  <Quick Status Screen>
③	Antenna Status Info	Displays the antenna status through a yellow indicator in the SETUP mode. • Initialize: The antenna system is initialized. • Searching: The antenna is searching the target satellite. • Tracking: The antenna is tracking the target satellite.
④	Signal Level	Displays the current signal level.
⑤	Tx Status	Displays whether the antenna is able to transmit data or not.
⑥	Lock	Displays whether the satellite is locked or not.
⑦	Main Menu	Selects the Main Menu (DASHBOARD, INSTALL WIZ, TOOLS, TROUBLESHOOTING, SETUP). Each main menu offers side menus on the left of the screen.
⑧	Setup	Enters the setup mode to modify settings. The following functions are available only in setup mode.

Main Menu	Side Menu	Function
SETUP	Antenna	Antenna Angle
		Dish Scan Range Check
		Sensor Calibration • Tilt Sensor Bias • Rate Sensor Bias
		Antenna Mode • Set Idle Mode
	Backup & Restore Setting	Antenna Restore

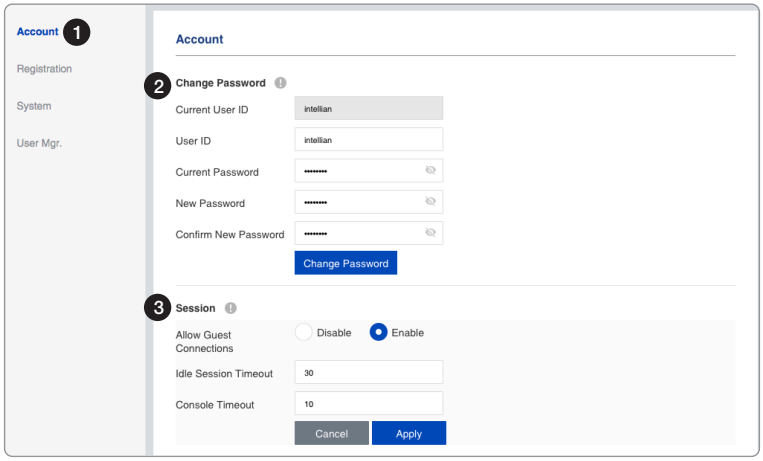
⑨	Restart	The antenna system exits the Setup mode and switches to the normal mode (Searching/Tracking mode).
⑩	Reboot	The antenna system powers off and restarts. After system initialization, the antenna switches to normal mode (Searching/Tracking mode).
⑪	Save Sat.	Saves current satellite settings. Bow offset will be adjusted and saved automatically.
⑫	Ant. Info	Obtains current antenna information.
⑬	Account Button	Click the button to manage the user account The **Account**, **System**, and **User Mgr**. menus are for the user management. Click the **Logout** button to log-out of the ***AptusNX*** web page.

9.5 Account Menu

1. Click the button to manage the user account
2. The **Account**, **System**, and **User Mgr.** menus are for the user management. Click the **Logout** button to log- out of the ***AptusNX*** web page.

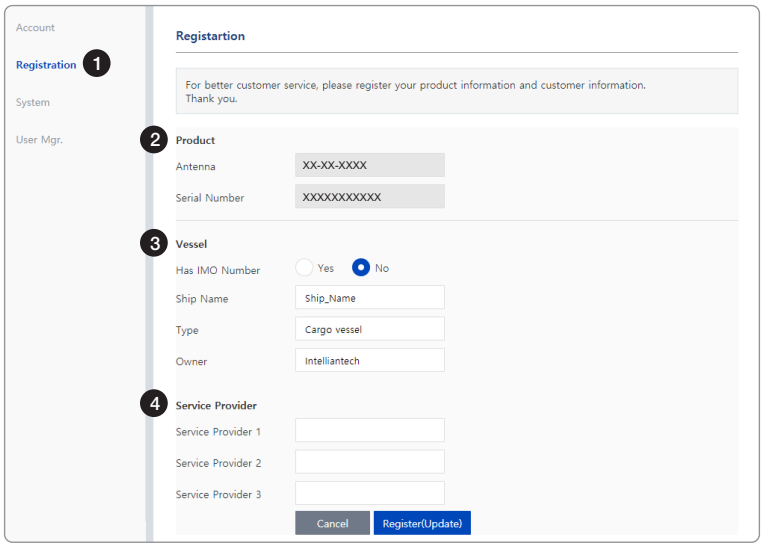


9.5.1 Account



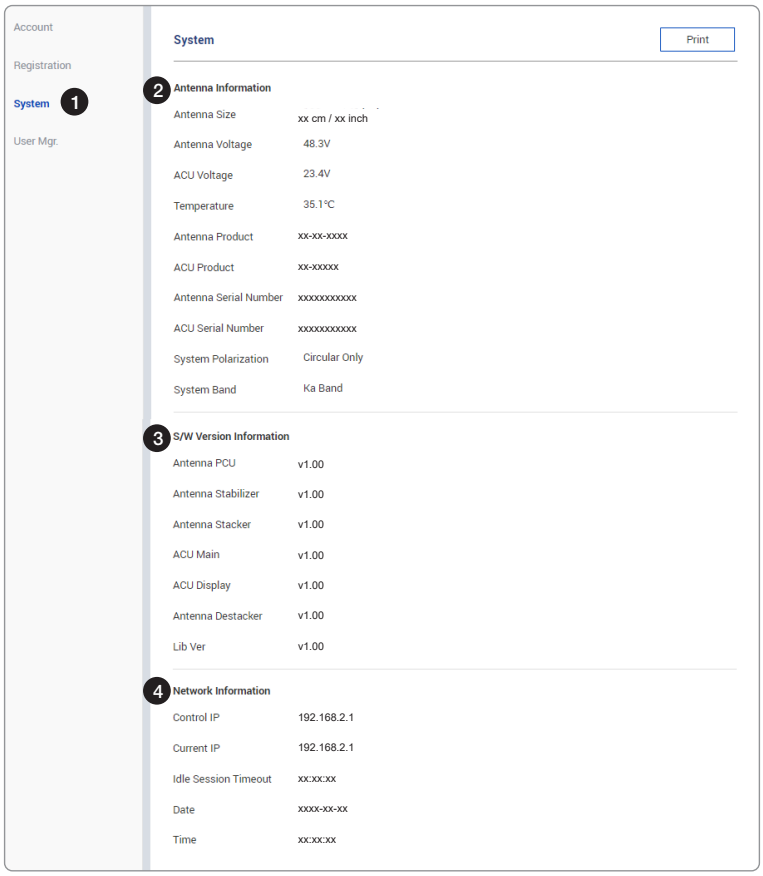
No.	Item	Description
①	Account	Updates your password and sets timeout.
②	Change Password	You can change your password. • Current User ID: Displays your user ID. • User ID: Enter the current user ID. • Current Password: Enter the current password. • New Password: Enter the new password. • Confirm New Password: Re-enter the new password to verify that it was entered correctly. Click the **Change Password** button to set the password to the new password. For the next login, the new password is required.
③	Session	You can give guests the accessibility to the AptusNX and set time-outs. • Allow Guest Connections: Select the guest's accessibility to the system (Disable / Enable). • Idle Session Timeout: Set the idle session time-out. • Console Timeout: Set the console time-out. Click the **Apply** button to apply the settings to the system.

9.5.2 Registration



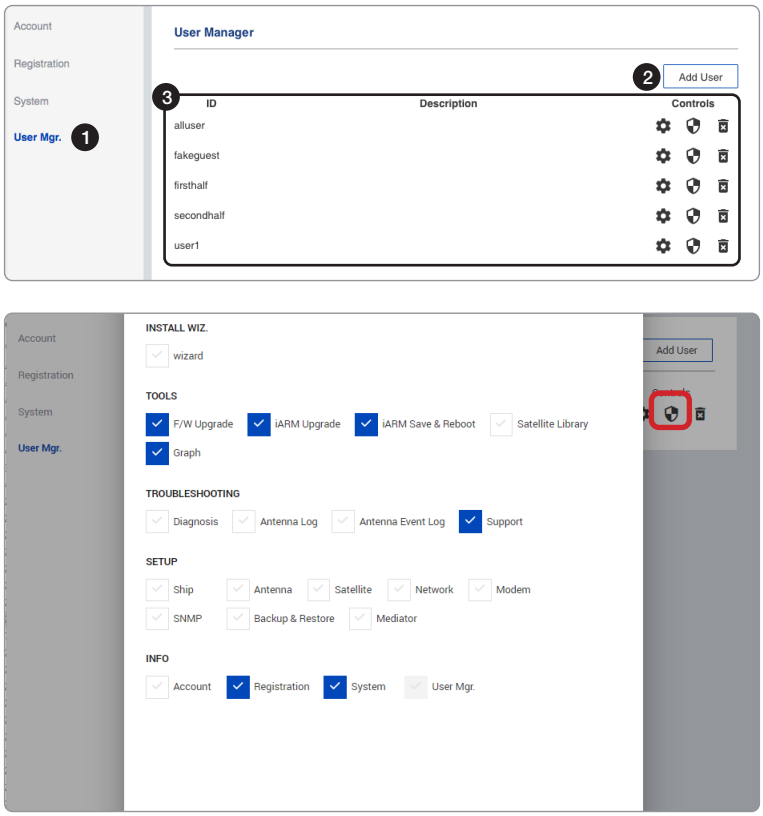
No.	Item	Description
①	Registration	Enter the product registration information for your convenience. Click the **Register (Update)** button to apply the settings to the system.
②	Product	Displays the antenna information. • Antenna: Displays the antenna name. • Serial Number: Displays the antenna serial number.
③	Vessel	Enter the vessel information. • Has IMO Number: Choose whether you have the IMO number or not. If you have the IMO number, select **Yes** and enter the number. If you do not have the IMO number, select **No** and enter the Ship Name, Type, and Owner information. • IMO Number: Enter the IMO number. • Ship Name: Enter the ship name. • Type: Enter the ship type. • Owner: Enter the owner's name.
④	Service Provider	Enter the information of your service provider. • Service Provider 1/2/3: Enter the names of service providers.

9.5.3 System



No.	Item	Description
①	System	Displays system information such as the antenna, S/W version, and network IP address.
②	Antenna Information	Displays antenna information.
③	S/W Version Information	Displays S/W version information.
④	Network Information	Displays network information.

9.5.4 User Manager

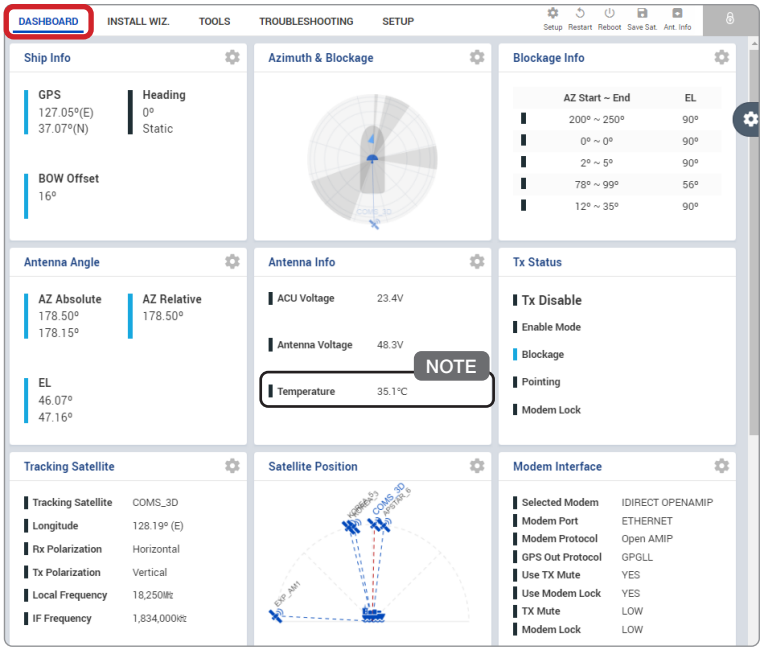


Editable User Permissions Menu

No.	Item	Description
①	User Manager	The captain with admin permissions can control and manage user permissions separately.
②	Add User	To create a new user, click the **Add User** button. Then the pop-up window is opened. Enter the new user ID and password, then click the **Add User**.
③	User Management List	Displays the user management state and can control and manage through the control buttons. • ID: Displays the registered user ID. • Description: Displays the user's description. • Controls: Each user can be controlled and managed by individual settings. - User Setting: Reset the user ID by clicking the **Update User** button, and changes the password by clicking the **Reset Password** button. - Edit Menu Permission: Choose user permissions to give by selecting the checkboxes, then click the **Apply** button. The user can access only the permitted options. - Delete User: Deletes the user.

9.6 Dashboard

The Dashboard menu is displayed to provide quick monitoring of the antenna status. The Dashboard helps you arrange panels on a single screen while providing you with a broad view of a variety of information at once. The dashboard contains multiple panels, which can easily customize the structure of your dashboard and arrange your panels in various ways to make them more readable and user-friendly.



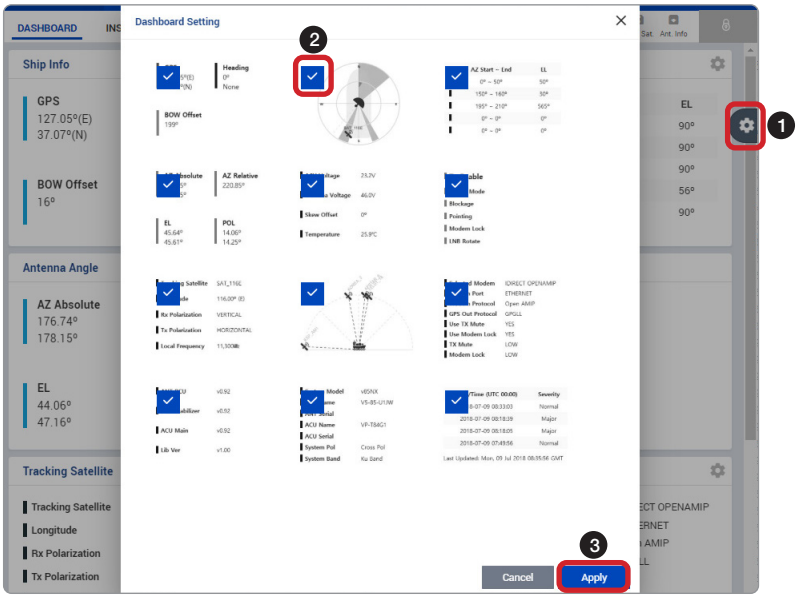
NOTE

The measured temperature can be different from the actual temperature.

9.6.1 How to Add & Remove Panels (Dashboard Setting)

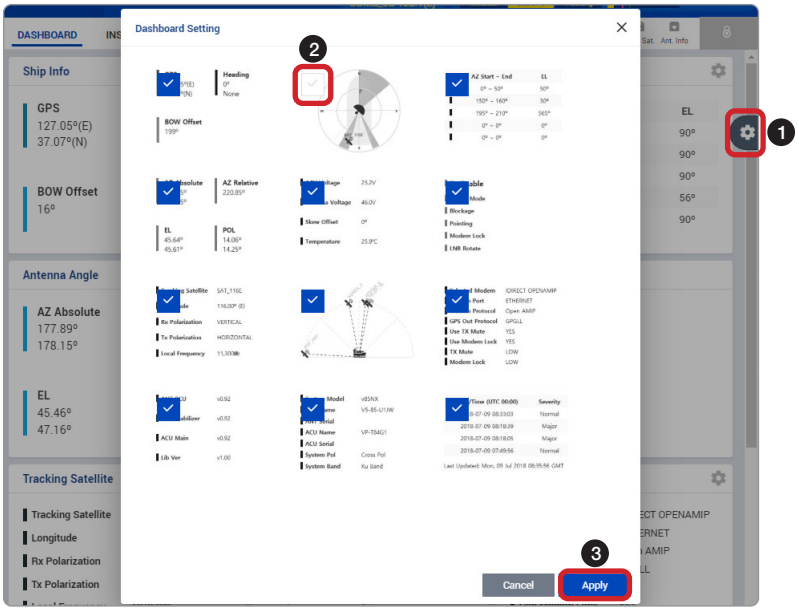
Adding Panels

1. On the right side of the page, you will see the gear icon to edit your dashboard. To start editing, click on the gear icon.
2. Check the box of the panel that you wish to add to the dashboard.
3. Click the **Apply** button to apply the settings to the system.
4. Once the panel is added, it will be automatically placed at the bottom of the page.



Removing Panels

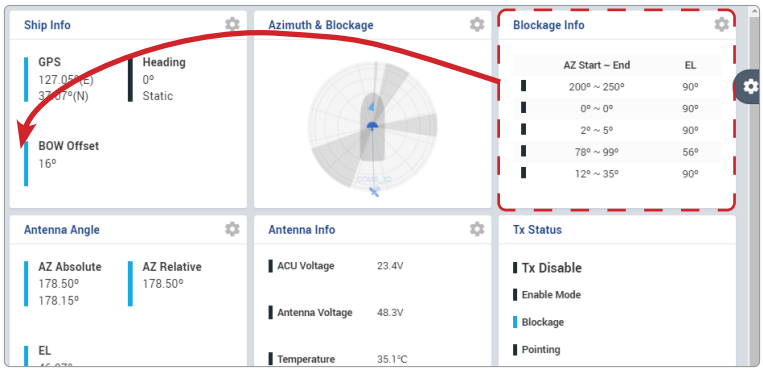
1. On the right side of the page, you will see the gear icon to edit your dashboard. To start editing, click on the gear icon indicated by the red mark.
2. Uncheck the box of the panel that you wish to remove from the dashboard.
3. Click the **Apply** button to apply the settings to the system.



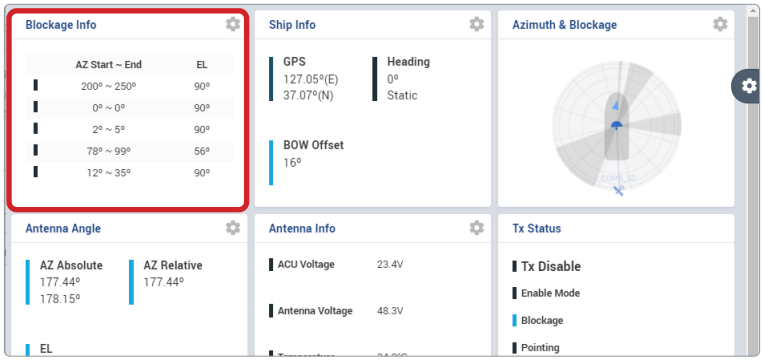
9.6.2 How to Arrange Dashboard Layout

You can customize the dashboard by rearranging panels as you wish.

1. Click and hold the left mouse button on a panel's title and then drag-and-drop in the desired position.



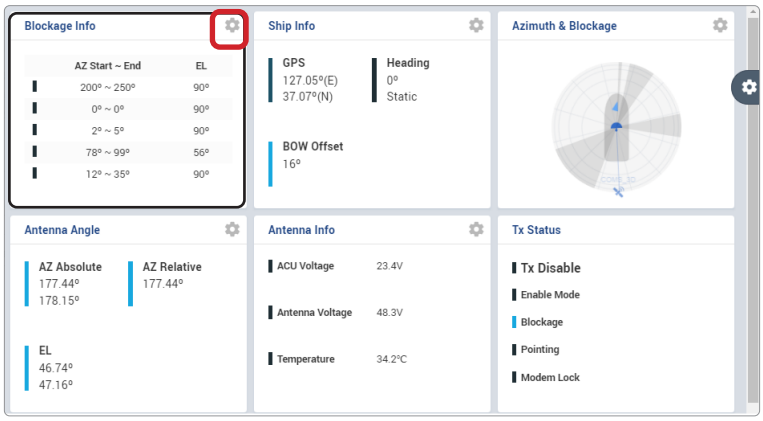
2. This time, the selected panel will be moved to the desired position. You can also move multiple panels into a customized layout in the same manner.



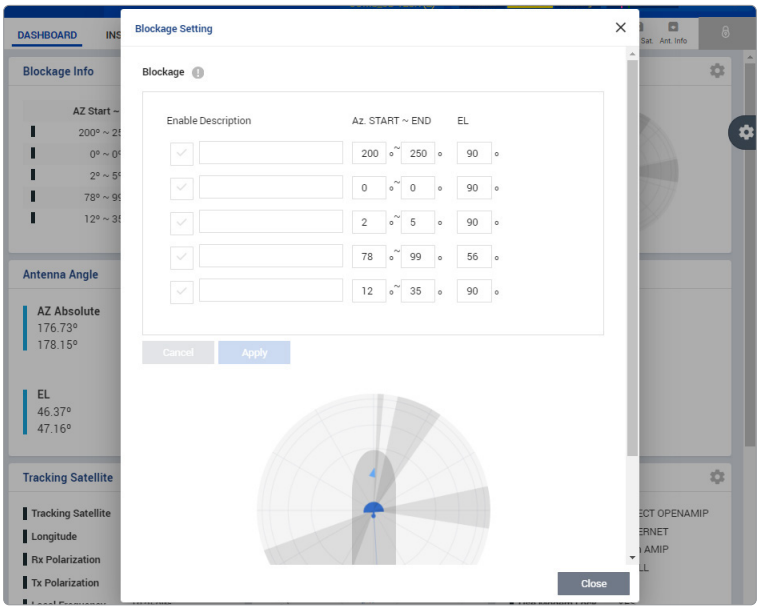
9.6.3 How to Use Shortcut Settings

Each panel on the dashboard provides a shortcut function. Using the **Shortcut** button on right side of the panel, you can easily access the detailed information and manage the each panel's settings.

1. Click the **Shortcut** button indicated by the red mark to open the setting page.

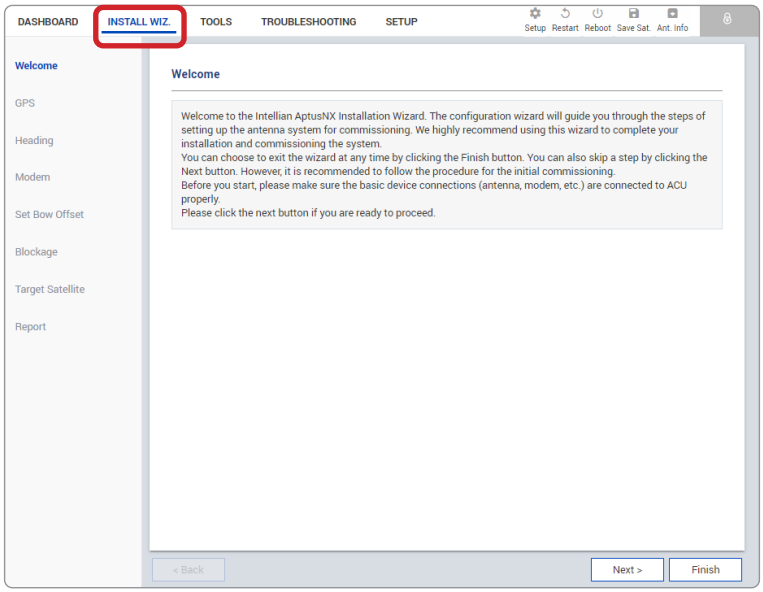


2. The setting page will appear on the individualized web page. You can check the detailed information and quickly apply settings that you wish.



9.7 Install Wizard

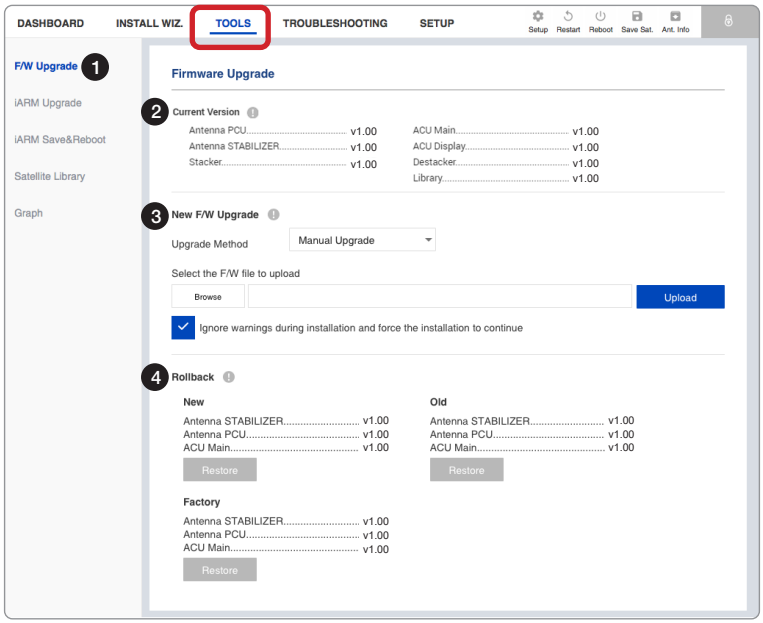
Refer to **"7.4 Starting Install Wizard" on page 54** for more details.



9.8 System Tools

This menu sets and displays the F/W Upgrade, iARM Upgrade, iARM Save&Reboot, Satellite Library, Spectrum Graph and Graph function.

9.8.1 Firmware Upgrade



No.	Item	Description
①	Firmware Upgrade	Displays current firmware versions and upgrades antenna firmware.
②	Current Version	Displays current firmware versions (Antenna STABILIZER, Antenna PCU, ACU Main, Library, Antenna Skew, Stacker, Destacker, ACU Display)
③	New F/W Upgrade	Upgrades antenna firmware. The update may take a few minutes to complete. The upload time may vary due to a variety of factors such as the speeds of your network. Uploading an incorrect firmware file may cause serious damage to your antenna and ACU. Check firmware version before uploading firmware. Upgrade Method: Selects an upgrade method between **Manual Upgrade** or **Auto Upgrade**. **NOTE** When using the **Manual Upgrade** method, refer to the following "**Antenna Firmware Update (Manual Upgrade method) Procedures**" page for more details.
④	Rollback	Displays the previous and latest versions of the firmware package and restores them. Other function cannot be operated while rollback is in process. • **New**: Most currently upgraded version of firmware • **Old**: Previous version of firmware before the upgrade • **Factory**: Initial version of firmware which was installed by the factory The new, old or factory version of firmware can be restored by clicking on the **RESTORE** button.

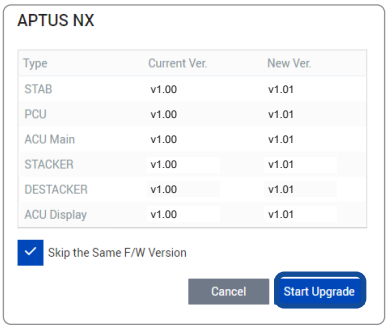
Antenna Firmware Upgrade (Manual Upgrade method) Procedures:

1. Choose **Manual Upgrade** from the pull-down menu of **Upgrade Method**. **Browse** and select the upgrade package file to upload. Click on the **Upload** button to transfer the Firmware package file (“*.fwp-in.) to iARM module.

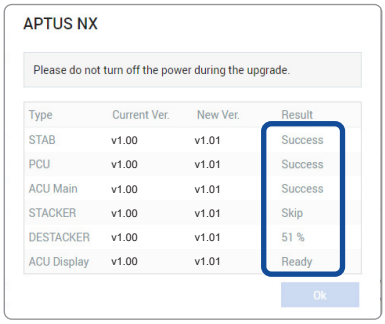
NOTE

If you select the box "Ignore warnings during installation and force the installation to continue", warning messages do not appear during the upgrade.

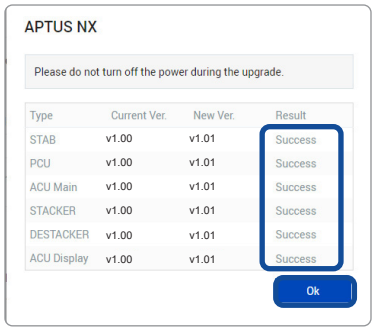
2. The antenna firmware versions are displayed on the pop-up window. Check the current version installed and the new version available, then click the **Start Upgrade** button.



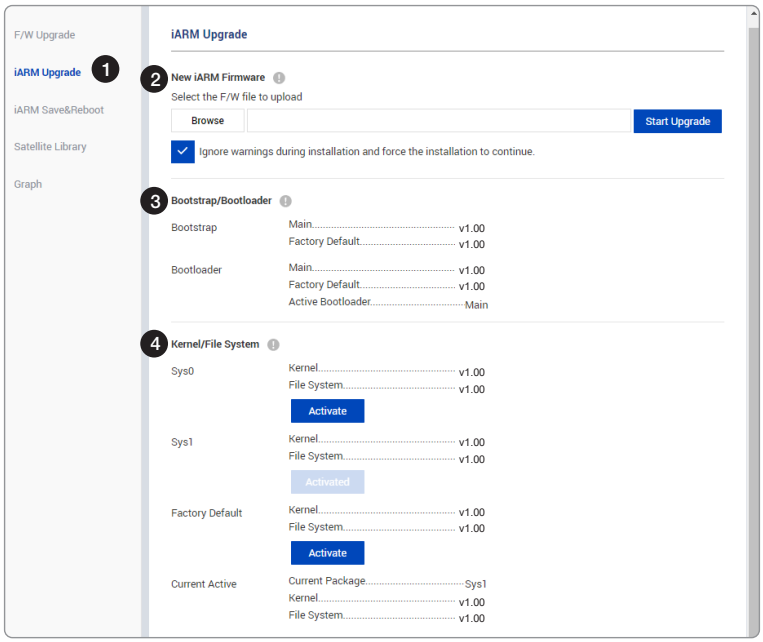
3. The upgrade process is displayed on the window.



4. If the firmware is successfully upgraded, the result is marked as “Success”. Click the **OK** button to close the pop-up window.



9.8.2 iARM Upgrade



No.	Item	Description
①	iARM Upgrade	Upgrades the firmware of iARM module.
②	New iARM Firmware	Browse and select the iARM firmware file to upload and click **Start Upload** button. The update may take a few minutes to complete. The upload time may vary due to a variety of factors such as the speeds of your network. Uploading an incorrect firmware file may cause serious damage to your antenna and ACU. Check the firmware version before uploading firmware. **NOTE**: Refer to the following **"7.4 Starting Install Wizard" on page 54** for more details.
③	Bootstrap/ Bootloader	Displays current bootstrap and bootloader version. • Bootstrap: Displays the Bootstrap Version (Main, Factory Default). • Bootloader: Displays the Bootloader Version (Main, Factory Default, Active Bootloader)
④	Kernel/File System	The ACU has three storage parts the Sys0, the Sys1 and the Factory Default. Selects the desired storage part and click the **Activate** button. Then perform the **"4.3 System Cables (Customer Supplied)" on page 20** to apply the settings to the system. • Sys0: Displays the Sys0 version. • Sys1: Displays the Sys1 version. • Factory Default: Displays the Factory Default version. The **Current Active** displays activated storage part Information. • Current Active - Current Package: Displays the activated storage part's name (Sys0, Sys1 or Factory Default). - Kernel, File System: Displays the activated storage part's file version.

iARM Upgrade Procedures:

1. Browse and select the iARM firmware file (.tgz) that you wish to upgrade. Click on the **Start Update** button to update the iARM firmware. Wait until the page is loaded.

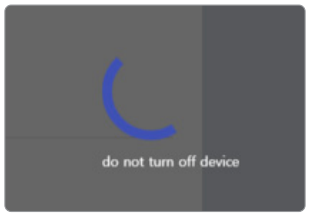
NOTE

If you select the box "Ignore warnings during installation and force the installation to continue", warning messages do not appear during the upgrade.

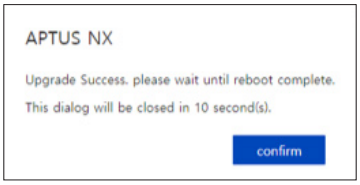
2. Once the update starts, the update process will be displayed on the screen. It will take about two minutes to complete the firmware upgrade.

WARNING

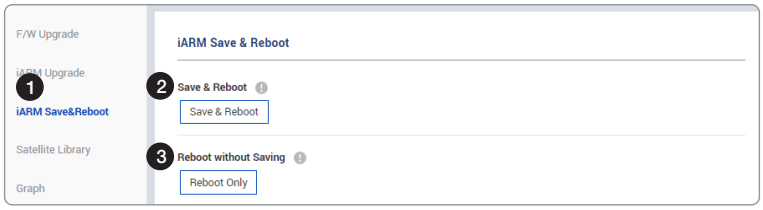
Do not turn off the device if the firmware upgrade is in process. Failure to comply may lead to damage and/or malfunction of the system.



3. Once the upgrade is completed, the iARM module will automatically reboot in 10 seconds.

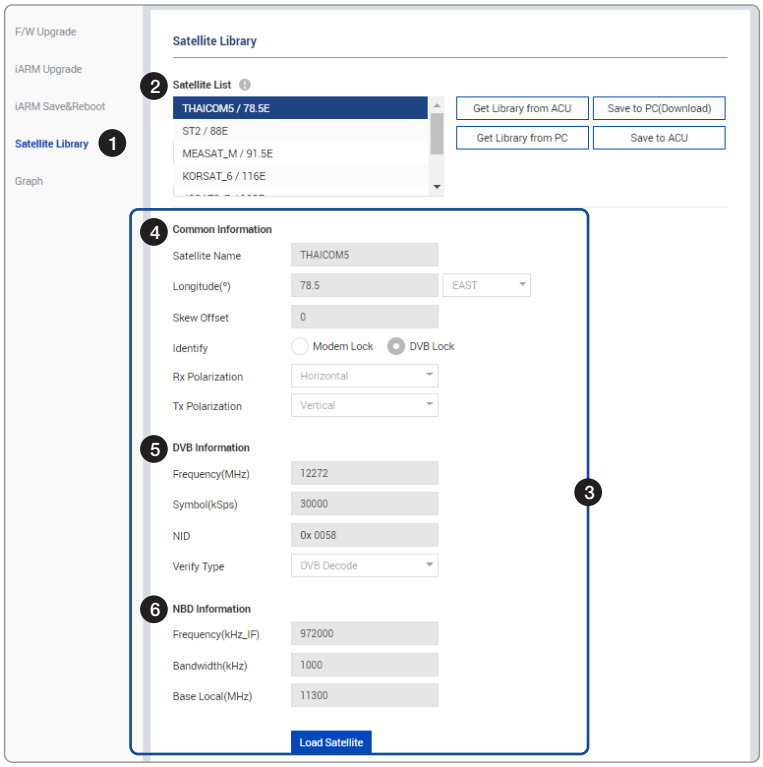


9.8.3 iARM Save & Reboot



No.	Item	Description
①	iARM Save & Reboot	Saves settings to the ACU and reboot or reboot the system without saving.
②	Save & Reboot	Saves the modified settings for the iARM, and reboots the system. All configuration changes made will be saved in the ACU and effective upon the reboot. Click the **Save & Reboot** button.
③	Reboot without Saving	Reboots the system without saving the modified settings of the iARM . All configuration changes made will be lost upon the reboot. Click the **Reboot Only** button.

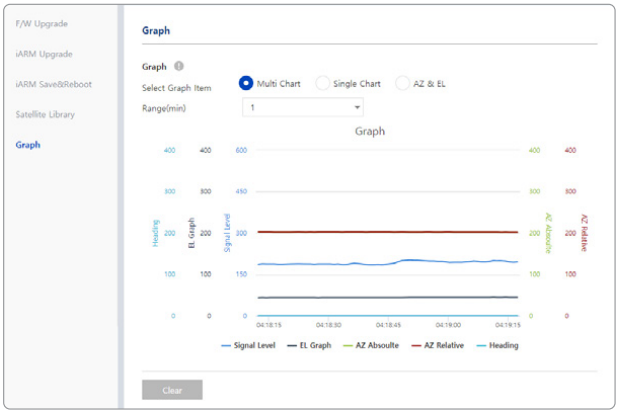
Satellite Library



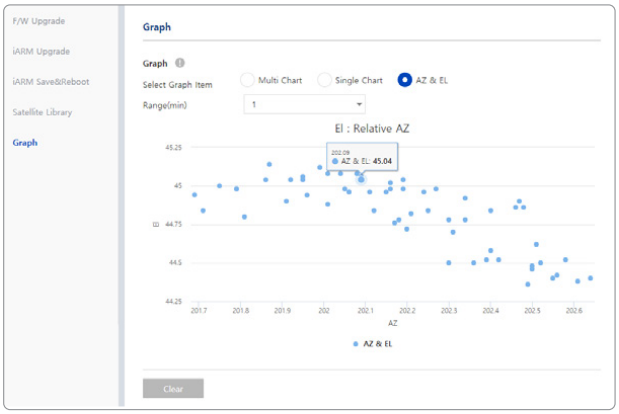
No.	Item	Description
①	Satellite Library	Sets the satellite library information.
②	Satellite List	Reads or manages satellite information from the library. • Get Library from ACU: Obtains satellite library file from the ACU. • Get Library from PC: Obtains the satellite library file from the PC. • Save to PC (Download): Saves the current library file to the PC. • Save to ACU: Saves the current library file to the ACU.
③	Satellite Information	Select one of the satellites in the **Satellite List** then Click the **Load Satellite** button to load the satellite information.
④	Common Information	Displays selected satellite information. • Satellite Name: Displays the satellite name. • Longitude(°): Displays satellite orbit position. • Skew Offset: Displays the Skew offset. • Identify: Displays the lock setting type (Modem Lock / DVB Lock) for satellite tracking. • Rx Polarization: Displays the current Rx polarization. • Tx Polarization: Displays the current Tx polarization.
⑤	DVB Information	Displays DVB mode's tracking information. • Frequency (MHz): Displays the tracking frequency. • Symbol (kSps): Displays the symbol rate. • NID: Displays the network ID. • Verify Type: Displays the verification type.
⑥	NBD Information	Displays NBD mode's tracking information. • Frequency (kHz_IF): Displays the tracking frequency. • Bandwidth (kHz): Displays the detection bandwidth. • Base Local (MHz): Displays the base local.

9.8.4 Graph

Single Chart View



Multi Chart View



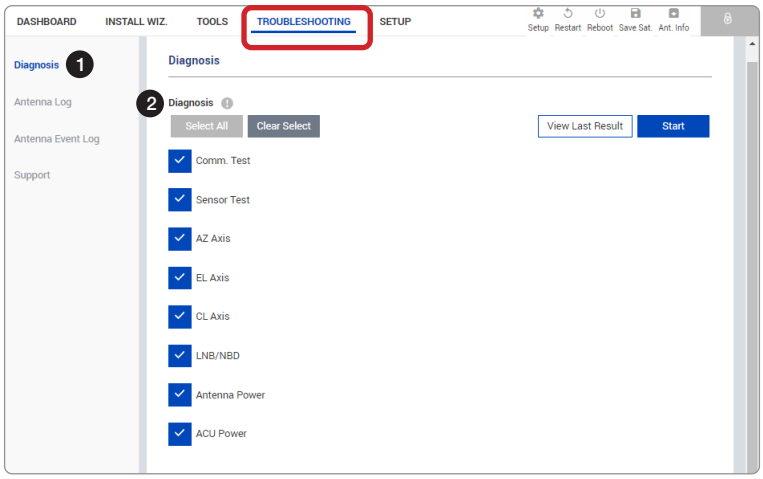
AZ & EL View

No.	Item	Description
①	Graph	This view provides information on the Signal Level, EL Graph, AZ Absolute, AZ Relative, Heading in the Multi Chart, Single Chart or AZ & EL formats.
②	Graph	Sets detailed options for the graph. • Select Graph Item: Shows the graphs of the checked item(s) in the Multi Chart, Single Chart or AZ & EL formats. - Multi Chart: Displays multiple graph Items in one graph view. - Single Chart: Displays the checked graph Item in each graph view. - AZ & EL: Displays the AZ / EL angle value in one graph view. • Range (min): Displays the data for the set time. By clicking the **Clear** button, the currently displayed graph is cleared and a new graph is displayed.

9.9 System Troubleshooting

This menu sets and displays the Diagnosis, Antenna Log, Antenna Event Log and Support function.

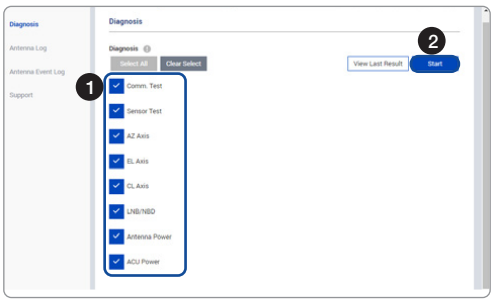
9.9.1 Diagnosis



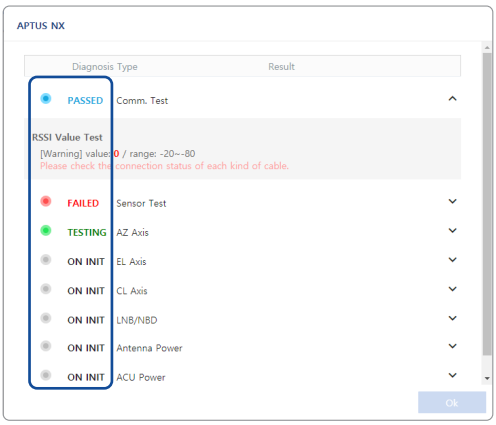
No.	Item	Description
①	Diagnosis	Executes antenna diagnosis test to check the antenna status.
②	Diagnosis	Select the checkbox (full diagnosis test or single diagnosis test) before modifying the settings. • Select All: Select to run a full diagnosis test. • Clear Select: Select to run a single diagnosis test. • View Last Result: Displays the recently saved diagnosis result. • Start: Executes the diagnosis test.

Diagnosis Procedures:

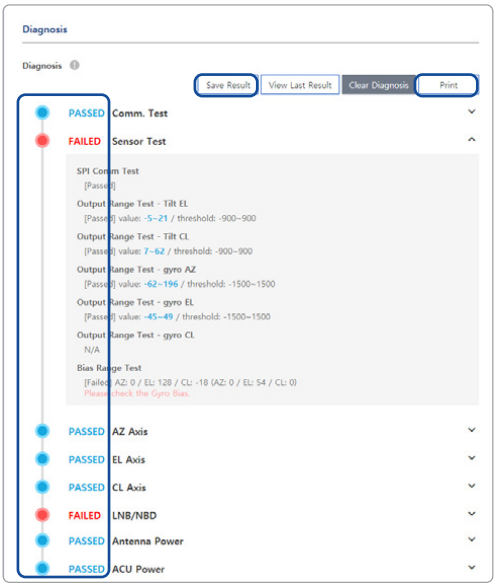
1. Select the checkbox (full diagnosis test or single diagnosis test) before modifying the settings. Click on the **Start** button to run the diagnostic test.



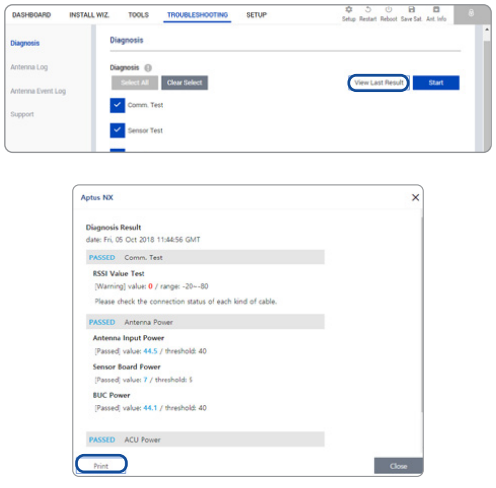
2. Once the diagnosis starts, the page will indicate test status. It should take a few minutes to complete the test.



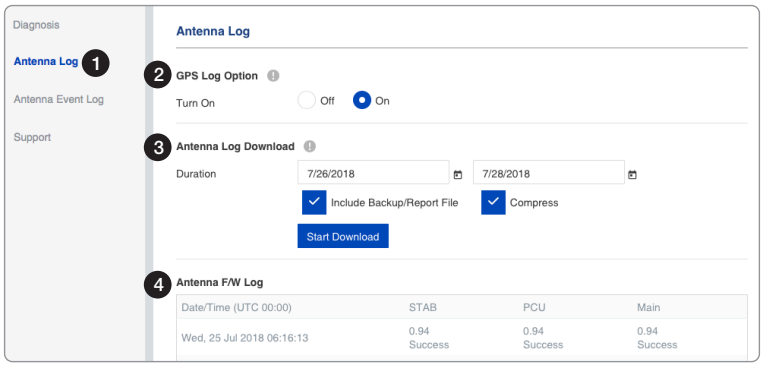
3. After the diagnosis is completed the system shows the diagnosis results of each item. You can save the results to the ACU by clicking the **Save Report** button and print this page by clicking the **Print** button.



4. When you want to check the recently saved diagnosis results, click the **View Last Report** button. The pop-up page of the diagnosis results, including the save date and time, will appear. You can print this page by clicking the **Print** button.

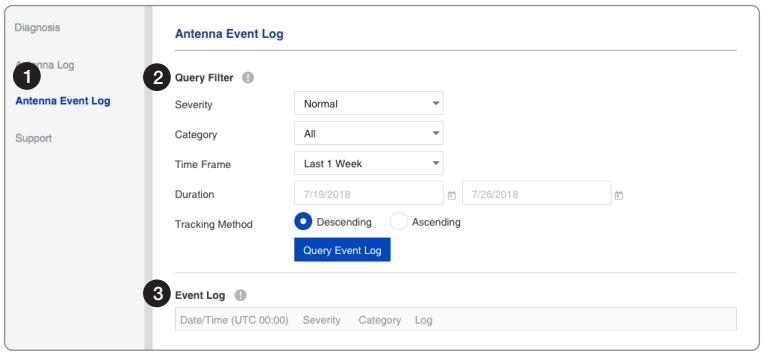


9.9.2 Antenna Log



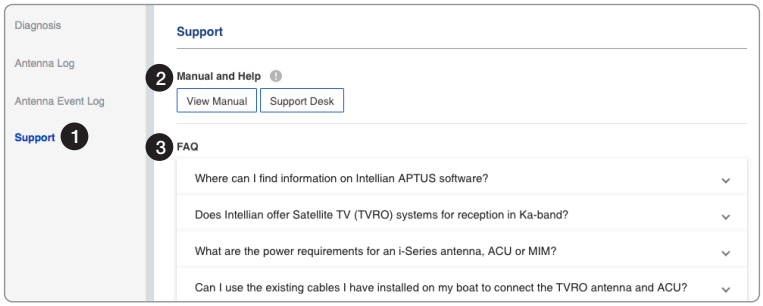
No.	Item	Description
①	Antenna Log	Displays the antenna log data.
②	GPS Log Option	Turns on/off the GPS log download option. Click the **Apply** button to apply the settings to the system.
③	Antenna Log Download	Any log data within three months can be downloaded. Select the duration on the calendar view that you want to show. Then click the **Start Download** button. **NOTE:** When selecting the box **Include Backup/Report File** before downloading, the Backup/Report File will download together. When selecting the box **Compress** before downloading, log files are downloaded in a compressed format.
④	Antenna F/W Log	Displays log information about firmware upgrade.

9.9.3 Antenna Event Log



No.	Item	Description
①	Antenna Event Log	Displays the logged events of the antenna system filtered by the urgency level, category and time frame of the events.
②	Query Filter	Sets the filter options to show the logged events. • Severity: Choose the urgency level of event to show. • Category: Choose the event category to show. • Time Frame: Choose the time frame of event log to show. • Duration: Set the duration by selecting start and end dates in the calendar. • Tracking Method: Select the sorting method (Descending / Ascending). Click the **Query Event Log** button to show the logged events under the Event Log.
③	Event Log	Displays the list of logged events filtered by the Query Filter options in the previous step.

9.9.4 Support

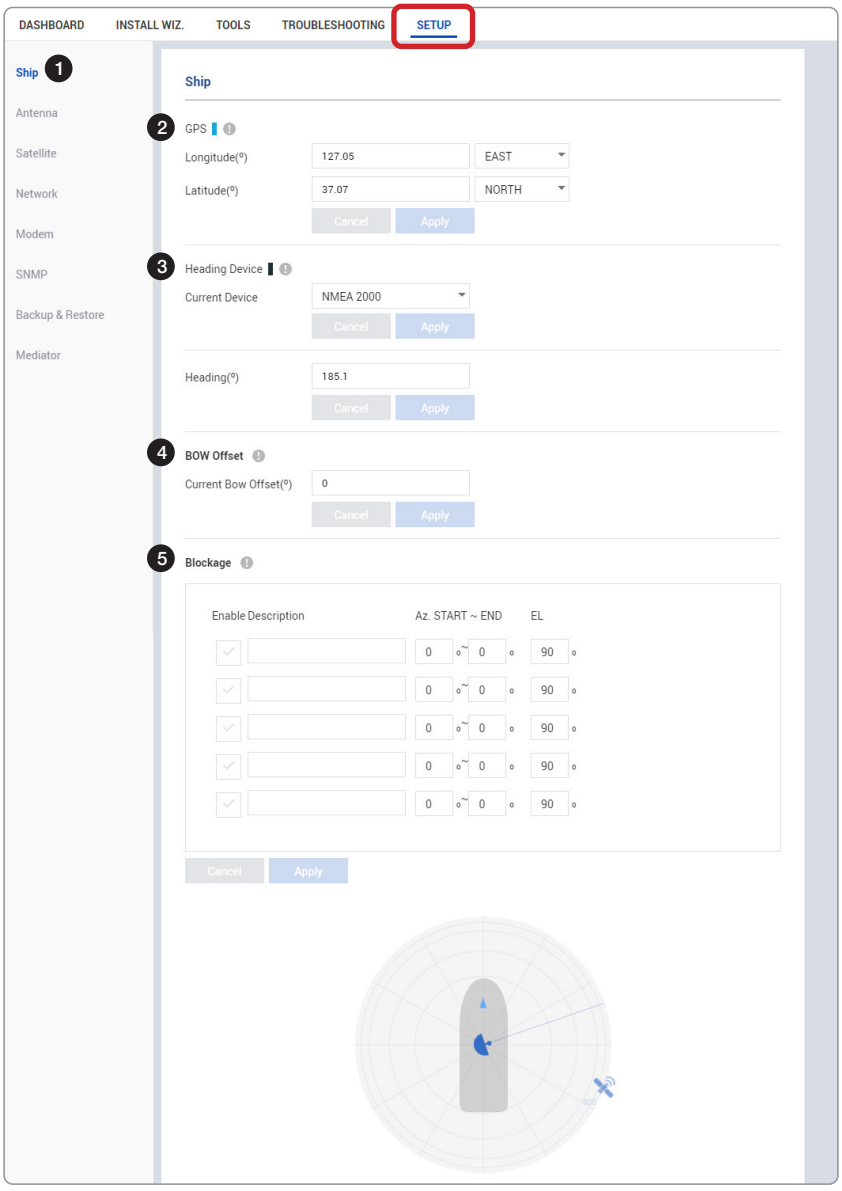


No.	Item	Description
①	Support	Supports the manual web page, support desk and FAQ list.
②	Manual and Help	Shows the manual web page and support desk information. • View Manual: Click the **View Manual** button to open the manual web page. • Support Desk: Click the **Support Desk** button to open Intellian's contact details for support.
③	FAQ	Provides answers for frequently asked questions about the product.

9.10 System Setting

This menu sets and displays the Ship, Antenna, Satellite, Network, Modem/BUC, SNMP, Backup & Restore and Mediator function.

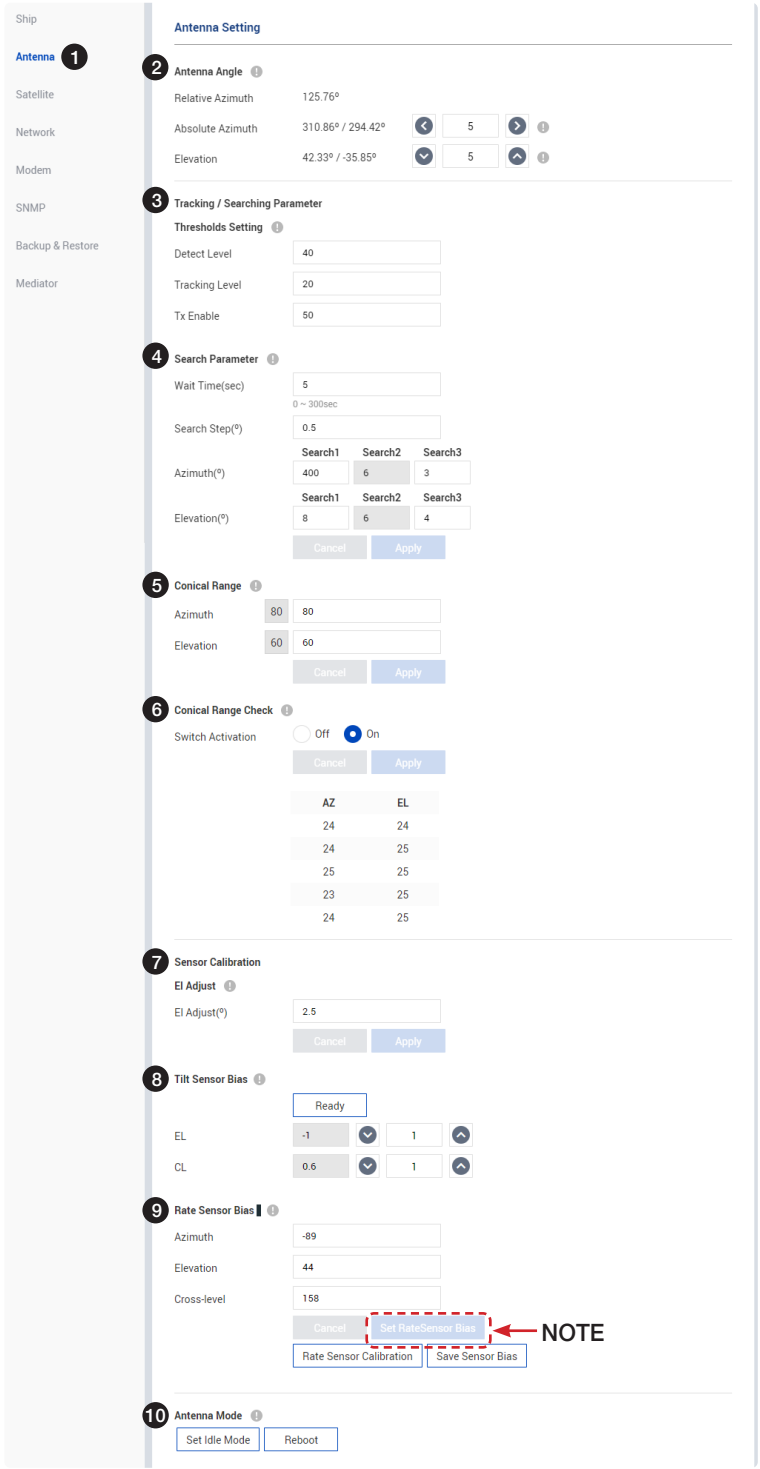
9.10.1 Ship Setting



No.	Item	Description
①	Ship	Sets the ship information and block zone.

No.	Item	Description
②	GPS	Sets the GPS position of the vessel for searching for a satellite. Check the GPS status connected to the antenna system. The indicator left of the help button shows the GPS status. Confirm the GPS indicator is Blue (blinking). (Blue (blinking): the system received a correct GPS input. Black: the system has not received a GPS input. You can enter the GPS value manually to set the GPS position.) • Longitude (º): Set Longitude information (East / West). • Latitude (º): Set Latitude information (North / South). Click the **Apply** button to apply the settings to the system.
③	Heading Device	Sets the ship's heading device. Choose the device type from the **Current Device** drop-down list. The indicator left of the help button shows the device connection status. (Blue: a ship's heading device is connected. Black: a ship's heading device is not connected.) • Current Device: Select the heading device (None, NMEA (0183), Static). • Baud Rate: Select the band rate (4800, 9600, 19200, 38400). It must be set when **NMEA** is selected on the **Current Device** list. • Sentence: Displays the sentence information. **When NMEA is selected on the Current Device list, this item appears.** • Heading(º): Enter the heading information. Click the **Apply** button to apply the settings to the system.
④	BOW Offset	For setting the bow offset, you need to select a satellite which is trackable in satellite library information. When the antenna tracks the selected satellite, bow offset will be set up automatically. • Current Bow Offset (º): Enter the Bow Offset Range (0 – 360°). Click the **Apply** button to apply the settings to the system.
⑤	Blockage	It is important to set up the blockage zones for Intellian VSAT. The VSAT system can be programmed with relative azimuth and elevation sectors to create up to five zones for transmission mute. It is indicated when the antenna is within one of the zones. A transmit inhibit output from the ACU will disable/mute the modem transmission within the blockage zones. The AZ START is the relative azimuth angle where the blockage starts, and the AZ END is the relative azimuth where the blockage ends (Range: 0 ~ 360). The EL is the elevation angle where the blockage is set (Range: 0 ~ 90). The blockage is activated below the elevation angle. Click the **Apply** button to apply the settings to the system.

9.10.2 Antenna Setting



NOTE

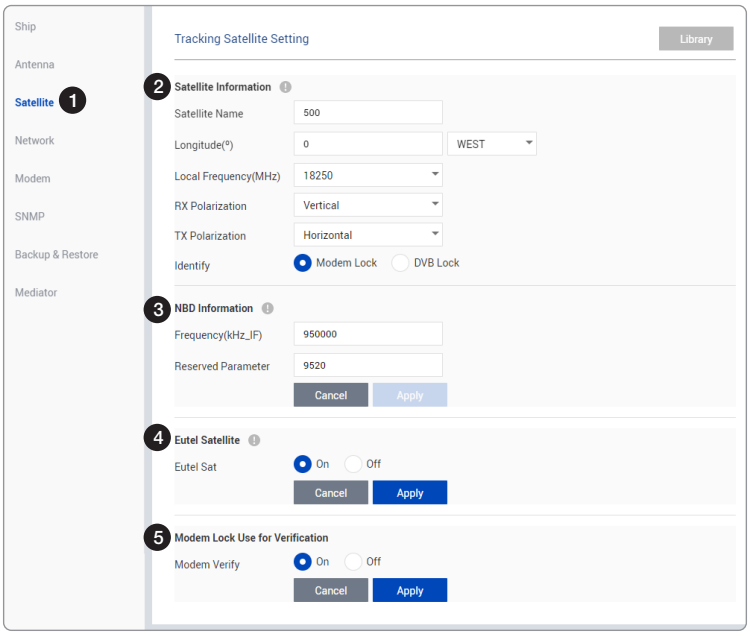
The "Set Rate Sensor Bias" function must be used by experienced engineers only.

No.	Item	Description
①	Antenna Setting	Sets current antenna position and search parameters. These parameters should only be changed by an authorized service technician. Improper setting of these parameters will render your system inoperable.

No.	Item	Description
②	Antenna Angle	Enter **Setup Mode** to modify settings. Sets current antenna position and LNB pol angle. You can move the antenna's azimuth and elevation position and LNB pol angle by using the arrows or inputting a value to find the desired satellite manually. • Relative Azimuth: Displays the antenna relative azimuth angle. • Absolute Azimuth: Adjust the antenna absolute azimuth angle. • Elevation: Adjust the elevation angle. • LNB Pol Angle: Adjust the LNB pol angle
③	Thresholds Setting	Sets current detect level threshold and tracking level threshold. • Detect Level: Enter the current detect level threshold. • Tracking Level: Enter the current tracking level threshold. • Tx Enable: Enter the Tx enable threshold. Click the **Apply** button to apply the settings to the system.
④	Search Parameter	Sets the time-out, search step and search range. • Wait Time (sec): Set the time-out for automatic initiation of a search after the signal level drops below the pre-defined threshold value. • Search Step(º): Set increment step size. • Search1/3: Set Search 1 & 3 search range. Search is conducted in a two-axis pattern consisting of alternate movements in azimuth and elevation to form an expanding square. • Search2: It is reserved for the future use. Click the **Apply** button to apply the settings to the system.
⑤	Conical Range	The relative force of the motors controlling azimuth and elevation. Sets the conical range while the antenna is in tracking mode. Click the **Apply** button to apply the settings to the system.
⑥	Conical Range Check	Enter **Setup Mode** to modify settings. Monitors the Azimuth and the elevation value when the conical range is modified. • Switch Activation: Choose whether you use the switch activation function or not (On / Off). Click the **Apply** button to apply the settings to the system.
⑦	Sensor Calibration	Enter **Setup Mode** to modify settings. Adjusts the elevation to offset the angle difference between the mechanical elevation angle and actual elevation angle. Click the **Apply** button to apply the settings to the system.

No.	Item	Description
⑧	Tilt Sensor Bias	**NOTE:** The tilt values of the elevation and cross-level axes were calibrated to the optimal condition at the factory prior to shipment. However, when the antenna MCU unit or fixed sensor unit is replaced, the elevation and the cross-level axes must be checked by adjusting tilt and rate sensor value. Refer to the replacement manual for detailed procedures. The separate device (e.g. level indicator) for manual adjustment is not provided by Intellian. Enter **Setup Mode** to modify settings. Maintain the elevation and the cross-level axes in order to keep the pedestal parallel to the horizon. • Ready: Click the **Ready** button to bring the elevation and cross-level to 0. • EL/CL: Select **EL/CL** and click the Up and Down arrow keys to adjust the elevation and cross-level. Click the **Restart** button on the top menu to restarts the antenna system.
⑨	Rate Sensor Bias	**NOTE:** The rate values of the azimuth, elevation, and cross-level axes were calibrated to the optimal condition at the factory prior to shipment. If the additional rate adjustment is required, make sure that the antenna is placed on a rigid and flat platform. During the calibration process, the antenna must avoid any motion as it can affect the antenna's performance. Enter **Setup Mode** to modify settings manually. Calibrates DC voltage output from the three rate sensors used to sense antenna motion in azimuth, elevation and cross-level axes. These are used to sense antenna motion that corresponds to the ship's motion (roll, pitch, and yaw) for stabilizing the pedestal. The DC voltage output from each of the rate sensors may vary by an amount which is directly proportional to the direction and rate of motion induced on it. • Rate Sensor Calibration: click the **Rate Sensor Calibration** button to calibrate the rate sensor automatically. The indicator left of the help button shows the rate sensor calibration status. (Black: the calibration is ready to start. Blue: the calibration is completed. Red: the calibration is failed. Green: the calibration is in process.) • Save Sensor Bias: click the **Save Sensor Bias** button to save the calibrated value of the rate sensor to the system.
⑩	Antenna Mode	Sets the motor to idle mode to check the antenna's balance. • Set Idle Mode: Enter **Setup Mode** to modify settings. Releases the elevation and cross-level motor. • Reboot: Reboots the system.

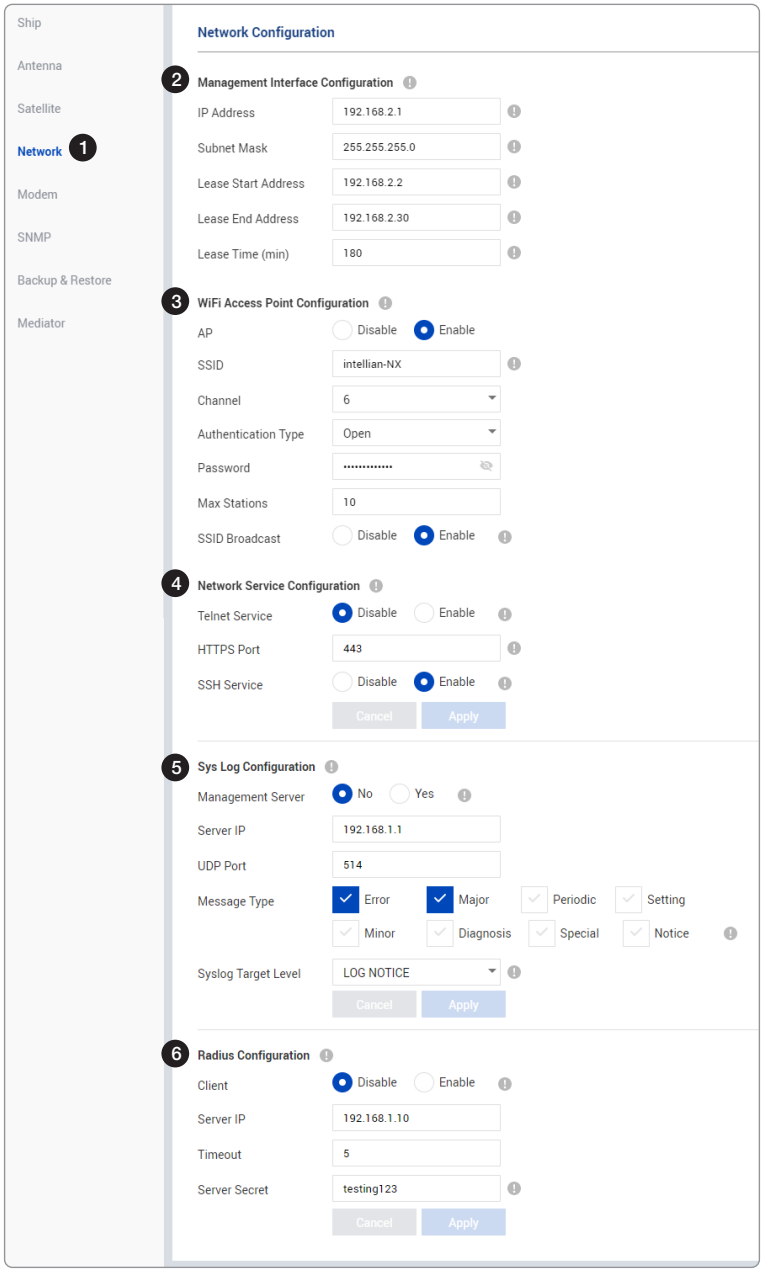
9.10.3 Tracking Satellite Setting



No.	Item	Description
①	Tracking Satellite Setting	Sets the current tracking satellite settings.
②	Satellite Information	Sets the current tracking satellite settings. • Satellite Name: Enter the satellite name. • Longitude(°): Enter the satellite orbit position. • Local Frequency (MHz): Select the local frequency. • Rx Polarization: Select the current Rx polarization. • Tx Polarization: Select the current Tx polarization. • Identify: Select the lock setting type (Modem Lock or DVB Lock) for satellite tracking. Click the **Apply** button to apply the settings to the system.
③	NBD Information	Sets NBD mode's tracking information. • Frequency (kHz_IF): Set the tracking frequency. • Reserved Parameter(kHz): Set the reserved parameter. Click the **Apply** button to apply the settings to the system.
④	Eutel Satellite	Select **ON** when the antenna is tracking the Eutelsat satellite. With this option enabled, a defined skew angle for each Eutelsat satellite is automatically applied without allowing a manual modification to the skew offset value. Click the **Apply** button to apply the settings to the system.
⑤	Modem Lock Use for Verification	Verifies modem lock status (modem lock function: active/inactive). • Modem Verify: Turn on or off the modem lock function (On / Off) Click the **Apply** button to apply the settings to the system.

9.10.4 Network Configuration

This function is available after performing the **"9.8.3 iARM Save & Reboot" on page 87**.

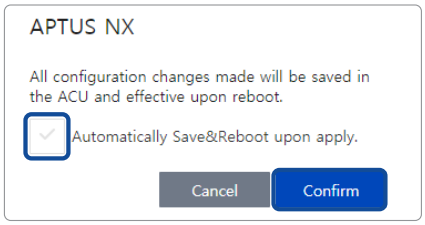


No.	Item	Description
①	Network Configuration	Sets the ACU's Internal IP address and ports.
②	Management Interface Configuration	Sets the Management Port's network configuration. The Management Port is located on the ACU front panel. • IP Address: Set the network IP address (Factory default: 192.168.2.1). • Subnet Mask: Set the subnet mask (Factory default: 255.255.255.0). • Lease Start Address: Set the lease IP address start range. • Lease End Address: Set the lease IP address end range. • Lease Time: Set the lease IP address update time. Click the **Apply** button to apply the settings to the system.

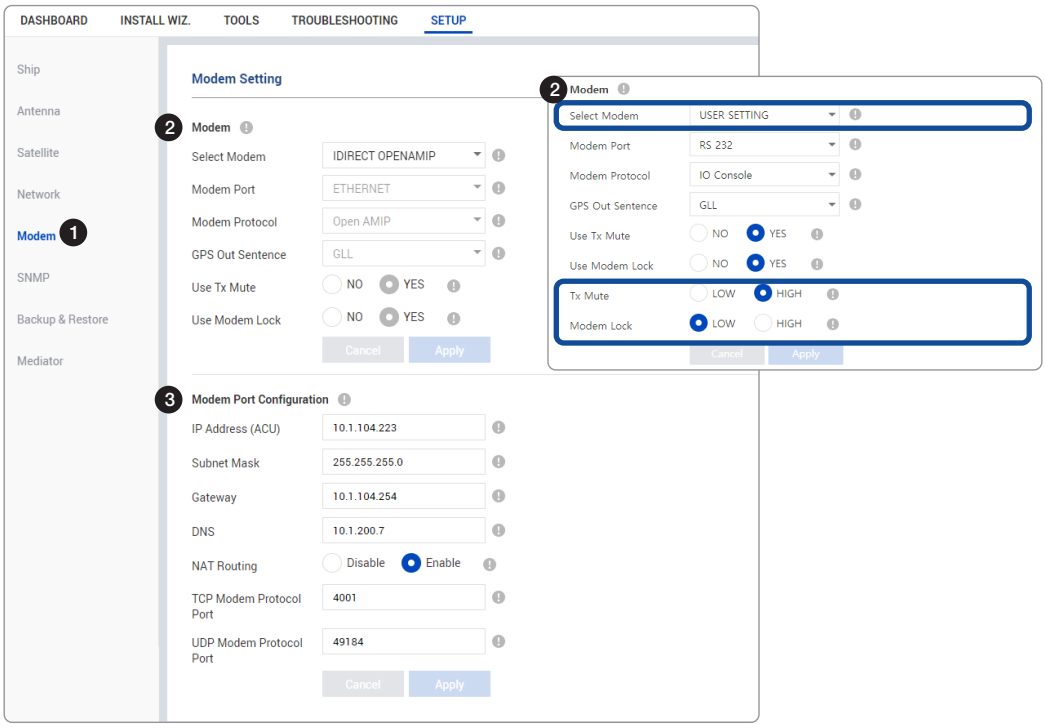
No.	Item	Description
③	Wi-Fi Access Point Configuration	Set up for the Wi-Fi access point function of ACU. • AP: Enable or disable the Access Point (AP) function. • SSID: The SSID is the network name shared among all devices in a wireless network. The SSID must be identical for all devices in the wireless network. It is case-sensitive and must not exceed 32 alphanumeric characters, which may be any keyboard character. Make sure this setting is the same for all devices in your wireless network. • Channel: Select an appropriate channel from the list provided to correspond with your network settings. All devices in your wireless network must use the same channel in order to function correctly. Try to avoid conflicts with other wireless networks by choosing a channel where the upper and lower three channels are not in use. • Authentication Type: The module supports an authentication mode that the 802.11 device uses when it authenticates and associates with an access point or IBSS cell. • Password: Set the password for Wi-Fi access point. • Max Stations: Enter the maximum number of stations. • SSID Broadcast: Enable or disable the SSID broadcast function. Click the **Apply** button to apply the settings to the system.
④	Network Service Configuration	Sets the network service configuration • Telnet Service: Sets the telnet service (Disable / Enable). • HTTPS Port: Sets the HTTPS port number. • SSH Service: Sets the SSH service status (Disable / Enable). Click the **Apply** button to apply the settings to the system.
⑤	Sys Log Configuration	Sets the system log configuration. Antenna sends log messages according to the emergency level. Enabling this function sends the message to your management server. • Management Server: Sets the management server status (No / Yes). • Server IP: Sets the management server IP address. • UDP Port: Sets the management port. • Message Type: Selects message type (Intellian message level) to send to the management server (Lower number indicates higher emergency). • Syslog Target Level: If you select this target level, the management server receives a log message equal to or less than this level. Click the **Apply** button to apply the settings to the system.
⑥	Radius Configuration	***This menu is used when the network administrator needs to authorize user connections using Radius server.*** • Client: Sets the Radius authentication (Disable / Enable). • Server IP: Sets the Radius server IP Address. • Timeout: Sets the Timeout value in seconds for the authentication process. • Server Secret: Sets the Pass-Phase. This should be matched between server and ACU. Click the **Apply** button to apply the settings to the system.

NOTE

When clicking the **Apply** button after editing the system settings, this pop-up message will appear. If you want to automatically save and reboot the system, select the checkbox and click the **Confirm** button.



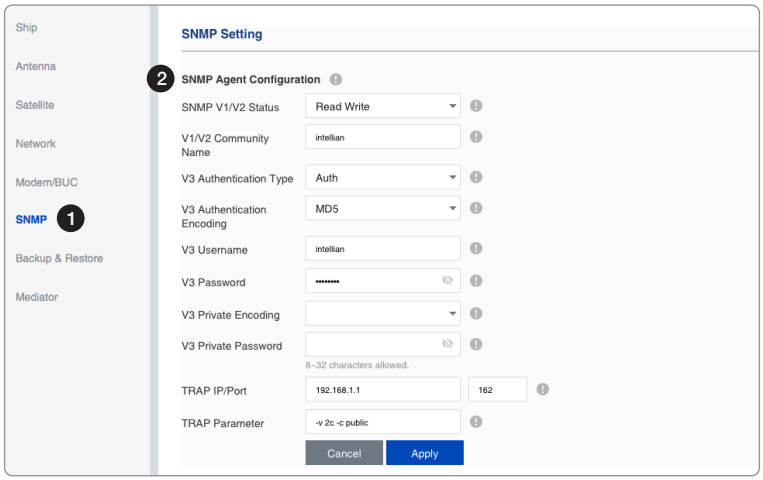
9.10.5 Modem/BUC Setting



No.	Item	Description
①	Modem/BUC Setting	Sets the modem and BUC interface.
②	Modem	Sets the interface between the ACU and the satellite modem. • Select Modem: Select your modem type from the **Select Modem** drop-down list for loading a pre-configuration for the type of modem used. The settings related to the modem interface will be set automatically once the modem type is selected. When you select **USER SETTING** the other settings can be changed independently. • Modem Port: Select a proper data communication port of the ACU for the satellite modem interface. • Modem Protocol: Select a proper communication protocol of the ACU for the modem interface. • GPS Out Sentence: Select the GPS out sentence type. • Use Tx Mute: Select whether you use the **Tx Mute** function for the modem or not. • Use Modem Lock: Select whether you use **Modem Lock** function for the modem or not. • Tx Mute: This function can be edited when **User Setting** option is selected in the **Select Modem** menu. It selects the Tx Mute option. The Tx Mute is a transmit inhibit output from the ACU to disable/mute the modem transmit through a 5 V (HIGH) or 0 V (LOW) current whenever the antenna is blocked, searching, or pointed 0.5 degrees off from peak satellite position. • Modem Lock: This function can be edited when **User Setting** option is selected in the **Select Modem** menu. It selects the Modem Lock option. The Modem Lock provides a logic input through a 5 V (HIGH) or 0 V (LOW) current to the ACU to identify when the system is on the correct satellite. Click the **Apply** button to apply the settings to the system.

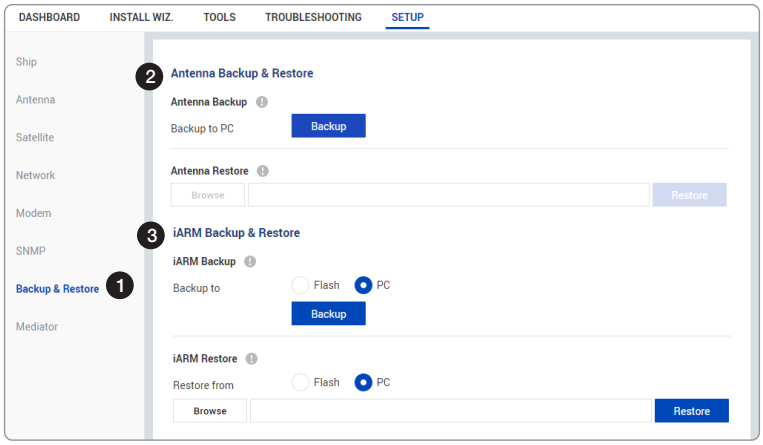
No.	Item	Description
③	Modem Port Configuration	This function is available after performing the **"9.8.3 iARM Save & Reboot" on page 87**. Sets the ACU's internal IP address, routing, and ports. • IP Address: Enter the network IP address. • Subnet Mask: Enter the subnet mask. • Gateway: Enter the gateway. • DNS: Enter the current default DNS address. • NAT Routing: Select the NAT routing (Enable / Disable). • TCP Modem Protocol Port: Enter the TCP port number for modem protocols using TCP as transport. • UDP Modem Protocol Port: Enterthe UDP port number for modem protocols using UDP as transport. Click the Apply button to apply the settings to the system.

9.10.6 SNMP Setting



No.	Item	Description
①	SNMP Setting	Sets SNMP configuration.
②	SNMP Agent Configuration	Sets the SNMP configuration. • SNMP V1/V2 Status: Choose the SNMP mode. • V1/V2 Community Name: Enter the SNMP V2 community name. • V3 Authentication Type: Enter the SNMP V3 authentication mode. • V3 Authentication Encoding: Choose the SNMP V3 authentication encoding. • V3 Username: Enter the V3 username of the SNMP Agent. • V3 Password: Set the V3 password of the SNMP agent. The password must be at least eight character long. • V3 Private Encoding: Choose the SNMP V3 private encoding. • V3 Private Password: Set the V3 private password. The password is must be at least eight character long. • TRAP IP/Port: Enter the TRAP IP/Port. • TRAP Parameter: Enter the SNMP trap specific parameter. Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.

9.10.7 Backup & Restore Setting



No.	Item	Description
①	Backup & Restore Setting	Backs up & Restores the antenna setting files and the iARM files.
②	Antenna Backup & Restore	• Antenna Backup: Back up antenna settings and parameters to PC by clicking on the **Backup** button. • Antenna Restore: Restore the antenna setting by uploading the saved backup file from PC. **Browse** the backup file, then click the **Restore** button to restore it.
③	iARM Backup & Restore	• iARM Backup: Back up iARM setting to internal Flash drive in ACU or PC by clicking the **Backup** button. • iARM Restore: Restore the iARM settings by uploading the saved backup file from internal Flash drive in ACU or PC. **Browse** the backup file, then click the **Restore** button to restore it.

9.10.8 Mediator Setting (Optional: For Dual Antenna System)

This function is available when using the Dual Antenna System.

Refer to **"12.2 Appendix B. Starting Dual Antenna System (Optional)" on page 111** for more detail.

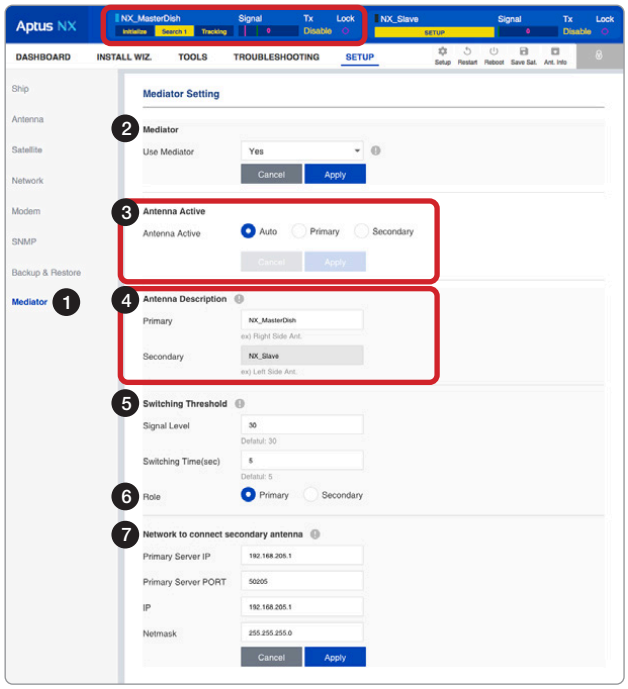


Figure 36: Mediator Setting for Primary Antenna

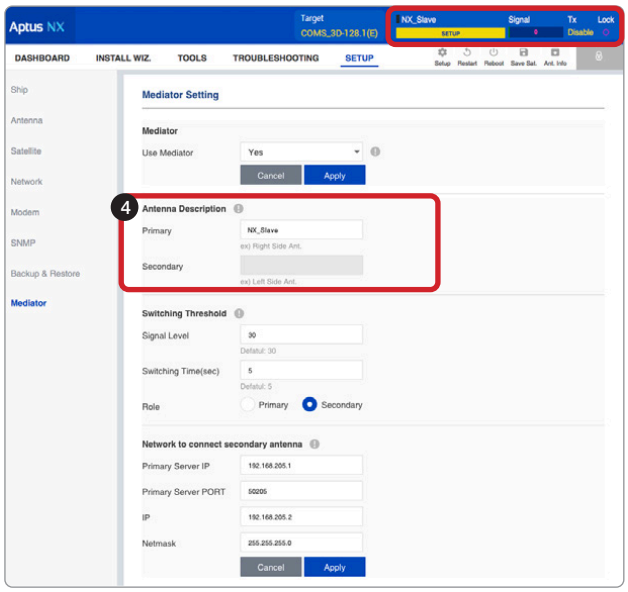


Figure 37: Mediator Setting for Secondary Antenna

No.	Item	Description
①	Mediator Setting	Intellian's new ACU has embedded Dual Antenna Mediator function, which can be utilized to switch between two Intellian VSAT antenna systems simultaneously. When one antenna is blocked by obstacles or has suddenly lost service, another antenna will immediately provide fail-safe operation to maintain the highest levels of system performance and reliability.
②	Mediator	Enable or disable the dual antenna mediator function. • Yes: Enables the mediator function to use the Dual Antenna System. The submenu is shown for detailed function settings. • No: Disables the mediator function. Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.
③	Antenna Active	This function is available in the Primary Antenna's AptusNX when both Primary Role's ACU and Secondary Role's ACU are connected to the system. Sets the method for selecting the active antenna. The active antenna (either primary or secondary antenna) is communicating (Tx/Rx) with a satellite. • Auto: This method is recommended. Automatically switch-over to the primary or secondary antenna which has no blockages and no errors. • Primary: Manually switch-over to the primary antenna which is connected to the modem and the gyrocompass. • Secondary: Manually switch-over to the secondary antenna. Click the **Apply** button to apply the settings to the system.

No.	Item	Description
④	Antenna Description	This menu is differently shown in the Primary Antenna's AptusNX and the Secondary Antenna's AptusNX. To clearly distinguish the primary antenna and the secondary antenna, enter a description to each antenna. • Primary: Enter the description for the primary antenna in AptusNX (Editable). This menu is not shown for the secondary antenna in AptusNX. • Secondary: Enter the description for the secondary antenna in AptusNX (Editable). This menu is displayed as Read-only for the primary antenna in AptusNX. Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.
⑤	Switching Threshold	When two antennas are in Tracking mode and have no blockage, the allowable value will apply for the automatic switching. • Signal Level: If the signal level is less than the set value, the active antenna is automatically switched (Default: 30). • Switching Time (sec): If the signal value difference between the active antenna and inactive antenna is more than the set value which is set in the **Signal Level** menu and the difference is maintained for a set time, the active antenna is automatically switched. Set the switching time value (Default: 5). Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.
⑥	Role	Assigns the antenna's role of the primary antenna or secondary antenna. • Primary: When running the primary ACU, which is connected to the modem and the gyrocompass, select the primary role. The primary ACU is assigned and operated as the primary antenna, which will communicate with the target satellite. • Secondary: When running the secondary ACU, select the secondary role. The secondary ACU is assigned and operated as the secondary antenna, which will be on standby and ready to assume primary antenna role to provide better service in the event of tracking failure or low signal level status. Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.
⑦	Network to connect secondary antenna	Sets the primary antenna's network information to transmit to the secondary antenna. • Primary Server IP: Enter the server IP address (Default: 192.168.205.1). • Primary Server PORT: Set a server port number for the primary antenna and the secondary antenna, which must be the same number (Default: 50205). • IP: When the antenna role is primary, enter the same IP address with the "Primary Server IP". When the antenna role is secondary, enter a different IP address from the "Primary Server IP"; however, it must be assigned to the same network class as the primary (Default: 192.168.205.1). • Netmask: The primary and secondary netmasks must be the same (Default: 255.255.255.0). Click the **Apply** button to apply the settings to the system. Then perform the **"9.8.3 iARM Save & Reboot" on page 87**.

CAUTION

When using the Dual Antenna System, the IP address under the Modem Port Configuration for the Primary ACU and the Secondary ACU must be assigned differently.

Chapter 10. Specification

10.1 Technical Specification

Antenna System		
Size	Antenna Radome Height	1970 mm (77.56 in.)
	Antenna Radome Diameter	Ø1900 mm (74.80 in.)
	Antenna Reflector Diameter	Ø1500 mm (59.06 in.)
	A/C Frame Height	652 mm (25.67 in.)
	A/C Frame Diameter	Ø1900 mm (74.80 in.)
Weight	Antenna	200 kg (440.92 lbs)
	Radome	80 kg (176.36 lbs)
	A/C Frame	260 kg (573.20 lbs)
Platform		3-axis: Azimuth, Elevation, Cross-level
Positioning		3-axis Velocity Mode Servo Control: Azimuth, Elevation, Cross-Level
Pedestal Motion Range	Azimuth	Unlimited
	Elevation	-15° to +110°
	Cross-level	Up to ±35°
Pointing Stabilization Accuracy		0.2° max in presence of specified ship motions
Ship Motions	Roll	±25° at 6 second
	Pitch	±15° at 6 second
	Yaw	±8° at 6 second
	Turning rate	Up to 10°/sec²
Rx	Frequency	17.7 ~ 20.2 GHz Ka-band
	Gain	46.8 dBi @ 19.7 GHz (w/ radome)
	G/T over Rx Range	Min. 22.5 dB/K @ 12.75 GHz, 30˚ EL (w/ radome)
Tx	Frequency	29.0 ~ 30.0 GHz Ka-band
	Gain	50.2 dBi @ 29.5 GHz (w/ radome)
Above Deck IFL Termination		1 x 50 Ω N-type female or 4 x 75 Ω F-type female connector Tx/Rx: 10 MHz / 50 MHz / 400 MHz / 433 MHz / L-band (950 - 2150 MHz) DC power to BUC & pedestal (and LNB)
Polarization		Circular (RHCP, LHCP)
BUC		Mission Microwave Ka 50 W, 100 W
LNB		LO Programmable
Dual Antenna System		Mediator function is embedded in ACU
ACU to ADU Cable (Antenna Cable)		Single 50 Ω coax RF cable connected from ACU to ADU for Rx, Tx, FSK, Reference and Power
Input Power		48 V DC (max 500 W) through a single RF cable

Antenna Control Unit (ACU)	
ACU Size	431 mm x 350 mm x 44.3 mm (16.97 in. x 13.78 in. x 1.74 in.)
ACU Weight	5.2 Kg (11.5 lbs)
Display	256 x 64 Graphic OLED
Key	Two Push Keys
LED Indicator	Three LEDs for Power, Tracking, Error
USB Port	2 ea (Front panel), 1 ea (Back panel, for Wi-Fi dongle)
Ship's Gyrocompass Interface	NMEA 2000, NMEA 0183 (GYRO)
GPS Interface	NMEA Out
Serial Interface	RS-232C (57600 bps 8, N, 1)
BUC Interface	RS422/Keyline Port (LK0080_ D SUB to RJ45 Cable)
Ethernet port	RJ 45, TCP / IP connection
Input Power	100 ~ 240 V AC, 50/60 Hz, 3.3 A

10.2 Environmental Specification

Test	Intellian Standard	
Temperature (Antenna)	Operational	-25 °C to +55 °C (IEC-60945)
	Survival	-40 °C to +80 °C (IEC-60945)
	Storage	-40 °C to +85 °C (IEC-60945)
Temperature (ACU)	Operational	-15 °C to +55 °C (IEC-60945)
	Survival	-25 °C to +70 °C (IEC-60945)
	Storage	-40 °C to +85 °C (IEC-60945)
Waterproofing	IPX5 (IEC-60529)	
Salt Mist	Saline Solution: 5 ±1 % NaCl Storage Period: 7 Days (IEC-60945)	
Vibration	Operational	IEC-60945
	Survival	IEC-60721-3-6 Class 6M3
Shock	Operational	IEC-60068-2-27 Method Ea 20 g, 7 ms
	Survival (Transient)	IEC-60721-3-6 Class 6M3 type II 30 g, 6 ms
	Survival (Bump)	IEC-60068-2-29 Method Eb 25 g, 6 ms

Chapter 11. Warranty

Warranty Policy

Intellian systems are warranted against defects in parts and workmanship, these warranties cover THREE (3) YEAR of parts and TWO (2) YEAR of factory repair labor to return the system to its original operational specification.

Warranty periods commence from the date of shipment from Intellian facility, or date of installation which is come sooner. Providing maximum 6 months Warranty additionally if submission of authorized form which is described installation occurs within 6 months from the shipment date.

Intellian Technologies warranty does not apply to product that has been damaged and subjected to accident, abuse, misuse, non-authorized modification, incorrect and/or non-authorized service, or to a product on which the serial number has been altered, mutilated or removed. Intellian Technologies, will (at its sole discretion) repair or replace during the warranty period any product which is proven to be defective in materials or workmanship, in accordance with the relevant product warranty policy. All products returned to Intellian Technologies, during the warranty period must be accompanied by a Service Case reference number issued by the dealer/distributor from Intellian Technologies, and (where applicable) a copy of the purchase receipt as a proof of purchase date, prior to shipment. Alternatively, you may bring the product to an authorized Intellian Technologies, dealer/distributor for repair.

Chapter 12. Appendix

12.1 Appendix A. Tightening Torque Specification

This table shows the recommended values of tightening torques.

Bolt Size	Tightening Torque (N-m)
M2	0.5
M2.5	1
M3	1.5
M4	3
M5	6
M6	12
M8	27
M10	50
M12	85
M14	130
M16	200

12.2 Appendix B. Starting Dual Antenna System (Optional)

Intellian ACU has the embedded Dual Antenna Mediator function, which can be utilized to switch between two Intellian VSAT antenna systems simultaneously. When one antenna is blocked by obstacles or has suddenly lost service, another antenna will immediately provide a fail-safe operation to maintain the highest levels of system performance and reliability. It ensures always-on broadband service by reducing the out of service time.

12.2.1 Configuration of Dual Antenna System

To use the Dual Antenna System, make sure the antenna system components are properly installed. Refer to the **"6.4.2 Dual Antenna System Configuration (Optional)" on page 38** for more details.

12.2.2 Setting Up Dual Antenna System

To establish the Dual Antenna System communication between the primary and secondary antennas, follow the steps below.

1. **Connecting Ethernet Cable**

Connect an Ethernet cable from the Management LAN port on the front of the Primary/Secondary ACU to the LAN port of PC. The connection network is established.

2. **Process to Set Up Dual Antenna System**

The following flow chart shows the process of establishing the Dual Antenna System.

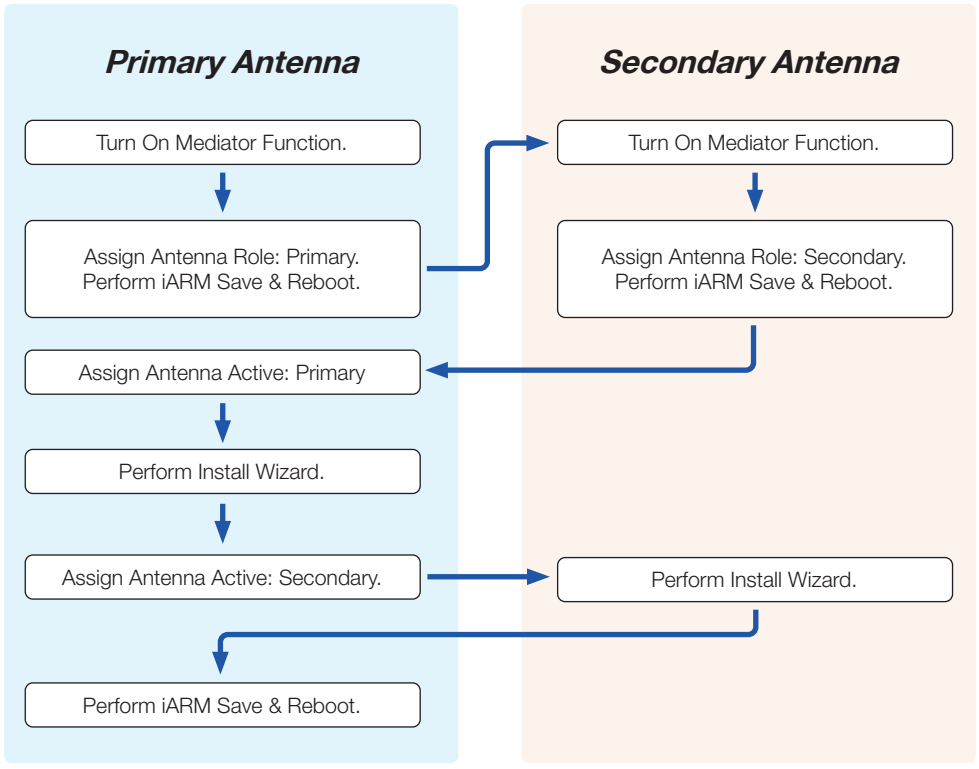
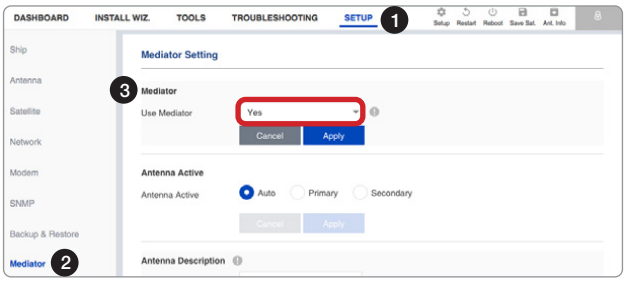


Figure 38: Flow Chart of Establishing Dual Antenna System

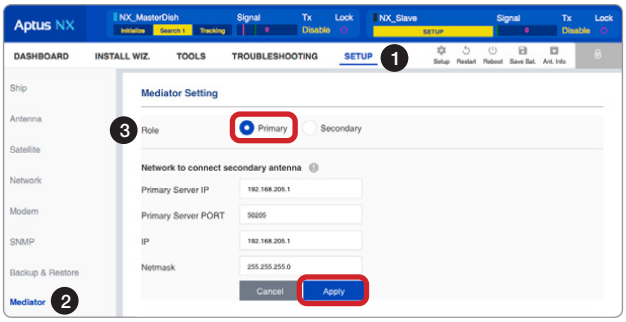
3. **Assigning Antenna Role**

Access the AptusNX (**IP Address: 192.168.2.1**) to manage and control the Dual Antenna System. Go to **SETUP > Mediator > Mediator Setting.** Select the **Yes** for the **Use Mediator** option.



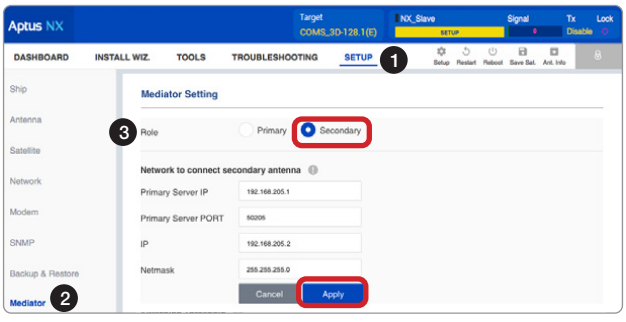
Assigning Primary Antenna Role

When connecting the primary ACU, which is connected to the modem and the gyrocompass, select **“Primary”** for the **Role** option. The primary ACU is assigned and operated as the primary antenna, which communicates with the target satellite. Click the **Apply** button to apply the settings to the system. Then perform **"9.8.3 iARM Save & Reboot" on page 87**.



Assigning Secondary Antenna Role

When connecting the secondary ACU, select **“Secondary”** for the **Role** option. The secondary ACU is assigned and operated as the secondary antenna, which will be on standby and ready to assume primary antenna role to provide better service in the event of tracking failure or low signal level status. Click the **Apply** button to apply the settings to the system. Then perform **"9.8.3 iARM Save & Reboot" on page 87**.



12.2.3 Performing Install Wizard

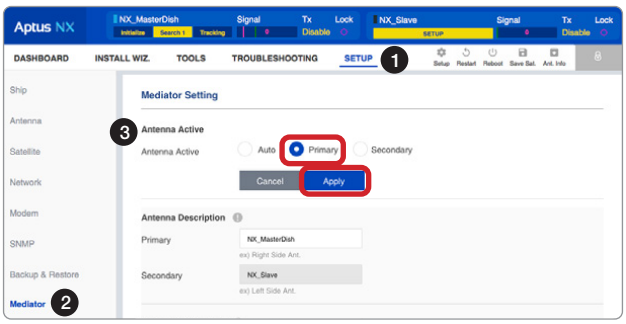
To control and manage both of the primary and secondary antenna systems, access the AptusNX with the Primary Antenna. Before starting the Dual Antenna System, perform the Install Wizard of the primary and secondary antenna system.

Performing Install Wizard for Primary Antenna System

To perform the Install Wizard of the primary antenna system, follow the steps below.

1. **Assigning Active Antenna**

Select **“Primary”** for the Antenna Active option. Click the **Apply** button to apply the settings to the system.



2. **Performing Install Wizard**

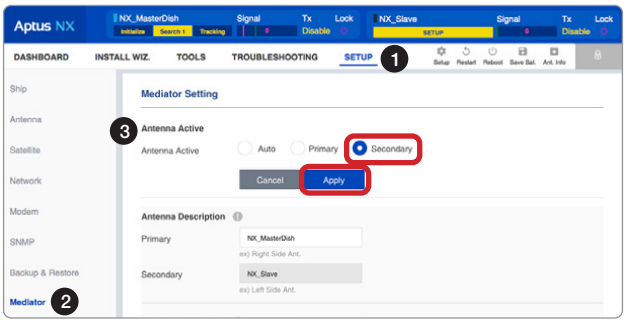
Perform the Install Wizard process. Refer to **"7.4 Starting Install Wizard" on page 54** for more details.

Performing Install Wizard for Secondary Antenna System

To perform the Install Wizard of the secondary antenna system, follow the steps below.

1. **Assigning Active Antenna**

Select the Secondary in the Antenna Active option. Click the **Apply** button to apply the settings to the system.



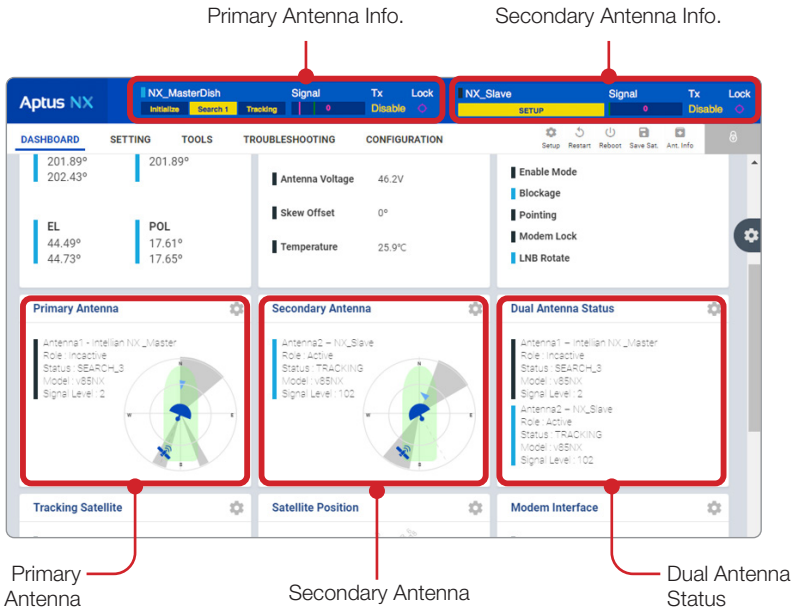
2. **Performing Install Wizard**

Perform the Install Wizard process. Refer to **"7.4 Starting Install Wizard" on page 54** for more details.

Then, perform **"9.8.3 iARM Save & Reboot" on page 87**.

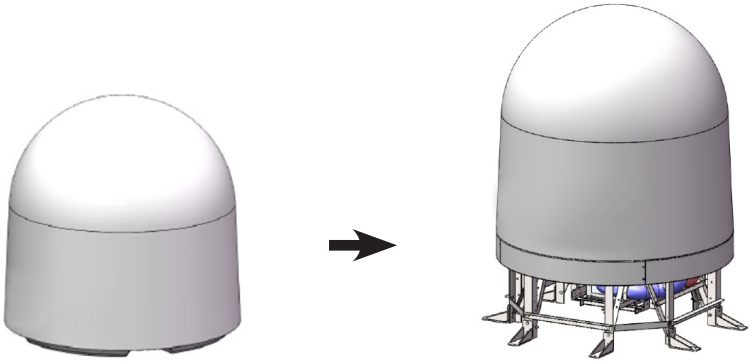
12.2.4 Monitoring Dual Antenna System

You can monitor the performance of the Dual Antenna System via AptusNX. The information of the primary and secondary antennas is shown on the Top Menu bar. On the Dashboard, the Dual Antenna Status, Primary Antenna, and Secondary Antenna panels are displayed for the monitoring.



12.3 Appendix C. Assembling Air-Conditioner (Optional)

The purpose of this document is to provide you with the necessary information to properly assemble the air-conditioner. We strongly recommend you to review this procedure thoroughly to assemble the air-conditioner successfully.



Standard Antenna

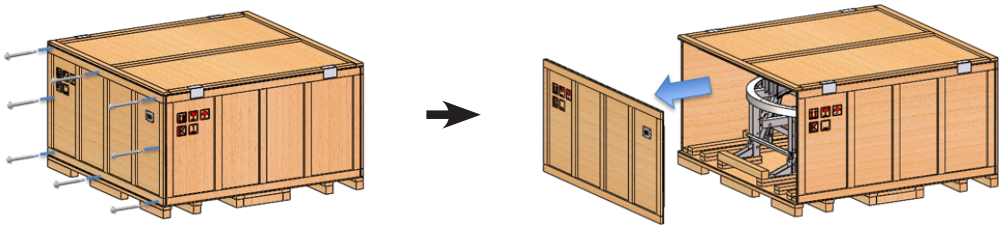
Air-Conditioned Antenna

12.3.1 Unpacking Wooden Crate

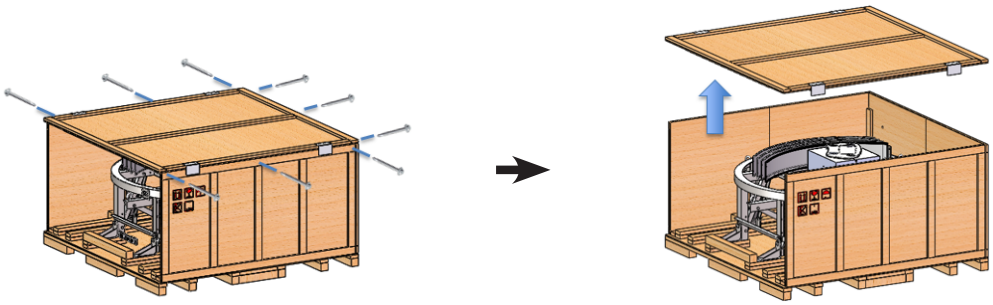
1. The pallet should be lifted by means of a forklift. To unpack the wooden crate, follow the procedure below. Remove the fixing screws (8 ea) from a front panel. Detach the front panel.

CAUTION

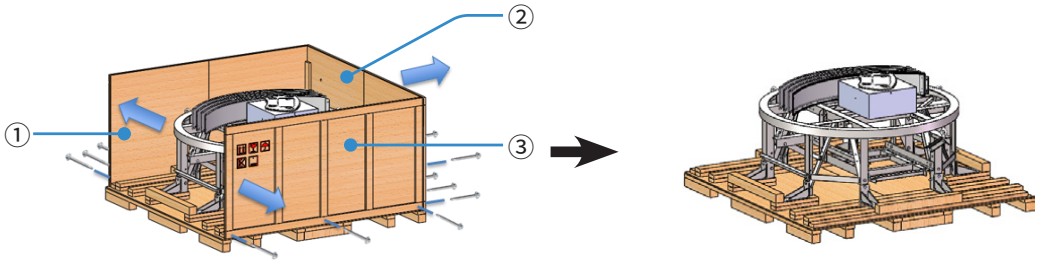
Be careful with the direction of the panel that you must open first.



2. Remove the fixing screws (9 ea) from a top panel. Detach the top panel by using a forklift carefully.

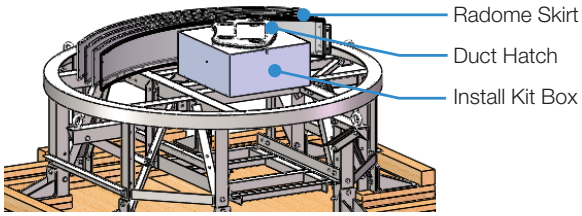


3. Remove the fixing screws from the panels, and then detach the panels in order (① left panel ➔ ② back panel ➔ ③ right pane).

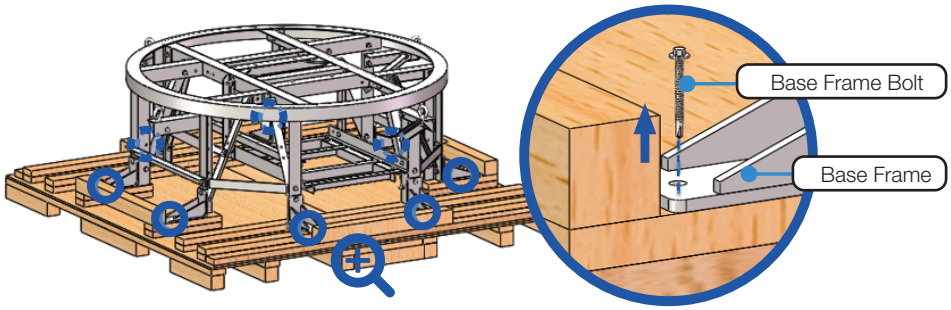


12.3.2 Removing Base Frame from Wooden Crate

1. The radome skirt, duct hatch, and install kit box are secured to the base frame with plastic straps. Release them using a cutter, and move them to a safe place for the next step.



2. Remove the fixing screws (8 ea) on the base frame which secures the base frame to the pallet by using a wrench.



3. Lift the base frame using a forklift and move it to the safe place to install the antenna. The width between forks should be adjusted within 550 mm.

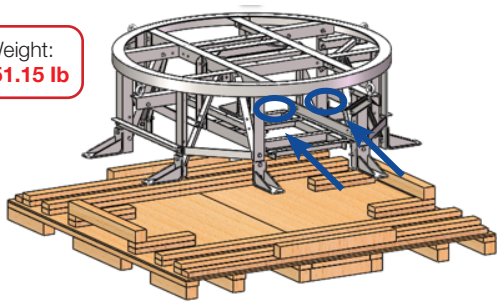
CAUTION

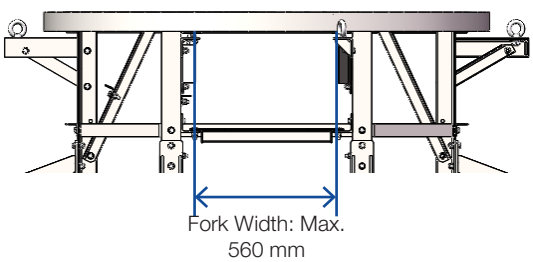
When using a forklift, be careful not to damage the base frame while inserting the fork. Intellian is not responsible or liable for any damage incurred due to improper handling.

WARNING

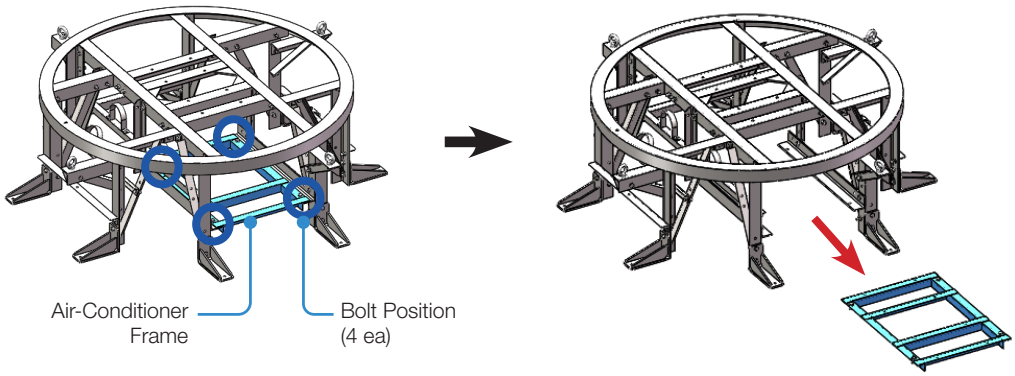
Be careful when lifting the heavy object. Incorrect handling of the heavy object may lead to injury to the installers and/or cause significant damage to the unit.

Base Frame Weight:
Total **250 Kg/551.15 lb**





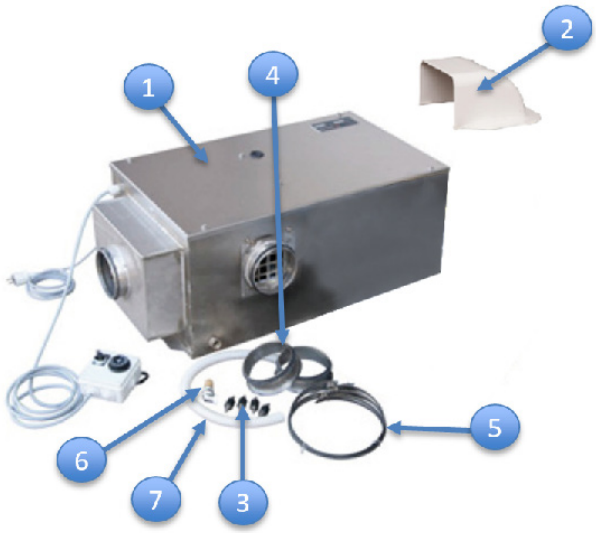
4. Remove M12 x 40L hex bolt (4 ea) and take out the air-conditioner frame. Keep the bolts in a safe place for the next step. When assembling air-conditioner, this bolt must be re-used.



12.3.3 Checking Air-Conditioner Components

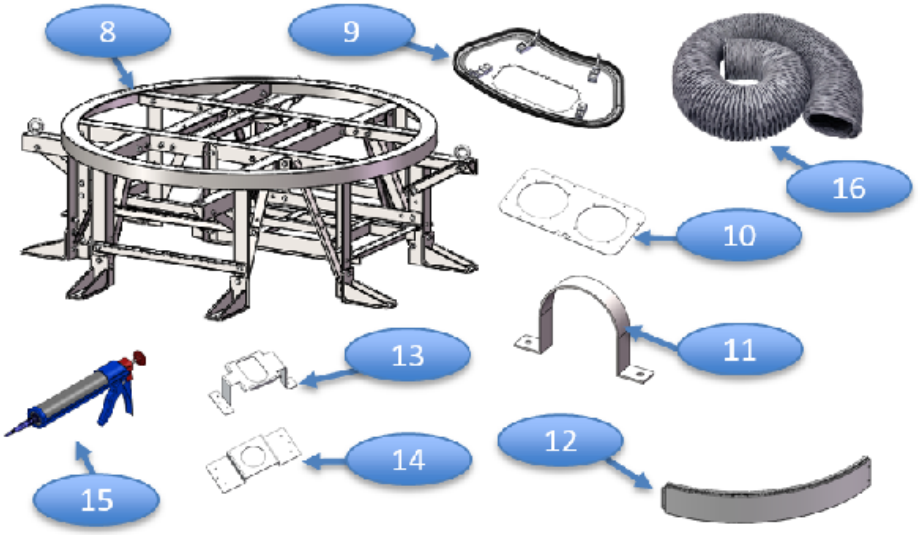
Before beginning installation, make sure you have all the included components.

Aeron Air-Conditioner Box (Including Components Kit)



No.	Description	Q'ty	Size	Remarks
1	Aeron AM-03 Air Conditioner	1		
2	Duck Hood	1		
3	Rubber Damper (Including Bolt Kit)	4		
4	Duct Flange (Stainless Steel)	2		
5	Hose Clamp	8		
6	Elbow (for Drip Pipe)	1		
7	Flexible Hose (for Drip Pipe)	1		

Intellian Base Frame & Duct Hatch Box (Including Components Kit)



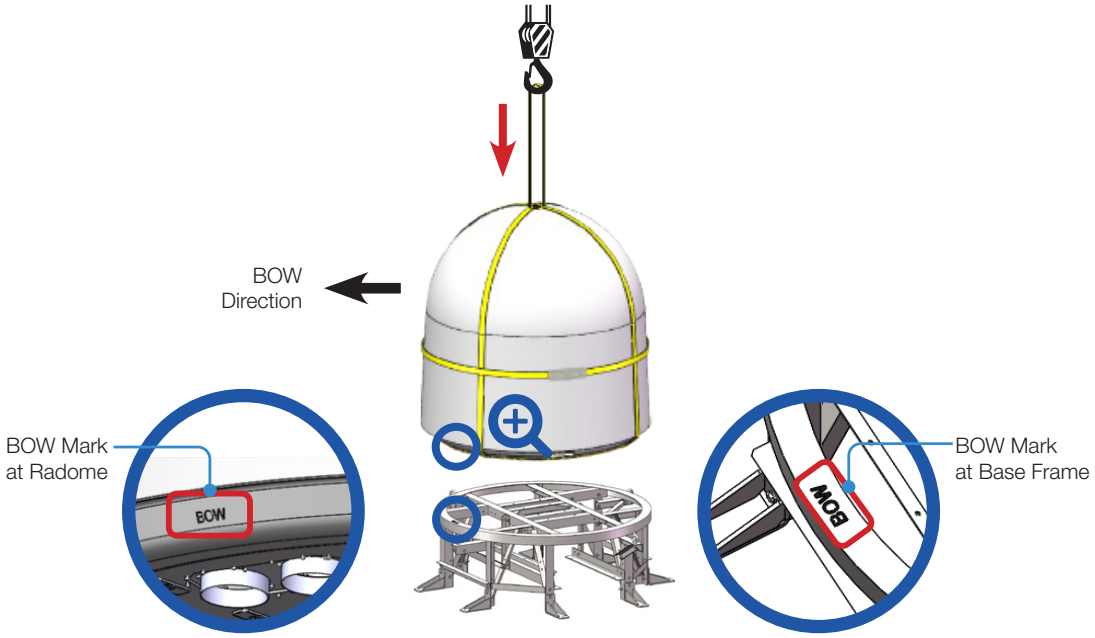
No.	Description	Q'ty	Size	Remarks
8	Base Frame	1		
9	Duct Hatch (installed in Radome bottom)	1		
10	Duct Plate	1		
11	Saddle Band (A125)	4		
12	Radome Skirt	4		
13	A/C Controller Radome Bracket (A type)	1		
14	A/C Controller Radome Bracket (B type)	1		
15	Silicon	1	10 ml	
16	Flexible Duct Hose	2	A125 x 5M	
	Hex Head Wrench Bolt	10	M4 x 12L	Bolt Kit for Duct Plate Assembly
	Spring Washer	10	M4	
	Flat Washer	20	M4	
	Nut	10	M4	
	Hex Head Wrench Bolt	7	M4 x 12L	Bolt Kit for A/C Controller Radome Bracket
	Spring Washer	7	M4	
	Flat Washer	7	M4	
	Hex Head Wrench Bolt	18	M4 x 20L	Bolt Kit for Duct Plate Assembly to Duct Hatch
	Spring Washer	18	M4	
	Flat Washer	36	M4	
	Nut	18	M4	
	Hex Head Wrench Bolt	10	M8 x 20L	Bolt Kit for Saddle Band
	Spring Washer	10	M8	
	Flat Washer	20	M8	
	Nut	10	M8	
	Hex Bolt (BUMAX)	9	M12 x 60L	Bolt Kit for Mounting Antenna on Mast (1 spare set included)
	Lock Washer	17	M12	
	Nut (BUMAX)	9	M12	

No.	Description	Q'ty	Size	Remarks
	Hex Bolt (BUMAX)	5	M12 x 80L	Bolt Kit for Installing Antenna to Base Frame (1 spare set included)
	Flat Washer (BUMAX)	5	M12	
	Spring Washer (BUMAX)	5	M12	
	Flat Head Bolt	10	M6 x 16L	Bolt Kit for Skirt
	Hex Head Wrench Bolt (BUMAX)	16	M6 x 40L	
	Flat Washer	16	M6, Ø 18	
	Spring Washer (BUMAX)	16	M6	
	Loctite 263	1	10 ml	
	Loctite 243	1	10 ml	

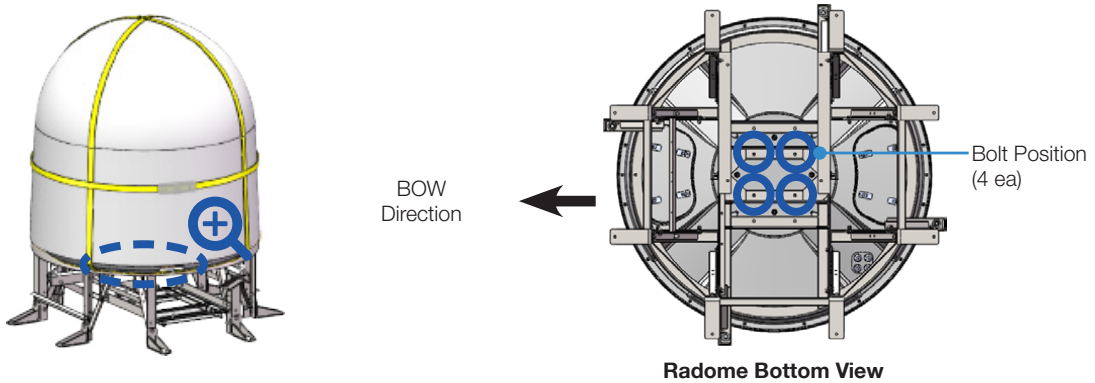
12.3.4 Installing Antenna to Base Frame

The Intellian antenna comes with the lifting straps pre-mounted from the factory. Check the condition of the lifting strap ensure the shackle is tightened up.

1. Lift the antenna above the mast using a crane and carefully put the antenna down on the base frame. When placing the radome, consider that the antenna should be positioned with the BOW marker aligned as close as possible to the ship's heading.



2. Bring the bolt kit for installing Antenna to Base Frame (4 ea) from the Intellian Base Frame & Duct Hatch Box. Assemble the radome to the base frame by using M12 x 80L (BUMAX) hex bolt. When tightening bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.

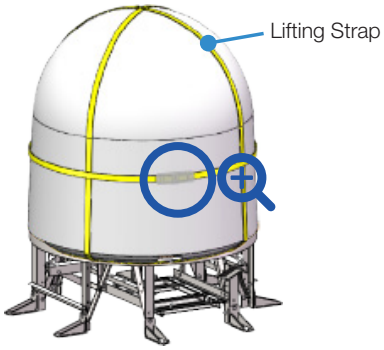


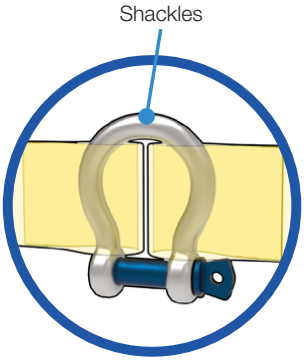
Radome Bottom View

Description	Q'ty	Size	Remarks
Hex Bolt (BUMAX)	5	M12 x 80L	Bolt Kit for Installing Antenna to Base Frame (1 spare set included)
Flat Washer (BUMAX)	5	M12	
Spring Washer (BUMAX)	5	M12	

Use a torque wrench. (18 mm)

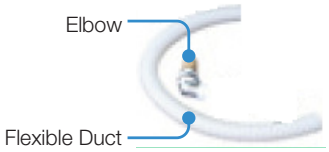
3. Release the shackles (2 ea) and remove the lifting straps after fixing the radome to the base frame.

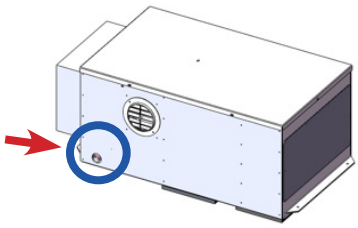




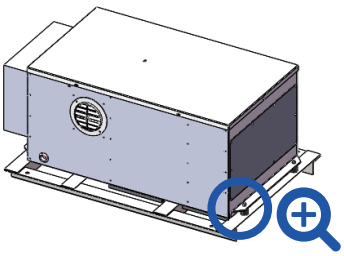
12.3.5 Assembling Air-Conditioner

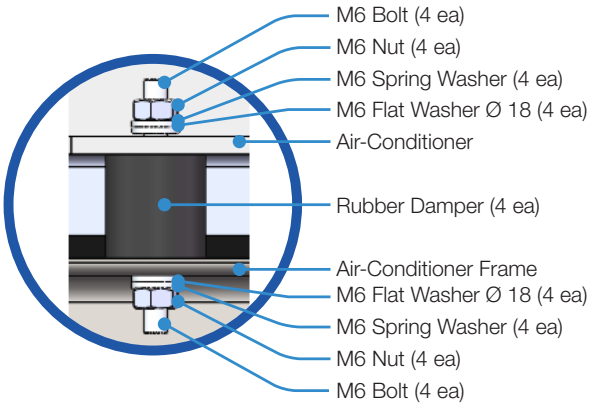
1. Assemble the elbow and flexible duct hose, then connect them to the hole of the air conditioner.

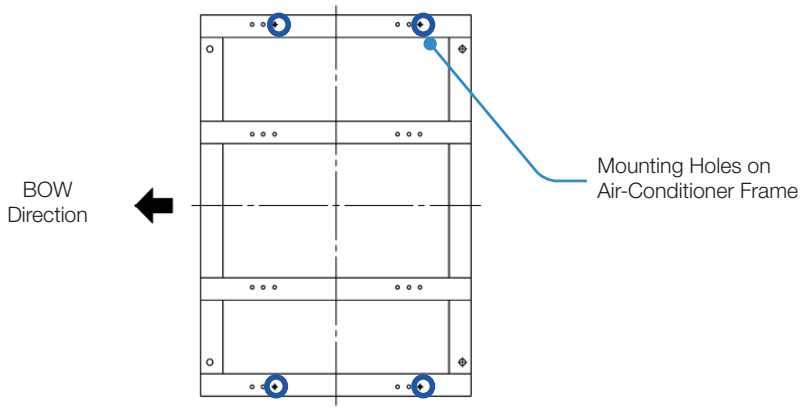




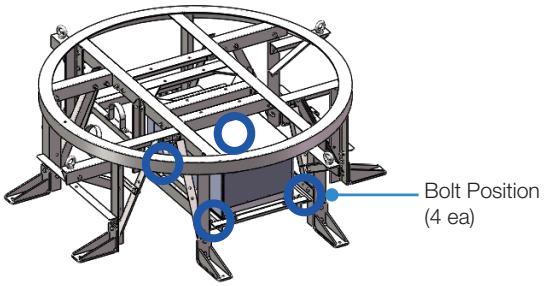
2. Bring the rubber damper and blot kit (4 ea) form the Aeron air-conditioner box. Assemble the air-conditioner frame to the bottom of the air-conditioner using them. When tightening bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.







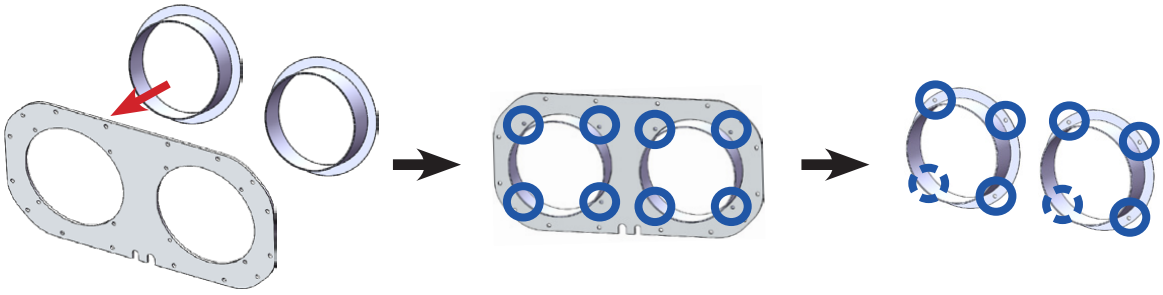
3. Assemble the frame mounted air-conditioner to the base frame using M12 x 40L hex bolts which are removed temporarily in the previous step. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.



12.3.6 Installing Duct Hatch

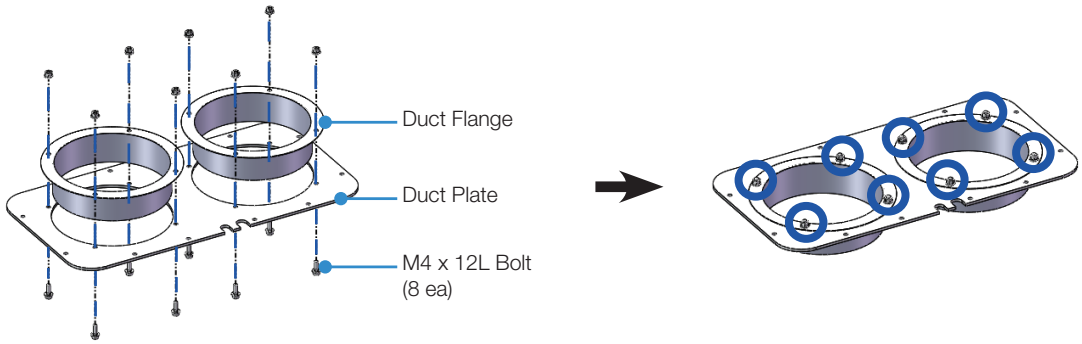
Drilling Duct Flange

To assemble the duct flange, the duct flange must have the Ø 4.5 hole (4 ea). Insert the duct flange to the duct plate then drill the Ø 4.5 hole (4 ea) by using a drill.



Assembling Duct Plate Assembly

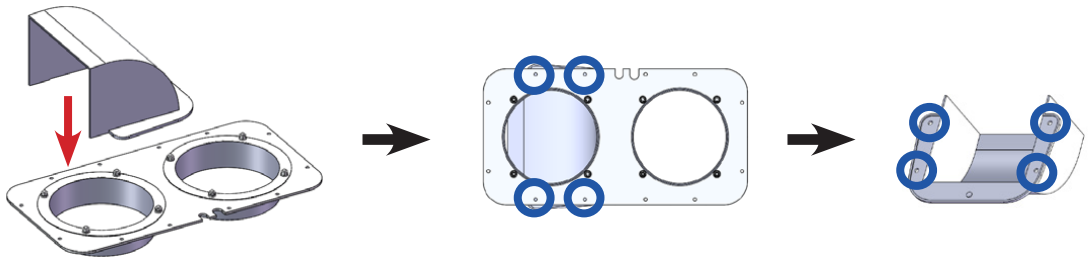
Assemble the duct plate assembly including duct plate and duct flange using the M4 x 12L (8 ea) hex head wrench bolt. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.



Description	Q'ty	Size	Remarks
Hex Head Wrench Bolt	8	M4 x 12L	Bolt Kit for Duct Plate Assembly
Spring Washer	8	M4	
Flat Washer	10	M4	
Nut	8	M4	

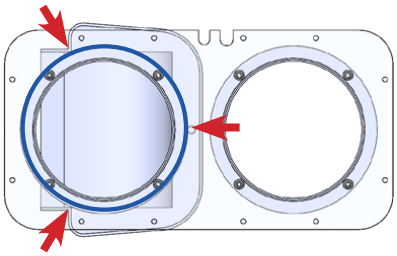
Drilling Duct Hood

To assemble the duct hood, the duct hood must have the Ø 5.5 hole (4 ea). Place the duct hood on the duct plate then drill the Ø 5.5 hole (4 ea) by using a drill.



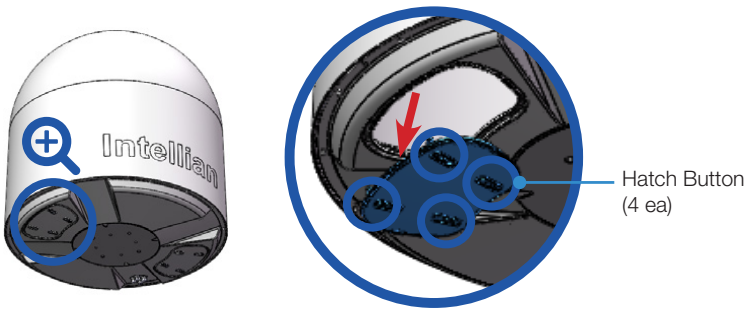
CAUTION

When placing the duct hood on the duct plate, the duct flange must be completely covered inside the duct hood.

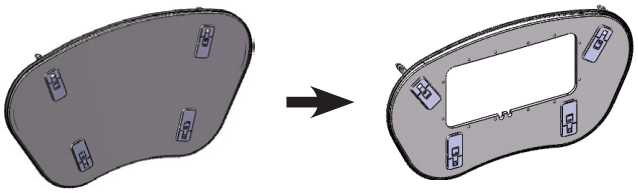


Assembling Duct Hatch to Radome

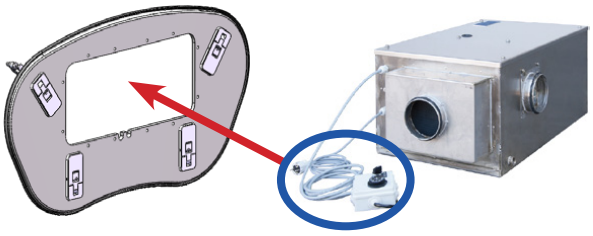
1. Detach the duct hatch by pushing at the center of the hatch button (4 ea).



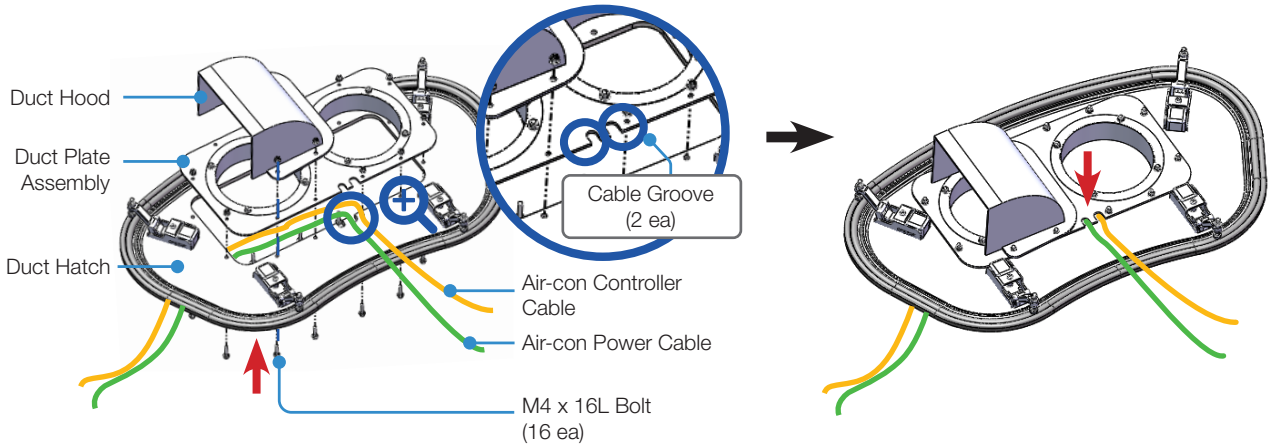
2. Change the radome hatch to the duct hatch.



3. Pass the power cable and controller cable of the air conditioner unit through the center hole of duct hatch.

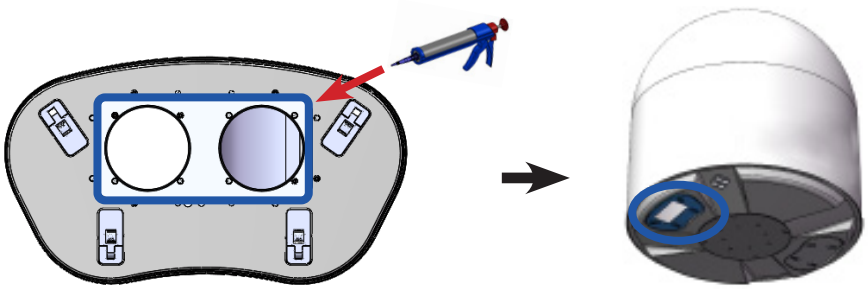


4. After passing the cables, place the duct plate assembly on the duct hatch inside the radome. When placing the duct plate assembly, the cables are passed through cable grooves which located on the middle of the duct plate.
5. Bring the duct hood from the Aeron Air-Conditioner Box. Assemble the duct plate assembly and duck hood to the duct hatch using M4 x 20L (16 ea) hex head wrench bolt. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.



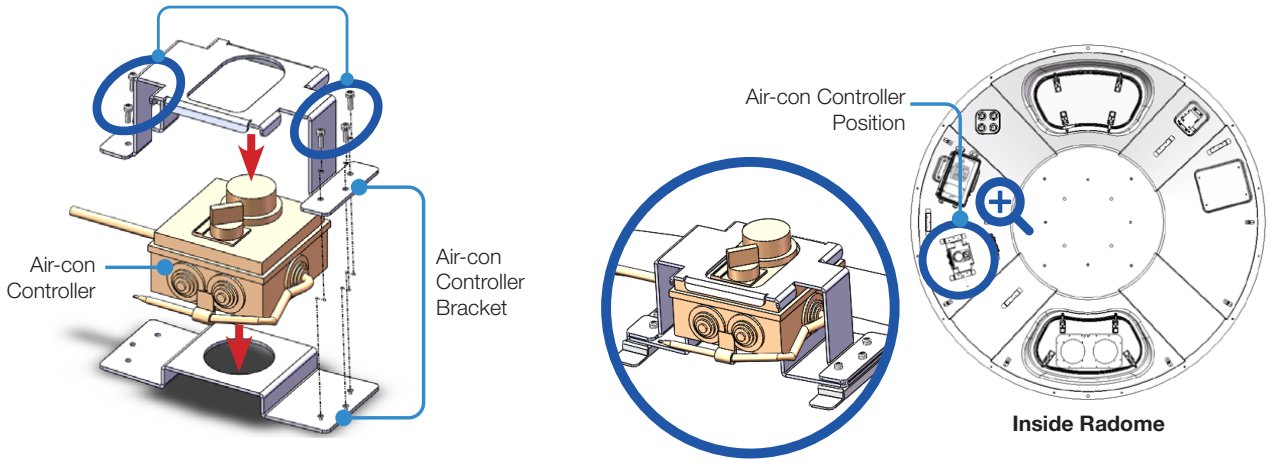
Description	Q'ty	Size	Remarks
Hex Head Wrench Bolt	16	M4 x 20L	Bolt Kit for Duct Plate Assembly to Duct Hatch
Spring Washer	16	M4	
Flat Washer	32	M4	
Nut	16	M4	

Spread Silicon on the boundary of the duct plate assembly to protect the surface. Assemble the duct hatch to the radome bottom.



12.3.7 Assembling Air-con Controller

Assemble the air-con controller between the air-con controller brackets using the M4x12L (6 ea) hex head wrench bolt, then install it inside of the radome. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.



Description	Q'ty	Size	Remarks
Hex Head Wrench Bolt	6	M4 x 12L	Bolt Kit for A/C Controller Radome Bracket
Spring Washer	6	M4	
Flat Washer	6	M4	

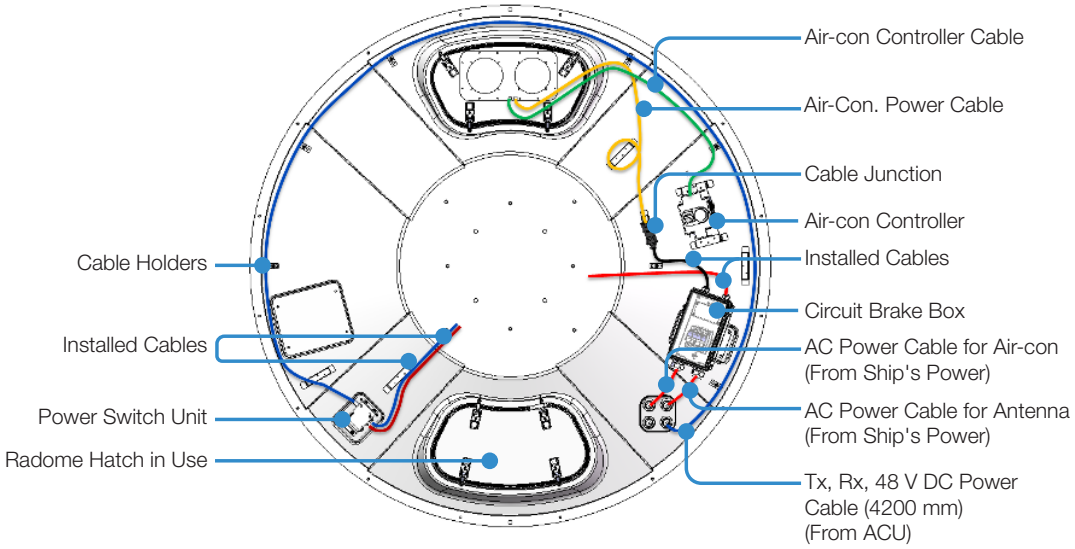
12.3.8 Connecting System Cables

Connecting Cables inside Radome

Connect the "Air-con Controller Cable" to the cable connector on the Air-con Controller inside the radome. Connect the "Air-Con. Power Cable" to the cable junction of the Circuit Brake Box inside the radome. Ensure the cable is firmly fastened to the connector. After connecting the cables, adjust the cable length then fix the cables on the cable holders by using cable ties. When all cables have been installed turn on the power switch.

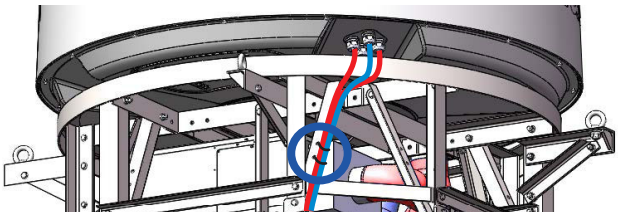
WARNING

Ensure that the power switch is off during installation. When all cables have been installed turn on the power switch.



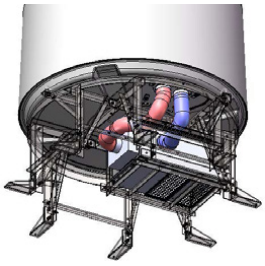
Connecting Cables outside Radome

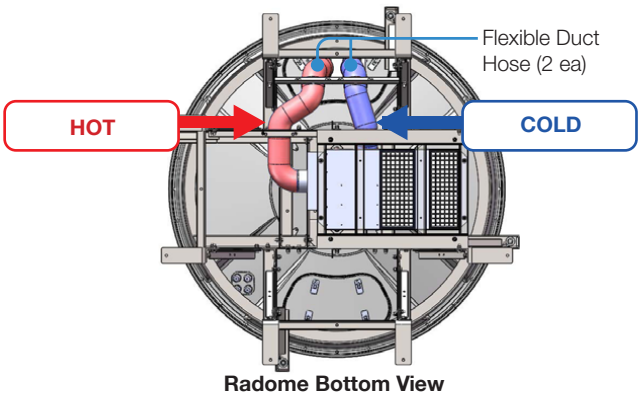
Fix cables located outside of the radome to the bracket using cable ties as shown in the figure.



12.3.9 Connecting Flexible Duct Hose

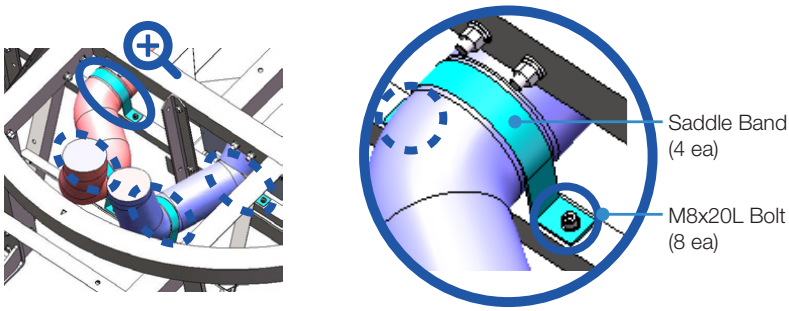
1. Measure the proper length of the flexible duct hose between duct hatch hole and the air conditioner hole, then cut the duct hose (2 ea).
2. Connect each duct hose from the duct hatch hole to the air conditioner hole. Fix the connected duct hoses by using the hose clamp.





Radome Bottom View

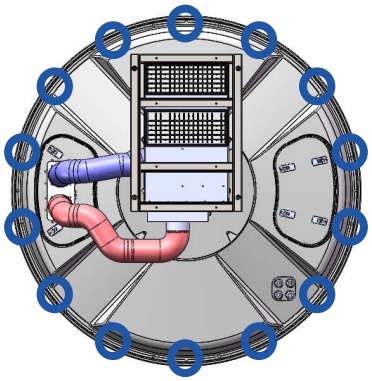
3. Lock each duct hose in place with the saddle band using M8 x 20L (8 ea) hex head wrench bolt. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.



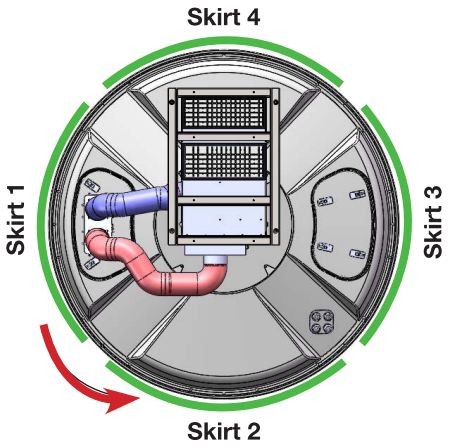
Description	Q'ty	Size	Remarks
Hex Head Wrench Bolt	8	M8 x 20L	Bolt Kit for Saddle Band
Spring Washer	8	M8	
Flat Washer	16	M8	
Nut	8	M8	

12.3.10 Assembling Radome Skirt

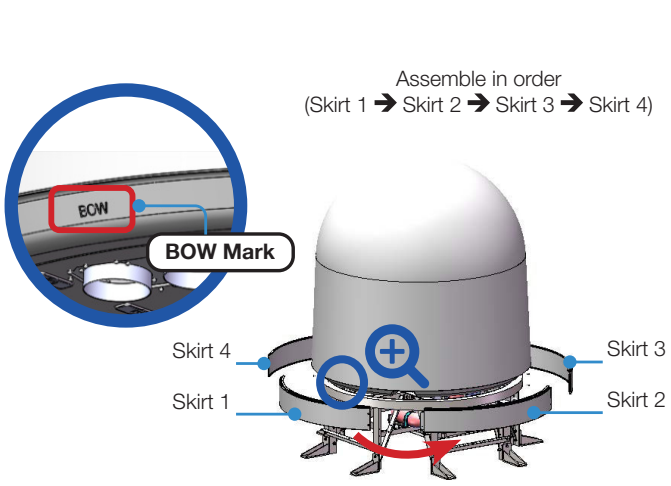
1. Remove the all radome bottom M6x40L bolts (14 ea) connected to radome top temporarily. Keep the bolts in a safe place for the next step. When assembling radome skirt, radome bottom, and radome top together, this bolt must be re-used.

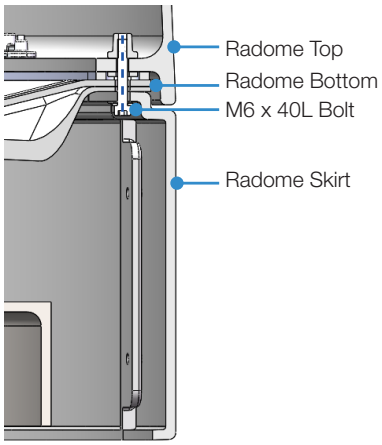


2. Bring the radome skirt (4 ea), and place them in order (Skirt 1 ➔ Skirt 2 ➔ Skirt 3 ➔ Skirt 4). The Skirt 1 is assembled to the bottom radome indicated the BOW mark for the first time. Assemble the radome skirt under the radome bottom using the M6 x 40L bolts (14 ea) which are removed temporarily in the previous step. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.



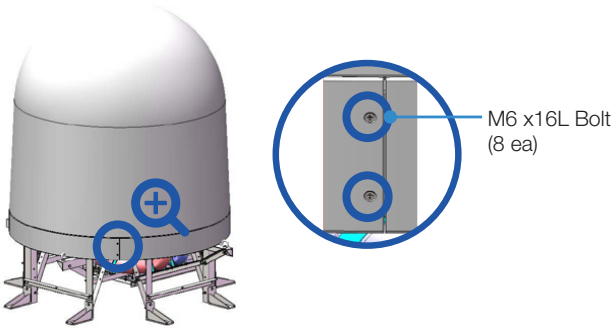
Radome Bottom View





Radome Side View

3. Fix the radome skirt by connecting the boundary of skirt A and skirt B using M6 x 16L flat head bolt. Apply to all four positions. When tightening bolts, apply Loctite #243 to the bolt's threads to ensure the bolts are fastened firmly.

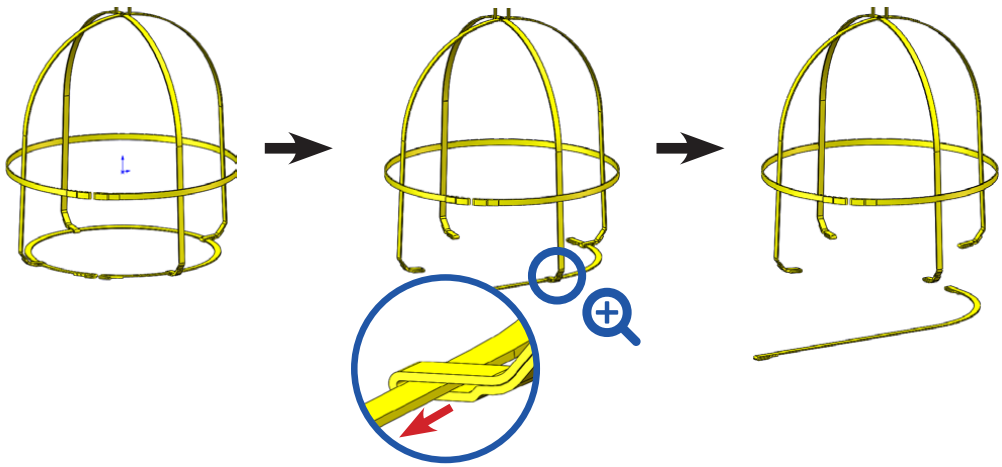


Description	Q'ty	Size	Remarks
Flat Head Bolt	10	M6 x 16L	Bolt Kit for Skirt
Hex Head Wrench Bolt (BUMAX)	16	M6 x 40L	
Flat Washer	16	M6, Ø 18	
Spring Washer (BUMAX)	16	M6	

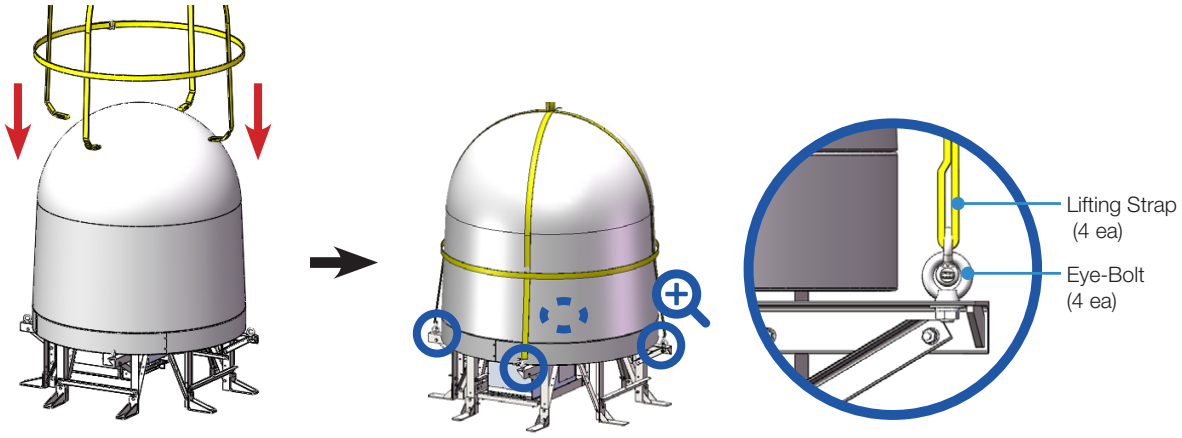
12.3.11 Connecting Lifting Strap

To lift a radome equipped with the air conditioner frame, the existing lifting straps must be deformed.

1. Remove the bottom rope of the lifting strap.



2. Cover the lifting straps to the radome, then connect to eye-bolts (4 ea) on the air-conditioner frame.



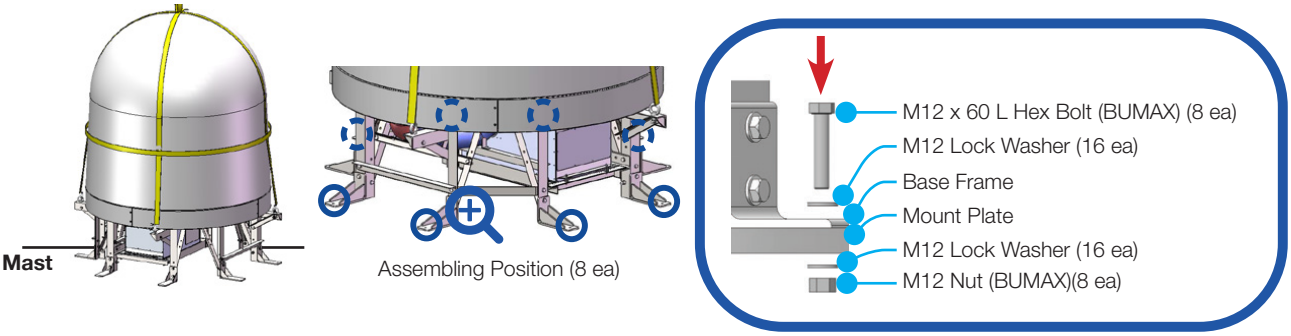
3. Lift up the Radome hanging all four straps on a crane hook. Straighten out the lifting straps prior to lifting the entire load of the antenna. Placing the antenna on the ship's mast.

WARNING

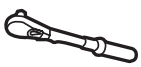
Be careful when lifting the heavy object. Incorrect handling of the heavy object may lead to injury to the installers and/or cause significant damage to the unit.

12.3.12 Mounting Antenna on Mast

1. After placing the antenna on the ship's mast, fix the base frame to the mast using bolts. When tightening bolts, apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly.



Description	Q'ty	Size	Remarks
Hex Bolt (BUMAX)	9	M12 x 60L	Bolt Kit for Mounting Antenna on Mast
Lock Washer	17	M12	
Nut (BUMAX)	9	M12	



Use a torque wrench.
(18 mm)

WARNING

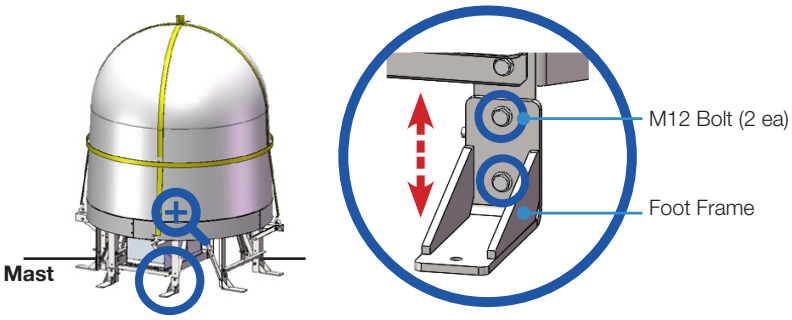
When placing the antenna on the ship's mast, move it slowly so the antenna frame does not get damaged.

NOTE

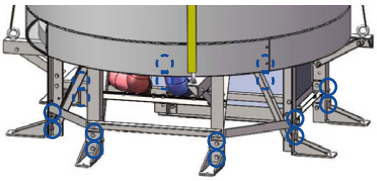
Refer to the **"12.1 Appendix A. Tightening Torque Specification" on page 110**. Apply the suitable torque value when tightening bolts.

CAUTION

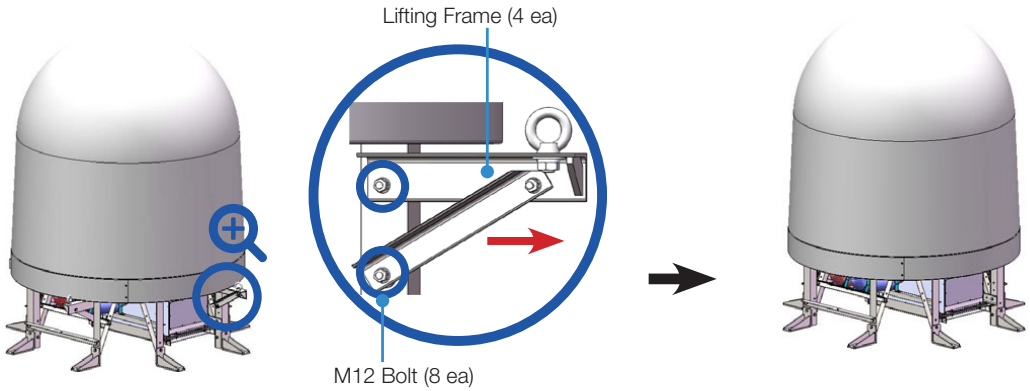
When the surface of the mast is not flat, disassemble the M12 bolt (2 ea) fastened to the foot frame, and adjust the height of the foot frame. The bottom surface of the foot frame must be as close as possible to the surface of the mast.



2. After fixing the base frame on the mast, disassemble fixing bolt (1 ea) on the foot frame, then apply Loctite #263 to the bolt's threads to ensure the bolts are fastened firmly. Fully tighten the foot frame bolt (1 ea) in the right place. Apply the same procedure to all 16 parts.

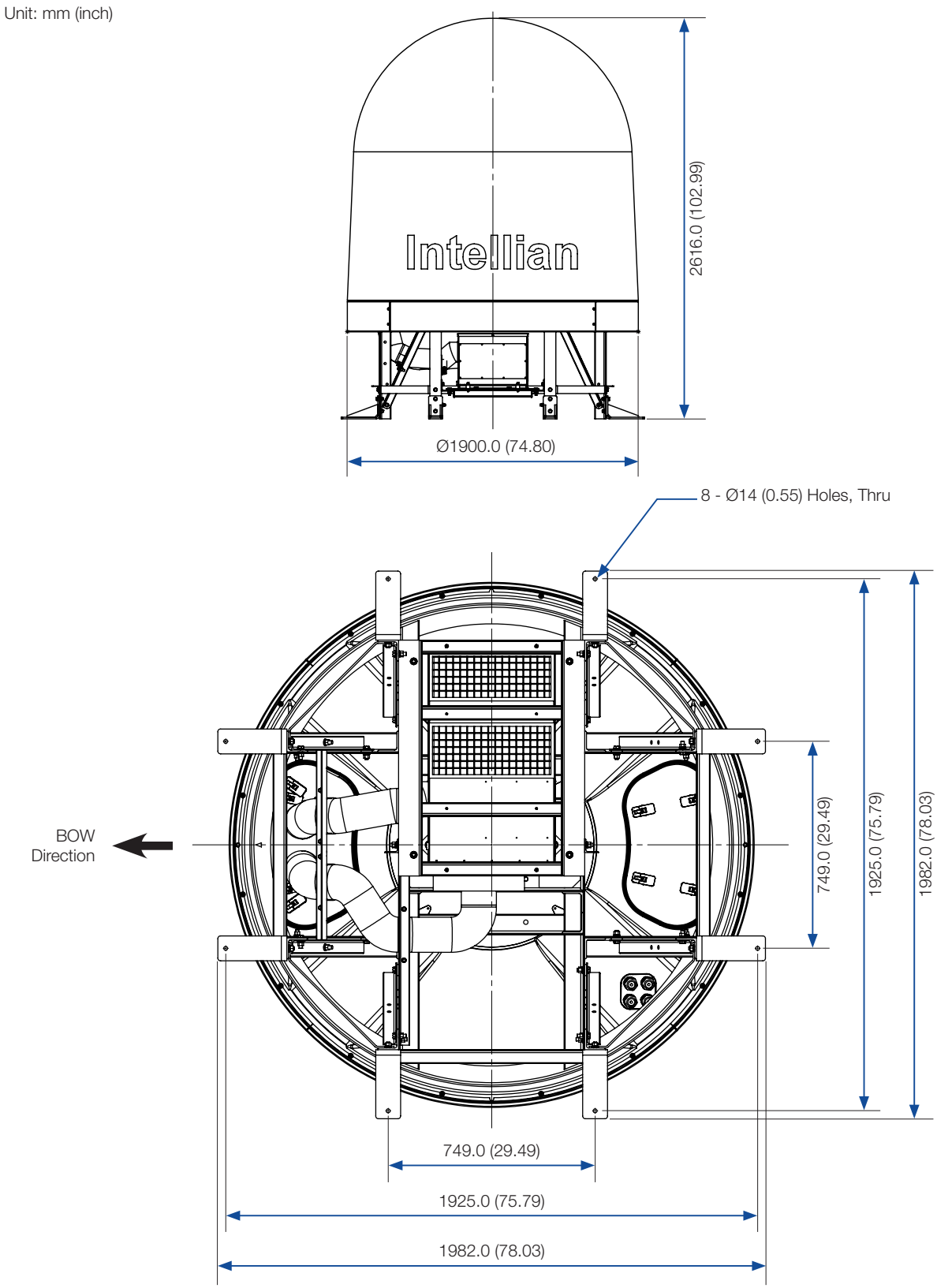


3. Remove the lifting straps after fixing the antenna frame to the ship's mast.
4. Remove lifting frame M12 bolt (8 ea) and take out the lifting frame (4 ea) from the base frame.



12.3.13 Mounting Hole Pattern

Unit: mm (inch)



12.4 Appendix D. Important notice of waterproofing connector

12.4.1 Introduction

During antenna installation, it is important to ensure that once the cable is connected to the antenna, proper waterproofing of the connector must b e done with a self-amalgamating tape.

If you need any assistance, please contact Intellian Technical Support (support@intelliantech.com).

12.4.2 Outline of taping

Self-amalgamating tape comes with a protective, plastic peel-away layer that allows the tape to rolled and shipped. To waterproof a connector, you need to begin by peeling away a portion of this protective plastic layer and then start wrapping the tape around it.

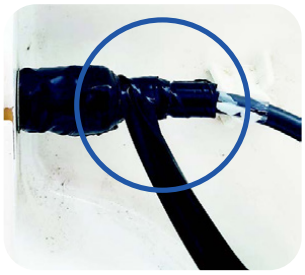
12.4.3 Procedure

1. Connect the cable to the connector to be fully secured.

CAUTION

- DO NOT over-tighten the connector, nuts, or screws when mounting the antenna to prevent any damage.
- DO NOT leave any cables loosen and non-fixed, especially for those installed outside of the antenna.

2. Apply tape over the connetor.
   It is important to wrap the cable onto itself and the best practice is to wrap the tape over itself by 50%, meaning that once you wrap your first layer your second layer should overlap over half of the first layer, and so on. This ensures that you get a strong bond between the different layers of tape that properly adhere to one another.



3. Ensure that the entire RF connector is taped up as shown the picture right.

WARNING

- Note that you cannot use ordinary electrical tape to waterproof the RF connector.
  Only self-amalgamating tape is able to waterproof the connector properly.
- Failure to do so will result in rust and corrosion to the cable and its connector and this might end up damaging the antenna.